Abstracts

Inflammatory bowel disease

001 THE USE OF ADALIMUMAB IN REFRACTORY CROHN’S DISEASE: A TERTIARY REFERRAL CENTRE EXPERIENCE

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Introduction: Tumour necrosis factor (TNF-α) blockade is an effective treatment strategy in inflammatory bowel disease (IBD). Currently, only infliximab, a chimeric monoclonal antibody directed towards TNF-α, is licensed in refractory IBD. However, loss of efficacy and hypersensitivity reactions to infliximab have become limitations to its use. Adalimumab is a fully humanised monoclonal antibody targeting TNF-α and recent data have shown its effectiveness in induction and maintenance of remission in moderate to severe Crohn’s disease (CD).

Aims & Methods: We aim to audit the use of Adalimumab in the rescue treatment of medically refractory CD at the Western General Hospital, a tertiary centre for IBD serving the Lothian region, Scotland over a 3-year period (2003–6).

Results: 22 (14 females; age at therapy: 32.6 years, IQR 20.9–41.7; 9 patients from previous open-labelled trials) patients with CD were treated with Adalimumab using an induction of 80 mg followed by fortnightly 40 mg regime. 14 (63%), 6 (27%), 1 (5%) patients had colonic, ileo-colic, ileal and oral CD respectively. 20 patients had previous infliximab infusions. All had proven refractory/intolerant to corticosteroids and other immunosuppressants. Of these patients, 8 (36%), 6 (27%), 3 (14%) had previous infusion reactions, no response and lost response to infliximab as indications for Adalimumab therapy respectively. Over a follow-up period of 1.01 years (IQR 0.62–2.48 years), 14 (64%) were considered to be in clinical remission, although 12 (55%) required escalation of therapy to 40 mg weekly with a median time of 0.55 years (IQR 0.22–1.37). 15 (68%) patients were on concomitant immunosuppressant. Six (36%) of these patients had had of Adalimumab-free intervals without loss of efficacy on recommencement (1 patient with ileo-colic CD was successfully re-treated following colectomy). Five (23%) patients had no response to therapy, and required colectomy (median time following initiation of therapy 0.67 years, IQR 0.37–2.45). A further three patients required permanent discontinuation of therapy—one patient (female smoker, age at therapy 68.3 years) developed lung cancer after 2.1 years treatment and 2 patients developed serious sepsis-related complications (facial cellulitis and psoas abscess, respectively). No patients developed infusion reactions.

Conclusion: Adalimumab is efficacious in the treatment of patients with refractory CD, with particular benefit in patients who have lost response or developed adverse reaction to infliximab. However, many patients require escalation of dosing regime. Moreover, the treatment carries definite risks of serious adverse events; careful patient selection and continuous monitoring are needed.

Liver free papers

003 A COMPARISON OF SCORING SYSTEMS FOR ORGAN ALLOCATION ON THE LIVER TRANSPLANT WAITING LIST

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Introduction: There is currently discussion as to the most appropriate method of organ allocation for liver transplantation. This occurs on the background of a 38% increase in registrations for liver transplant and 7% fewer liver transplants being performed in 2005/6. Similar problems in the US resulted in the introduction of the MELD system. There are, however, criticisms of this scoring system in that it is not a bedside test and does not take into account significant clinical variables such as ascites. We analysed several scoring systems for end-stage liver disease to assess which predicted survival on the waiting list.

Aims & Methods: All patients listed with UK Transplant (UKT) at our centre, between January 2000 and December 2003, were included in the study. Patients were excluded if they were super-urgently listed, listed for multiple organ transplants, non-NHS entitled for liver transplant or their indication for transplant was amyloidosis. The scoring systems examined were the Child-Pugh (CP) score, MELD score, MELD–Na score and three variants of the CP score incorporating creatinine at the time of listing with UKT. A positive outcome was surviving to transplantation or being delisted due to improvement abating the need for transplant. A negative outcome was death on the transplant list or being delisted due to the developments of contraindications for transplant. Receiver-operating characteristic (ROC)
curves were generated for each scoring system based on these outcome measures and the areas under the curve (AUC) were compared using the Hanley–McNeil method.

**Results:** 787 patients were listed. After exclusions, 490 patients were analysed in the study. The median age of the patients was 55 years and the predominant aetiologies were alcoholic liver disease and hepatitis C. The median CP score was 9 and the median MELD score was 15. There were 416 patients with a positive outcome including 402 transplants. The median CP score was 9 and the median MELD score was 15. There were 64 patients with a positive outcome including 62 transplants. The Hanley–McNeil method.

**Conclusion:** All scoring systems analysed performed adequately in predicting a negative outcome on the transplant waiting list with no difference between CP score and MELD score. However, MELD–Na was significantly better than all the other scoring systems at predicting waiting list mortality and had significant changes in organ allocation warrant comparison with this scoring system.

**004 ONE YEAR SURVIVAL IN BUDD–CHIARI SYNDROME TREATED WITH TIPSS: AN INTERNATIONAL STUDY**

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**Introduction:** Hepatic vein thrombosis (Budd-Chiari syndrome, BCS) is a rare cause of liver disease but can lead to liver failure and ascites. Recently we published our treatment algorithm proposing transvenous intrahepatic portosystemic shunt (TIPSS) as first line treatment option in patients in whom angioplasty is not possible.

**Aims & Methods:** We aimed to analyse the outcome of patients with BCS after TIPSS. Case notes of all patients undergoing TIPSS for BCS in 6 European hepatology units were analysed with emphasis on putative factors predicting liver survival (need for liver transplant or death).

**Results:** From 1993 to March 2006 TIPSS was performed on 122 patients (62% female) including 39 from Birmingham. Aetiology of the syndrome were myeloproliferative disorders (51%, including 30% polycythemia rubra vera), antiphospholipid syndrome (12%), paroxysmal nocturnal haemoglobinuria (10%) and essential thrombocythemia (10%). Morbidity pre-TIPSS included ascites (98%), jaundice (52%), hepatic encephalopathy (22%) upper GI bleed (14%) and acute liver failure (8%). TIPSS was performed for portal hypertension (68%), liver failure (22%) and in patients without major complications (10%). A median of 2 stents were placed (range 1–4) and 55% had at least 1 covered stent. During follow-up 8 patients required liver transplantation and 14 died. The main causes of death were liver failure (4), haematological malignancy (4) and sepis (3). The combined endpoint of death or liver transplant at 1 year was present in 10% of patients. Predictors of this composite endpoint were studied in univariate and multivariate analysis. In multivariate Cox regression analysis patient age, bilirubin and INR were found to be independent predictors of death or transplantation at 1 year. A prognostic score of “age × 0.082 + bilirubin × 0.00924 + INR × 0.629” was found to best predict the endpoint with an area under the receiver operator curve of 0.86.

**Conclusion:** Poor prognosis can be predicted in a subgroup of patients undergoing TIPSS for BCS and this may help in treatment decisions.

**005 ISCHAEMIA-REPERFUSION INJURY PROMOTES HEMATOPOIETIC STEM CELL RECRUITMENT TO THE MURINE HEPATIC MICROCOROLUATION IN VIVO**

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**Introduction:** Hematopoietic stem cells (HSCs) can migrate to injured liver and aid repair by differentiating into new and healthy hepatocytes. However, no studies have identified the initial events that govern recruitment of HSCs to hepatic microcirculation. Indeed, it is not known whether HSCs follow a similar recruitment pattern to that described for neutrophils. This study used fluorescent intravital microscopy (IVM) to establish whether hepatic ischaemia-reperfusion (I/R) could promote HSC recruitment. Since the yield of isolated pure HSCs from bone marrow is low, a murine HSC line, HPC-7, which displays many characteristics of “pure” HSCs was used.

**Aims & Methods:** Hepatic I/R injury was induced for 90 minutes in anaesthetised C57BL/6 mice. 100uL (1 × 10⁶ cells) of fluorescently labelled HPC-7s were administered (i.a) after 5 or 30 minutes reperfusion. Intravital observations were made every 5 minutes for a further 1 hour with cells categorised as adherent (static for >30 seconds) or free flowing. Parallel Stamper–Woodruff assays were conducted on frozen sections of tissue to quantitate HPC-7 adhesion in vitro.

**Results:** HPC-7 cell adhesion was significantly raised in vivo by 30 minutes post-reperfusion (eg, 13.27 (1.66) in I/R animals at 60 mins vs 3 (0.94) in sham-surgery animals at 60 mins; p<0.0001). Similar adhesive events were observed at 60 mins regardless of whether cells were introduced at 5 or 30 minutes post-reperfusion. Adhesion was observed predominantly in sinusoidal capillaries rather than post-capillary venules, with “rolling” events, typical of neutrophil recruitment, not observed. Similar results were obtained in vitro with significant HPC-7 adhesion to tissue sections isolated from I/R injured animals compared to controls (9.4 (2.5) v 4.5 (0.5) respectively; p<0.05).

**Conclusion:** These novel results illustrate that hepatic I/R injury can act as a stimulus for HSC recruitment to sinusoidal microcirculation. Having established this model, future work will aim to identify the molecular mechanisms that govern HSC recruitment. This would allow development of potential strategies to enhance HSC recruitment to injured liver thereby reducing damage and speeding recovery.

**006 REPRERIOTISATION OF LIVER EXPORT PROTEIN SYNTHESIS IN PATIENTS WITH DECOMPENSATED ALCOHOLIC LIVER DISEASE**

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**Introduction:** Albumin and fibrinogen synthesis appear to account for the majority of protein exported by the liver. In addition, these proteins play an important role in the systemic inflammatory response (SIR) with albumin recognised as a negative acute phase protein and fibrinogen a positive acute phase reactant. The changes in the plasma concentrations have been thought to be due to reprogramming of liver export protein synthesis. We have previously carried out simultaneous direct measurements of albumin

<table>
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<tr>
<th>Abstract 006</th>
<th>Normal</th>
<th>Baseline</th>
<th>4-6 weeks</th>
<th>p Value</th>
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<tr>
<td>Age (years)</td>
<td>46 (58)</td>
<td>64 (38)</td>
<td>60 (46)</td>
<td>0.075</td>
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<tr>
<td>Sex (male/female)</td>
<td>4/2</td>
<td>1/2</td>
<td>1/2</td>
<td>0.25</td>
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<tr>
<td>Child-Pugh score</td>
<td>12 (12–14)</td>
<td>12 (12–14)</td>
<td>12 (12–14)</td>
<td>0.93</td>
</tr>
<tr>
<td>Albumin TSR (mg/kg/day)</td>
<td>208 (122–287)</td>
<td>61 (29–287)</td>
<td>61 (29–287)</td>
<td>0.01</td>
</tr>
<tr>
<td>Fibrinogen TSR (mg/kg/day)</td>
<td>28 (23–55)</td>
<td>15 (5–55)</td>
<td>23 (12–38)</td>
<td>0.093</td>
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<tr>
<td>APPQ</td>
<td>0.10 (0.10–0.25)</td>
<td>0.17 (0.10–0.67)</td>
<td>0.22 (0.12–0.42)</td>
<td>1.00</td>
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</tbody>
</table>

Results expressed as median (range).

p<0.05

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and fibrinogen in normal subjects and derived a ratio of the total synthetic rate (TSR) of fibrinogen/albumin which is expressed as the Acute Phase Protein Quotient (APPQ). However, to our knowledge there has been no such measurements in disease. The characteristic low albumin seen in patients with uncompensated liver disease is an important predictor of outcome and is incorporated into the widely used Child-Pugh scoring system for assessment of disease severity. The aim of the present study was to examine the longitudinal relation between disease severity and total albumin and fibrinogen synthetic rates in patients with uncompensated alcohol related liver disease during periods of hospitalisation and recovery.

Aims & Methods: Seventeen patients admitted with uncompensated alcohol-related liver disease and with no evidence of sepsis and GI bleeding were recruited at baseline. Patients underwent measurement of the albumin and fibrinogen synthetic rates using a validated [2H5] phenylalanine flooding dose technique. Routine biochemical parameters of liver function were also measured. Ten patients had these measurements repeated following clinical improvement 4–6 weeks later. The study was approved by the local ethics committee.

Results: Baseline and follow-up results are shown in the table. The extent and nature of autochthonous (locally acquired) HEV (aHEV) in the UK are unclear.

Aims & Methods: Patients with unexplained hepatitis were tested for HEV over a 7-year period. Cases were defined as: biochemical evidence of hepatitis (serum aminotransferase >500 IU/L) and strong reactivity for anti-HEV IgM (test:cut-off ratio = 5), or a rising titre of anti-HEV IgG, or detectable viraemia by RT-PCR. HEV RNA isolated from the cases was amplified, characterised and compared to previously characterised HEV isolates. Cases of aHEV were asked to complete a lifestyle questionnaire to elucidate possible risk factors.

Results: 38 cases of aHEV were identified. Clinical manifestations ranged from asymptomatic infection to subacute hepatic failure. The median index bilirubin was 150 μmol/L (range 3–417 μmol/L, 8/38 were anicteric. 35/38 patients recovered within six weeks. One patient died of an unrelated cause.

Conclusion: In the UK aHEV is more common than previously recognised, and may be more common than HAV. As has been documented in the Indian subcontinent, aHEV superinfection in patients with cirrhosis carries a poor prognosis. Although the mode of transmission remains to be determined, it may be a zoonosis with pigs as a reservoir. Hepatitis E is a public health issue in the UK.

Introduction: Alterations in epithelial mucin expression are associated with carcinogenesis. MUC4 contains an EGF-like domain that can induce cell proliferation and differentiation via the ERBB2 receptor. In pancreatic ductal disease, MUC4 has been proposed as a diagnostic and prognostic marker for malignancy. While MUC4 has been reported to be a sensitive serological marker for biliary tract cancer (BTC), MUC4 has been reported to be a sensitive serological marker for biliary tract cancer (BTC).

Aims & Methods: We assessed MUC4 and MUC5AC expression in: (1) 79 archived biliary tissue samples (69 BTC, 10 benign) by immunohistochemistry (IHC), and (2) bile and serum specimens from 72 patients with biliary obstruction (39 BTC, 8 other malignancies, 9 primary sclerosing cholangitis (PSC), 16 benign), by TaqMan-based quantitative real-time RT-PCR (qPCR) and Western blot, respectively. We used two monoclonal MUC4 antibodies (against transmembrane and secretory unit epitopes) and a mono- and polyclonal MUC5AC antibody. MUC4 and MUC5AC gene primers and probe sets were custom-synthesised according to published reports. mRNA quantification was normalised to the housekeeping gene GAPDH.

Results: In archived tissues, MUC4 and MUC5AC proteins were detected expressed in 27% and 10% of BTC samples, respectively, vs. in none of the benign samples (p = 0.02, p = 0.4). In bile, MUC4 protein was detected in 27% of BTC and 29% of PSC cases, but not in other benign disease. qPCR revealed a 2.5-fold increased expression of MUC4 mRNA in the bile of patients with BTC and PSC compared with other benign disease.

Conclusion: MUC4 and MUC5AC expression in BTC is associated with disease status.

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Abstract 009 Biliary tract cancer prediction markers for bile MUC4 and serum MUC5AC by Western blot

<table>
<thead>
<tr>
<th>Bile MUC4</th>
<th>Serum MUC5AC</th>
<th>Bile MUC4 or Serum MUC5AC</th>
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</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>27% (9/34)</td>
<td>44% (17/39)</td>
</tr>
<tr>
<td>Specificity</td>
<td>93% (26/28)</td>
<td>96% (26/27)</td>
</tr>
<tr>
<td>PPV</td>
<td>82% (9/11)</td>
<td>94% (17/18)</td>
</tr>
<tr>
<td>NPV</td>
<td>51% (26/51)</td>
<td>54% (26/48)</td>
</tr>
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(PPV, NPV, positive and negative predictive values)

Aims & Methods: A retrospective study of patients in whom TIPSS was inserted for refractory ascites.

Results: Over 14 years, of 768 TIPSS procedures, 83 (10.8%) were undertaken for ascites (males 72%; mean age 57 (3.7) years). Median follow-up 7.1 (0.1 to 115.8) months. Aetiology: ALD (70%), Mean Child-Pugh (CP) score was 9.6 (1.3) (Child’s C, 48%; Child’s B, 52%) and MELD score was 15 (5.5). 43% had diuretic resistant ascites and 57% had diuretic presence of oesophageal varices. Portal pressure gradient fell from 22.2 (6.04) to 7.2 (2.7) mm Hg post TIPSS. Following TIPSS, there was a complete response in 15%, partial response in 49% and no response in 36%. Factors predicting a favourable response to TIPSS included female sex (p = 0.04), diuretic resistant rather than diuretic intractable ascites (p = 0.05) and MELD score (p = 0.02). Patients who responded to TIPSS had lower CP (p = 0.004) and MELD scores (p = 0.05). Response was unrelated to type of stent (covered (n = 31) v uncovered (n = 52)) or creatinine pre-TIPSS. Ascites recurred after initial improvement in 19 (38%) patients at a median of 2.3 (0.1 to 58.1) months. This was related to shunt dysfunction in 10 (52%), and to therapeutic shunt reduction for refractory hepatic encephalopathy (HE) in 3 (15.7%). HE occurred in 47%, post-TIPSS, with 4 patients requiring shunt modification. Survival was poorer in Child’s C of Child’s B (p = 0.05), and where MELD > 17 (p = 0.001). On univariate analysis MELD, CP score and sodium < 125 were independent predictors of survival, but on multivariate analysis, only MELD was a significant predictor of survival.

Conclusion: TIPSS is effective in the management of refractory ascites, but does not appear to influence the long-term prognosis. Pre-TIPSS MELD and female sex, CP score and diuretic resistant ascites predict better response to TIPSS. HE is a significant limitation and patient selection criteria remain to be determined.

Reference:

HISTOLOGICAL PREDICTORS OF OESOPHAGEAL VARICES. A SINGLE BLINDED RETROSPECTIVE ANALYSIS

Aims & Methods: The aim of this study was to determine if the nodule size and septal thickness on histology were predictive variables for endoscopic classification of cirrhosis. Studies have suggested that small nodularity and septal thickness correlates with CSPH1 and a histological subclassification of cirrhosis has been suggested.

Conclusion: Our study showed that an index comprised of simple patient and laboratory data can accurately identify patients with significant fibrosis and cirrhosis. In the new era of antiviral therapy where HCV patients no longer routinely undergo histological assessment, the AAIP may help identify patients at risk of cirrhosis, and thus select those patients to whom HCC surveillance should be offered.

Reference:
A RETROSPECTIVE ANALYSIS OF GIST MUTATION STATUS IN ONE UK REFERENCE CENTRE

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Introduction: We present a retrospective analysis of intra-abdominal mesenchymal tumours undertaken at University Hospital Birmingham. The aim was to review and classify tumours according to the current criteria and to then proceed with a comprehensive molecular analysis.

Aims & Methods: Cases from the period 1990 to 2004 were retrieved using the SNOMED classification system. Slides were reviewed and immunohistochemistry was performed using an extensive panel of antibodies. GISTs were then tested for KIT or PDGFRA gene mutations from paraffin-embedded tissue blocks with the following protocol: Kit positive tumours were initially tested for exon 11 of KIT, if wild type (WT), we subsequently screened exons 9, 13 and 17. Kit negative GISTs were initially tested for exons 11 and 9 of KIT, and exons 12 and 18 of PDGFRA. Results: Ninety-two tumours were retrieved; 54/92 (59%) were reclassified as GISTs. 52/54 GISTs showed KIT expression by IHC. All 92 tumours were positive with PDGFRA and SCF markers. There were two oesophageal tumours, 32 gastric tumours, 7 duodenal tumours, 14 small bowel tumours, 2 colonic tumours, 2 pelvic tumours and 8 liver tumours. Site was not mentioned for 4 lesions. 73 tumours in 68 patients have been analysed for exon 11 and 15 for exon 9 of KIT gene. Exon 11 mutation was detected in 72% of the gastric tumours, 57% of bowel tumours, in 2/2 (100%) of the oesophageal tumours, 2/2 (100%) of the pelvic tumours and in 5/8 (62%) of the liver lesions. Average size of tumours was 5 cm for exon 11 WT tumours and 10 cm for tumours with exon 11 mutations. We have collected 10 very low risk GISTs, all found incidentally in specimens local to either a carcinoma or a large GIST. Only one tumour (from the duodenum) showed a mutation in exon 9.

Conclusion: In conclusion we show that KIT and PDGFRA mutation analysis is technically feasible from archival material with 100% sensitivity. Our results show that the rate of exon 11 mutations is comparable to other series. The rate of exon 11 mutation is higher in gastric tumours than in bowel tumours and 10 cm for tumours with exon 11 mutations. We have collected 10 very low risk GISTs, all found incidentally in specimens local to either a carcinoma or a large GIST. Only one tumour (from the duodenum) showed a mutation in exon 9.

A RETROSPECTIVE ANALYSIS OF GIST MUTATION STATUS IN ONE UK REFERENCE CENTRE

THE CHARACTERISATION OF BACTERIAL COMMUNITY DIVERSITY IN CULTURES DERIVED FROM HEALTHY AND INFILTRATED ILEAL POUCHES AFTER RESTORATIVE PROCTOCOLECTOMY, USING 16S RIBOSOMAL DNA TERMINAL RESTRICTION FRAGMENT LENGTH POLYMORPHISM PROFILING

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Introduction: After restorative proctocolectomy 40% develop pouchitis (acute inflammation of an ileal pouch). There are two leading theories regarding the pathogenesis of pouchitis: firstly, that it is a reaction to dysbiosis; and secondly, that it is related to a loss in the immune tolerance towards normal faecal-derived bacteria. We aimed to assess differences between bacterial communities cultured from both healthy and inflamed ileal pouches in patients with ulcerative colitis (UC) and familial adenomatous polyposis (FAP) coli.

Aims & Methods: Pouchitis was determined using an objective pouchitis score (OPS) of >5/12 (endoscopic score of >3/6 and an acute histological score of >2/6). Seven UC patients were diagnosed with pouchitis (P+), 15 UC patients had a healthy pouch (P−). 1 FAP patient had pouchitis (F+), while 9 FAP patients had un-inflamed pouches (F−). Two biopsies were taken per patient and cultured in aerobic and anaerobic conditions. Standardised DNA extraction was performed and PCR products were derived by amplifying the 16S rRNA gene, specific to the genus bacteria. Following digestion with a specific restriction endonuclease, ribosomal gene fragments were resolved by terminal restriction fragment length polymorphism (T-RFLP) profiling. In this way, a “fingerprint” of the bacterial community within each of the samples was created. The degree of species richness and evenness was determined from T-RF band lengths and relative intensities.

Results: In total 179 bands representing different species were identified from 64 samples. Of the most prevalent bacteria identified, 39 were consistent with the genera Enterobacter, Citrobacter or Shewanella, 16 were Clostridia, 13 were Lactobacilli and 7 were members of the genus Prevotella. For the F−, Fr− and P+ groups 96, 29, 124 and 80 species bands were seen, with each sample having an average species richness of 13.6 (6.2), 15.3 (10.6), 11.9 (6.1) and 14.7 (6.2), respectively. The species diversity was measured at 5.3, 14.5, 4.1 and 5.7, respectively. Similar trends were noted when the anaerobic and aerobic groups were analysed separately. The species evenness was similar throughout all groups, with the average highest/lowest proportions of the anaerobic and aerobic species represented by 33.6/0.02 (F− anaerobes) and 36.9/0.02 (F− aerobes). Similar trends were seen in the species diversity and richness of the two groups. The significance of such data is yet to be fully determined, but would favour the loss of immune tolerance as the primary pathogenic process.

STROMAL GENE EXPRESSION MAY BE RESPONSIBLE FOR MAINTAINING MORPHOLOGICAL DIFFERENCES BETWEEN SMALL AND LARGE BOWEL

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Introduction: CDX-1 and CDX-2 regulate gut differentiation in the embryo and are believed to maintain this morphology in the adult by controlling HOX gene expression. However, the molecular mechanisms underlying this regulation are not known. Although it is well established that stromal expression of CDX genes is overlying information on whether gut morphology is controlled by stromal or epithelial expression of CDX genes, the functional role of CDX genes in maintaining gut morphology in the adult human is not fully understood. In this study we aimed to examine whether CDX gene expression may be responsible for maintaining morphological differences between small and large bowel.

Aims & Methods: The aim of this study was to identify if CDX gene regulation was mediated via stromal signalling, by assessing CDX expression patterns in human gut. Paired samples of full thickness ileum and ascending colon from 3 patients were harvested with 4 matched rectal tissue samples, and micro laser dissected into epithelium and stroma. mRNA was extracted using standard techniques, and quality assessed by new 3’-5’ and inhibition assays, prior to quantification by real-time reverse transcription polymerase chain reaction (RT-qPCR).

Results: Expression of CDX-1, 2 mRNA was higher in samples of ascending colon and descending colon than small bowel (CDX-1: median 192-fold difference, CDX-2: median 12-fold difference, p<0.005). CDX-2 mRNA expression was 1000-fold higher than CDX-1 in both large and small bowel (p<0.005). CDX-2 mRNA levels were higher in large bowel stroma compared to the crypt epithelial cells (median ninfold difference; p<0.005). CDX-1 mRNA expression levels varied between crypt and stroma in different individuals, and did not reach significance.

Conclusion: Adult human gut expresses CDX-1, 2 in a caudal to rostral gradient, similar to the mammalian embryo. The higher CDX-2 expression in human gut stroma compared with epithelium may indicate a previously underappreciated signalling mechanism for maintaining gut morphology. A greater understanding of CDX function in normal differentiated tissue may provide an appreciation of CDX gene involvement in intestinal metaplasia, and provide the basis for novel strategies to monitor risk of associated carcinoma development.

**016 THE EXPRESSION PATTERN OF MCMs, GEMININ AND THEIR REGULATION TO TUMOUR DIFFERENTIATION: TUMOUR PATIENT SURVIVAL DIFFERS BETWEEN GASTRIC AND SMALL BOWEL ADENOCARCINOMA**

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1Section of Pathology and Tumour Biology, 2General Surgery, Medicine and Anaesthesia, University of Leeds, Leeds Institute of Molecular Medicine, Leeds. 3Department of Histopathology, University College London, London, UK

Introduction: Gastric adenocarcinoma (GC) is 19 times more common than small bowel adenocarcinoma (SBA), despite the small bowel contributing 90% of the gastrointestinal tract mucosal surface. However, the incidence of SBA is much higher in patients with coeliac disease. Minichromosome maintenance complex (MCM) and geminin are proteins essential for regulation of DNA replication initiation. Dereplication of MCM and geminin function may result in defective DNA replication and thus promote tumorigenesis. The aim of this study was to compare the expression pattern of MCMs and geminin in GC, SBA and coeliac-related SBA.

Aims & Methods: We studied the frequency of expression of MCM2, MCM3, MCM4, MCM5, MCM6, MCM7, geminin in 140 GC, 17 coeliac-related cases and 163 GC using tissue microarrays and immunohistochemistry (IHC). The relation of individual proteins with clinicopathological data, frequency of Ki67 expression (marker of proliferation) and patient survival was analysed. K-median cluster analysis was performed to compare GC and SBA based on the degree of similarity measured over the 4 IHC markers.

Results: High expression of all MCMs and geminin was associated with poor tumour differentiation in SBA (p<0.05) but not in GC. High expression of MCM5, MCM7 and geminin was associated with longer patient survival in GC (p<0.05) but not in SBA. High expression of K67 was associated with longer patient survival in SBA (p=0.0286) and in GC (p=0.0256). Expression of the majority of the proteins differed between intestinal-type GC and SBA (p<0.02). Cluster analysis showed an excellent (85%) discrimination of GC and SBA using the IHC profile of all markers. MCM2 and MCM6 were expressed more frequently in coeliac-related SBA than in non-coeliac-related SBA (p<0.05).

Conclusion: The clear separation of GC and SBA based on their IHC profiles of all markers, and the finding that MCM and geminin expression were related to survival only in GC, plus the different expression pattern of MCMs, MCM7 and geminin in the intestinal-type GC and SBA (despite these tumours having similar morphology), suggest that the regulation of DNA replication differs between GC and SBA. However, known additional functions of MCMs and geminin may play a role in the different protein expression patterns seen in these two tumours. Frequent expression of MCMs in coeliac-related SBA may reflect a general increase in cell turnover due to chronic inflammation of the small bowel mucosa in these patients. Further investigations are required to determine whether MCM expression may serve as a marker of an increased risk of malignant transformation in patients with coeliac disease.

**017 THE APC1310T/+- MOUSE: A NOVEL MURINE MODEL OF INTESTINAL TUMORIGENESIS ANALOGOUS TO THE APC-1309 MUTATION CAUSING SEVERE INTESTINAL POLYPOSIS IN HUMANS**

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1Experimental Pathology Laboratory, Cancer Research UK, London Research Institute, London, UK

Introduction: Mutations in both alleles of the adenomatous polyposis coli (APC) gene result in inactivation of intestinal tumorigenesis in patients with familial adenomatous polyposis coli (FAP). In the intestine, the Wnt signalling pathway regulates proliferation and differentiation. The APC protein regulates Wnt activity through interaction with beta catenin. Certain germline APC mutations are associated with a severe disease phenotype in humans, such as the APC-1309 mutation. Commonly used murine models of FAP, such as the ApcMin/+ mouse, carry germline mutations in Apc which are not in sites analogous to those found in humans.

Aims & Methods: To develop a murine model containing an Apc mutation in a site equivalent to that causing severe FAP disease in humans, and compare this with the ApcMin/+ mouse, in order to investigate the functional effects of different apc proteins on Wnt signalling and tumorigenesis.

Methods: We used embryonic stem cell targeting and homologous recombination to create a novel murine model, Apc1310T/-. Molecular characterization of the Apc1310T/- was performed with Western and Southern blotting. The phenotype of Apc1310T/- mice was compared with the most commonly used mouse model of intestinal tumorigenesis, the ApcMin/+, which carries an Apc allele truncated at codon 850. Both mouse lines were compared in terms of tumour burden, size, shape and composition. The Wnt signalling pathway was assessed with immunohistochemistry, in situ hybridisation and gene expression arrays. Crypt fission analysis and TUNEL assays were performed to assess tumour development.

Results: Compared with the ApcMin/+, the Apc1310T/- demonstrates a higher tumour burden (mean number of gastric adenomas, 2; mean number of small bowel adenomas, 186; mean number of large bowel adenomas, 3). Apc1310T/+ adenomas are larger with many tumours showing high grade dysplasia. Tumours develop approximately 20 days earlier than a comparable burden in the ApcMin/+ mouse. In early tumorigenesis, the Wnt signalling pathway is activated to markedly different levels between the two models.

Conclusion: The Apc1310T/+ mouse allows study of intestinal tumorigenesis consequent to germline mutations in Apc that are equivalent to those in humans. Our data suggest this phenotype is analogous to the severe intestinal polyposis seen in FAP patients with APC-1309 germline mutations. Disregulation of the Wnt signalling pathway relative to that in the ApcMin/+ mouse appears to play a central role in producing this more severe phenotype. It is an excellent in vivo model for a comparative study of Wnt signalling control by different portions of the apc protein.

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**018 THE IMPACT OF COLORECTAL CANCER FAMILY HISTORY CLINIC ON YIELD OF COLONOSCOPIC SCREENING**

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1Department of Gastroenterology, 2Department of Genetics, 3Department of Surgery, St Thomas’ Hospital, Guy’s and St Thomas’ NHS Foundation Trust, London, UK

Introduction: Approximately 20% of patients with colorectal cancer (CRC) have a positive family history. Public awareness of CRC is high and there has been an increase in the number of referrals seeking screening in those with a family history of CRC. Guidelines for screening in this group vary and many individuals are screened too early with a resulting low yield of screening. In this study, we hypothesised that screening by colonoscopy in those with a family history of CRC prior to following the introduction of a CRC family history clinic introducing screening according to agreed guidelines.

Aims & Methods: Cases undergoing colonoscopy between October 1994 and May 2003 prior to introduction of the CRC family history clinic (Group 1) were identified from the endoscopy database. Cases referred subsequently (Group 2) were identified from prospective clinic records and the endoscopy database. Demographic data, adherence to agreed guidelines and adenoma detection rate were compared between the two groups.

Results: 133 individuals were identified in Group 1. 87 (65%) of these were screened earlier than recommended by guidelines with a mean of 7.7 years in advance of these recommendations. This premature screening was associated with 2 or more adenomas. Adenoma detection rate increased with age and many individuals are screened too early with a resulting low yield of screening with a family history of CRC. Guidelines for screening in this group vary and many individuals are screened too early with a resulting low yield of screening with a family history of CRC. Guidelines for screening in this group vary and many individuals are screened too early with a resulting low yield of screening.
Conclusion: The introduction of a CRC family history clinic significantly improves the adenoma detection rate in individuals with a family history of CRC. It also eliminates unnecessary endoscopy for those who do not have a significantly increased risk of CRC based on their family history. The high incidence of right-sided adenomas confirms that total colonoscopy is an appropriate screening tool.

019 EARLY EXPERIENCE OF THE MULTIBANDER ENDOSCOPIC MUCOSAL RESECTION: BENEFITS AND SHORT COMINGS


Introduction: Endoscopic mucosal resection (EMR) is a recent but established method of removing upper GI tract lesions with dysplasia. We have recently started using banding device without submucosal injection, a novel new technique where a pseudopolyp is created by applying a band around the base of the lesion before snaring.

Aims & Methods: To assess the safety, ease of use and effectiveness of this new technique of EMR using banding device without submucosal injection for the removal of dysplastic lesions of the upper GI tract. We collected prospective data of all upper GI tract EMRs carried out by banding device and without submucosal injection in our institution over the last 1 year.

Results: Seventeen cases with mean age of 63.8 years and median ASA status of 2 were included. Conscious sedation was used in 13 cases (midazolam, mean dose 3.4 mg, pethidine mean 44 mg) and GA in 4 cases. The mean duration of the procedure was 41.5 minutes. Excluding GA cases, 9 patients reported no or mild discomfort and 4 moderate discomfort. Before mucosectomy, 9 were intramucosal cancers, 6 high grade dysplasias, 1 hyperplastic polyp and 1 squamous carcinoma. Nine lesions were in the lower oesophagus, 3 at the GOJ, 1 each in the mid oesophagus, cardio and the greater curve. 16/17 lesions were completely resected using this technique. Post-EMR histology showed clear margins in 8, positive lateral margin in 5 and positive deep margin in 2. There were 6 minor bleeds, 1 delayed bleed, 1 perforation and 1 stricture. Two patients with positive deep margins did not have residual lesion after radical surgical resection.

Conclusion: EMR using banding equipment without submucosal injection for the removal of the upper GI lesions appears to be easy, quick and well tolerated by patients. However this new technique is not without complications such as perforation, delayed bleeding and post-EMR stricture. The shortcomings are positive margins and missing the index lesion; both can be avoided if overlapping wide resection is carried out.

Abstract 019

<table>
<thead>
<tr>
<th>Lesions</th>
<th>EMR success</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
<td>7/7</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>1/2</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1/1</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>7/7</td>
</tr>
</tbody>
</table>

020 WHAT ARE THE SENSITIVITY AND SPECIFICITY OF ENDOSCOPIC PHOTOGRAPHS IN DOCUMENTING COMPLETION OF COLONOSCOPY? RESULTS FROM AN ONLINE QUESTIONNAIRE

A. I. Thuraisingam, J. L. Brown, J. T. Anderson. Gastroenterology, Gloucestershire Hospitals NHS Foundation Trust, Gloucester, UK

Introduction: There is no consensus as to the best method for documenting complete colonoscopy and little is known about which methods are actually used. Two studies have examined the use of endoscopic photographs. Both studies asked reviewers to determine whether images taken of coecal landmarks documented complete colonoscopy. A combination of different views was most convincing but there was considerable disparity between reviewers as to whether the photographs confirmed completion of colonoscopy. For endoscopic photographs to be useful for documentation reviewers must be able to distinguish between incomplete and complete colonoscopy.

Aims & Methods: The aims were to assess current methods of documenting colonoscopy completion and to calculate the diagnostic specificity and sensitivity of a pair of photographs in confirming complete colonoscopy. 80 pairs of photographs were taken from completed colonoscopies. Two photographs, including at least one view of the ileo-caecal valve, were taken of coecal landmarks and/or the terminal ileum. Colonoscopy completion was independently validated using video clips. 20 pairs of photographs were also taken from another site in the colon that could potentially be misinterpreted as the caecum, for example hepatic flexure. Using an online questionnaire, experienced endoscopists were asked which method they used most frequently to document complete colonoscopy. Each reviewer then assessed the 100 photographic pairs and was asked “Taking both photographs into account are you convinced that complete colonoscopy has been performed?”

Results: Thirty four endoscopists completed information on their current practice; 19 (56%) did not routinely use any objective method to document colonoscopy completion; 13 (38%) most frequently used single or multiple photographs for documentation. 32 endoscopists reviewed the 100 pairs of photographs. This generated review of the equivalent of 2560 (32 x 80) images of completed colonoscopy and 640 (32 x 20) images of incomplete colonoscopy. Using a pair of endoscopic photographs to document colonoscopy completion had a sensitivity of 51.4% (CI 49.5–53.3%) and a specificity of 89.2% (CI 86.8–91.6%).

Conclusion: Endoscopic photographs are not routinely used to document completion of colonoscopy. Both the sensitivity and the specificity of a pair of endoscopic photographs are too low to be used for reliably documenting colonoscopy completion.


021 BOTOX PREDICTS THE OUTCOME OF ENDOSCOPIC SPHINCTEROTOMY IN POST-CHOLECYSTECTOMY BILIARY PAIN DUE TO SPHINCTER OF ODDBI SPASM

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Introduction: Muscle spasm of the sphincter of Oddi (SO) can cause post-cholecystectomy biliary pain. Sphincter of Oddi hypertenion (SOH) is classically diagnosed using endoscopic SO manometry (EMB). This procedure is associated with a high incidence of pancreatitis and does not accurately define the patients whose symptoms are due to SO spasm. Botulinum toxin (Botox) injected into the SO muscle will relax the sphincter for 2–3 months.

Aims & Methods: To study whether relief of pain following Botox injection predicts the outcome of endoscopic sphincteroplasty in post-cholecystectomy biliary pain due to SO spasm.

Methods: Over a 3-year period, 78 patients underwent 4 injections of 25 units each of Botox into their SO muscle at duodenoscopy.

Results: Fifty eight (50 females) of these 78 patients were referred with post-cholecystectomy biliary pain and no physical abnormality of the biliary tree. Thirty three of these 58 patients underwent EBM prior to Botox treatment. Forty one of the 58 patients (71%) experienced temporary relief from their pain following Botox treatment. Thirty nine of these 41 patients have undergone endoscopic biliary sphincteroplasty (ES) with relief of pain in 36 patients (92%). All 25 patients with positive EBM and relief of pain following Botox achieved pain relief following ES compared with an 85% response for those patients who did not undergo EBM prior to Botox treatment. This compares with a 75% pain relief rate when ES was based on EBM results alone.

Conclusion: Botox relaxation of the SO is a highly sensitive indicator of the response to endoscopic sphincteroplasty in patients likely to have biliary pain from SOH.

022 DETERMINATION OF SAFETY OF DRINKING BEFORE GASTROSCOPY

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Introduction: Traditionally patients have fasted for 6 hours (food and fluid) before routine endoscopy. A number of guidelines have endorsed shorter fluid fasts for elective surgical procedures. The findings of one small randomised controlled trial comparing a shortened fluid fast of 90 minutes before endoscopy with traditional 6-hour fast suggests similar residual

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gastric volume and pH, but conditions were very controlled.1 An
unpublished survey of endoscopy units in NW England in 2000 revealed
only 4 of 21 units with a fluid fasting policy of 2 hours.
Aims & Methods: To determine the clinical equivalence of a shortened and
conventional fluid fasting time in endoscopy patients on levels of gastric
volume and pH. Study design: double blind randomised controlled clinical
equivalence trial. Study population: patients aged 18–80 years and ASA
grade 1 or 2 undergoing routine gastroscopy performed by a nurse
endoscopist. Setting: one endoscopy unit in NW England. Study period:
June 2002 to June 2006. Randomisation: central off-site computer-
generated randomisation stratified by age and sex. Intervention: interven-
tion group: 6 hours from appointment time food fast and 2 hours clear fluid
fast. Control group: standard 6 hours from appointment time fast for food
and fluid. Main outcome measure: residual gastric volume. Other outcome
measure: pH. Subsidiary outcome measures: thirst, headache, anxiety,
adverse events.
Results: Of the 440 subjects randomised, 218 were in the intervention
group and 222 in the control group. Sixteen subjects were on acid
suppressants at time of endoscopy. With the exception of smoking, baseline
characteristics were similar between the groups. The median time from last
drink to procedure was estimated to be 2.7 hours and 6.9 hours for the
intervention and control group respectively. A total of 418 subjects had a
residual gastric volume collected. The mean residual gastric volume in the
intervention and control group respectively. A total of 418 subjects had a
residual gastric volume collected. The mean residual gastric volume in the
intervention group was 24.5 ml (SD 18.83) and 24.0 ml (SD 17.05) in the
control group (difference = 0.5 ml, 95% CI −2.95 to 4.00). There were no
adverse events. Compared to the control group, intervention group subjects
were more satisfied with fasting time and had less thirst but were more
adverse events. Smoking at various time points was not associated with
BO. Although current alcohol consumption was not associated with an
increased OR of BO, at age 30 this was associated with an astonishing OR
of 30.32 on univariate analysis, supporting the hypothesis that this may act
as an initiator of BO. Interestingly, eating smaller meals more often was
associated with a reduced OR of BO, suggesting that adopting this lifestyle
measure may be efficacious in reducing reflux and prevention of BO. Risk
factors for BO are multifactorial and large patient numbers are required to
demonstrate factors with relatively small odds ratios.

1. Greenfield SM. Assessment of residual gastric volume and thirst in

Oesophageal free papers

[023] LARGE-SCALE PROSPECTIVE STUDY REVEALS NOVEL
RISK FACTORS FOR BARRETT’S OESOPHAGUS

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Cell Unit, Hutchinson-MRC Research Centre, 2National Medical Laser Centre,
University College London Hospital, London, 3Oldchurch Hospital, Havering
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Research Centre, Cambridge, UK

Introduction: Barrett’s oesophagus (BO) is the precursor lesion for
oesophageal adenocarcinoma (AC), which is rapidly rising in incidence.
Most patients with AC present de novo without the opportunity for
surveillance as their BO has not been diagnosed. Hence the epidemiolo-
gical risk factors associated BO could be clinically useful in determining a
Barrett’s predictor model, to determining which patient group to screen. To
date symptom nomograms have not been sensitive or specific enough for
clinical use.
Aims & Methods: A modified validated questionnaire was used to
prospectively investigate the epidemiological factors that may be asso-
ciated with BO in consecutive patients attending upper gastrointestinal
doscopy for all indications. Unselected patients between 18–75 years were
recruited prospectively in 3 UK centres: Addenbrooke’s Hospital, Cambridge,
Oldchurch Hospital, Essex and UCLH, London following MREC
approval.
Results: 11823 patients were recruited, 904 were male (M) and 919 female
(F). 1181/2 (6.5%) patients were found to have a new diagnosis of BO,
78M and 41F. The significant findings on univariate analysis and
multivariate logistic regression analysis are summarised in the table.

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Univariate OR (95% CI)</th>
<th>p Value</th>
<th>Multivariate OR (95% CI)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>2.01 (1.53 to 2.63)</td>
<td>&lt;0.001</td>
<td>2.04 (1.46 to 2.85)</td>
<td>0.004</td>
</tr>
<tr>
<td>Age</td>
<td>1.03 per year</td>
<td>&lt;0.001</td>
<td>1.03 (0.84 to 1.26)</td>
<td>0.001</td>
</tr>
<tr>
<td>Heartburn ≥5 years</td>
<td>1.88 (1.44 to 2.43)</td>
<td>&lt;0.001</td>
<td>1.80 (1.12 to 2.87)</td>
<td>0.013</td>
</tr>
<tr>
<td>Acid regurgitation ≥5 years</td>
<td>3.31 (2.20 to 5.00)</td>
<td>0.028</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Nocturnal awakening heartburn</td>
<td>1.90 (1.19 to 3.03)</td>
<td>0.034</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Nocturnal acid regurgitation</td>
<td>1.70 (0.93 to 3.12)</td>
<td>0.034</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Heartburn: some bothersome sx</td>
<td>1.97 (1.13 to 3.43)</td>
<td>&lt;0.001</td>
<td>1.84 (1.04 to 3.27)</td>
<td>0.01</td>
</tr>
<tr>
<td>Alcohol ≥10 units aged 30</td>
<td>30.52 (16.03 to 61.99)</td>
<td>0.006</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Eating smaller meals</td>
<td>0.51 (0.27 to 0.96)</td>
<td>0.049</td>
<td>0.48 (0.24 to 0.98)</td>
<td>0.004</td>
</tr>
</tbody>
</table>

NS, not significant; OR, odds ratio.

Conclusion: This is the largest prospective epidemiological study to date.
Multivariate analysis showed that increasing age, male sex, duration of
reflux symptoms and nocturnal symptoms were associated with a diagnosis
of BO.

Abstract 023 Significant risk factors for Barrett’s oesophagus on uni- and multivariate analysis

Introduction: Barrett’s oesophagus is an important pre-malignant condi-
tion. Work on clonal expansion in Barrett’s suggests that in some patients a
single clone can expand to populate an entire Barrett’s segment. This work
was largely completed on lysate obtained from whole biopises.
Aims & Methods: We aimed to re-examine the clonality of Barrett’s
dysplasia using p53 gene mutations and microsatellite markers to assess
for loss of heterozygosity (LOH) in the lysate obtained from single Barrett’s
glands. Individual glands from across dysplastic patches from paraffin
embedded Barrett’s tissue were isolated by laser capture microdissection.
Gland lysate underwent microsatellite marker analysis for three tumour
suppressor genes (APC, p53, p16), and nested PCR amplification to allow
p53 gene sequencing. Individual gland mutations were compared with the
results obtained from whole biopsy lysates.
Results: Dissected tissue was classified histologically. LOH patterns for
the three different markers were analysed for each of the histological tissue
grades present in oesophagectomy and biopsy blocks. p53 gene mutations
and LOH patterns showed a great deal of clonal diversity between
individual glands in oesophagectomy blocks, suggesting a greater degree of
clonal heterogeneity than expected. No LOH or gene mutations were
found in neo-squamous islands. Individual gland dissection also allowed
detection of LOH not detectable from whole biopsy analysis.
Conclusion: Individual gland dissection and analysis reveals clonal
diversity within Barrett’s segments not detectable by whole biopsy analysis.
Gland-to-gland clonal heterogeneity suggests that previous models of
mutational selective sweeps across entire Barrett’s segments may be
oversimplifications. Neo-squamous islands appear to have a different
clonal origin from the surrounding mucosa and may originate from
oesophageal gland ducts.
025 LOW INCIDENCE OF OESOPHAGEAL ADENOCARCINOMA FOLLOWING OPTIMAL REGIMENT OF AMINOLAEVULINIC ACID PHOTOFIN PHOTODYNAMIC THERAPY FOR HIGH GRADE DYSPLASIA IN BARRETT’S OESOPHAGUS


Introduction: Photofrin photodynamic therapy (PDT) has recently been licensed to treat high grade dysplasia (HGD) for the prevention of adenocarcinoma in Barrett’s oesophagus. Aminolaevulinic acid (ALA) PDT is a potentially attractive alternative because of the short light photosensitivity (24 hours) and lack of oesophageal stricture formation. Many different ALA regimens have been suggested in the literature for the eradication of dysplasia in Barrett’s oesophagus including varying light dose, drug dose and wavelength of the activating light. The optimal regimen of ALA PDT remains unknown.

Aims & Methods: Seventy two patients were treated for high grade dysplasia with different parameters of ALA PDT to determine the optimal regimen. All patients were hydrated with intravenous fluids prior to the oral administration of ALA to prevent systemic hypotension. Three groups of patients were studied: Group A: high dose ALA (60 mg/kg) activated by high light dose red light (1000 J/cm), Group B: high dose ALA activated by lower doses of red light (500-750 J/cm), and Group C: low dose ALA (30 mg/kg) activated by high light dose. Additionally, 24 patients in groups A and B were randomised to either red (1000 J/cm) or green laser light (1000 J/cm) activation. Success was determined by regular endoscopic follow-up and radiographic biopsies every 2 cm through the treated area. The primary outcome was development of adenocarcinoma.

Results: One patient was lost to follow-up. Kaplan Meier analysis demonstrated that patients treated in group A, with high red light and high drug dose, had a very significant decrease in cancer risk at 36 months compared to 34% in those treated with other regimens (Log rank statistic < 0.002). In patients randomised to either red or green light activation the difference in adenocarcinoma rates were also significantly different in favour of red light at 8% versus 45% (p value < 0.05). No patients suffered photosensitivity reactions or developed oesophageal strictures.

Conclusion: This case series of 72 patients demonstrates a statistically significant difference in the cancer rates between ALA regimens. The adenocarcinoma incidence rate following ALA PDT with the most effective regimen was low at 3% compared to the other regimens at 34%. This data compare favourably to the cancer rates in the randomised trial of PFI versus Photofrin PDT at 28% and 14% respectively at two years’ follow-up. These data would support the use of the optimal regimen of ALA in a randomised controlled trial of ALA versus Photofrin PDT.

026 INTEROBSERVER VARIATION IN THE DIAGNOSIS OF DYSPLASIA IN BARRETT’S OESOPHAGUS

S. A. Sonwalkar1, O. Rotimi2, N. Scatt2, M. Dixon2, A. Axon1, S. M. Everett2.

Introduction: Riddell et al described “dysplasia” as an unequivocal neoplastic alteration of the epithelium. Six studies have assessed the interobserver variation in the diagnosis of dysplasia in Barrett’s oesophagus (BO), mostly based on Riddell’s method of classification in IBD. There are no studies based on the accepted Vienna system.

Aims & Methods: The primary aim of the study was to assess the interobserver variation in the diagnosis of dysplasia (in particular, indefinite for dysplasia) in BO using the revised Vienna classification. Histology database was searched for lists of cases diagnosed with BO (SIM on histology), dysplasia and adenocarcinoma in the time period 1 April 1984 to 31 December 2004. 42 cases with a diagnosis of IND for dysplasia and 15 time-matched controls, each with a diagnosis of BO without dysplasia, LGD, HGD and ADO were thus identified and 137 slides retrieved. Three GI histopathologists (P1, P2 and P3) reassessed the slides independently based on the revised Vienna classification. Interobserver agreement between individual GI pathologists was determined by Cohen’s Kappa statistics.

Results: Twenty one of 42 cases (50%) were reclassified as IND by at least one of the three histopathologists—14 by pathologist 1 (P1), 3 by pathologist 2 (P2) and 12 by pathologist 3 (P3). Thus P1, P2 and P3 were in agreement with the original diagnosis of IND in 14/42 (33%), 3/42 (7%) and 12/42 (29%) cases respectively. P1 and P2 agreed on the diagnosis of IND in a single case, P2 and P3 in none and P1 and P3 in 7 cases. A consensus diagnosis of BO in 11 of 42 cases (26%) originally diagnosed as IND. The kappa for the cases with an initial diagnosis of IND (n = 42) between P1 and P2 was 0.15 (poor), between P2 and P3 was 0.03 (poor) and between P1 and P3 was 0.35 (fair). The kappa on all cases between P1 and P2 was 0.26 (fair), between P2 and P3 was 0.13 (poor) and between P1 and P3 was 0.36 (fair).

Conclusion: This is the first study looking at interobserver variation in the diagnosis of indefinite for dysplasia in Barrett’s oesophagus using the revised Vienna criteria. This is the most difficult group to identify histologically due to the overlap with inflammatory changes, but causes surveillance and clinical conundrums. The kappa for the diagnosis of IND was fair at best in this study (0.15, 0.03 and 0.35 respectively).

027 DYNAMICS OF UNBUFFERED POSTPRANDIAL ACID POCKET AND ROLE IN ACIDIC GASTROESOPHAGEAL REFLUX

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Introduction: An unbuffered pocket of highly acidic juice is observed in the proximal stomach after a meal in healthy subjects using pull-through pH studies.

Aims & Methods: (1) To confirm that postprandial acidification of the proximal stomach occurs using a novel static high resolution pH catheter. (2) To determine whether the characteristics of this acid pocket change with time. (3) To establish whether discrete episodes of oesophageal acid reflux originate from the postprandial acid pocket. Fifteen healthy subjects were studied. A custom made high resolution 12 sensor pH catheter (sensors 1–10, 12 located 172; 138; 127; 116; 105; 94; 83; 72; 61; 50; 30; 0 mm from the distal tip) was attached to the oesophageal mucosa at the proximal margin of the gastric folds using endoclips through prolene loops between sensors 4 and 5. After a 2-hour rest period following endoscopy, fasting pH was recorded for 50 minutes, a standardised meal and for 90 minutes after completion of the meal. The % time pH < 4 for the 90 minute postprandial period in every sensor was calculated for each subject and episodes of postprandial acidic oesophageal reflux recorded.

Results: The median % time pH < 4 for the 90 minute postprandial period was reduced in the sensors immediately distal to the proximal margin of the gastric folds. The median difference (in median % time pH < 4) between sensors 6 and 10 (the area of most consistent intragastric buffering) was 29.3% (p = 0.045) with a strong trend also seen in sensors 7 (median difference 21.5% v sensor 10, p = 0.055) and 12 (median difference 15.5% v sensor 10, p = 0.09). The proximal stomach showed the least duration of buffering after completion of the meal. The duration of buffering progressively increased on moving distal to the proximal stomach. 60 reflux events (oesophageal pH < 4) were recorded in the postprandial period in the 15 subjects. 43/60 (71.7%) acid reflux events could be attributed to a source within the proximal stomach.

Conclusion: Postprandial buffering is of least duration in the proximal stomach and this provides a source of highly acidic gastric juice available for reflux into the oesophagus.

Abstract 027

<table>
<thead>
<tr>
<th>Sensor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median % time pH &lt; 4</td>
<td>99.9</td>
<td>99.4</td>
<td>98.8</td>
<td>97.5</td>
<td>79.9</td>
<td>41.9</td>
<td>55.8</td>
<td>98.9</td>
<td>99.7</td>
<td>99.6</td>
<td>85.5</td>
<td>69.2</td>
</tr>
<tr>
<td>Distance proximal (−) or distal (+) to (mm)</td>
<td>61.5</td>
<td>−27.5</td>
<td>−16.5</td>
<td>−5.5</td>
<td>5.5</td>
<td>16.5</td>
<td>27.5</td>
<td>38.5</td>
<td>49.5</td>
<td>60.5</td>
<td>80.5</td>
<td>110.5</td>
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**028 THE PREVALENCE OF LARYNGOPHARYNGEAL REFUX IN A POPULATION WITH GASTRO-OESOPHAGEAL REFUX**

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**Introduction:** Laryngopharyngeal reflux (LPR) is a syndrome associated with a constellation of symptoms usually treated by ENT surgeons. It is believed this is caused by the retrograde flow of stomach contents into the laryngopharynx; this being a supra-oesophageal manifestation of gastro-oesophageal reflux (GORD). It has been cited that LPR and GORD can be considered as separate entities. Our hypothesis was that LPR is a supra-oesophageal manifestation of GORD and therefore that patients with GORD should have a degree of symptoms suggestive of LPR due to the reflux of the gastric contents. We examined a population of patients with both UGIE and symptom-proven GORD and using a questionnaire looked at their existing symptoms to help assess the prevalence of LPR. We also looked at whether, as expected, that with more severe GORD (suggestive of increased gastric contents reflux) the degree of symptoms suggestive of LPR would be increased.

**Aims & Methods:** A population of patients with endoscopically-proven GORD were recruited and divided into groups depending on the severity of their reflux disease. A questionnaire was then administered examining both LPR and GORD scoring criteria. The relationship between GORD and LPR was then analysed.

**Results:** 1383 subjects with GORD were recruited; those with severe GORD had significantly higher LPR scores compared with those with mild GORD (p<0.01), moderate (p<0.05) and inactive disease (p<0.001).

**Conclusion:** The condition of LPR is likely to represent a supra-oesophageal manifestation of GORD. This study has examined a large number of patients with endoscopically-proven GORD and has demonstrated a correlation between severity of GORD and the prevalence of LPR. LPR and GORD remain common and interlinked conditions. Most patients with GORD have LPR but tend only to complain of the dominant symptoms. The subsequent diagnosis of LPR in the population with GORD is therefore likely to be dramatically underestimated.


**029 LASER AND RADICAL CHEMORADIOThERAPY FOR OESOPHAGEAL CARCINOMA**

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**Introduction:** The incidence of oesophageal carcinoma is rising with rates in the UK the highest in the EU. Most patients present with locally advanced disease and 5-year survival rates are poor. The median survival even after neoadjuvant chemotherapy and surgery is only 17 months. Further, most patients are elderly, present with dysphagia and may be unfit for surgery. Minimally invasive approaches are needed.

**Aims & Methods:** To determine whether endoscopic laser followed by radical chemoradiotherapy resulted in acceptable survival and morbidity. We retrospectively reviewed the notes of all patients with oesophageal carcinoma treated with laser followed by radical chemoradiotherapy at UCH between January 1999 and November 2004. All patients had dysphagia before starting chemoradiation. Mitomycin C and 5-fluorouracil were then administered during weeks 1 and 4 of external beam radiotherapy (median 55 Gy, range 45–60 Gy) which was given in divided daily doses over 6 weeks.

**Results:** Thirty patients (21 male, 10 female), median age 69 (range 51–88) were treated. 19 patients had squamous cell carcinoma and 12, adenocarcinoma. Two patients had stage T2N1, 12 had T3 disease and 15, T3/4 or T4 disease. Dysphagia was adequately palliated in all apart from 4 who had a PEG placed. 28 of 31 patients completed treatment. Overall median survival was 15 months which did not change after exclusion of patients who had had less than 50 Gy radiotherapy. Median survival among patients with adenocarcinoma was 22 months compared with 12 months for squamous cell carcinoma. Early toxicity was mild with radiation-associated dysphagia in only 4 patients. Late toxicity included a benign oesophageal stricture in 50% which responded to dilatation. Local recurrence occurred in at least 50% of patients.

**Conclusion:** Laser followed by radical chemoradiotherapy appears to be a viable treatment for locally advanced oesophageal carcinoma which causes minimal morbidity compared to surgery. It is generally well-tolerated and provides a median survival similar to neoadjuvant chemotherapy followed by resection. A randomised controlled trial comparing these approaches is warranted.
within the gastrointestinal epithelium, it is logical that they are the target for mutations that may lead to the aberrant epithelial biology seen in Barrett’s metaplasia, a pre-malignant condition that can lead to oesophageal adenocarcinoma. To date, the identification of the putative stem cell within the epithelium of the Barrett’s metaplastic lesion remains elusive.

Aims & Methods: We used iododeoxyuridine (IUDr) a nucleoside and a thymidine analogue which is incorporated into the DNA of replicating cells, as a marker to identify the putative Barrett’s stem cell. Since transit amplifying cells are lost from the lumen and replaced from below in about 3-7 days, we expect the label retaining cells (LRC) to contain the putative Barrett’s stem cell. Two patients diagnosed with oesophageal adenocarcinoma having previously undergone chemotherapy were scheduled to undergo oesophagectomy. These two patients were recruited to the SAIN'T clinical trial. Seven days prior to their surgery each patient was infused with IUdR. After resection, tissue samples of normal oesophagus, Barrett’s, normal stomach and tumour were extracted and fixed in neutral buffered formalin for approximately 8 hours. Routine immunohistochemistry was performed on 6 micron sections of all tissue types.

Results: Infusion three days or less in vitro in transformed cells and explants revealed appropriate abundant staining of the proliferative compartments. However labelling at 7 days days in both patients ex vivo showed positive discrete staining of LRCs within various gastrointestinal tissue types including Barrett’s metaplasia. These label retaining cells were seen in the parabasal layer and basal layer of the squamous epithelium, this is in line with the hypothesis that the location of the oesophageal stem cell. LRCs were seen at several locations in metaplastic tissue both at the base of the gland and in the neck region.

Conclusion: This is the first report of LRCs within the human oesophagus. Our findings correlate with the hypothesis that LRCs are located in the squamous metaplasia. More importantly LRCs were also located in the basal and neck region of the Barrett’s gland, implying that these are the locations of Barrett’s stem cells. Future studies underway include looking at 14 days post-IUDR infusion pre-surgery as well as molecular characterisation of the stem cells and their niche.

032 ELASTIC SCATTERING SPECTROSCOPY TO GENERATE AN IMAGE OF PATIENT RISK IN BARRETT’S OESOPHAGUS


Introduction: Elastic scattering spectroscopy (ESS) is a real-time in vivo technique which detects changes in the physical properties of cells. We have previously demonstrated a sensitivity for detecting high grade dysplasia (HGD) in Barrett’s oesophagus of 92% and a specificity of 60%. ESS is a point measurement but readings are extremely fast offering an opportunity to virtually “scan” an area of Barrett’s mucosa.

Aims & Methods: This was a preliminary study to prospectively test our previously published algorithm for the detection of HGD and aneuploidy in Barrett’s oesophagus. Four measurements per site and quadrantic sites every centimetre were measured throughout a patients Barrett’s segment. An optical image was created by interpolating the spectral scores following analysis to define the risk of HGD and aneuploidy. This was then compared to quadrantic biopsies every 2 cm taken for histology. One biopsy at each level was processed for aneuploidy using image cytometry. The time taken for the measurements to be collected was recorded in order to assess practicality.

Results: Forty patients had their Barrett’s oesophagus scanned. Twenty four had HGD and 16 without. Of the 40 patients, 16 had either low grade dysplasia or no dysplasia. Of these 16 patients without HGD, 7 were found to have aneuploidy in all of their biopsies. All 24 patients with HGD and all 7 with aneuploidy had positive scans and 4/9 low risk patients with no dysplasia or aneuploidy had entirely negative scans. If biopsies were directed only at suspicious areas on the scans, 17 instead of 80 biopsies would have been required in the low risk patients and only 7 instead of 19 would have been necessary to exclude aneuploidy. Scanning the oesophagus optically was performed by four different operators and took an average of 4 minutes and 22 seconds for a 6 cm segment of Barrett’s, with no significant difference between operators.

Conclusion: Scanning patients Barrett’s oesophagus is fast without interobserver variability and can be used to identify high risk patients with either HGD or aneuploidy. It could reduce the number of biopsies required to detect HGD by over a half and reduce the number of biopsies processed for aneuploidy by over 60% in a surveillance situation. This study also suggest that no biopsies would be needed in a half of all patients undergoing endoscopic surveillance. In this series, no patients with HGD or aneuploidy had negative scans. This study requires completion followed by confirmation in multisite testing on a surveillance population.

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033 RANDOMISED CONTROLLED TRIAL OF PATIENT CONTROLLED SEDATION FOR COLONOSCOPY: ENTONOX VERSUS PATIENT-MAINTAINED, TARGET-CONTROLLED PROPOFOL

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Introduction: Intravenous sedation for colonoscopy is associated with cardiorespiratory complications and prolonged drowsiness and we have previously shown that Entonox is superior to Intravenous sedation. Moreover, patient controlled sedation has shown to be effective for various procedures. We aimed to compare patient-controlled Entonox inhalation with patient-maintained, target-controlled Propofol infusion for colonoscopy, in terms of analgesic efficacy, psychomotor recovery, patient and endoscopist satisfaction.

Aims & Methods: All patients undergoing elective colonoscopy were included. Ethics committee approval was obtained and patients were randomised (with adequate allocation concealment) to receive either Entonox or target-controlled infusion of Propofol. Patients in entonox group inhaled gas for 60 seconds before procedure and then as required. Patients in propofol group were administered the drug with target of 1.2 µg/ml loading dose and then allowed to sedate themselves using handset. Sedation scoring was done every 5 minutes during procedure and every 15 minutes subsequently. Patients completed anxiety score, baseline letter-cancellation test and pain score on 100 mm-visual analogue scale (VAS) before procedure and repeated letter-cancellation tests and marked pain on VAS immediately after procedure and at discharge. All patients completed satisfaction survey at discharge and 24-h post-procedure, when they also marked pain assessment. Secondary end-points measured were completion rates, nurse and endoscopist satisfaction and complication rates. An anaesthetist was present throughout procedure.

Results: 100 patients were randomised to receive Entonox (n=50) or Propofol (n=50). The median dose of propofol was 174 mg and median time to reach target-controlled infusion of 3 minutes. There was no difference in two groups in terms of pain recorded (Entonox group mean score 20 v 15, p=0.3; Mann–Whitney U test) with similar pre-procedure anxiety scores (p=0.1). There was no difference between two groups in terms of completion rates, total colonoscopy time and endoscopist and nurse satisfaction. Patient satisfaction was similar in both groups. The depth of sedation was higher in propofol group (median 3.5 v 3 as compared to 1.5 in entonox group), with more patients needing assistance for change of position as compared to Entonox group (6 v 0; p=0.05). Psychomotor recovery and hence discharge was faster in entonox group, though differences were not statistically significant. There were no complications in both groups.

Conclusion: Patient-controlled sedation using target-controlled Propofol provides greater depth of sedation as compared to Entonox; however both techniques are safe and effective for colonoscopy, providing excellent patient satisfaction and facilitating early discharge. We believe that Entonox could be used in all patients undergoing colonoscopy but with patient-controlled Propofol used instead of midazolam/analgesia for those cases where Entonox is unsuitable.


034 HIGH PROFICIENCY READING OF 3D VIRTUAL COLONOSCOPY BY EXPERIENCED OPTICAL ENDOSCOPISTS AND ENDOSCOPY NURSES: A NEW ERA IN COLONOSCOPY?


Introduction: V3D (Viatronix Inc) virtual colonoscopy (VC) is currently the only CT colonoscopy application which presents the reader with a primary 3D animated image of the colon. The virtual reality image resembles a conventional optical colonoscopy (OC) and the mouse control closely replicates the tip-control of a video-endoscope. A large screening study conducted by radiologists has indicated that V3D VC is at least as sensitive as optical colonoscopy for detecting cancer, and polyps >5 mm in size. 1 In this study, we have tested the hypothesis that experienced endoscopists and endoscopy nurses are able to accurately read and interpret 3D VC.
Aims & Methods: Fifty symptomatic gastroenterology outpatients aged 45 and older underwent same-day VC and OC. The VC image included matched supine and prone views. An experienced GI radiologist (JB) provided initial training to two advanced gastroenterology trainees (AP, SE) and one gastroenterology nurse (LJ). The radiologist and three non-radiologists independently both the prone and supine VC views from rectum to caecum and caecum to rectum. All readers were blinded to the colonoscopy result. The 2D view was only referenced when the 3D view was equivocal. The endoscopist performing the OC was unaware of the VGD result until the withdrawal phase of the endoscopy when segmental unblinding occurred. The VC and OC findings were compared using the unblinded OC as the reference standard.

Results: Three cancers were found on OC, all of which were detected by the four VC readers. On unblinded OC, six polyps >5 mm in diameter were reported in five patients. The radiologist and one gastroenterology nurse detected all 6 polyps on VC. The second trainee and the endoscopy nurse correctly identified five polyps. Both failed to identify the same polyp localized at the anal margin, abutting on the non-occluding rectal inflation catheter. The mean reporting time for the radiologist was 21.0 (SD 4.99) minutes. The mean reading time for non-radiologist ranged from 25.8 (SD 9.37) to 44.1 (SD 12.43) minutes with the nurse reading the quickest.

The endoscopy nurse, gastroenterology trainees and the radiologist reported a preference or equivalence for the 3D, as opposed to 2D image in 100%, 85%, 84% and 80% of the VC images respectively.

Conclusion: This is the first study to report the accuracy of 3D virtual colonoscopy in the detection and identification of colorectal polyps. A large-scale prospective study of 1000 polyps is proposed.

BRIEF REPORT: A TOLERABLE PROTOCOL FOR PERCUTANEOUS ENDOSCOPIC GASTROSTOMY: RESULTS OF THE NATIONAL CONFIDENTIAL ENQUIRY INTO PATIENT OUTCOME AND DEATH

S. D. Johnston1, T. C. K. Tham2, M. Mason2. 1Department of Gastroenterology, Belfast City Hospital, 2Department of Gastroenterology, Ulster Hospital Dundonald, Belfast, Chief Executive, NCEPOD, London, UK

Introduction: Percutaneous endoscopic gastrostomy (PEG) is an accepted method of placing a feeding tube to enable enteral feeding in patients with swallowing difficulties. However, the factors associated with morbidity and mortality following PEG have not been studied in detail. We describe the largest audit of mortality following PEG tube insertion in the UK.

Aims & Methods: Deaths occurring within 30 days following PEG tube insertion in the UK between April 2002 and March 2003 were identified from consultant endoscopist questionnaire entries for the audit.

Results: 719 patients (391 male, median age 80 years; range 26–98 years) who died within 30 days following PEG insertion were identified. 97% of patients had coexistent neurological disease. PEG tubes were inserted by specialised GI physicians in 522 cases (73%). Seventy two patients (13%) required reversal agents following sedation. Following PEG tube insertion 309 patients (43%) died within one week. Death was due to cardiovascular disease (n = 175), respiratory disease (n = 508), central nervous system disease (n = 358), renal disease (n = 38) and hepatic failure (n = 11). In 136 cases (19%) the NCEPOD expert panel regarded the procedure as futile.

Conclusion: Mortality and morbidity following PEG tube insertion is not insignificant. Selection of patients is paramount to good patient outcomes. Multidisciplinary team assessment should be performed on all patients being referred for PEG tube insertion. Attention to pre-procedural baseline investigations can further reduce morbidity and mortality.

ENDOSCOPIC MUCOSAL RESECTION FOR FLAT NEOPLASIA IN CHRONIC ULCERATIVE COLITIS: CAN WE CHANGE THE ENDOSCOPIC MANAGEMENT PARADIGM?


Introduction: No studies have addressed the potential of EMR for treating flat dysplastic lesions (Paris 0-II) in chronic ulcerative colitis. Historically, such lesions were referred for colectomy. There are only limited data to support endoscopic resection of exophytic (Paris I) adenoma-like mass lesions in UC.

Aims & Methods: To evaluate the safety and clinical outcomes of patients with chronic UC undergoing EMR for Paris class 0-II and class I adenoma-like mass treated with EMR (primary end-points being colorectal cancer development, resection efficacy, macroscopic lesion rates and post-resection recurrence rates) compared to sporadic controls.

Results: 204 lesions were diagnosed in 169 UC patients throughout the study period. 82% (167/204) were diagnosed in “entry” colonoscopy with 36/204 (18%) at follow-up. A total of 170 ALMs, 18 DALMs and 16 OC were diagnosed. 4316 colonoscopies were performed throughout the study period (median per patient 6; range 1–8). The median follow-up period for the complete cohort was 4.1 years (range 3.6–5.2). 1675 controls were taken from our prospective database of non-colitis patients in the study period (median per patient 6; range 1–8). The median follow-up period for the complete cohort was 4.1 years (range 3.6–5.21). 1675 controls were taken from our prospective database of non-colitis patients in the study period. 210 digital images of each pre-biopsy specimen were obtained. Magnified NBI endoscopic findings were classified as: (A) round pits with regular microvascularity, (B) villous/ridge pits with regular microvasculature, (C) absent pits with regular microvasculature and (D) irregular pits with irregular microvasculature. The endoscopic findings and the corresponding biopsies were recorded and blinded histopathological analysis performed. The sensitivity, specificity, and predictive values of the various patterns for the prediction of CM, D/EC were then calculated. Reproducibility of this classification was assessed by four non-NBI expert endoscopists (HK, PF, AS, KG). The kappa statistics of both Paris class 0-II and class I lesions in the context of UC.

Discussion: Our findings show that EMR for the resection of flat dysplastic lesions in selected UC cases is proposed.

MULTIDISCPLINARY TEAM ASSESSMENT OF COLONIC NEOPLASIA: CAN WE CHANGE THE ENDOSCOPIC MANAGEMENT PARADIGM?

Aims & Methods: Fifty symptomatic gastroenterology outpatients aged 45 and older underwent same-day VC and OC. The VC image included matched supine and prone views. An experienced GI radiologist (JB) provided initial training to two advanced gastroenterology trainees (AP, SE) and one gastroenterology nurse (LJ). The radiologist and three non-radiologists independently both the prone and supine VC views from rectum to caecum and caecum to rectum. All readers were blinded to the colonoscopy result. The 2D view was only referenced when the 3D view was equivocal. The endoscopist performing the OC was unaware of the VGD result until the withdrawal phase of the endoscopy when segmental unblinding occurred. The VC and OC findings were compared using the unblinded OC as the reference standard.

Results: Three cancers were found on OC, all of which were detected by the four VC readers. On unblinded OC, six polyps >5 mm in diameter were reported in five patients. The radiologist and one gastroenterology nurse detected all 6 polyps on VC. The second trainee and the endoscopy nurse correctly identified five polyps. Both failed to identify the same polyp localized at the anal margin, abutting on the non-occluding rectal inflation catheter. The mean reporting time for the radiologist was 21.0 (SD 4.99) minutes. The mean reading time for non-radiologist ranged from 25.8 (SD 9.37) to 44.1 (SD 12.43) minutes with the nurse reading the quickest.

The endoscopy nurse, gastroenterology trainees and the radiologist reported a preference or equivalence for the 3D, as opposed to 2D image in 100%, 85%, 84% and 80% of the VC images respectively.

Conclusion: This is the first study to report the accuracy of 3D virtual colonoscopy in the detection and identification of colorectal polyps. A large-scale prospective study of 1000 polyps is proposed.

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The endoscopy nurse, gastroenterology trainees and the radiologist reported a preference or equivalence for the 3D, as opposed to 2D image in 100%, 85%, 84% and 80% of the VC images respectively.

Conclusion: This is the first study to report the accuracy of 3D virtual colonoscopy in the detection and identification of colorectal polyps. A large-scale prospective study of 1000 polyps is proposed.
Results: 100 patients (71 males, mean age 61.7, mean length 4.3 cm) of which 890 biopsy specimens were taken. The sensitivity, specificity, positive and negative predictive values for round pits (type A) (1) corresponding to CM was 97%, 100%, 100%, and 100% respectively, (2) types B-C for the prediction of HGD/EC was 100%, 80%, 100%, and 100% respectively, and (3) type D for the prediction of HGD/EC was 94%, 100%, 90%, and 100% respectively. The mean kappa value for interobserver agreement in assessing the various patterns were 0.711 (SD 0.042) and the interobserver agreement was 0.869 (SD 0.031).

Conclusion: HRME with NBI can clearly visualise the mucosal morphology in BO without dye spray. It has a high level of inter- and intraobserver agreement, further demonstrating its potential to be useful in routine clinical practice.


038 ACHIEVING R0 RESECTION IN THE COLORECTUM USING ENDOSCOPIC SUBMUCOSAL DISSECTION: FIRST FEASIBILITY STUDY IN THE UK

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Introduction: EMR permits resection of Paris type 0-II, Is and LSTs of the colorectum. However, piecemeal EMR has raised concern given default staging to Rx. Endoscopic submucosal dissection (ESD) using a gastroscope and distal transparent cap attachment allows en bloc knife dissection for lesions >20 mm. There are no data regarding ESD technical feasibility in the UK.

Aims & Methods: A prospective technical feasibility study of cap assisted ESD for curative intent in selected Paris 0-II, LST and Is lesions. Primary endpoints were R0 resection status, safety and recurrence rates. Patients with Paris 0-II adenoma or LSTs >20 mm were recruited (EUS pre-resection). Lifting of the submucosal plane from the muscularis was achieved using a 1% solution of 1900 kDa sodium hyaluronic acid (HA). Circumferential mucosal incisions were made at 5–6 mm intervals around the lesion using an Olympus KD 630 L “flex knife” (total cutting vertical length 1 mm) using a 40 W pure cut. Submucosal dissection was then initiated from the most proximal lesion aspect using the IT knife in an oblique 30–40 degree axial position. Complications of all resections were recorded in addition to 30-day mortality and re-admission rates.

Results: 42/56 (75%) patients with 42 lesions fulfilled criteria. En bloc resection was achieved in 33/42 (78%) with 9 (22%) requiring a piecemeal approach. Median time for ESD completion was 48 mins (range 18–240). Median inpatient stay was 22 hours (range 4–120). Perforation occurred in 1 patient (1/42 (2.4%)). Three patients (3/42 (7%)) required admission due to post resection ileus (median stay 46 hours; range 26–58). Bleeding complications occurred in 5/42 (12%) of cases. There were no significant differences observed in the frequency of bleeding complications, lesion diameter or anatomical location between Paris type 0-II lesions as compared to LSTs (G or NG-type). 36 patients (36/42 (86%)) completed a median of 6 months surveillance (range 3–18 months).

Conclusion: This is the first UK and largest cohort study addressing the technical feasibility, safety and short-term efficacy of ESD for R0 intent in the colorectum. ESD achieves high endoscopic cure rates using both endoscopic and EUS recurrence criteria. Furthermore, we have extended the technical feasibility of ESD to include en bloc dissections proximal to the splenic flexure. These data may change the management paradigm of selected Tim/T1/N0 neoplastic lesions to one of primary endoscopic versus surgical resection.

039 RANDOMISED TRIAL OF NARROW BAND IMAGING FOR ADENOMA DETECTION AT COLONOSCOPY IN HIGH RISK GROUPS

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Introduction: Comprehensive adenoma detection at colonoscopy is important for carcinoma prevention, risk stratification and as a quality indicator. Back-to-back studies of colonoscopy indicate a miss rate for adenomas of 22%. Flat adenomas are more difficult to detect and may have enhanced pre-malignant potential. Narrow band imaging (NBI) is a novel, push-button, optical technology that enhances contrast for superficial capillaries and may improve adenoma detection.

Aims & Methods: High definition (HDTV) white light colonoscopy was compared with narrow band imaging for “wide-field” adenoma detection during colonoscopy withdrawal in groups at high risk for adenomas defined as: surveillance following a diagnosis of colorectal cancer; or had at least 3 adenomas or 1 adenoma >10 mm at last colonoscopy; or had a positive faecal occult blood test. Patients were randomised at the caecum if bowel preparation was adequate in a 1:1 ratio. A third generation prototype NBI system (Olympus, Japan) with narrow band centred on wavelengths 415 and 520 nm was used. Two experienced colonoscopists who each had over 100 procedures experience with NBI performed the examinations. Minimum withdrawal time was 8 minutes.

Results: Eighty two patients (of a planned 214) were randomised, 41 to each group. Groups were generally well matched for baseline demographics, but there was an excess of men in the white light arm, p = 0.04. There was a 30% increase in the number of patients with at least 1 adenoma in the NBI arm, p = 0.17 (Fisher exact). More polyps were found in the NBI arm, p = 0.01, with a trend towards more adenomas detected p = 0.06 (Mann–Whitney). There was a trend towards a higher proportion of flat adenomas in the NBI arm, p = 0.08 (Fisher exact). Twice as many patients had 5 or more adenomas in the NBI arm, p = 0.22 (Fisher exact).

Conclusion: In a population at high risk of further adenomas, NBI increased adenoma detection overall by over 40%, driven partly by an increase in the numbers of flat adenomas. NBI may have a role for improving wide field adenoma detection in screening and surveillance of these and other higher risk groups.

ClinicalTrials.gov Identifier: NCT00279357.


040 STUDY OF SERUM ELECTROLYTES FOLLOWING SODIUM PHOSPHATE BOWEL PREPARATION AND COLONOSCOPY IN PATIENTS WITH NORMAL CREATININE

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1Gastroenterology, Royal Oldham Hospital, Oldham; 2Public Health Network, East Lancashire, Accrington, UK

Introduction: Sodium phosphate (NaP) is widely used as bowel preparation for colonoscopy. It can cause serum electrolyte abnormalities sometimes severe enough to cause fatalities. The occurrence of these abnormalities in a UK population with normal creatinine is not known.

Aims & Methods: To study the changes in sodium, potassium, magnesium, calcium, and phosphate following NaP bowel preparation and subsequent colonoscopy. Second, to examine the risk factors associated with these changes. Patients undergoing elective colonoscopy between April 2003 and March 2004 with normal creatinine were invited to take part after ethics committee approval. Blood samples were obtained from patients one week before the procedure (baseline, B), before colonoscopy (BC) and after colonoscopy (AC).

Results: Seventy seven patients were included after informed consent. The median age was 58 years (range 22–97) and male/female ratio was 0.97 (38/39). All patients had normal creatinine with a median of 85 µmol/l (range 46–140). The means of serum electrolyte changes in the three time frames are shown in the table. The prevalence of changes was hyperphosphataemia in 50.6%, hypernatremia in 11.7%, hypokalaemia in 9.1% and hypocalcaemia in 2.6% patients following bowel preparation. Post colonoscopy, the prevalence of hyperphosphataemia was in 54.5%; hypokalaemia in 15.6%; hypernatremia in 6.5% and hypocalcaemia...
.persisted in 2.6% of patients. No changes in magnesium levels were noted. Analysis of variance found significant relationships between baseline creatinine (≥1.0 mg/dL) and BC sodium (p=0.02), potassium (p<0.01) and phosphate (p=0.03); as well as BC potassium (p=0.02) and phosphate (p=0.01) values. There was also a significant relation between side effects and BC sodium (p<0.01) values. None of the patients had any apparent clinical adverse effects from these disturbances.

Conclusion: Significant changes in phosphate, sodium and potassium occur following NaP bowel preparation and after colonoscopy. Rising creatinine levels and presence of side effects were observed to be risk factors. However, these electrolyte changes did not have any undesirable clinical events in this group.


042 NARROW BAND IMAGING FOR COLONOSCOPY SURVEILLANCE IN HEREDITARY NON-POLYPYSIS COLORECTAL CANCER

J. E. East1, M. Stavrinid1, N. Suzuki1, N. Palmer1, T. Guenther2, H. J. W. Thomas3, B. P. Saunders1. 1Wolffson Unit for Endoscopy, 2Department of Academic Pathology, 3Cancer Research Colorectal Cancer Unit, St Mark’s Hospital, Harrow, UK

Introduction: Standard colonoscopic surveillance has recently been shown to reduce cancer death rates in patients with hereditary non-polypsis colorectal cancer (HNPPC)1; however some of the “successes” represent early stage detection of cancer rather than prevention through polypectomy. Chromoendoscopy has recently been shown to detect significantly more additional adenomas than white light endoscopy alone in HNPPC surveillance.2, 3 Narrow band imaging (NBI), nicknamed “digital chromoendoscopy”, uses optical filters in the light source to highlight superficial blood vessels and may improve polyp detection. We aimed to test this in HNPPC surveillance.

Aims & Methods: Patients who met revised Amsterdam II or genetic criteria for HNPPC were examined twice from the caecum to sigmoid-descending junction, first with high definition white light, and then with NBI. All polyps were biopsied or resected immediately when seen and assessed by an experienced gastrointestinal pathologist. Examination was performed by three endoscopists, each with over 100 NBI cases experience, with a high definition (HDTV) colonoscope and NBI system (Olympus Medical System Corporation, Tokyo, Japan) with a minimum exubartion time of 6 minutes for each pass. NBI illumination was used with blue and green narrow band filter centréd on 415 and 540 nm respectively.

Results: Fifty-four patients (of a planned 60) were examined, mean age 47 (range 33–80), 20 (37%) male. The proportion of flat adenomas was significantly higher in NBI pass, p=0.02 (Fisher exact). The median exubartion time was longer in the NBI pass by 16 seconds, p = 0.02 (Fisher exact). The median polyp size was 3.2 mm in NBI pass and 3.3 mm in white light pass. NBI illumination significantly increased polyp detection. A further 5 adenomas in 3 patients, all with proximal adenomas, were found in the segment from sigmoid descending junction to rectum with white light alone.

Abstract 042

<table>
<thead>
<tr>
<th>Initial white light pass</th>
<th>Second NBI pass</th>
<th>Combined white light + NBI</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least 1 adenoma</td>
<td>15 (28%)</td>
<td>15 (28%)</td>
</tr>
<tr>
<td>Total adenomas</td>
<td>23</td>
<td>19</td>
</tr>
<tr>
<td>Flat adenomas</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Total polyps</td>
<td>51</td>
<td>47</td>
</tr>
<tr>
<td>Average adenoma size (mm)</td>
<td>3.3</td>
<td>3</td>
</tr>
<tr>
<td>Withdrawal time (mins)</td>
<td>6.33</td>
<td>6.49</td>
</tr>
</tbody>
</table>

Conclusion: The use of NBI after meticulous HDTV white light examination and polyp removal almost doubled the yield of adenomas in the right colon. The overall proportion of patients with at least one adenoma is higher than a previous series from our institution (43 v 27%).4 These results exceed those seen in a similar trial using pan-chromendoendoscopy. NBI looks promising as a tool to improve adenoma detection in HNPPC surveillance.

ClinicalTrials.gov Identifier: NCT00313755

Abstract 041

<table>
<thead>
<tr>
<th>Sensitivity (95% CI)</th>
<th>Specificity (95% CI)</th>
<th>PPV (95% CI)</th>
<th>NPV (95% CI)</th>
<th>Area under curve (95% CI)</th>
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</thead>
<tbody>
<tr>
<td>MCM5 cut-off point &gt;1000</td>
<td>66% (50–79)*</td>
<td>94% (70–100)†</td>
<td>97% (90–100)</td>
<td>80% (70–91)</td>
</tr>
<tr>
<td>Brush cytology</td>
<td>20% (7–35)*</td>
<td>100% (75–100)†</td>
<td>100%</td>
<td>60% (40–76)</td>
</tr>
</tbody>
</table>

*p = 0.004 MCM5 v cytology.
†p = NS.
Service development free papers

**043 HOW TO ACHIEVE AN “A” IN TIMELINESS: CAPACITY AND DEMAND MANAGEMENT IN ENDOSCOPY SERVICES**

R. Kasturi, E. Said, S. Pearson, A. Reddy, J. Singh, A. Saeed. Gastroenterology, Queen Elizabeth Hospital, Gateshead, UK

**Introduction:** Our endoscopy unit was able to achieve the national waiting time target [6 weeks for routine and 2 weeks for all urgent referrals] by September 2006 with the following strategy.

**Aims & Methods:** Capacity management in 2002, a new purpose built endoscopy unit with three available suites was commissioned and an electronic endoscopy reporting system was installed (Endosoft, Utech Inc). Based on national endoscopy pilot, a capacity and demand data recording system was put in place. Utilisation of lists was monitored for each endoscopist. All lists were pooled and generic work initiated. The booking system was centralised. Full booking was introduced (outpatients choosing the appointment from available slots before leaving hospital). Nurse pre-assessment was introduced to assess risk, handout information leaflets and provide bowel prep with instructions. Patients were sent postal reminders to attend. Protocols were developed after multispecialty consultation, for diabetic and anticoagulated patients, to maximise day case procedures. Capacity was improved by adding two lists. Upper and lower GI nurse endoscopists were trained. Trained locum endoscopists were occasionally used. Demand management. A retrospective audit of surveillance colonoscopies based on BSG guidelines showed that 60% of the performed procedures were either premature or not needed. Based on this a prospective programme was initiated for the booked procedures and those not conforming to guidelines were managed appropriately (by cancellation or appropriate timing). NICE Dyspepsia Guidelines were introduced and implemented in April 2005. Stool antigen test for H pylori was introduced in hospital and community. All upper GI alarm symptoms referrals were triaged, telephone pre-assessed and brought straight to endoscopy into dedicated slots. A web-based referral system was introduced to assure quality and adherence to guidelines. All endoscopy requests were triaged using this web-based system.

**Results:** The waiting times improved to a mean of 7.3 weeks in September 2003 (median 7.5 weeks, range 3–12 weeks). 6.2 weeks in September 2004 (median 7 weeks, range 4–8 weeks). 7.2 weeks in September 2005(median 7 weeks, range 5–13 weeks). In September 2006 mean waiting times of 3.5 weeks (median 3 weeks, range 2–6 weeks) were achieved for routine procedures. For urgent procedures the waiting time improved to 2 weeks.

**Conclusion:** Ensuring timelines requires a corporate work model. Flexible working is advantageous. Dissemination and easy availability of information to referring doctors is necessary. Regular and ongoing quality assurance is important.

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**044 ONE WEEK RAPID IMPROVEMENT OF QUALITY AND THROUGHPUT IN ENDOSCOPY**

L. Hodgson,1 G. Nicholson,1 H. Gray,1 S. More,2 J. Stacey,2 C. Jenkins,2 K. Oppong,2 Endoscopy Unit, 2Service Improvement, Freeman Hospital, Newcastle upon Tyne, UK

**Introduction:** We planned to create a rapid improvement in quality and throughput in Endoscopy in one week by shortening room turnaround time as a result of introducing “lean” operation methodologies to frontline staff and embedding these methodologies into the culture thus creating a nucleus for further improvement.

**Aims & Methods:** Working with the Trust’s Service Improvement Team and McKinsey Management Consultants, a number of methodologies were applied to improve the efficiency of the department. Overall Equipment Effectiveness (OEE) methodology was applied in that the theoretical maximum production limit for Endoscopy would be the continuous use of endoscopes. Any activity other than endoscope usage time reduces the maximum production limit for Endoscopy. The “SS” principles provided a structured approach to establish and maintain a well organised workplace and involved Sorting, Straightening, Shining, Standardising and Sustaining. Idle time, due to reasons including patient flow, was tackled by dialogue and the use of visual management boards.

**Results:** During the observation period the mean turnaround time was 12 minutes and following initial implementation of the above, there was a reduction of 2.5 minutes (21%) per procedure. There was an agreement that any time saved was to be used to embed methodology into the unit culture to improve patient care. Problem solving discussions with external consultants were initiated to motivate and restructure the frontline staff to improve quality of patient care and productivity was achieved.

**Conclusion:** In the course of one week rapid improvement was achieved. However, sustainable improvements require regular team performance discussions and active problem solving with consideration given to the following three intersecting elements. Operating systems involving equipment, activities and information flows needed to treat patients. Mindsets and behaviours involving active engagement of all staff, to improve the system through problem solving and sustaining changes through adherence to standards. Management infrastructure involving performance metrics and management activities required to monitor and continuously improve the system and engagement of staff.

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**045 GLOBAL RATING SCALE REQUIREMENTS FOR PATIENT COMFORT IN ENDOSCOPY: A SOLUTION**

R. Miskimmin1, M. Miskimmin1, M. D. Rutter1. 1Endoscopy, 2Gastroenterology, University Hospital of North Tees, Stockton-on-Tees, UK

**Introduction:** It is a Global Rating Scale (GRS) requirement to collect patient comfort data for endoscopic procedures and to provide anonymised data on this to individual endoscopists at least three times a year, to “enable endoscopists to review their technique or sedation practice if comfort levels are suboptimal”. How this is achieved remains a challenge. One suggestion, using nurse-reporting of patient comfort, is subject to bias. We report our solution to the problem.

**Aims & Methods:** As we believed that only the patient could comment on their level of comfort, a simple discharge questionnaire was devised. All patients complete this before leaving the endoscopy unit. To the question “How comfortable did you find your procedure?” patients circle one of four responses: comfortable (3), acceptable level of discomfort (2), uncomfortable (1), very uncomfortable (0). The procedure, endoscopist and sedation type/dose is also recorded by the discharging nurse. Data are anonymised and collated into a broader 4-monthly audit of quality and safety indicators in endoscopy. Each endoscopist can view their own data and sedation type/dose is also recorded by the discharging nurse. Data are anonymised and collated into a broader 4-monthly audit of quality and safety indicators in endoscopy. Each endoscopist can view their own data along with anonymised data for their colleagues. Comfort is presented as a mean score for each procedure that each endoscopist performs (see table). An in-house policy has been devised and ratified for what is considered an unacceptable level of discomfort (mean < 2.0), and what action should be taken if this occurs.

**Results:** See table (note: data are illustrative).

<table>
<thead>
<tr>
<th>Endo code</th>
<th>N</th>
<th>G</th>
<th>C</th>
<th>FS</th>
<th>E</th>
<th>Comments</th>
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<td>2.9</td>
<td>2.9</td>
<td>2.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion:** By implementing the survey, our Unit improved its GRS comfort rating from C to A. We believe the survey provides a simple and accurate snapshot of patient comfort levels. By collecting the responses at a standardised time (on discharge), variation in recollection of comfort over time is minimised. Although use of higher doses of sedation could distort recollection, we also monitor endoscopists’ sedation practices/use of reversal agents to ensure a safe sedation practice.

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**NEW GLOBAL RATING SCALE SHAREWARE: ENDOSCOPY AUDIT AT A KEYSTROKE**

M. S. Smith1, I. P. Crane2, L. M. Atkin1. 1Gastroenterology, 2IT, Shrewsbury and Telford Hospital, Shrewsbury, UK

Introduction: Endoscopy units joining the National Bowel Cancer Screening Programme are required to score level B or above on the Global Rating Scale (GRS) for quality and safety. The data recorded on our department’s endoscopy reporting system are insufficient for this purpose.

Aims & Methods: Using Microsoft Access, a comprehensive database was constructed to record quality and safety data for use with the GRS in patients undergoing endoscopy. The programme included auditable outcomes and quality standards for all endoscopies as defined by the British Society of Gastroenterology. An initial version was piloted over 6 months in two endoscopy units. The system was developed further using feedback from endoscopists and nurses. Data were entered prospectively on one screen per procedure alongside the endoscopy reporting system. Outcome data were entered retrospectively.

Results: This programme provides: annual or biannual audits for endoscopic procedures in one keystroke; comfort data by endoscopist; 6-monthly safety data; quality outcomes by endoscopist. A live demonstration will be given.

Conclusion: A successful collaboration between the hospital IT department, endoscopists and nurses has produced a comprehensive endoscopy governance system which is fully transferable to other units.

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**ENDOSCOPY 30 DAY MORTALITY: A RETROSPECTIVE AUDIT OF DIAGNOSTIC AND THERAPEUTIC ENDOSCOPY AT A SINGLE UNIT**

T. Elliott1, A. Bates2, T. Wong3, J. Sanderson1, M. McCarthy1. 1Department of Gastroenterology, 2Clinical Audit Department, St Thomas’ Hospital, Guy’s and St Thomas’ NHS Foundation Trust, London, UK

Introduction: The publication from NCEPOD “Scoping our Practice”, 2004, provides nationwide 30 day mortality data for all therapeutic endoscopic procedures. It is important for all centres to perform mortality audits on their own endoscopic practices and compare this to NCEPOD data. This enables assessment, maintenance and improvement of standards in endoscopy.

Aims & Methods: We aimed to retrospectively assess 30 day mortality for the following diagnostic and therapeutic endoscopic procedures—OGD, colonoscopy and percutaneous endoscopic gastrostomy (PEG) for a 1 year period between March 2005 to March 2006 and compare this to the published NCEPOD data. Our secondary aim was to document the causes of death and assess which deaths may have been contributed to by endoscopy. This was done using our Trust clinical information coding system and examination of patient records, postmortem reports and endoscopy reports.

Results: Of 7698 endoscopies performed between March 2005 and March 2006, 89 patients in total died within 30 days of their procedure. Endoscopy directly contributed to death in only 3/7698 total endoscopies performed (0.04%). These were perforated duodenal ulcer during therapeutic endoscopy (n = 1) and haemorrhage post colonoscopy with polypectomy in a patient with end stage renal failure (n = 1). Causes of death not attributable to endoscopy (n = 86) were invasive malignancy (n = 42), COPD (n = 9), sepsis (n = 9), cardiac disease (n = 8), GI bleed (n = 6), chronic liver disease (n = 5), stroke (n = 3) and other (n = 4). Rates of postmortem examination and reporting of deaths to the coroner at GSTT were 16/89 (18%) and 39/89 (44%) respectively, compared with 9% and 27% respectively from NCEPOD.

Conclusion: The 30 day mortality rates after endoscopy at GSTT over a 1 year period compare favourably with those of NCEPOD. Only a small percentage of deaths were directly contributed to by endoscopy. In each of these a systematic review of care was undertaken and appropriate changes where necessary were implemented. Rates of postmortem examination and deaths within 30 days of endoscopy reported to the coroner were superior to those of NCEPOD but were still well short of the recommendation from NCEPOD that all deaths following a medical procedure should be reported to the coroner. This highlights the need for greater vigilance by gastroenterologists in the reporting of deaths to the coroner after endoscopy.

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**EFFECT OF HELICOBACTER PYLORI ERADICATION ON DYSPEPSIA, QUALITY OF LIFE AND UTILISATION OF HEALTHCARE RESOURCES IN THE EASTERN ENGLAND HELICOBACTER PYLORI PROJECT: RANDOMISED CONTROLLED TRIAL**

C. Osornaya1, K. Osornaya2, M. Abdil, L. Guo3, S. Smith2. 1Epidemiology and Education Unit, Centre for Adult and Paediatric Gastroenterology, Institute of Cell and Molecular Science, Barts and The London Queen Mary, 2Department of Endocrinology, Diabetes and Internal Medicine, Guy’s, King’s and St Thomas’ School of Medicine, 3Research and Education Unit, Association of Health Care Professionals, London, UK

Introduction: Helicobacter pylori (H pylori) infection can contribute to the development of diseases, such as dyspepsia, gastritis and ulcers in the stomach and duodenum. H pylori infection is most likely acquired by ingesting contaminated food and water and through person to person contact. The purpose of this paper is to determine the impact of a community based H pylori screening and eradication programme on the incidence of dyspepsia, quality of life and resource utilisation, including a cost consequences analysis.

Aims & Methods: Ten general practices and one community hospital in Eastern England participated in the study. 12 504 people aged 21–65 years were screened for H pylori infection (13C urea breath test); 1639 of the 1794 participants who tested positive were randomised to H pylori eradication treatment or placebo, and 1606 (98%) were followed up for two years. The treatments given were Ranitidine bismuth citrate 400 mg and clarithromycin 500 mg twice daily for two weeks or placebo. Clinical care consultation rates for dyspepsia (defined as epigastric pain) two years after randomisation, with secondary outcomes of dyspepsia symptoms, quality of life, utilisation of resources and health cost were evaluated.

Results: In the eradication group, 37% fewer participants consulted for dyspepsia over two years compared with the placebo group [56/793 v 79/784; odds ratio 0.66, 95% confidence interval 0.47 to 0.95; p = 0.022; number needed to treat 32] and 30% fewer participants had regular symptoms (odds ratio 0.72, 0.57 to 0.91; p = 0.06). NHS costs were £57.45 (£26.70 to £95.56) greater per participant in the eradication group over two years, of which £86.20 (£148; 95% CI 123) was the cost of eradication treatment. No difference in quality of life existed between the two groups.

Conclusion: Screening and eradication of H pylori is feasible in the general population and contributed to significant reductions in the number of people who consulted for dyspepsia and had symptoms two years after treatment. These benefits have to be balanced against the costs of eradication treatment, so a targeted eradication strategy in dyspeptic patients may be preferable.

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**COLONOSCOPY WAITING LISTS: REVALIDATION BY GENERAL PRACTITIONERS IS COST EFFECTIVE AND REDUCES UNNECESSARY ENDOSCOPY COMMISSIONING**

P. F. Marden1, A. Newton2, M. Williamson3, D. Robertson1. 1Gastroenterology, Royal United Hospital, 2Service Commissioning, Bath and North East Somerset PCT, 3Department of Surgery, Royal United Hospital, Bath, UK

Introduction: The advent of colorectal screening highlights the need for accurate colonoscopy waiting lists. The Endoscopy Global Rating Scale (GRS) states that the appropriateness of an endoscopic investigation is central to patient safety and service provision quality. It also highlights the need to be timely as a patient centred endpoint in rating customer care. Failure of endoscopy units to comply with GRS quality standards precludes their participation in colorectal cancer screening programmes and endoscopy training. By December 2008 all patients in the NHS will require effective...
treatment within 18 weeks of original referral, adding further impetus to the need for reduction of endoscopy waiting lists.

**Aims & Methods:** This study aimed to assess the positive impact of clinical revalidation on a Primary Care Trust non-urgent colonoscopy waiting list. The Bath and North East Somerset Primary Care Trust (BANES PCT) covers a population of 182,000 patients and consists of 227 GPs. Patients on the colonoscopy waiting list for over three months were identified from the Primary Care Trust and Royal United Hospital Bath clinical databases. Their general practitioner revalidated the need for a colonoscopy by reviewing their clinical records (66%), contacting the patient by phone (25%) or seeing the patient in clinic (9%). A proforma to help guide this revalidation was produced after consultation with clinical leads in endoscopy, colorectal surgery, gastroenterology, general practice and medical management. The form categorised patients and their symptoms into the need for a barium enema, flexible sigmoidoscopy, colonoscopy or no further action. Results were returned by post. The study took four weeks to complete.

**Results:** 769 patients were identified on the waiting list. Ages ranged from 18–100 years old. 11 patients had waited 7 years, 13 patients 6 years, 17 patients 5 years, 28 patients 4 years and 682 less than 3 years. All GP practices in the PCT participated, and no cost was charged by GPs for conducting the revalidation. Of the 769 forms sent out, 92 were incomplete as patients were not contactable due to moving out of the PCT area. Of the remaining 677 patients 328 (48%) no longer required the examination due to a full recovery from symptoms or not waiting the investigation. 52 patients (7%) were referred to a flexible sigmoidoscopy and 14 (2%) to a barium enema. 283 (41%) still required a colonoscopy and of these 133 (19%) were colorectal cancer surveillance patients. If the original numbers of procedures on the waiting list are taken into account a saving of £51 (19%) were colorectal cancer surveillance patients. If the original numbers were used this saving would be £102 (19%).

**Conclusion:** The striking reduction in colonoscopies required after this revalidation (48%) not only brings into question the accuracy of other waiting lists for endoscopic procedures but perhaps more importantly referral practices by clinicians. For planning in endoscopy services to be efficient and cost effective, accurate waiting lists are a necessity. This survey has demonstrated that through cooperation between commissioning agents, GPs and the local service providers, a more accurate record of waiting lists can be achieved, and service provision for the patient optimised with minimal cost being incurred.

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**505 TOWARDS A BETTER OUTPATIENT SERVICE IN INFLAMMATORY BOWEL DISEASE**

A. Malik1, A. Saeed2, S. Bradbury3, D. W. Bullmore1. 1Medicine, Barnsley NHSFT, Barnsley; 2Medicine, Barnsley NHSFT, Barnsley, UK

**Introduction:** Outpatient (OP) services for inflammatory bowel disease (IBD) patients must alter to meet changing patient expectations and required reduction in New:Follow-Up ratios while maintaining a safe quality service. We have initiated a flexible, responsive service using email and SMS (ibdbarnsley@nhs.net) or SMS text messaging plus blood tests to reduce unnecessary OP attendance and free slots for new patients.

**Aims & Methods:** IBD patients under one medical consultant were identified between 2004 and 2005. Any number of blood tests or visits to see the specialist on-call rota. CC consists of 20 ventilated and non-ventilated beds. There are also similarities in both groups (p = 0.2 in all). In REJ patients, the commonest reason for non-acceptance was that “care ward would be sufficient” (54%) in whom the mortality was 71%. The outcomes of critically ill patients referred by gastroenterologist following acceptance by CC (ACC) were superior to those that were not (REJ). Somewhere, we did not find any clear differences between the two populations to suggest patient selection was a contributory factor. Although these results need to be viewed cautiously because of the small numbers, this audit does suggest that all patients referred to CC may have potentially benefited. Following this audit, service improvements suggested (1) an introduction of gastroenterology/CC patient proforma/pathway, (2) improved dialogue between CC physicians and gastroenterologists and (3) potential high dependency area within Gastroenterology.

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**506 AN AUDIT TO UNDERSTAND OUTCOMES OF CRITICALLY ILL GASTROENTEROLOGY PATIENTS AND THE SELECTION CRITERIA USED BY CRITICAL CARE TO IMPROVE SERVICES**

K. Bowering, P. Kelly, J. McDonough, S. Sarkar. Aintree Centre for Gastroenterology, University Hospital Aintree, Liverpool, UK

**Introduction:** The mortality of patients admitted to Critical Care (High Dependency or Intensive Care) with gastroenterological diagnoses such as cirrhosis (CLD) and upper gastrointestinal haemorrhage (UGH) is high. Consequently, patient selection by Critical Care (CC) may be an important factor contributing to outcomes of critically ill patients referred by gastroenterologist. There are no data on patient selection and outcomes in non-select gastroenterology patients referred to CC.

**Aims & Methods:** To understand outcomes of critically ill gastroenterology patients and the selection criteria used by CC for service development. University Hospital Aintree (UHA) is a large teaching hospital with a 72 bedded gastroenterology unit covered by a consultant gastroenterologist on a specialist on-call rota. CC consists of 20 ventilated and non-ventilated beds covered by 9 consultant intensivist. This was a prospective audit, where all Gastroenterology ward referrals to CC were identified and the medical case notes audited using a standard proforma over a 12-month period (22/8/05 to 21/8/06). 30-day mortality from referral was used as the measurable outcome. Comparisons were made using x² and Mann-Whitney Analysis between accepted (ACC) and rejected (REJ) patients by CC with p < 0.05 as the significance level.

**Results:** Forty nine referrals were made in 38 patients with 66% accepted by CC. Overall 30-day mortality was 61%, but 48% in those accepted for procedure (ACC) compared to 85% in those rejected (REJ) (p = 0.007). There were no differences in average age (ACC: 51 (14.4) years v REJ 56 (8.3) years, p = 0.3), ASA grade (ACC 2.8 (0.7) v REJ 3.4 (1.1) (p = 0.12)) or comorbidities (p = 0.7). 58% of patients had either CLD and/or UGH. Diagnoses were similar with patients with alcohol related problems (36% v 53%) and uncomplicated CLD (48% v 53%) in ACC and REJ (p = 0.3 and p = 0.4, respectively). Patients with UGH (33% v 8%) but this was not significant (p = 0.1). Furthermore, the reasons for requiring CC including; acidosis, hypoxia, ventilatory support and haemodynamic instability, severe sepsis and intensive monitoring/care were also similar in both groups (p = 0.2 or all). In REJ patients, the

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**507 DEVELOPMENT OF AN ENDOSCOPIC ULTRASOUND-GUIDED FINE NEEDLE ASPIRATION CYTOLOGY SERVICE: A REVIEW**

S. S. Menon1, S. A. Kapadia2, K. Maleki3, T. Hollingsworth4, N. C. Fisher1. 1Gastroenterology, Dudley Group of Hospitals, Dudley; 2Gastroenterology, New Cross Hospital, Wolverhampton; 3Radiology; 4Pathology: Dudley Group of Hospitals, Dudley, UK

**Introduction:** Endoscopic ultrasound fine needle aspiration (EUS-FNA) is an established technique for obtaining diagnostic material for cytological (and histological) analysis. BSG guidelines suggest that the target yield for diagnostic material using this technique should be 90%. After earlier experience in radial EUS, we introduced this technique to our cancer network in 2004 and reviewed our outcome data.

**Aims & Methods:** EUS-FNA was done with a Hitachi FG38X echoendoscope and 22G Wilson-Cook Echotip needles. Air-dried smears were used for cytology and any solid material was fixed in formalin. Specimens were
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053 ISOLATION, CHARACTERISATION AND TRANSPLANTATION OF HUMAN ENTERIC NERVOUS SYSTEM STEM CELLS
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Introduction: Hirschsprung’s disease (HSCR) is a congenital defect affecting 1 in 5000 births per year. It is caused by a failure of the enteric nervous system (ENS) to develop normally in the terminal bowel, which is therefore aganglionic. Current treatment is surgical, but long-term morbidity often ensues. A possible future therapy is the use of ENS stem cells to replenish the deficient ENS in the aganglionic segment. Embryonic and early postnatal mouse, rat and human gut have all been shown to contain a source of ENS stem cells that are contained within neurospheres generated in cell cultures of dissociated gut. We have used the chick choio-allantoic membrane (CAM) as a model gut culture system to maintain recipient gut following ENS stem cell transplantation.

Aims & Methods: Our aims were: (1) to isolate and characterise ENS stem cells from embryonic and postnatal (early and late) human gut and (2) to transplant the ENS stem cells into recipient chick gut maintained on the CAM. Cell cultures were generated by dissociating human embryonic and postnatal gut, beyond the age of 1 year. Characterisation shows that they contain cells positive for markers of neurons, glia and ENS stem cells. When transplanted into recipient gut, ENS stem cells migrate to the appropriate gut layers. Current work is directed towards further characterisation of the fate of transplanted neurospheres within recipient guts including the generation of mature neuronal subtypes. These findings provide a significant basis for future work towards a possible stem-cell-based therapy for HSCR.

054 IRRITABLE BOWEL SYNDROME SHOWS AN ACTIVATED AND EFFECTIVE IMMUNE SYSTEM
E. B. Campbell1, K. Garsed1, M. Richards1, S. Foley1, M. Hastings2, F. Whorwell1, Y. Mahida1, I. Hall1, K. Neal2, K. Spiller1, 1 Wolfson Digestive Diseases Centre, University Hospital, Nottingham, UK; 2Neurogastroenterology Unit, Wythenshawe Hospital, Manchester; 3Institute of Cell Signalling; 4Department of Epidemiology and Public Health, University Hospital, Nottingham, UK

Introduction: Irritable bowel syndrome (IBS) is a heterogeneous condition characterised by abdominal pain or discomfort and alterations in stool frequency and consistency. The aetiology is unknown although low-grade mucosal inflammation has been described by ourselves and others. Alterations in the IL-12/IL-10 balance have been reported and genetic polymorphism studies suggest a deficiency in interleukin-10 production may be important.

Aims & Methods: Our aim was to assess deficiencies in inflammatory responses between IBS patients and healthy controls. 65 IBS patients satisfied Rome III criteria for IBS. 29 diarrhoea-predominant IBS (D-IBS), 10 constipation-predominant (C-IBS) and 26 post-infective IBS (PI-IBS). 21 normal healthy controls (HC) were recruited. Peripheral blood mononuclear cells (PBMCs) were isolated over a Histopaque gradient and incubated for 24 hours, with and without LPS stimulation. Supernatant cytokine levels were assayed by Becton Dickson cytometric bead array.

Results: Unstimulated PBMC incubations from D-IBS and PI-IBS had significantly elevated IL-1β, IL-10 and TNF-α levels compared to healthy controls, p<0.05. LPS-stimulated incubations showed no significant differences between HC and IBS subgroups, p>0.05. IL-12 was undetectable in most cases.

Conclusion: IBS differ from healthy controls in producing elevated TNF-α, IL-1β and IL-10 from unstimulated PBMC incubations, suggesting that most IBS patients have an inflammatory component to their illness. The immune response between IBS subgroups and healthy controls was evaluated using cytokine results as median values.

Abstract 054 Cytokine results as median

<table>
<thead>
<tr>
<th></th>
<th>HC (n = 21)</th>
<th>D-IBS (n = 29)</th>
<th>PI-IBS (n = 26)</th>
<th>C-IBS (n = 10)</th>
<th>p vs HC</th>
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<td>820**</td>
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<td>&lt;0.04,*&lt;0.008</td>
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<td>186**</td>
<td>88</td>
<td>&lt;0.04,*&lt;0.008</td>
</tr>
<tr>
<td>IL-10</td>
<td>5</td>
<td>206*</td>
<td>292**</td>
<td>266</td>
<td>&lt;0.03,*&lt;0.002</td>
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<tr>
<td>LPS</td>
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<td></td>
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<tr>
<td>IL-1β</td>
<td>3137</td>
<td>2547</td>
<td>3395</td>
<td>2595</td>
<td>p=0.5</td>
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<tr>
<td>TNF-α</td>
<td>274</td>
<td>391</td>
<td>316</td>
<td>199</td>
<td>p=0.3</td>
</tr>
<tr>
<td>IL-10</td>
<td>1307</td>
<td>1020</td>
<td>1032</td>
<td>991</td>
<td>p=0.3</td>
</tr>
</tbody>
</table>

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system in IBS patients is activated compared to healthy controls and is equally responsive to LPS stimulation. These data suggest an activated rather than a deficient immune system.


**055** INCREASED TRPV1 EXPRESSING NERVE FIBRES IN COLONIC BIOPSIES FROM IRRITABLE BOWEL SYNDROME PATIENTS CORRELATE WITH THE DEGREE OF ABDOMINAL PAIN

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Introduction: TRPV1 is the heat and capsaicin receptor expressed by nociceptor fibres, which on activation leads to burning pain and local release of the neuropeptides CGRP and substance P (SP). It has been linked to GI disorders including painful IBD and rectal hypersensitivity, where increased TRPV1 fibres correlated with rectal hypersensitivity to distension and heat. Our objective was to characterise molecular basis of visceral hypersensitivity in IBS patients by quantifying TRPV1 and SP fibres, and relating these to pain severity.

Aims & Methods: Patients were defined as suffering from IBS using Rome II criteria. Daily pain diaries (using the SF-MPQ) were recorded for 1 week after colonoscopy by IBS patients and controls. All subjects had normal mucosa at colonoscopy/flexible sigmoidoscopy. Recto-sigmoid biopsies were taken for histological analysis to exclude inflammation, and used to study SP and PGP 9.5 fibres. SP and PGP 9.5 and TRPV1- immunoreactive nerve fibres were analysed by computerised image analysis. The area of TRPV1 immunoreactivity was correlated with abdominal pain.

Results: Fine mucosal TRPV1-immunoreactive fibres were seen in all control (n = 22) and IBS (n = 23) biopsies. There was a significant increase in TRPV1 fibres in IBS (fibres/mm², mean (SEM), 4.0 (0.6)) compared to controls (1.6 (n = 22) and IBS (n = 23) biopsies. There was a significant increase in TRPV1 fibres correlated with rectal hypersensitivity to distension after colonoscopy by IBS patients and controls. All subjects had normal mucosa at colonoscopy/flexible sigmoidoscopy. Recto-sigmoid biopsies were used to study SP and PGP 9.5 fibres. SP and PGP 9.5 and TRPV1 fibres were analysed by computerised image analysis. The area of TRPV1 immunoreactivity was correlated with abdominal pain.

However, the precise relationship between these pathways remains unclear. 1Hz repetitive transcranial magnetic stimulation (rTMS) can be used to induce “virtual lesions” of targeted brain regions.

Aims & Methods: Our study applied 1Hz rTMS to the bilaterally represented motor cortex system for human swallowing to establish the existence of functionally relevant asymmetry. Eight right-handed healthy subjects (5M/3F; range 26–47 years) participated in this study. Single pulse TMS combined with pharyngeal motor evoked potentials (PMEPs), recorded via a swallowed intraluminal catheter, were used to assess swallowing motor cortex (SMC) of both hemispheres. The hemisphere evoking the largest PMEPs was termed dominant SMC (D-SMC), the other,

**056** FUNCTIONAL EVIDENCE FOR HEMISPHERIC ASYMMETRY IN THE CORTICAL CONTROL OF HUMAN SWALLOWING: A “VIRTUAL BRAIN LESION” STUDY

1Gastrointestinal Sciences, University of Manchester, Manchester, UK; 2Service de Physiologie, Universite de Rouen, Rouen, France; 3Sobell Department of Motor Neuroscience and Movement Disorders, Institute of Neurology, London, UK.

Introduction: Cortical control of swallowing is bilateral but displays inter-hemispheric asymmetry, with dominant and non-dominant projections.

Abstract 056 Changes in (A) normal, (B) fast and (C) challenge swallow reaction times from baseline following a 1 Hz rTMS-induced “virtual lesion” to swallowing motor cortex.

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Normal rectal sensory function: Evaluation using four different modalities in healthy volunteers

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Introduction: Intact rectal sensory function is integral to normal defaecation and maintenance of faecal continence. Aberrant rectal sensitivity (both heightened and blunted) has been implicated in the genesis of symptoms in patients with functional hindgut disorders. Assessment of rectal sensory function is most widely measured using simple intrarectal balloon distension. However, although quick and easy to perform, results are susceptible to misinterpretation in the presence of altered rectal wall properties (for example, compliance, capacity). Hence, different sensory stimuli (pressure, thermal, electrical) have also been used for evaluating rectal sensation. Irrespective of technique however, defining abnormal rectal sensory function is entirely dependent upon robust normative data, which are currently lacking.

Aims & Methods: To provide robust normal ranges for rectal sensation using different sensory modalities, and to assess their degree of correlation with volumetric balloon distension. 91 healthy volunteers (50 F, mean age 39 years, range 18–63) underwent assessment of rectal sensory thresholds (mmHg). Correlations between different modalities are presented in the table. There were strong correlations (r = 0.530, p = 0.001) and fast (r = 0.612, p < 0.001) and volume thresholds on barostat (r = 0.530, p = 0.001). Similar correlations were observed between DDV on balloon distension and the other sensory modalities.

Conclusion: Our data show clear differences in swallowing behaviour to a virtual lesion of each hemisphere, providing compelling evidence for contralateral “non-dominant” SMC (ND-SMC). A swallowing reaction time task was used to assess swallowing behaviour and comprised 3 cued tasks: normal, fast and challenged swallows (within a 150 ms time window). Baseline swallowing measurements were followed by 10 minutes of 1Hz rTMS (active to D-SMC or ND-SMC and sham, randomised to separate days). Behavioural measurements were then re-acquired, immediately (0), 30 and 60 minutes after rTMS. Baseline v hemispheric intervention data (active and sham) were then analysed with ANOVA.

Results: RTMS to D-SMC was associated with a reduction in both normal (r = 0.01, n.s.) and fast (r = 0.43, p = 0.018) swallow reaction times compared to baseline. By contrast, active rTMS to ND-SMC and sham had no effect. Moreover, challenge swallows showed an expected rise in successful “hits” following sham (p = 0.04) but showed no change following active rTMS of either hemisphere.

Conclusion: Our data show clear differences in swallowing behaviour to a virtual lesion of each hemisphere, providing compelling evidence for functionally relevant asymmetry in the cortical swallowing motor system.

<table>
<thead>
<tr>
<th>Modality</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCS</td>
<td>31 (21–108 ml)</td>
<td>48 (15–151 ml)</td>
</tr>
<tr>
<td>DDV</td>
<td>87 (38–199 ml)</td>
<td>116 (40–192 ml)</td>
</tr>
<tr>
<td>MTV</td>
<td>148 (75–291 ml)</td>
<td>200 (74–326 ml)</td>
</tr>
<tr>
<td>Electrostimulation</td>
<td>12.0 (3.8–20.2 mA)</td>
<td>13.4 (4.9–36.3 ml)</td>
</tr>
<tr>
<td>Thermosensitivity</td>
<td>45.3 (41.3–50°C)</td>
<td>46.2 (42.4–50°C)</td>
</tr>
<tr>
<td>Rectal barostat</td>
<td>7 (4–12 mmHg)</td>
<td>9 (4–14 mmHg)</td>
</tr>
<tr>
<td>FSP</td>
<td>16 (8–24 mmHg)</td>
<td>13 (8–24 mmHg)</td>
</tr>
<tr>
<td>DPP</td>
<td>28 (10–44 mmHg)</td>
<td>26 (9–36 mmHg)</td>
</tr>
</tbody>
</table>

FCS, DDV and MTV (first sensation, desire to defaecate and max tolerated volumes).
Low BMI was the strongest risk factor associated with osteoporosis. Taq1 VDR variants were more prevalent in the male CD population suggesting a sex specific effect.

**059 ADALIMUMAB MAINTAINS CLINICAL REMISSION AND RESPONSE, INDUCES AND MAINTAINS HEALING OF DRAINING FISTULAS IN PATIENTS WITH ACTIVE CROHN’S DISEASE**


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**Introduction:** This study assessed the efficacy and safety of adalimumab (ADA), a fully human anti-TNF monoclonal antibody with demonstrated efficacy in the induction of remission in Crohn’s disease (CD), in the maintenance of clinical remission and of response in patients with active CD.

**Aims & Methods:** In CHARM, a double-blind (DB), placebo-controlled, multicentre study, patients with moderately to severely active CD (CDAI >220-450) received open-label (OL) induction dosages of ADA sc, 80 mg/40 mg at Wk 0 (BL)/Wk 2. All patients were randomised at Wk 4 to placebo (PBO) or 40 mg ADA every other wk (EOW) or 40 mg weekly (W), through Wk 56. Clinical response was defined as a decrease from BL CDAI >70 or 100 (CR-70/100). Co-primary endpoints were remission (CDAI<150) at Wks 26 and 56 in Wk-4 responders (randomised responders RR). CR-70. Patients with draining fistulas at both screening and BL visits were evaluated for healing at Wks 26 and 56 and at their last 2 blinded study visits. Safety was routinely assessed.

**Results:** Characteristics at BL were similar across treatment arms; mean CDAI=313. Of 854 patients enrolled, 778 patients were randomised at Wk 4. Of these, 499 (58%) were stratified as RR. Significantly higher rates of remission and response were maintained in RR with ADA v PBO at both Wk 26 and Wk 56 (table). Maintenance ADA therapy significantly increased percentages of all randomised patients with complete fistula healing at their last 2 visits (33% combined ADA groups v 13% PBO, p<0.05) and at both Wks 26 and 56 (33% combined ADA groups v 13% PBO, p<0.05). In the 4-wk QL induction period, serious adverse events (SAE) were reported in 5% of patients. In the 52-wk DB period, significantly lower rates of SAE were reported in the ADA 40 mg EOW/W treatment groups, 9% and 8% respectively, v15% in the PBO group (p<0.05).

**Conclusion:** Adalimumab, EOW or W, was more effective than PBO in maintaining ADA-induced clinical remission and response in patients with moderately to severely active CD. Patients receiving ADA therapy achieved and maintained significant and complete fistula healing. Adalimumab was well-tolerated, with significantly lower rates of SAE v ADA maintenance compared with PBO.

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**060 PREGNANCY OUTCOME AND FERTILITY IN INFLAMMATORY BOWEL DISEASE IS INFLUENCED BY DISEASE PHENOTYPE**


1Gastrointestinal Unit, Institute of Medical Genetics, Western General Hospital; 2Medical Genomics Unit, Institute of Medical Genetics, Western General Hospital; 3Centre for Reproductive Biology, University of Edinburgh; 4MRC Centre for Inflammation Research, QMRI, University of Edinburgh, Edinburgh, UK

**Introduction:** The incidence of the chronic inflammatory bowel diseases, Crohn’s disease (CD) and ulcerative colitis (UC) peaks between the ages of 10 and 40 years. Subsequently many females have IBD during their reproductive years and have concerns surrounding fertility, pregnancy, and childbirth. CD patients have fewer babies than expected; the most important determinant of fecundity is disease activity at conception. In UC there is a threefold increase in subfertility in women with preVIOUS ileal anastomosis.

**Aims & Methods:** We aimed to describe pregnancy outcome, subfertility rates, and menstrual health in a large population of accurately phenotyped Scottish women whose IBD was diagnosed while they were of child-bearing age. Furthermore, we aimed to explore women’s perception as to how their IBD has affected their decisions regarding their family planning. A detailed questionnaire was sent to 554 female IBD patients from a single tertiary referral centre in Lothian, Scotland. All women were less than 50 years old at diagnosis (median 26.4 years; IQR 21.3-33.2). Data from 272 fully completed responses were analysed, comprising 137 patients with UC and 135 with CD. The median age at enrolment was 40.5 years (IQR 33.0-49.8). Control data on over 95% of the childbirths in Scotland were available for comparison (http://www.isdscotland.org/sd/1022.html).

**Results:** 58.8% of women reported attempting pregnancy, with 90.6% of these successful. 36/160 (22.5%) of women attempting to be pregnant were referred for fertility treatment. 172/272 (63.2%) of respondents had been pregnant, with data available on a total of 365 pregnancies. 27/172 (15.7%) patients had at least one unplanned pregnancy. 12.2% were taking the oral contraceptive pill at the time of conception. Although women with CD took longer to conceive for each pregnancy than those with UC (6.64 months v 3.83 months, p=0.03), they had equivalent numbers of pregnancies. The proportion of low birthweight infants was more than expected in the background population (11.2% v 7.2%, p=0.01). Women with IBD during their pregnancy years had shorter gestations than those diagnosed after all pregnancies [38.9 v 39.7 weeks, p=0.0023] and more preterm babies (16.2% v 6.8%, p=0.021). Detailed phenotyping demonstrated that patients with ulcerative proctitis (E1) had significantly heavier birthweights than those with left sided or extensive colitis (E2 and E3) [3.63 kg v 3.20 kg, p=0.03]. Women reported that IBD made their periods heavier and more painful, especially during periods of disease activity.

**Conclusion:** Women with IBD in Lothian have pregnancies of shorter duration and babies of lower birthweight than the background population. However, women with limited ulcerative proctitis appear to be protected from these problems.

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**061 IDENTIFICATION OF GLI-1 AS AN IBD2 SUSCEPTIBILITY GENE**


1Gastrointestinal Unit, Institute of Medical Genetics, Western General Hospital; 2Medical Genomics Unit, Institute of Medical Genetics, Western General Hospital; 3Centre for Reproductive Biology, University of Edinburgh; 4MRC Centre for Inflammation Research, QMRI, University of Edinburgh, Edinburgh, UK

**Introduction:** There is compelling evidence for a genetic susceptibility locus determining ulcerative colitis (UC) susceptibility/phenotype within 12q13 (IBD2), outwith the NOD2/CARD15 gene in the IBD1 region that is implicated in Crohn’s disease (CD) pathogenesis. However, the causative IBD2 gene has yet to be identified. The hedgehog (HH) signalling pathway plays vital roles in gastrointestinal tract development, homeostasis and disease.1 Paneth cell differentiation,2, 3 T cell immunology, and inflammation. The major HH pathway effector, GLI-1, plays vital roles in gastrointestinal tract development, homeostasis and disease.1 Paneth cell differentiation,2, 3 T cell immunology, and inflammation. The major HH pathway effector, GLI-1, (3.43 kg v 3.20 kg, p=0.03). Women reported that IBD made their periods heavier and more painful, especially during periods of disease activity.

**Aims & Methods:** We aimed to analyse the contribution of inherited GLI-1 variation and dysregulated HH signalling to IBD susceptibility. A total of 19 SNPs were typed, including 4 GLI-1 tagging SNPs, and 8 IBD2 that

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**Abstract 059 ADA efficacy at Weeks 26 and 56, % of patients**

<table>
<thead>
<tr>
<th>Endpoints</th>
<th>Wk</th>
<th>PBO (n = 170)</th>
<th>ADA 40 mg EOW (n = 172)</th>
<th>ADA 40 mg W (n = 157)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remission</td>
<td>26</td>
<td>17</td>
<td>40*</td>
<td>47*</td>
</tr>
<tr>
<td>56</td>
<td>12</td>
<td>26</td>
<td>52*</td>
<td>52*</td>
</tr>
<tr>
<td>CR-100</td>
<td>56</td>
<td>17</td>
<td>41*</td>
<td>48*</td>
</tr>
<tr>
<td>CR-70</td>
<td>56</td>
<td>28</td>
<td>54*</td>
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</tr>
<tr>
<td>56</td>
<td>18</td>
<td>43*</td>
<td>49*</td>
<td></td>
</tr>
</tbody>
</table>

*p<0.001 v PBO.
defined adjacent haplotype blocks. Three common and five rare GLI-1 haplotypes were present in the Scottish healthy control (HC) population (n = 1374). SNPs were assayed by Taqman in a Scottish IBD population (335 cases of CD and 474 of UC) for case-control analysis. Log-likelihood testing assessed the overall contribution of GLI-1 variation to disease susceptibility. Haplotype and variant analysis was performed using $\chi^2$ testing. Expression of key HH signalling components were analysed by microarray, real-time PCR and immunohistochemastry in a large panel of formalin-fixed and fresh frozen colonic tissues from CD (n = 53), UC (n = 87) and HC (n = 31).

Results: A gene-wide haplotype-tagging strategy was employed to determine whether GLI-1 is the IBD2 gene. We have demonstrated a strong association with GLI-1 variation and inherited susceptibility to UC (OR = 35.8, p < 0.0001), particularly with severe disease (p = 3.55 × 10^{-05}), extensive disease (p = 0.014), and requirement for colectomy (p = 1.45 × 10^{-09}). UC patients homozygous for the risk haplotypes had increased rates of severe disease (88.9% vs 48.2%, p = 0.002, OR = 8.61), colectomy (55.6% vs 16.7%, p = 0.0001, OR = 6.25) and more extensive disease (E3 72.2% vs 41.0%, p = 0.02, OR = 3.74) than other UC patients. Haplotype tagging of adjacent blocks shows that GLI-1 is located in a haplotype block spanning 10 Kb that does not extend into neighbouring genes. In detailed expression studies, we have shown that Indian hedgehog-Patched-1-Gli-1 signalling is downregulated in UC, regardless of inflammation, consistent with recent reports that it is downstream of NF-kB.

Conclusion: These findings implicate common genetic variation in a key component of the HH signalling pathway in the pathogenesis of IBD, providing evidence that GLI-1 is the IBD2 gene.


062 NATALIZUMAB MAINTAINS CORTICOSTEROID-FREE REMission FOR 2 YEARS IN PATIENTS WITH Moderately TO Severely Active Crohn’s Disease AND IN THOSE WITH PRIOR INFliximAB Exposure: RESULTS FROM AN OPEN-LABEL EXTENSION Study

S. Ghosh, R. Panaccione, 1 Gastroenterology, Imperial College, London, UK; 2 Inflammatory Bowel Disease Clinic, University of Calgary, Calgary, Canada

Introduction: Natalizumab has been demonstrated as effective therapy for moderately to severely active Crohn’s disease (CD) in both induction and long-term maintenance trials. Fifty five per cent of patients who responded to natalizumab induction therapy were in remission (Crohn’s Disease Activity Index (CDAI) score <150) after 15 months of continuous natalizumab therapy in the ENACT trials, compared with 22% in the placebo group (p < 0.001). This analysis was undertaken to assess the ability of natalizumab to maintain long-term corticosteroid-free remission.

Aims & Methods: Patients who completed the ENACT-2 trial were eligible to enroll in an open-label extension (OLE) study. The primary objective of this 2-year study was to examine the long-term safety and tolerability of natalizumab. Secondary efficacy endpoints included evaluation of the ability of natalizumab to maintain remission. This analysis includes patients who were in remission after 15 months of continuous natalizumab therapy in the ENACT trials who enrolled in the OLE study and received an additional 12 months of natalizumab therapy. Eighty seven patients met the criteria for analysis, 22 of whom had previous exposure to, and 11 of whom had previously failed therapy with, infliximab. Remission rates were calculated using last observation carried forward.

Results: Ninety three per cent (81/87) of patients who were in remission at Month 12 of ENACT-2 were in remission following 6 additional natalizumab infusions in the OLE study. After 12 additional infusions, 86% (75/87) were in remission. 91% (73/80) of the patients who were corticosteroid-free and in remission on entry maintained corticosteroid-free remission after 6 additional natalizumab infusions in the OLE, and 85% (68/80) did so after 12 additional infusions. In the subpopulation of patients with prior exposure to infliximab, 85% (17/20) and 90% (18/20) were in corticosteroid-free remission after an additional 6 and 12 infusions of natalizumab in the OLE study. Similarly, 80% (8/10) who had previously failed therapy with infliximab were in corticosteroid-free remission at the same timepoints.

Conclusion: Natalizumab maintained remission for >2 years (27 months) when administered as continuous therapy. Patients who entered remission with natalizumab induction therapy were highly likely to maintain long-term corticosteroid-free remission, including patients who had previously failed therapy with infliximab.

063 REPLICATION OF CROHN’S DISEASE MUCOSAL E. coli ISOLATES WITHIN MACROPHAGES AND THEIR SUSCEPTIBILITY TO ANTIBIOTICS

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Introduction: At least five independent studies have shown that Crohn’s disease (CD) mucosa commonly contain E. coli. These E. coli have an adherent phenotype and can be found within CD tissue macrophages suggesting a role in pathogenesis.

Aims & Methods: We aimed to investigate the ability of CD mucosal E. coli to replicate within macrophages and their susceptibility to antibiotics. Replication of CD E. coli isolates within J774-A1 murine macrophages and human monocyte-derived macrophages (HMDM) was assessed by lysis and culture after gentamicin killing of non-internalised bacteria and verified by transmission electron microscopy (TEM). The antibiotics: ampicillin, azithromycin, clarithromycin, ciprofloxacin, rifampicin, tetracycline and trimethoprim, were assessed for their efficacy against macrophage-internalised CD E. coli.

Results: All three CD isolates studied: HM580, HM605 and HM615, replicated within J774-A1 cells (170.8 (6.8%), 230.3 (15.9%) and 274.3 (33.8%); respectively by 3 h) more than non-pathogenic E. coli strain K12 (127.0 (16.3%), p < 0.05). Similar replication was seen within HMDM (HM605: 395.2 (74.3)% by 3 h) also exceeding that seen for K12 (138.8 (20.0%), p = 0.03). TEM showed replicating E. coli within macrophage phagolysosomes. The table shows killing of HM605 within J774-A1 cells following 3 h incubation with antibiotics at published peak serum concentrations (Cmax) and 10% of Cmax. At 10% Cmax, combinations of ciprofloxacin, trimethoprim and tetracycline (97% (0%) killing) and of ciprofloxacin, rifampicin and tetracycline (94 (11%) were able to kill a higher proportion of HM605 within macrophages compared with ciprofloxacin alone (86 (2%), p < 0.01).

Conclusion: Clinical trials are now indicated to assess the efficacy in CD of combination antibiotic therapy with ciprofloxacin, tetracycline and trimethoprim.


Abstract 063

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>% killing of HM605 at Cmax</th>
<th>% killing of HM605 at 10% of Cmax</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SE)</td>
<td>Mean (SE)</td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>11.2 (2.5)</td>
<td>7.8 (4.5)</td>
</tr>
<tr>
<td>Azithromycin</td>
<td>41.0 (10.5)</td>
<td>28.5 (9.1)</td>
</tr>
<tr>
<td>Clarithromycin</td>
<td>50.8 (4.3)</td>
<td>32.2 (3.6)</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>100.0 (0.0)*</td>
<td>87.2 (9.5)*</td>
</tr>
<tr>
<td>Rifampicin</td>
<td>76.0 (11.5)*</td>
<td>16.0 (12.5)</td>
</tr>
<tr>
<td>Tetracyline</td>
<td>69.3 (11.5)*</td>
<td>61.7 (6.6)*</td>
</tr>
<tr>
<td>Trimethoprim</td>
<td>57.2 (4.9)*</td>
<td>44.8 (8.8)*</td>
</tr>
</tbody>
</table>

*p < 0.05*

**ADALIMUMAB MAINTAINS CLINICAL REMISSION IN PATIENTS WITH CROHN’S DISEASE WITHOUT CONTINUED STEROID USE AND REGARDLESS OF ANY HISTORY OR CONCOMITANT IMMUNOSUPPRESSANT THERAPY**


**Introduction:** This study evaluated the efficacy of adalimumab (ADA) in sustaining clinical remission in patients with active CD (1) without continued corticosteroid use and (2) with a history of anti-TNF treatment or concomitant immunosuppressant (IMM) therapy.

**Aims & Methods:** In CHARM, a Phase III, double-blind, placebo-controlled study of the efficacy and safety of ADA, patients with active CD (CDAI 220–450) received open-label induction dosages of ADA sc 80 mg or mg at Wk 0 (BL)/Wk 2. At Wk 4, all patients were randomised to placebo (PBO) or 40 mg ADA, every other week (EOW) or weekly (W), through Wk 56. Patients with clinical response (decrease from BL CDAI >70 CR-70) at Wk 4 were classified as randomised responders (RR). Steroid tapering was permitted at/after Wk 8 for patients with clinical remission (CDAI <150). The % of patients with CDAI<150 at Wks 26 and 56 who had been off steroid therapy for >90 days were calculated for each treatment arm. The % of patients with CDAI<150, stratified by either concomitant IMM use or anti-TNF history, was also calculated at Wks 26 and 56.

**Results:** Clinical characteristics at BL were similar across the 3 arms: mean CDAI = 313; corticosteroid use, 44%; concomitant IMM use (AZA, 6-MP, or MTX), 47%; history of anti-TNF therapy, 50%. Of 854 patients receiving induction therapy, 778 were randomised. Of these, 499 (58%) were RR. Significantly greater percentages of patients receiving ADA achieved steroid-free remission for >90 days (19% EOW, 15% W, 3% PBO at Wk 26; 29% EOW, 20% W, 5% PBO at Wk 56 (p<0.05 each ADA group v PBO)). The proportions of RR achieving CDAI<150 at Wks 26 and 56 by history of prior anti-TNF or concomitant IMM therapy are shown (table). 

**Conclusion:** Adalimumab therapy allowed a significant percentage of patients to maintain steroid-free remission for >90 days at both Wk 26 and Wk 56. Adalimumab was also significantly superior to PBO for the long-term treatment of CD irrespective of concomitant IMM or prior anti-TNF therapies.

**FURTHER EXPERIENCE WITH THE USE OF 6-THIOGUANINE AS AN ALTERNATIVE IMMUNOSUPPRESSANT IN PATIENTS WITH CROHN’S DISEASE**

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**Introduction:** 6-Thioguanine (6-TG) has been used as an alternative thiopurine in patients with Crohn’s disease (CD) resistant to, or intolerant of conventional immunosuppression, with evidence of good clinical efficacy. However, recent reports have questioned its safety with respect to hepatotoxicity but experience remains limited. In this study we report our experience of the safety and efficacy of 6-TG in a series of patients with Crohn’s disease.

**Aims & Methods:** A retrospective study of 29 patients with CD who had failed thiopurines +/- / methotrexate between 2001 and 2006 was performed. Indications for treatment with 6-TG were active disease (n=15), ability to withdraw infliximab (n=8), steroid sparing (n=3) and fistula closure (n=3). All patients underwent regular clinical review, liver function tests (LFTs) and full blood counts (FBC). 20/29 patients underwent imaging of the liver and those on treatment for longer than 1 year were advised to undergo liver biopsy.

**Results:** The median dose of 6-TG used was 40 mg daily (range 20–60 mg). Median duration of 6-TG treatment was 22 months (range 0–60 months). Initial clinical response was achieved in 17/29 (59%). Of these, 12 (41%) remained in remission at a median of 44 months follow-up. Six of 29 (21%) patients discontinued 6-TG due to adverse effects (hepatotoxicity (n=3), gastrointestinal upset (n=2), and rash (n=1)). In total, 9/29 (31%) patients developed abnormal LFTs during thioguanine therapy. These were mostly transient and mild (up to 2× normal). One patient developed a sinusoidal syndrome with splenomegaly and pancytopenia resolving on cessation of 6-TG. FBCs were normal in all other patients. MRI and US imaging showed mild splenomegaly in one other patient. All other liver images were normal. Of 11 liver biopsies, none showed evidence of nodular regenerative hyperplasia. Positive findings at liver biopsy were focal areas of thickened liver cell plates (but no fibrosis) (n=1), granuloma (n=1), mild portal tract inflammation (n=2) and mild steatosis (n=6).

**Conclusion:** 6-TG is moderately well tolerated with acceptable clinical efficacy for third line immunosuppression in CD. Hepatotoxicity remains a concern and the occurrence of an atypical sinusoidal syndrome emphasises the need for vigilance. Mild LFT abnormalities are common and of uncertain significance. However, reports of significant NRH as summarised by a recent European 6-TG Working Party have not been substantiated by this well-studied UK cohort.
TOLERABILITY OF 6-MERCAPTOPURINE IN AZATHIOPRINE-INTOLERANT PATIENTS WITH INFLAMMATORY BOWEL DISEASE


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Introduction: Azathioprine (AZA) and 6-mercaptopurine (6-MP) are both effective immunosuppressive agents for the induction and maintenance of remission in both Crohn’s disease (CD) and ulcerative colitis (UC). At present, AZA therapy is prescribed in preference in Europe, while 6-MP is favoured as first-line therapy in N America. Azathioprine intolerance (AZAINTOL) is a common clinical problem, requiring drug withdrawal in up to 30% of patients. The subsequent use of 6-MP in these patients is described, but data to support this are lacking.

Aims & Methods: The aim of this study was to assess the tolerability of 6-MP therapy in IBD patients previously intolerant of AZA, and determine factors that predict tolerability. 61 AZAINTOL patients who were subsequently treated with 6-MP at a single tertiary referral centre for IBD between 1993 and 2005 were identified. Data were extracted by retrospective case review. Phenotypes were analysed by the Montreal classification. The median age at diagnosis was 34.9 years (IQR 24.7–46.8). There were equal numbers of each sex (male 31/61, 50.8%), and disease type (CD 31/61, 50.8%; UC 30/61, 49.2%). The median duration of 6-MP treatment was 733 days (IQR 328–1127) in AZAINTOL-6-MP patients, and 54 days (IQR 5–180) in AZAINTOL-MPINTOL patients.

Results: 6-MP was tolerated by 59% (36/61) of AZAINTOL patients overall, 60.7% (17/28) in patients in whom nausea and vomiting was the primary reason for AZA withdrawal, 61.1% (11/18) for flu-like illness, 33.3% (3/9) with hepatotoxicity, 100% (1/1) with neutropenia, 100% (3/3) with rash and 0% (0/1) with pancreatitis. It was noteworthy that the primary intolerance of 6-MP was frequently different to that for AZA. The median age at diagnosis was significantly younger in the AZAINTOL-6-MPINTOL group (28.4, IQR 22.5–38.1) compared with AZAINTOL-6-MPINTOL (37.0, IQR 27.0–56.5, p = 0.014). 6-MP was tolerated more frequently in males (22/31, 71.0%) than in females (14/30, 46.7%; p = 0.048, OR 2.79, CI 1.09–7.04). The maximum AZA dose in the two groups was equivalent (AZAINTOL-6-MPINTOL 1.48 mg/kg vs. AZAINTOL-6-MPINTOL 1.39 mg/kg, p = 0.80), as was the median duration of AZA treatment (35.0 days [IQR 24.0–157.0] vs. 76.0 days [IQR 26.5–197.0]; p = 0.93). 6-MP tolerance was not affected by diagnosis, disease location, disease behaviour, surgery, smoking status, family history, extra-intestinal manifestations, or TPMT activity.

Conclusion: 6-MP should be considered in AZAINTOL patients, particularly those in whom nausea and vomiting, flu-like illness or rash was the major reason for AZA withdrawal.

Polyposis families without mutations have a less severe phenotype


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Introduction: Familial adenomatous polyposis (FAP) is an autosomal dominant condition predisposing to multiple polyps of the large bowel. However, not all patients with polyposis carry germine mutations in the APC (adenomatous polyposis coli) gene or other known genes which predispose to this condition.

Aims & Methods: The genotype-phenotype relationship of polyposis kindreds without identified mutations in known genes was determined in order to characterise features of a previously undescribed polyposis syndrome. The yield using stringent mutation detection methods was also determined. A cohort of sixty two unrelated patients recorded at St Mark’s Hospital did not have mutations in the APC or MYH genes identified using standard techniques in diagnostic genetics laboratories. The coding and splice regions of the APC gene were directly sequenced. Exon number changes were detected using a relatively new technique called multiplex-ligation probe amplification (MLPA). Haplootype analysis was performed using six flanking microsatellite markers, and two intronic single-nucleotide polymorphisms (SNPs) within APC. The MYH gene was screened for mutations using single-stranded conformational polymorphisms (SSCP) analysis and sequencing.

Results: Nineteen kindreds were found to have either previously undetected APC mutations or exon copy-number changes. Four patients were found to carry a biallelic MYH mutation. Therefore approximately 37% of patients had mutations found not previously identified by diagnostic genetics laboratories. Five novel mutations of APC were identified, including a duplication of exon 4 of APC found using MLPA. Duplication mutations have not previously been identified. Genotype-phenotype analysis revealed a difference in polyp number between mutation positive (n = 23) and mutation negative (n = 39) groups (p < 0.003, t test). Tumour genotype did suggest an aetiology not involving the Wnt signalling pathway. A subgroup analysis of the mutation negative group (based on family history) shows that there is a less penetrant condition among those with evidence of recessive inheritance. There is a later age of diagnosis of polyposis (4 years v 31.8 years, p = 0.007, t test), lower rate of colorectal and extra-colonic cancers (p < 0.002 and 0.017 respectively, Fisher’s exact), and lower rate of duodenal polyposis (p < 0.001, Fisher’s exact).

Conclusion: The mutation negative group is likely to consist of a heterogeneous group of patients with mutations in a different predisposition gene for polyposis. A subgroup analysis suggests that those with a recessive type of inheritance pattern have a less severe phenotype and may represent a distinct syndrome.

Determinants of compliance to a community colorectal cancer screening programme in Lecco province (Italy)


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Introduction: Compliance to the first round of the colorectal cancer screening programme in the Lecco province (21 654 invitations), based on faecal occult blood test (FOBT) + colonoscopy in FOBT-positive individuals, was 47%. In order to assess major determinants of compliance, we evaluated differences of scholarity, profession, age, sex and motivations in two randomised groups of participants (P) and non-participants (NP) to the programme. We also studied the overall impact of different promotional interventions on the compliance to the programme.

Aims & Methods: 400 post-P and 400 post-N questionnaires were sent by ordinary mail in June 2006 to the two groups (200 P and 200 NP) randomly selected from the Health trust population database. Since NP had also a very low response rate, they were then contacted by phone. Concerning the different promotional interventions, other than a campaign on local media, specific interventions were classified as A, B, C and D. A = personal invitation letter; B = information from GPs, friends and neighbours; C = information from Pharmacists, media and associations; D = invitation (60%), information from GPs, friends and neighbours (22%), role of Pharmacists, media and associations (14%). Time, language, explanation, logistic problem with the test kit and, in general, the level of satisfaction concerning the programme were around 90% for P group.
Conclusion: Major determinants of compliance to mass colorectal cancer screening in our province are: age, level of scholarity, type of profession, type of intervention. In order to increase population compliance to this programme we should work on better communication, by promoting the advantages of early diagnosis and another useful concept could be to outline a message like “take time for yourself and your health”. We should consider sending the kit by the ordinary mail, as this strategy had a higher level of participation, and also to send a recall letter for those who did not participate initially.

Introduction: Mass screening of colorectal cancer with faecal occult blood test (FOBT) every two years has been recommended by health organisations in Italy. Lecco province is one of the first pilot areas which were selected in order to implement screening for the general population. We report herein the preliminary results of this program which started in November 2005.

Aims & Methods: The campaign has been organised according to the schedule of conditions defined by regional health authorities. The target population comprised 78,464 men and women aged between 50 and 69 years. Individuals with risk factors of colorectal cancer, known inflammatory colonic disease or those who underwent a complete colonoscopy in the last 5 years were excluded. The campaign started in November 2005; general practitioners (GPs) were trained in small groups before starting up. Study population was contacted by mail; the faecal test was distributed by pharmacists and GPs. When necessary, reminder letters were sent 2 months after the first contact. Immunochemical faecal tests were processed with an automated reading technique by a single analysis centre.

Results: Up to October 2006, 21,654 asymptomatic individuals have been screened. The participation rate was equal to 47.6%. The FOBT positivity rate was 5.2%. A complete colonoscopy was performed in 93.3% of people referred for a positive test. On colonoscopy cancer was diagnosed in 23 cases (4.2%), an advanced adenoma in 111 cases (20.5%), a non-advanced adenoma in 137 cases (25.3%). The subsite of cancer was the rectum or the sigmoid in 57% of cases, 71.1% of screen-detected cancers were stage 0 or I, and 33.3% were diagnosed by histology of resected adenomatous polyps. The rate of caecal intubation at colonoscopy was 97.6%; perforation rate after adenoma in 137 cases (25.3%).

Conclusion: These findings indicate a potential mechanism by which lamin A/C may improve a less adherent, more motile and consequently more aggressive phenotype on colon cancer cells. Cancers exhibiting lamin A/C expression may be more aggressive because they acquire a stem cell-like phenotype.

Introduction: Malignant colorectal obstruction can be managed with self-expanding metal stents. Palliation of non-operative neoplastic disease can be achieved. The addition of a "bridge to providing a "bridge to surgery". This management approach provides a highly effective clinical outcome when used as a "bridge to surgery" and facilitates optimisation of preparative clinical parameters, which improve outcome in this group. Small case numbers and predominant retrospective study designs limit current data. We describe our prospective experience of combination fluoroscopic and “through-the-scope” (TTS) self expandable metallic stent placement over a 5-year period.

Aims & Methods: All patients presenting with clinical or radiological evidence of colorectal obstruction between January 2001 to November 2006 at a tertiary referral colorectal unit were recruited to the study. Combination fluoroscopic and TTS endoscopic placement under conscious sedation was used for all stent placements. The primary clinical end-point was technical success of stent placement. Secondary end-points included in the analysis were procedure related complications (stent migration, re-occlusion, perforation, stent fracture and fistualisation).

Results: Sixty-six patients were recruited to receive combination fluoroscopic/TTS stent insertion. Complete colorectal luminal obstruction was radiologically evident in 30% of patients pre-procedure using water-soluble contrast “road mapping”. 3/66 (4.5%) of stents were placed proximal to the splenic flexure. Technical success was achieved in 89% (59/66) cases. Complications (early/delayed) occurred in 10/66 (15%) of the cohort. Stent migration occurred in 3%, luminal re-occlusion 6%, acute “on table” perforation 1.5%, stent fracture 1.5% and stent related fistualisation in 1.5%.

Conclusion: This is the largest prospective UK experience of combination TTS/fluoroscopic colorectal stenting. We have shown the combination approach provides a highly effective clinical outcome when used as a clinical tool both for palliative and preoperative “bridging” therapy with a threefold reduction in complication rates when compared to previous published retrospective UK data.

Introduction: Endoscopic mucosal resection (EMR) is a standard minimally invasive treatment for early gastric and oesophageal neoplasms in Japan. However, there are very few centres in the UK performing EMR on a regular basis. We have been treating all early upper GI neoplasms by EMR at our centre. The EMR techniques are rapidly evolving but there are four common techniques that are widely used. Most centres use one of these techniques.
techniques to treat all cases but we believe that all these techniques are complimentary and a centre performing EMR should have expertise in all these techniques.

**Aims & Methods:** We have recorded small (60–90 seconds) video clips of the complete techniques and will present them with the aims: (1) to demonstrate the technical feasibility of each technique and (2) to discuss the strengths, weaknesses and clinical applicability of each technique. All patients undergoing EMR have chromoendoscopy to identify the exact margins of the abnormal area which is then premarked using diathermy. One of the dissected field has been identified then submucosal injection is performed (if indicated) prior to EMR.

**Results:** We have performed EMRs on 40 upper GI lesions using four different techniques as listed below. We have had excellent clinical outcome and cure rates with only a single patient developing delayed bleeding at 48 h (which was controlled very effectively by endoscopic therapy). None of our patients developed perforation or required emergency surgery. We have recorded small clips demonstrating the technical aspects of each of the following techniques: video clip of strip biopsy (conventional) using a double channel gastroscope; video clip of cap and snare technique (Olympus); video clip of Duette (Ligation technique) (Cook); video clip of endoscopic submucosal dissection (ESD) using an IT knife and Needle knife (Olympus). We feel that Cap and Snare technique is well suited to remove single small and raised (<1.5 cm) lesions with or without surface inflammation/erosions but is time consuming requiring two operators. Duette is very effective in treating large flat lesions and is very quick requiring only single operator but is not suited for polypoid lesions and lesions with surface erosions/minor ulcerations. Strip biopsy is an excellent technique to remove residual islands left behind using any of the above techniques. ESD is an excellent technique which meets the basic percutaneous principle of one piece resection of cancers. However it is time consuming and has a long learning curve.

**Conclusion:** EMR is an effective technique to treat early upper GI neoplasms. All four techniques demonstrated above are not mutually exclusive but are complimentary and the technique should be chosen depending on the size and type of the lesion. We recommend that clinicians performing EMR should acquire expertise in all these techniques as more then one techniques are commonly used to effectively remove a large lesion in upper GI tract.

**074 ENDOSCOPIC SUBMUCOSAL DISSECTION FOR EARLY OESOPHAGEAL CANCER: TECHNICAL FEASIBILITY AND CLINICAL APPLICABILITY**

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**Introduction:** Conventional EMR techniques are well suited for tiny (<1.5 cm) gastric and oesophageal lesions. However, when used to resect larger lesions these techniques are associated with high risk of recurrence.1 In order to overcome this problem, a new technique of endoscopic submucosal dissection (ESD) has been developed and has become a standard treatment for early gastric cancers in Japan.2 The primary aim of ESD is to obtain one piece resection of cancers. However, ESD using endoscopic knives is not routinely used in UK. We have been performing ESD for all early gastric cancers at our centre in Portsmouth for the last 2 years. We now report the first case of ESD of early oesophageal cancer in UK.

**Aims & Methods:** A 74-year-old male with known Barrett’s oesophagus was found to have high grade dysplasia on a non-targetted biopsy taken during surveillance OGD. We performed chromoendoscopy to identify the lesion and removed it using Insulated Tip (IT) knife assisted ESD. It starts with identification and demarcation of the lesion margins which are marked by a needle knife. This is followed by submucosal injections at the margins before performing a circumferential mucosal incision around the lesion. Subsequent submucosal dissection is performed using an IT knife. We will demonstrate a video clip of IT knife assisted ESD in oesophageal adenocarcinoma.

**Aims:** (1) To demonstrate the technical feasibility of ESD in early oesophageal cancer. (2) To discuss the strengths and clinical applicability of ESD. (3) To demonstrate the common complications and their management during ESD.

**Results:** We identified and removed a 4.5 cm large oesophageal lesion extending 3 cm above and 1.5 cm below the cardia involving half the oesophageal circumference. On histology this was primarily high-grade dysplasia but a very tiny focus of adenocarcinoma with superficial submucosal invasion was also identified. The procedure took 80 minutes. Some therapeutic haemorrhage was noted and effectively treated. No other complication was seen and patient was discharged home after overnight observation.

**Conclusion:** We have demonstrated that it is technically possible to remove large oesophageal lesions using IT knife assisted ESD. It is safe and feasible but is time consuming. ESD provides a large single piece resection specimen for accurate histological staging to predict the risk of lymph node metastasis and decide the need for additional treatment. We feel that in our case the focus of submucosal invasion was so minute that it would have been easily missed by conventional multiple piece EMR techniques and patient might have received inadequate treatment with risks of delayed recurrence. We suggest that ESD is an ideal technique to remove oesophageal lesions bigger than 2 cm in size.


**075 AN EMERGING ‘GOLD STANDARD’ FOR THE COLONOSCOPIC ASSESSMENT OF ULCERATIVE COLITIS: HIGH MAGNIFICATION CHRONOSCOPY PROVIDES A VALID IN VIVO OPTICAL BIOPSY AND EXTENT ASSESSMENT TOOL**

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**Introduction:** Colonoscopy with mucosal biopsy is currently considered the “gold standard” investigation for the evaluation of disease activity and extent in UC. Conventional colonoscopy criteria alone are inadequate for disease extent assessment and in predicting clinical outcomes. Histopathological markers of relapse such as microscopic crypt abscess formation and mucus depletion cannot be identified using conventional resolution white light endoscopy.

**Aims & Methods:** To evaluate the efficacy of high-magnification chromoscopic colonoscopy in vivo prediction of histopathological inflammation and disease extent using standardised endoscopic and histopathological criteria. Total colonoscopy using the Olympus CF240Z magnifying colonoscope was performed prospectively on 325 consecutive patients with a known diagnosis of ulcerative colitis. A “bi-phasic” examination of all 5 colonic segments and rectum using conventional endoscopy followed by magnification imaging and biopsy was performed. Disease activity was documented using the Baron classification, modified Saitho criteria for magnification imaging and Matts criteria for histopathology.

**Results:** 1800 images were analysed from 300 patients (25 excluded). The K coefficient of agreement between magnification Saitho grade 1/2, 3/4, 5/6 and histopathological Matts grade 1/2, 3a/b and grade 4/5 disease was 0.96, 0.62 and 0.51 respectively. Mild, moderate and severe histopathological disease (Matts grade 1/2, 3a-3b) was represented more accurately using Saitho criteria than conventional Baron scores for all clinical parameters ($r=0.976, p<0.001$). Magnification imaging was significantly better than conventional colonoscopy when predicting in vivo extent of disease ($p=0.0001$).

**Conclusion:** This is the largest prospective study and only Western group to report on this application of magnification imaging. Using a simplified modification to the HMCC Saitho criteria we demonstrated a more accurate in vivo representation of disease activity as compared to conventional colonoscopy using Baron criteria for all parameters ($p<0.001$). These data have major clinical implications, as HMCC grade 2/3 disease is associated with epithelial defects and an increase in mucosal inflammatory cellular traffic—a significant independent predictor of disease relapse. These data are therefore clinically useful for targeting patients at “high risk” of clinical relapse where medical therapy could be augmented (provide a valid biomarker for disease relapse in vivo) and also by limiting the numbers of biopsies required per examination with significant cost saving advantages to pathology services.

**076 DOES CHANGE TOWARDS SAFER SEDATION PRACTICES REALLY IMPROVE ENDOSCOPIC OUTCOMES? A RE-AUDIT FOLLOWING IMPLEMENTATION OF GRS, BSG AND NCEPOD RECOMMENDATIONS**


**Introduction:** The NCEPOD report “Scoping our practice” (2004) emphasised sedation practice as a contributor to endoscopy related mortality. Following our audit of sedation practice in 2003 a number of
GRS, BSG and NCEPOD recommendations were introduced. These included: feeding back personal practice, change in endoscopy reporting tool, introduction of pharmacy labelled/prepacked 5 mg syringes of midazolam (MD), adverse events recording of MD doses > 5 mg and reversal agents, better documentation of procedural sedation and recovery procedures of sedated patients and quarterly adverse events review.

**Aims & Methods:** Re-audit 12 months following the implementation of safer sedation practice to assess its impact on endoscopic outcomes. 7071 consecutive patients in a 6-month period in 2006 were identified using Uniform database and compared with the audit data over the same period collected from the Endoscribe database in 2005 (7234 patients). ERCPs were not included in both data sets. Outcomes audited were MD doses, 30 day post procedure mortality (PPM), reversal agents use and immediate complications. PPM was correlated by identifying any death within 30 days of an endoscopic procedure using the hospital Medway IT system. Statistical analysis used were $\chi^2$, paired $t$-test, statistical significance $p<0.05$ and Mann-Whitney (significance $p<0.05$) tests.

**Results:** Sedation was used in similar proportions of procedures in both years, ie 53% (n=3816) in 2005 and 56% (n=3916) in 2006. Sedation practice was improved: (1) overall mean MD dose (SD) was much lower at 2.9 (1.2) mg in 2005 v 4.9 (2.5) mg in 2005 (p<0.0001); (2) MD doses in patients aged >70 years were lower at 2.4 (1) mg in 2005 v 4.3 (2) mg in 2005 (p<0.0001); and (3) no endoscopist used mean MD doses > 5 mg in 2006 compared to 10.75% (6/22) in 2005. However, the use of reversal agents (0.6% and 0.7% for 2005 and 2006 respectively; $\chi^2=0.1$) overall PPM (0.7% v 0.8% for 2005 and 2006 respectively; $\chi^2=0.6$) and sedated patients PPM (1.0% v 1.3% for 2005 and 2006 respectively; $\chi^2=1.4$) were all similar. Furthermore, overall poor outcomes in sedated patients were not identified (PPM/Renal/Reversal/MD Complications) were no different at 1.7% in 2005 and 2.0% in 2006 ($\chi^2=0.6$). In PPM patients, the ages (74.5 (13) years v 74.3 (13) years; $p=0.8$) and the MD doses used (2.3 (2) mg v 2.0 (1.3) mg in 2005 and 2006 respectively; $p=0.6$) were similar. Conclusion: With the implementation of safer sedation practice, there were substantial reductions in the doses of Midazolam used in 2006. This did not translate to improved hard end points in endoscopic outcomes.
Aims & Methods: To prospectively assess the clinical applicability and predictive power of the EC3870K endomicroscope for the in vivo diagnosis of intraepithelial neoplasia (IN) during ongoing videoendoscopy. Patients assuming a high lifetime risk of colorectal neoplasia underwent colonoscopy using the EC3870K. Following endoscopic intubation, lesions were identified using conventional chromo-endoscopy (morphology class as per Paris guidelines) with CLE imaging graded according to Mainz criteria. 10% iv sodium fluorescein facilitated surface and deep imaging to the lamina propria. CLE imaging of both circumscribed lesions and 4 segments of colorectal quadrant was performed. Targeted biopsy specimens from the raster scanned colorectal segments were then compared with conventional histopathology.

Results: Forty patients completed protocol (22 male; median age 62 years (range 39–82)). The median ileal intubation and total procedure duration was 12 minutes (range 5–26) and 55 minutes (range 28–92) respectively. Ileal CLE revealed discrete gablect cells, stromal capillary loops, visible erythrocytes and mononuclear cells. Video chromoscopy revealed 162 lesions in 39 patients (73 (45%) Paris 0–II, 54 (33%) Paris Is, 35 (22%) Paris III)—median diameter 5 mm (range 1–22), 8 mm (range 2–34) and 10 mm (range 5–20 mm) respectively. CLE imaging was obtained on all 162 (100%) lesions. 5422 confocal images were then compared to 802 targeted biopsy specimens. Regarding primary end-points of IN prediction, when neoplastic endomicroscopic architecture was defined according to Mainz criteria for combined superficial and deep vascular net pattern and discrete architecture (dilated vascular distortion with leakage elevation +/− tortuosity and cryptic/gablect cellular attenuation with mucin depletion respectively), IN was predicted with an accuracy of (99.1%) sensitivity 97.4%/specificity 99.3%−MN p < 0.05. The secondary end-point of image quality evaluation at re-review showed 76% of images were graded as satisfactory to good.

Conclusion: Endomicroscopy permits high quality cellular, subsurface vascular and stromal imaging in vivo enabling high accuracy prediction of neoplasia. Clinical practice may be radically changed in targeted cohorts where rapid high accuracy diagnosis of IN can be made with optimisation of on-table management decisions with an associated reduction in non-significant histopathological sampling—an important health economic requisite.

Introduction: Azathioprine is an accepted part of the long term treatment of inflammatory bowel disease (IBD) but concerns exist regarding its carcinogenic potential. Studies in renal transplant and rheumatology patients have reported an increased risk of cancer however azathioprine is prescribed. In IBD, studies have suggested at most a small increased risk of lymphoma and protection against colorectal cancer but the overall risk of malignancy has not been established.

Aims & Methods: We conducted a case-control study using the General Practice Research Database. We examined the records of patients with IBD for azathioprine prescriptions and diagnoses of any cancer (excluding non-melanoma skin cancer) occurring after diagnosis. Prescriptions per year of follow-up were then grouped into tertiles for analysis. Azathioprine use was compared between cases (with a diagnosis of cancer) and controls (without). Subjects with less than one year of follow-up were excluded.

Results: 16 663 patients with IBD were identified of whom 15 771 had exposure to azathioprine. 8121 (52%) of the IBD cohort were taking azathioprine at the time of referral for follow-up. These patients had a median of 4.3 years (range 6 months–24 years) on azathioprine with a mean of 4.3 years (SD 2.1 years) of follow-up. 162 (100%) lesions. 5422 confocal images were then compared to 802 targeted biopsy specimens. Regarding primary end-points of IN prediction, when neoplastic endomicroscopic architecture was defined according to Mainz criteria for combined superficial and deep vascular net pattern and discrete architecture (dilated vascular distortion with leakage elevation +/− tortuosity and cryptic/gablect cellular attenuation with mucin depletion respectively), IN was predicted with an accuracy of (99.1%) sensitivity 97.4%/specificity 99.3%−MN p < 0.05. The secondary end-point of image quality evaluation at re-review showed 76% of images were graded as satisfactory to good.

Conclusion: Endomicroscopy permits high quality cellular, subsurface vascular and stromal imaging in vivo enabling high accuracy prediction of neoplasia. Clinical practice may be radically changed in targeted cohorts where rapid high accuracy diagnosis of IN can be made with optimisation of on-table management decisions with an associated reduction in non-significant histopathological sampling—an important health economic requisite.
addition to increasing lower oesophageal sphincter tone. We conclude

that surgical control of reflux with a floppy Nissen alters gastric motility which may have consequences for proximal migration of oesophageal reflux.

GUT SYMPTOMS IN DIABETES CORRELATE WITH AUTONOMIC ACTIVITY AND COMPONENTS OF THE RECTO-ANAL INHIBITORY REFLEX, NOT PUDENDAL NERVE LATENCIES

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Introduction: Anorectal dysfunction leading to faecal incontinence (FI) occurs in 20% of patients with diabetes mellitus (DM), and a number of motor and sensory abnormalities have been described. The problem occurs more often in patients with systemic autonomic neuropathy, but it remains unknown whether gut-specific autonomic dysfunction is associated. The recto-anal inhibitory reflex (RAIR) is an enteric reflex that reflects the integrity of the sampling mechanism in the physiology of faecal continence. We hypothesised that diabetic patients with FI have gut specific abnormalities—autonomic disturbance and abnormal RAIR parameters.

Aims & Methods: The following patients were studied: 31 type I DM (19 female, mean age 32; 19 FI and 12 constipation); 42 type II DM (26 female, mean age 38; 26 FI and 16 constipation); 21 controls (14 female, mean age 35). Patients underwent two systemic (cardiovascular autonomic tone (Mayo CAS score) and pudendal nerve terminal motor latency, PNTML (St Mark’s electrode)) and two gut specific (autonomic tone (rectal mucosal blood flow-RMBF) and RAIR) neurological assessments. Three phases of the reflex were identified—the latency from stimulus to maximal sphincter relaxation; the duration of maximal relaxation; the time to recovery back to resting pressure. In addition, the amplitude of maximal reflex relaxation was compared between groups. All subjects completed symptom scores for FI (St Mark’s) and constipation (Wexner).

Results: Systemic: CAS score in DM patients was not correlated with symptom severity for either FI (r = −0.21, p = 0.10) or constipation (r = 0.14, p = 0.20). PNTMLs were not correlated with symptom scores (FI or constipation), RMBF or any component of the RAIR. Gut-specific: RMBF was lower in DM patients with constipation than controls (124 ± 169, p < 0.05) and correlated inversely with Wexner scores (r = −0.79, p = 0.004). RAIR correlated with FI scores in DM patients (r = 0.65, p = 0.02). RAIR amplitude of relaxation was lower in constipated DM patients than controls (54 ± 77%, p = 0.03) and diabetics with FI (54 ± 68%, p < 0.05). RAIR recovery back to resting pressure was slower in diabetics with FI than constipation or controls (6.8 ± 4.4 and 4.3 resp, p = 0.01 both). This RAIR recovery time correlated with RMBF (r = 0.58, p = 0.04).

Conclusion: Symptoms in patients with DM correlate with gut specific features but not systemic ones. Specifically there were differences in the character of the RAIR, pointing towards a role for sphincter muscle dysfunction in diabetics with constipation and for sphincter neuropathy in diabetics with FI.

BILE ACID MALABSORPTION AND ILEAL HISTOLOGY IN DIARRHOEA-PREDOMINANT IRRITABLE BOWEL SYNDROME

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Introduction: Bile acid malabsorption (BAM) is characterised by watery diarrhoea and confirmed by subnormal (<10%) 7-day retention of 75-seleno-homo-taurocholic acid (SeHCAT). It occurs almost invariably after

Abstract 083

EVALUATION OF GASTRIC FUNCTION AND CONTROL OF MIGRATION OF OESOPHAGEAL REFLUX AFTER LAPAROSCOPIC NISSEN FUNDOPLICATION

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Introduction: Gastric emptying increases after Nissen fundoplication. The aim of this study was to document changes in gastric myoelectrical activity, if any, after surgery for GORD

Aims & Methods: The study group consisted of 27 symptomatic patients, with documented gastroesophageal reflux disease on 24 hour pH monitoring. Twelve patients had Barrett’s oesophagus, 3 had previous endotherapy. All patients had detailed history, symptom questionnaire, manometry and pH and multi-channel electrogastrography (EGG) studies before surgery and at approximately 6 months postoperatively.

Results: Seventy four per cent of patients had some degree of preoperative gastric dysmotility. After surgery, 63% (17) of patients had normal percentages of baseline electrical rhythm (~70% range 2–4 cycles per minute). Dominant frequency remained within the normal range but was significantly increased (p < 0.01) from 2.3 to 3.0. Power ratio reduced from 2.1 to 1.8 (NS). There was also a significant reduction in post-prandial reflux, from 29.9 to 2.6% (p < 0.001) which was associated with the improvement in normagastria after surgery. Laryngopharyngeal reflux (LPR) was identified in 18 patients (67%) preoperatively. This was significantly reduced (p < 0.001) to 9 positive LPR postoperatively.

Conclusion: Nissen fundoplication normalises gastric dysmotility in addition to increasing lower oesophageal sphincter tone. We conclude that surgical control of reflux with a floppy Nissen alters gastric motility which may have consequences for proximal migration of oesophageal reflux.

Abstract 084

GUT SYMPTOMS IN DIABETES CORRELATE WITH AUTONOMIC ACTIVITY AND COMPONENTS OF THE RECTO-ANAL INHIBITORY REFLEX, NOT PUDENDAL NERVE LATENCIES

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Introduction: Anorectal dysfunction leading to faecal incontinence (FI) occurs in 20% of patients with diabetes mellitus (DM), and a number of motor and sensory abnormalities have been described. The problem occurs more often in patients with systemic autonomic neuropathy, but it remains unknown whether gut-specific autonomic dysfunction is associated. The recto-anal inhibitory reflex (RAIR) is an enteric reflex that reflects the integrity of the sampling mechanism in the physiology of faecal continence. We hypothesised that diabetic patients with FI have gut specific abnormalities—autonomic disturbance and abnormal RAIR parameters.

Aims & Methods: The following patients were studied: 31 type I DM (19 female, mean age 32; 19 FI and 12 constipation); 42 type II DM (26 female, mean age 38; 26 FI and 16 constipation); 21 controls (14 female, mean age 35). Patients underwent two systemic (cardiovascular autonomic tone (Mayo CAS score) and pudendal nerve terminal motor latency, PNTML (St Mark’s electrode)) and two gut specific (autonomic tone (rectal mucosal blood flow-RMBF) and RAIR) neurological assessments. Three phases of the reflex were identified—the latency from stimulus to maximal sphincter relaxation; the duration of maximal relaxation; the time to recovery back to resting pressure. In addition, the amplitude of maximal reflex relaxation was compared between groups. All subjects completed symptom scores for FI (St Mark’s) and constipation (Wexner).

Results: Systemic: CAS score in DM patients was not correlated with symptom severity for either FI (r = −0.21, p = 0.10) or constipation (r = 0.14, p = 0.20). PNTMLs were not correlated with symptom scores (FI or constipation), RMBF or any component of the RAIR. Gut-specific: RMBF was lower in DM patients with constipation than controls (124 ± 169, p < 0.05) and correlated inversely with Wexner scores (r = −0.79, p = 0.004). RAIR correlated with FI scores in DM patients (r = 0.65, p = 0.02). RAIR amplitude of relaxation was lower in constipated DM patients than controls (54 ± 77%, p = 0.03) and diabetics with FI (54 ± 68%, p < 0.05). RAIR recovery back to resting pressure was slower in diabetics with FI than constipation or controls (6.8 ± 4.4 and 4.3 resp, p = 0.01 both). This RAIR recovery time correlated with RMBF (r = 0.58, p = 0.04).

Conclusion: Symptoms in patients with DM correlate with gut specific features but not systemic ones. Specifically there were differences in the character of the RAIR, pointing towards a role for sphincter muscle dysfunction in diabetics with constipation and for sphincter neuropathy in diabetics with FI.

BILE ACID MALABSORPTION AND ILEAL HISTOLOGY IN DIARRHOEA-PREDOMINANT IRRITABLE BOWEL SYNDROME

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Introduction: Bile acid malabsorption (BAM) is characterised by watery diarrhoea and confirmed by subnormal (<10%) 7-day retention of 75-seleno-homo-taurocholic acid (SeHCAT). It occurs almost invariably after
ileal resection and frequently in severe ileal disease, for example, Crohn’s. We observed BAM in one third of diarrhoea-predominant irritable bowel syndrome (D-IBS) patients (Smith MJ et al. J R Coll Physicians London 2000;34:448–51), an unexpected finding without obvious explanation. Terminal ileal villous atrophy in association with BAM has been reported.

Aims & Methods: To prospectively study the association of BAM and ileal histological changes in D-IBS. All patients with D-IBS (ROME II criteria) with or without BAM, seen over the last 24 months, were followed-up. Data on SeHCAT retention, TI histology (light microscopy H & E stain) and daily stool frequency were collected.

Results: See table. Seventy two patients with D-IBS were studied; 31 had BAM. TI histological changes occurred in one fifth of patients with BAM but only rarely in those without. Mild non-specific inflammation was the most common histological abnormality; ileal villous atrophy was rare (n = 2) and noted only with BAM. Stool frequency >3 per day was slightly commoner in those with BAM.

Conclusion: Bile acid malabsorption in D-IBS is, in our experience, rarely associated with major ileal histological abnormalities. We therefore suggest that other mechanisms must be involved in causing BAM.

Gastroduodenal free papers

086 GENDER DIFFERENCE IN GASTRIC CANCER IS UNRELATED TO GASTRIC ATROPHY

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Introduction: Most gastric cancers develop by progression from H pylori superficial gastritis to atrophic gastritis to cancer (as originally described by Correa). Male gender is a strong risk factor for gastric cancer with the age specific incidence occurring 10–20 years earlier in males versus females. The mechanism of this gender effect and where it exerts its influence on the cancer pathway are unclear. We have investigated whether development of atrophic gastritis occurs at a younger age in males versus females.

Aims & Methods: Between 1995 and February 1997, 10234 subjects (male/female; 7021/3213, mean age; 49.0 (SD 8.9) in male, 49.4 (8.7) in female) participated in our Japanese endoscopic mass screening programme. Pepsinogen (PG) I and II levels were simultaneously assayed. We compared the age-specific percentage of atrophic gastritis (PG I/II <3.0) between males and females. We also studied the incidence of new gastric cancer development in the cohort of 6983 followed-up for 4.7 years. Multivariate analysis was conducted to assess the hazard ratios of gender and PG I/II.

Results: At the initial screening, 4909 subjects were seropositive for H pylori with the prevalence being similar between males and females (48.1% v 47.6%, p=0.6). The prevalence of low PG I/II increased progressively with increasing age, and the rate and timing of increase was identical in males and females, being 11.7% v 14.4% in males v females for age 30–39, 21.6% v 25.1% for 40–49, 32.5% v 36.8% for 50–59, 46.5% v 45.6% for 60–69 and 50.0% v 45.6% in 70 and over. The annual gastric cancer incidence rate was >3 times higher in males v females (0.17% v 0.05%, p<0.001). Male gender and low PG I/II were independent risk factors for the incidence of gastric cancer. Hazard ratio in males compared with females was 3.5 (95% CI 1.4 to 8.9, p<0.01) and hazard ratio for PG I/II <3.0 v >3.0 was 5.1 (95% CI 2.5 to 10.3, p<0.0001).

Conclusion: This study indicates that the male predominance is not mediated via more rapid development of atrophic gastritis in males versus females.

087 INACTIVATION OF THE SECOND ALLELE IN PATIENTS WITH HEREDITARY DIFFUSE GASTRIC CANCER HARBOURING GERMLINE E-CADHERIN MUTATIONS

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Introduction: Approximately 10% of gastric cancers have a familial association. Hereditary diffuse gastric cancer (HDGC) is a cancer predisposition syndrome with autosomal dominant inheritance. Germline mutations of the E-cadherin tumour-suppressor gene (CDH1) are causative in 30–40% of HDGC cases and the penetration of these mutations is 67–83%. Following Knudson’s two-hit hypothesis both alleles of the E-cadherin gene must be inactivated for loss of function to occur.

Aims & Methods: The aim of the study was to determine how the second allele of the E-cadherin gene is inactivated in HDGC patients with germline CDH1 mutations. 13 patients from 7 HDGC families (mean age 49) provided formalin-fixed paraffin embedded tumour material for analysis. DNA extracted from the tumour material from each of these patients was used for PCR using exon-specific primers to amplify and sequence each of the 16 CDH1 exons. The mutative effects of intronic mutations on splicing were investigated by in silico analysis using the LAGAN Alignment Toolkit to assess sequence conservation and Splicing Rainbow to identify splice factor binding sites. Loss of heterozygosity (LOH) analysis was carried out using the chromosome 16q microsatellite markers D16S3025, D16S496, D1623141 and D1653067. Availability of corresponding normal DNA (from blood) only permitted analysis on five individuals.

Results: Seven potentially interesting intronic mutations were found and these were spread throughout the gene. These mutations had not previously been identified as polymorphisms. In silico analysis demonstrated that some of these mutations fall within conserved sequences and may affect the binding strength of positive and negative regulators of splicing. In addition many silent mutations and polymorphisms, which are not likely to effect protein expression, were also identified. In one patient loss of heterozygosity was identified at all of the interpretable locs analysed, indicating that this is the mechanism of inactivation of the second allele of the E-cadherin gene in this patient. FISH analysis is being conducted to determine the extent of the region of loss.

Conclusion: This is the first report that LOH can be the second hit in an individual with a germline mutation. In HDGC, intronic mutations have been identified in five individuals, however additional functional analysis will be required to determine their significance. Analysis of promoter methylation is being undertaken to determine if this is the mechanism of gene silencing in the remaining patients. In addition to genetic alterations, transcriptional regulation and post-translational modifications are other likely mechanisms of E-cadherin downregulation.

088 THE CLINICAL UTILITY AND DIAGNOSTIC YIELD OF ROUTINE GASTRIC BIOPSIES IN THE INVESTIGATION OF IRON DEFICIENCY ANAEMIA

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Introduction: Upper GI endoscopy and duodenal biopsy is standard practice in iron deficiency anaemia (IDA). Previous small studies suggest that gastric atrophy is common in patients with IDA. Despite this, gastric biopsy is frequently not performed in these patients despite having the opportunity to do so during endoscopy and the Royal College of Pathologists have suggested that gastric biopsy is of no clinical use in the macroscopically normal stomach.

Aims & Methods: This study aimed to determine the frequency of significant gastric pathology in patients with IDA. For this, gastric biopsies were evaluated by 1 pathologist with a consensus meeting. In addition, CDH1 mutations. 13 patients from 7 HDGC families (mean age 49) provided formalin-fixed paraffin embedded tumour material for analysis. DNA extracted from the tumour material from each of these patients was used for PCR using exon-specific primers to amplify and sequence each of the 16 CDH1 exons. The mutative effects of intronic mutations on splicing were investigated by in silico analysis using the LAGAN Alignment Toolkit to assess sequence conservation and Splicing Rainbow to identify splice factor binding sites. Loss of heterozygosity (LOH) analysis was carried out using the chromosome 16q microsatellite markers D16S3025, D16S496, D1623141 and D1653067. Availability of corresponding normal DNA (from blood) only permitted analysis on five individuals.

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Conclusion: This is the first report that LOH can be the second hit in an individual with a germline mutation. In HDGC, intronic mutations have been identified in five individuals, however additional functional analysis will be required to determine their significance. Analysis of promoter methylation is being undertaken to determine if this is the mechanism of gene silencing in the remaining patients. In addition to genetic alterations, transcriptional regulation and post-translational modifications are other likely mechanisms of E-cadherin downregulation.

Abstract 88

<table>
<thead>
<tr>
<th>Atrophy</th>
<th>&lt;</th>
<th>Atrophy 2–3</th>
</tr>
</thead>
<tbody>
<tr>
<td>No anaemia (n = 163)</td>
<td>160 (98.1%)</td>
<td>3 (1.9%)</td>
</tr>
<tr>
<td>Anaemia (n = 152)</td>
<td>112 (73.6%)</td>
<td>40 (26.4%)</td>
</tr>
</tbody>
</table>

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significantly between the IDA group and the random control group (p = 0.233). Within the IDA group aspirin usage did not differ in patients with and without atrophy (p = 0.986). Coeliac disease was diagnosed in 6/156 IDA patients (3.8%) colorectal carcinoma in 4/161 (2.4%).

Conclusion: This study has shown a high level of significant gastric pathology in patients with anaemia. Moreover, there is a strong association between IDA and gastric atrophy suggesting that this might be an important and underrecognised cause of IDA. These patients may benefit from treatment of HP where applicable or in some cases a parenteral route of iron administration. These data suggest that routine gastric biopsy in patients with IDA is valuable and national guidelines should consider including this as part of the standard workup.

089 ADMINISTRATION OF DIMETHYLOXALYLGLYCLE AS A NOVEL GASTROINTESTINAL REPAIR STRATEGY
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Introduction: Hypoxia inducible factor-1 (HIF) is upregulated by low oxygen tension, increasing production of angiogenic peptides and growth factors. Its role in injury and repair is, however, unclear. Modulation of HIF levels may provide a novel approach to the prevention and/or treatment of gastrointestinal disease. We therefore examined the effect of dimethyl oxalylglycine (DMOG), which increases intracellular HIF levels, in a variety of in vitro and in vivo models of gut injury and repair.

Aims & Methods: In vitro studies utilised promigratory (wounded monolayer) and proliferation ([3H] thymidine incorporation) assays of human colon HT29 epithelial cells. In vivo studies utilised a rat gastric (indomethacin, 20 mg/kg and 3 hour restraint) damage model.

Results: DMOG stimulated migration in a dose-dependent manner, causing an approximate twofold increase in migration when added at 25 μmol (p<0.01). Additive/synergistic effects were seen when DMOG was added to cells in hypoxic conditions. DMOG also stimulated thymidine uptake by about twofold when added at 50 μmol. In the in vivo indomethacin and restraint induced rat gastric damage model, both oral and subcutaneous administration of DMOG decreased gastric injury without influencing intra gastric pH (50% reduction when 1 ml gavaged at 0.57 mM, p<0.01).

Conclusion: These initial studies suggest that non-peptide factors such as DMOG, that modulate HIF levels, may be useful to stabilise or repair gut mucosa. Further studies appear warranted.

090 IS MASTIC GUM EFFECTIVE IN THE TREATMENT OF FUNCTIONAL DYSPESIA? A RANDOMISED DOUBLE-BLIND PLACEBO CONTROLLED TRIAL
K. J. Dabas1, E. Silka1, L. J. Vlatta1, D. Frantz1, G. I. Amygdalos2, G. Giannikopoulos3. 1GI Unit, Surgery; 2Medicine, Chios District General Hospital, Chios, Greece

Introduction: Treatment of dyspepsia remains unsatisfactory. Mastic gum is a resinous exudates from the stem of Pistacia lentiscus varchia. It is a traditional natural remedy used throughout the eastern Mediterranean.

Aims & Methods: The aim of this study was to assess the efficacy of mastic gum in patients with functional dyspepsia. One hundred and eight patients were randomly assigned to receive either mastic gum 350 mg three times daily or placebo. After three weeks of treatment the change from baseline in the severity of symptoms of functional dyspepsia was assessed using the Hong Kong index of dyspepsia. Patients’ global assessment of efficacy was also evaluated.

Results: 103 patients had outcome data. There was a marked improvement of symptoms in 41% of patients receiving placebo and in 75% of patients receiving mastic gum (p<0.03). The symptom score improved significantly overall in patients receiving mastic gum (~8.66 v ~3.78 in the placebo group) (p<0.05). Individual symptoms that showed significant improvement with mastic gum were: stomach pain in general, stomach pain when anxious, dull ache in the upper abdomen and heartburn (~0.05 for all four symptoms).

Conclusion: Mastic gum significantly improves symptoms in patients with functional dyspepsia.
Abstract 092

Small bowel/nutrition free papers

**093 WHAT ARE THE BEST IMMUNOLOGICAL TESTS FOR COELIAC DISEASE? A PROSPECTIVE ASSESSMENT OF 2000 BIOPSY VERIFIED RESULTS**

**094 WHAT IS THE OPTIMAL SITE AND NUMBER OF ENDOSCOPIC DUODENAL BIOPSIES REQUIRED TO DIAGNOSE COELIAC DISEASE?**

### Abstract 092

**Vitamin D3 levels**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Severe def &lt;25 nmol/l</th>
<th>Mid def 25–50 nmol/l</th>
<th>Adequate &gt;50 nmol/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients (n = 25)</td>
<td>12</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Sex, M/F</td>
<td>5/7</td>
<td>7/2</td>
<td>2/2</td>
</tr>
<tr>
<td>Age (mean [SD])</td>
<td>53.8 [10]</td>
<td>62.9 [13.0]</td>
<td>60.6 [13.2]</td>
</tr>
<tr>
<td>Musculoskeletal symptoms</td>
<td>8/12</td>
<td>7/9</td>
<td>3/4</td>
</tr>
<tr>
<td>On Creon or Antaz at D check</td>
<td>6/12</td>
<td>7/9</td>
<td>3/4</td>
</tr>
<tr>
<td>25OHD, median (range) nmol/l</td>
<td>7.75 [5–19]</td>
<td>37 [26–46]</td>
<td>67.65 [64.4–90]</td>
</tr>
<tr>
<td>Calc, median (range) nmol/l</td>
<td>7.38 [5.6–2.51]</td>
<td>2.40 [2.55–2.57]</td>
<td>2.31 [2.22–2.41]</td>
</tr>
<tr>
<td>Phosphate, median (range) mmol/l</td>
<td>1.00 [0.61–1.18]</td>
<td>1.01 [0.85–1.31]</td>
<td>1.12 [0.74–1.39]</td>
</tr>
<tr>
<td>Intact PTH (PTH), median (range) pg/ml</td>
<td>70.7 [8.4–317.2]</td>
<td>27.6 [12.4–51.1]</td>
<td>35.8 [19.5–52.5]</td>
</tr>
</tbody>
</table>

*Kruskal-Wallis non-parametric test: p < 0.05

### Abstract 093

**Accuracy of serological tests used to refer for biopsy**

<table>
<thead>
<tr>
<th>Serological test</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
<th>PPV (%)</th>
<th>NPV (%)</th>
<th>Biopsies taken/2000</th>
<th>Missed CD/2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only TTG+</td>
<td>90.9</td>
<td>90.1</td>
<td>28.6</td>
<td>99.6</td>
<td>245</td>
<td>7</td>
</tr>
<tr>
<td>Only EMA+</td>
<td>87.0</td>
<td>98.0</td>
<td>64.4</td>
<td>99.4</td>
<td>104</td>
<td>10</td>
</tr>
<tr>
<td>If TTG+ and then EMA+</td>
<td>85.7</td>
<td>98.6</td>
<td>71.7</td>
<td>99.4</td>
<td>92</td>
<td>11</td>
</tr>
<tr>
<td>Either TTG or EMA+</td>
<td>92.2</td>
<td>91.1</td>
<td>29.3</td>
<td>99.7</td>
<td>242</td>
<td>6</td>
</tr>
<tr>
<td>IgA gliadin+</td>
<td>47.3</td>
<td>95.9</td>
<td>31.5</td>
<td>97.9</td>
<td>114</td>
<td>40</td>
</tr>
<tr>
<td>IgG gliadin+</td>
<td>49.4</td>
<td>89.6</td>
<td>16.0</td>
<td>97.8</td>
<td>238</td>
<td>39</td>
</tr>
</tbody>
</table>

+ , positive.
grade of villous atrophy 4 biopsies was most accurate (1 from the bulb, 2 from the proximal and 1 from the distal duodenum-regime B). Conclusion: We would suggest that the optimal method for diagnosing CD is Regime B—this ensures recognition of all cases of CD, as well as detecting the most severe lesion. Our data suggest that we should no longer perform quadrantic duodenal biopsies but instead take a linear approach.

095 PROSPECTIVE STUDY OF THE PREVALENCE OF COELIAC DISEASE IN ADULTS WITH TYPE 1 DIABETES MELLITUS: EFFECT UPON GLYCAEMIC CONTROL AND QUALITY OF LIFE

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Introduction: The prevalence of coeliac disease (CD) in Type 1 diabetes mellitus ranges between 3% to 7% and the optimum screening profile is as yet undetermined. The effect of CD on metabolic control of diabetes is undetermined as is the effect on quality of life. The preliminary results are presented.

Aims & Methods: 1000 consecutive patients were recruited from the Sheffield Diabetes centre (mean age 42.3 years, 439 females). Antinuclear antigens (EMAs) and anti-tissue transglutaminase antibodies (IgG) and immunoglobulins were measured. Additionally Short Form-36 v2 was completed to measure quality of life. Patients with positive antibodies were offered duodenal biopsy.

Results: Twenty two patients had known CD prior to the study and were already established on GFD. 58 patients had previously undetected positive antibodies and 8 IgA deficiency. 19 were EMA/IgG positive and 39 IgG positive in isolation. 12 new cases of CD were found at biopsy (11/12 EMA positive) and all patients with IgA deficiency had a normal biopsy. Sensitivity and specificity for positive EMA/IgG was 91.7% and 99.3% respectively giving a PPV 0.83 and NPV 1. Median HbA1c levels in those with CD compared to age-sex matched controls were 8.5 and 7.3 respectively (p<0.0001). Quality of life scores were not significantly different. Stepwise multiple logistic regression from 13 clinical variables revealed only antibody positivity as being significant (p=0.0001).

Conclusion: The prevalence of coeliac disease in this cohort was 3.5%. Undetected coeliac disease has an adverse effect on metabolic control of diabetes but not quality of life scores. Combined EMA/IgG testing provides suitable sensitivity and specificity.

096 LONG-TERM FOLLOW-UP OF PATIENTS WITH MALIGNANT CARCINOID SYNDROME RECEIVING SANDOSTATIN LAR

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Introduction: Somatostatin analogues are used for symptomatic and therapeutic treatment of malignant carcinoid syndrome. Use of long-acting preparations has major implications in terms of convenience. There are few long-term data regarding the use of somatostatin analogues.

Aims & Methods: To assess the long-term effect of Sandostatin LAR on the management of patients with malignant carcinoid syndrome. Case notes of 60 consecutive patients (age range 30-78 years; 40 male and 20 female) treated with Sandostatin LAR attending a specialist neuroendocrine clinic were reviewed. 35 patients had primary tumour in the midgut, 12 in the foregut and 13 had unknown primary tumour sites. Patients had 3-6 monthly evaluation of symptoms, biochemical markers and CT imaging. 28 (47%) patients did not require any other therapy, however 32 (53%) patients required additional therapeutic modalities including chemotherapy, interferon and radionuclide targeted therapy.

Results: Fifty five of the 60 patients (92%) were commenced on a dose of 20 mg monthly, 5 (8%) on 30 mg. Of the 28 patients treated with Sandostatin LAR alone, median follow-up time was 25 months. 29 of these (64%) improved and remained stable in terms of symptoms although 10 had deterioration of symptoms after an average of 12.4 months. Five of 28 patients (18%) had progressive disease on CT scans after an average time of 27 months. Increased symptoms or disease progression was an indication to increase the Sandostatin LAR dose. Of 32 patients requiring additional therapies, 21 were on Sandostatin LAR alone for an average of 18 months before beginning other treatments. 15 of the 32 patients (47%) had radiological progression; the remaining 17 were treated in view of biochemical progression or symptomatic deterioration. Side effects: of the total 60 patients, 6 (10%) were noted to have gallstones on CT imaging. 3 patients (5%) had abdominal pain after the injection, 6 (10%) had increased diarrhoea for up to 5 days following the injection.

Conclusion: Sandostatin LAR is a well tolerated long-term treatment. Somatostatin analogues are good at controlling malignant carcinoid syndrome. A significant proportion of patients maintained stable disease whilst on Sandostatin LAR. The anti-tumour/stabilisation effect of somatostatin analogues need to be assessed in randomised studies.

097 ANTI-TISSUE TRANSGLUTAMINASE ANTIBODY QUANTIFICATION IS USEFUL IN THE FOLLOW-UP OF COELIAC DISEASE PATIENTS

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Introduction: The optimal form of follow-up for coeliac disease patients is controversial. Traditionally follow-up has been largely clinical and dietetic, with blood tests used to identify deficiencies in folate, ferritin and vitamin B12.

Aims & Methods: This study aimed to assess the usefulness of serial quantitative IIFG measurements in the outpatient follow-up of adult coeliac disease patients. 64 patients with known coeliac disease attending our coeliac disease review clinic had IIFG, folate, vitamin B12 and ferritin measured at each clinic visit over a period of 2-5 years. IIFG levels were measured using the Aeskulisa O IIFG-A NEO ELISA kits. The patient’s own assessment of their compliance to gluten free diet (GFD) was recorded.

Results: The IIFG results divided the patients into 3 groups: patients with repeatedly low IIFG values, 16 patients with repeatedly high IIFG values and 19 patients with changing IIFG values. Of the 29 patients with low IIFG 72% claimed to be strictly compliant and the remainder partially compliant. Of the 16 individuals with high IIFG only 12% claimed to be strictly compliant, 44% partially compliant and 44% felt they were non-compliant. Low IIFG was significantly associated with strict compliance (p<0.001). The high IIFG group contained more abnormal laboratory results (ferritin, folate and vit B12 below the normal range) than the low IIFG group (35% v 18%, p<0.05). The individuals with a changing IIFG value enabled the time course of the test to be defined. Of the 32 patients with changing IIFG showing a reduction in IIFG within the first 4-8 months. The quantitative nature of serial IIFG was clearly superior to qualitative anti endomysial antibody (EMA) results in this group, as the early response to diet could be monitored before the EMA result became negative.

Conclusion: Serial quantitative IIFG measurement in patients undergoing routine follow-up for coeliac disease may identify individuals with poor compliance with the GFD, who are at increased risk of nutritional deficiencies associated with their coeliac disease. IIFG measurement may help targeting of limited dietetic resources to those patients who are most likely to benefit.

098 NEW INTRODUCTOR PEG-GASTROSEXY WITHOUT PROPHYLACTIC ANTIBIOTICS: A PROSPECTIVE RANDOMISED DOUBLE BLIND TRIAL

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Introduction: Periportal infections are still the most common complications of PEG despite use of prophylactic antibiotics. A major problem associated with the administration of prophylactic antibiotics is the emergence of resistant microorganisms, especially the Methicillin resistant Staphylococcus aureus (MRSA) at the PEG site. In the introducer PEG technique, as the sojourn of PEG catheter through the oropharynx is avoided there are negligible chances of infectious complications. Introducer PEG, though known for 22 years, has not been popular because of risks...
and associated complications. However the new introducer PEG-gastro-
pexy has been recently proved to be very safe.

Aims & Methods: We conducted a randomised double-blind placebo-
controlled trial to determine the incidence of peristomal wound infections
post PEG in patients undergoing this new introduce PEG-gastroscopy with
and without antibiotics. From October ’03 till June ’06, 63 patients
underwent introducer PEG-gastroscopy. Following randomisation they
were assigned in to 2 groups. Group I comprised 32 patients in whom
30 minutes before the procedure an injection of Ceftriaxone antibiotic was
given while 31 patients in group II underwent PEG-gastroscopy with a
placebo injection. PEG was done using the Freka (Pexact, Fresenius
Germany) under Propofol sedation. This is a new introducer PEG system in
which anterior gastric wall is sutured non-surgically to anterior abdominal
wall before catheter insertion under endoscopy. All the patients were
followed-up by nutrition support team (NST) and the wound was inspected
daily. The dressing changed and the peristomal wound assessment was
done as per the point score system in which local redness, induration and
exudation was recorded on a scale of 1–4 for first 7 days. In addition, the
maximum combined score for each patient was also calculated and the
wound reaction graded from 0–4.

Results: One patient died within 3 days of procedure due to myocardial
infarction and so was excluded from analysis. Patient’s age group ranged
from 60 ± 15.0 years. Both the groups were well matched in terms of
patient characteristics. There were 40 males and 22 females. There was
no significant difference in the grades of infection in both the groups of
patients undergoing PEG with or without antibiotics within 7 days (see
Table).

Conclusion: We conclude that this new introducer PEG-gastroscopy can be
performed safely without the need of any prophylactic antibiotics, which is
a revolutionary finding. Thus all the scours associated with antibiotic
usage (like emergence of resistant microbiological strains, antibiotic
associated diarrhoea and costs) can be potentially avoided in patients
undergoing PEG feeding.

098 INCIDENCE OF REFEEDING SYNDROME IN GENERAL
MEDICAL INPATIENTS ON ENTERAL FEEDING

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Introduction: BSG guidelines recommend daily monitoring of phosphate
and electrolytes in all patients commenced on enteral feeding to identify
electrolyte abnormalities pertaining to Refeeding syndrome (RS). The
incidence of RS has been assessed in patients on intensive care, palliative
care wards, with cancer and anorexia nervosa. There is little information
on the incidence in a general medical inpatient population especially elderly
patients who are likely to be at a higher risk when commenced on enteral feeding.

Aims & Methods: To determine the incidence of hypophosphatemia and
other metabolic abnormalities predisposing to RS in general medical
inpatients receiving enteral nutritional support. All hospitalised medical
patients who were commenced on artificial enteral nutrition over a 6-month
period January–June 2004 were studied. Post-surgical patients and
patients on parental nutritional support were excluded. All patients had
full blood count, electrolytes including urea, phosphate, calcium, magnes-
ium and glucose were measured before commencing feed followed by
daily measurements for 1 week and then twice weekly for another week.
Liver function tests were measured before and twice weekly for two weeks
after feeding. Medical records of all the patients were reviewed for
development of signs and symptoms of RS. Phosphate levels <0.50 mmol/l
and 0.51–0.85 mmol/l were defined as treatable hypophosphatemia (TP)
and moderate hypophosphatemia (MP) respectively.

Results: Forty patients received enteral feeding (26 NG; 1 NJ and 13 PEG).
There were 17 males and 24 females. Median age was 78 years (range
23–94 years). 11 (28%) developed TP. 20 (50%) developed MP of which 4
went on to develop TP. Of the patients with TP, 2 had associated
hypomagnesaemia, 4 had renal impairment and 3 had hypokalemia. 29%
of patients over 65 years and 67% over 85 years developed TP compared
to 20% in age below 65 years. 31% of PEG fed patients developed TP as
opposed to 26% of NG and NJ fed patients. Patients with decreased oral
intake for > 10 days were at a higher risk of developing TP compared to
those with low intake <10 days (56% v 17%). 71% of patients with low
albumin developed TP and MP (43% TP); 81% of patients with raised white
cell count (WCC) developed TP and MP (45% TP). At 2 weeks, 9 out of 11
patients with TP continued artificial feeding and 2 started oral feeding.

Conclusion: Over one quarter of medical inpatients commenced on
enteral feeding developed electrolyte abnormalities which predispose to RS. Age
over 85 years with decreased oral intake for > 10 days, low albumin and
raised WCC are high risk predictors for developing RS. Our study
reinforces the importance of regular monitoring for RS in this patient
change when enteral feeding is commenced.

100 EFFECT OF MICROBIAL OVERGROWTH ON CYTOKINE
EXPRESSION IN THE UPPER GASTROINTESTINAL TRACT
OF PATIENTS RECEIVING ENTERAL NUTRITION

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Introduction: Enteral feeding via percutaneous endoscopic gastrostomy
(PEG) tube is required for nutritional support in patients with dysphagia.
Enteral tube feeding (ETF) bypasses innate defence mechanisms in the
upper gastrointestinal tract resulting in microbial overgrowth, which can
have detrimental effect on the mucosal immune response.

Aims & Methods: The aims of this study were to characterise microorganisms
colonising the upper gut in ETF and to assess the effects of enteral nutrition
(EN) on proinflammatory cytokine expression in gastric and small intestinal
mucosae. Seven patients undergoing PEG tube placement or replacement
were studied to determine the types of microorganisms present in the upper
gut in ETF. All patients had received nasogastric feeding prior to
gastrostomy insertion. Gastric and small bowel aspirate and biopsy
samples were obtained at endoscopy and the microbial populations
investigated using quantitative real-time PCR. Tissue samples for cytokine
expression analysis were collected from the seven ETF patients and compared
with mucosal samples collected from 10 control subjects. Tissue cytokine
expression was measured using real-time PCR.

Results: Patients receiving EN possess abnormal gastric and small intestinal
microbiota; the most commonly isolated organisms were enterobacteria
and staphylococci. Expression of the proinflammatory cytokines IL1-α, IL6
and TNF-α was significantly higher in gastric and small intestinal mucosa
from patients on normal diets in comparison with those on EN.

Conclusion: Enteral nutrition results in significant bacterial overgrowth in
the upper gastrointestinal tract, this is associated with a significantly
diminished proinflammatory cytokine response in gastric and small
intestinal mucosa.

microbial overgrowth in the stomachs and duodenas of patients
undergoing percutaneous endoscopic gastrostomy feeding. JCM

101 SCREENING FOR MALNUTRITION IN OUTPATIENTS

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Introduction: The February 2006 NICE guidelines state that all outpatients
should be screened for malnutrition at their first appointment and when
there is concern. Malnutrition among inpatients is well known. But there is
little information on the prevalence of malnutrition among outpatients.

Aims & Methods: To assess the nutritional status of outpatients in various
clinics and determine proportion of patients at risk of malnutrition and
thereby identify clinics where assessment may be of little value. The risk of
malnutrition was also compared between different age groups. A validated
questionnaire was used to assess the nutritional status of patients over age
18 attending various clinics at Royal Glamorgan Hospital in June 2006.

Body mass index (BMI) was calculated. The answers were scored for
development of signs and symptoms of RS. Phosphate levels <0.50 mmol/l
and 0.51–0.85 mmol/l were defined as treatable hypophosphatemia (TP)
and moderate hypophosphatemia (MP) respectively.

Results: 502 out patients underwent assessment and 3% (15 patients) were
malnourished and 25% (125) were at possible risk of malnutrition. 66% of
females were at no risk of malnutrition, while 30% were at possible risk
and 4% malnourished. This compares to 78%, 20% and 3% in males

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respective. 60% of the possible risk group and 70% of malnourished group were over 65 years old. Possible risk of malnutrition and malnourishment were fairly consistent over age groups 18–84 years (20–30% and 0–4% respectively). In the group 85–100 years, 35% were at possible risk of malnutrition and 13% were malnourished. The prevalence of possible risk and malnourishment in various clinics is shown in the table. An inconsistent correlation exist between BMI and risk of malnutrition: 39% of the patients were overweight and 27% of our patients were obese.

**Conclusion:** Over a quarter of outpatients are malnourished or at risk. Elderly patients are more malnourished than non-elderly, and the clinics with the highest level of malnourishment are rheumatology, oncology and gastroenterology. General medicine, cardiology and podiatry clinics had lower proportion of patients at risk of malnutrition. This supports the NICE recommendation that all outpatients, especially high-risk clinic patients, must be screened for malnutrition.

### Training Gastroenterologists in Clinical Nutrition

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**Introduction:** The nutritional care of patients is now high on the agenda of both public and healthcare organisations. There are increasing expectations that gastroenterologists should lead the delivery of nutritional care within NHS trusts, and therefore it is imperative that they receive appropriate training in clinical nutrition. They need the skills to lead a clinical service and support the training of junior doctors to ensure they acquire the competencies and skills set down in the foundation programme and the JCHMT gastroenterology curriculum.

**Aims & Methods:** This study sought to assess the extent of training opportunities and knowledge in clinical nutrition among gastroenterology SpRs. A questionnaire was distributed to those attending a regional training day and national course in clinical nutrition.

**Results:** Forty SpRs completed the questionnaire, 33% of whom were in the first two years of training. Although 68% of trainees were currently working in hospitals with a Nutrition Support Team, only 25% had attended nutrition ward rounds and 18% had received formal postgraduate training in clinical nutrition. General medicine, cardiology and podiatry clinicians had lower proportion of patients at risk of malnutrition. This supports the NICE recommendation that all outpatients, especially high-risk clinic patients, must be screened for malnutrition.

### Relapsing, Remitting Obstructive Liver Function Tests

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**Case Report:** A 65-year-old gentleman was referred by his GP with a 3 month history of anorexia, dry mouth and epigastric discomfort followed by jaundice with pale stools which slowly resolved. He had a past medical history of infectious hepatitis 35 years ago. He did not smoke or drink alcohol. Physical examination was unremarkable. Serum biochemistry revealed AIP 1465, ALT 495 and bilirubin 20 with normal INR and albumin. Hepatitis serology was negative. Abdominal ultrasound showed a bulky pancreas but normal liver and bile ducts hence an abdominal CT was performed. This performed a diffusely enlarged “sausage shaped” pancreas but no focal lesion. The CBD was dilated to 12 mm and there were several small peri-pancreatic lymph nodes. Tumour markers were normal. ERCP showed a regular stricture at the distal end of the CBD of 2–3 cm length. There was also a 1–2 cm length irregular stricture of the pancreatic duct within the pancreatic head and irregular ductules. Biliary cytology was unremarkable. An endoscopic ultrasound revealed pancreatic duct obstruction with mixed echogenicity containing stranding and lobulation but no majority of trainees working in hospitals with a Nutrition Support Team. The provision of safe and effective nutritional care is a responsibility all doctors have to their patients, but achieving this will require improvements in the standards of education of training.

### Case Presentations

**103** **AN UNUSUAL CAUSE OF ACUTE LOWER GASTROINTESTINAL BLEEDING**

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**Case Report:** A 36-year-old presented with abdominal cramps, diarrhoea and several episodes of profuse rectal bleeding (1 week duration). No associated fever, sweats or weight loss. He was haemodynamically stable. He had mild left iliac fossa tenderness, no organomegaly and bowel sounds were normal. Digital rectal examination revealed some fresh blood but no haemorrhoids and a normal prostate. Other systems were unremarkable. Investigations: c-RP 10 mg/l, Hb 13.6 g/dl, WBC 8.34 × 10^3/mm³, and platelets 162 × 10^3/mm³. Multiple stool cultures were negative. A flexible sigmoidoscopy demonstrated blue lesions in the recto-sigmoid area, confluence inflammation of the descending and sigmoid colon, and relative rectal sparing, with ulceration. The histopathology specimen revealed ischaemic colitis with red cell extravasation, haemosiderin deposition and fibrosis. Mesalazine was discontinued. The patient had no further rectal bleeding and remained asymptomatic during his follow up over 6 months. This is first reported association of ischaemic colitis with Blue Rubber Bleb Nevus (BRBN) syndrome. BRBN are cavernous haemangioma lined by single layer of endothelium surrounded by thin connective tissue. The fragility of thin wall may predispose to further bleeding into submucosa compromise the vascular supply. BRBNS is managed conservatively with iron replacement therapy and transfusions. Endoscopic laser photocoagulation, systemic treatment with corticosteroids, interferon and vincristine may also be effective. Subcutaneous octreotide in the presence of active lesion proliferation or DIC has been used successfully. Skin lesions have been treated with the neodymium: YAG laser.


**104** **RELAPSING, REMITTING OBSTRUCTIVE LIVER FUNCTION TESTS**

J A Jupp, S Bridge, C J Howells. Gastroenterology, Poole General Hospital, Poole, Dorset, UK

**Case Report:** A 65-year-old gentleman was referred by his GP with a 3 month history of anorexia, dry mouth and epigastric discomfort followed by jaundice with pale stools which slowly resolved. He had a past medical history of infectious hepatitis 35 years ago. He did not smoke or drink alcohol. Physical examination was unremarkable. Serum biochemistry revealed AIP 1465, ALT 495 and bilirubin 20 with normal INR and albumin. Hepatitis serology was negative. Abdominal ultrasound showed a bulky pancreas but normal liver and bile ducts hence an abdominal CT was performed. This performed a diffusely enlarged “sausage shaped” pancreas but no focal lesion. The CBD was dilated to 12 mm and there were several small peri-pancreatic lymph nodes. Tumour markers were normal. ERCP showed a regular stricture at the distal end of the CBD of 2–3 cm length. There was also a 1–2 cm length irregular stricture of the pancreatic duct within the pancreatic head and irregular ductules. Biliary cytology was unremarkable. An endoscopic ultrasound revealed pancreatic duct obstruction with mixed echogenicity containing stranding and lobulation but no majority of trainees working in hospitals with a Nutrition Support Team. The provision of safe and effective nutritional care is a responsibility all doctors have to their patients, but achieving this will require improvements in the standards of education of training.
mass lesion. The pancreatic duct was irregular and the CBD was thick walled. His symptoms resolved and LFTs returned to normal. However he subsequently became unwell again with deranged LFTs and facial swelling secondary to parotid and submandibular gland enlargement, which was confirmed by MRI. Schirmer’s test was positive. Autoimmune profile, serum ACE and LDH were unremarkable. His ESR was 54. Parotid biopsy revealed a lymphohistiocytic infiltrate with evidence of chronic inflammation and gland atrophy. Serum IgG4 was elevated at 8.5 g/l (<1.3). Treatment with corticosteroids was commenced leading to a resolution of symptoms and return of biochemistry and imaging to normal. In this case we discuss the criteria for diagnosing a rare syndrome complex by means of history, laboratory data, imaging and histopathology.

**105 WATERY DIARRHOEA: IS IT INFECTIVE, IATROGENIC OR IS THERE MORE TO IT?**

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**Case Report:** A 61-year-old white female was admitted to hospital with a history of shivering, fever, lethargy and intermittent watery diarrhoea for 8/52. Shortly prior to her presentation, she was treated with a course of antibiotics for a UTI and was also found to be hypothyroid, for which she was treated with thyroxine. She had no other significant past medical history. On examination she was dehydrated and hypothermic. Her blood results confirmed neutropenia (WBC 25.9 x10^9/l), acute renal failure (urea 22.9 mmol/l, creatinine 327 µmol/l), metabolic acidosis (PH 7.32, HCO3 13.9, BE -10.6) and a raised CRP at 38 mg/l. Her stool was subsequently positive for clostridium difficile toxin (CDT). The patient was treated with IV fluids with potassium replacement, IV antibiotics and oral vancomycin. She made a good recovery with normalization of both her renal function and acidosis. She was discharged home to be followed up as an outpatient. However, she was readmitted 2 weeks later with an identical clinical and biochemical presentation, except for a raised serum calcium and a negative stool CDT. As part of the investigations of the patient the patient underwent a CT abdomen and chest which showed evidence of pulmonary embolism and the CT abdomen showed some abnormalities. The history of which revealed the rare diagnosis. The patient was treated supportively along with the specific treatment. She made a good recovery and her diarrhoea stopped with no further recurrence of her renal failure.

**106 FROM PHLEBOLITH TO SURGERY**


**Introduction:** This case describes a rare cause of rectal bleeding. It highlights an unusual clinical relevance of phleboliths seen on an abdominal radiograph in rectal bleeding.

**Aims & Methods:** A 52-year-old woman was referred from her GP in 2005 with a 2 month history of rectal bleeding, anaemia and constipation. In her twenties, she was dependent on iron injections and frequent blood transfusions at her local hospital. She had always been constipated and original investigations revealed internal piles which were ligated. A barium enema was normal. There was no social or family history of note and routine physical examination revealed no abnormalities. Proctoscopy showed only internal piles. Routine blood investigations revealed a high white blood cell count of 19.9 x10^9/l with a normal MCV, normal liver and kidney function, normal thyroid function tests, B12/folate levels and coeliac serology. Colonoscopy revealed grossly abnormal sigmoid mucosa from 10 to 40 cm from the anal margin showing severe mucosal vascular malformations. Computer tomography (CT) angiography and magnetic resonance (MR) examinations were also performed.

**Results:** The diagnosis is colonic cavernous haemangioma (CHH). Multiple submucosal and serosal calcified phleboliths are visible on CT angiography while a high signal is seen on the T2 weighted MR images in mucosal/submucosal areas.

**Conclusion:** Haemangiomas are rare benign vascular tumours that occur mostly in the rectosigmoid colon. Phleboliths are characteristically visible on plain abdominal films. CHH is commoner in younger males and it originates from embryologic sequestrations of the mesentery. It can be focal, diffuse, localised or annular. Possible presentations include GI bleeding, obstruction, perforation, intussusception or compression/invasion of adjacent structures. Other associations are Osler-Weber-Rendu disease, Blue Rubber Bleb Nevus syndrome, Klippel-Trenaunay-Weber syndrome, Maffucci’s syndrome, diffuse neonatal hemangiomatisis, and Prokofiev syndrome. No medical treatment is available. Surgery should always be sphincter-saving. The commonest surgical technique is resection with colonic sleeve anastomosis as in this case. This is the first case in the British literature.


**107 AN UNUSUAL CAUSE OF GASTRIC OUTLET OBSTRUCTION**

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**Introduction:** Gall stones are a common surgical problem. We present an unusual presentation of this common problem.

**Aims & Methods:** A 72-year-old lady was referred to us with features of gastric outlet obstruction and weight loss. She was investigated with an upper GI endoscopy, barium meal and a CT scan, all of which showed gastritis without obstruction with a mass lesion. The differential diagnosis was between a tumour and a foreign body. She underwent a laparoscopy which revealed an inflammatory mass involving duodenum, gall bladder and transverse colon. Another upper GI endoscopy on table suggested gall stones causing duodenal obstruction. A laparotomy, duodenotomy and removal of stones was performed. She made an uneventful recovery.

**Results:** Leon Bouveret first described gastric outlet obstruction by gall stones, a condition which came to be described as Bouveret’s syndrome. It is considered as a type of gall stone ileus, associated with a bilio enteric fistula. The management is controversial and could be one stage operation with enterolithotomy, cholecystectomy and repair of the bilio enteric fistula, two stage where cholecystectomy and repair of fistula is done later or enterolithotomy alone.

**Conclusion:** Gallstone disease can present atypically leading to diagnostic and treatment dilemmas. Absence of previous biliary symptoms does not rule out the diagnosis of gallstone ileus. Investigations such as CT scan and MRI are helpful in diagnosis and treatment planning. The treatment of choice in patients with gallstone ileus would be to relieve the bowel obstruction, either endoscopically or surgically.
intervention. Most of the ulcers usually heal within 6 weeks of withdrawal of drug. The mechanism by which Nicorandil causes ulcerations is not clear, however it is likely to be mediated by a systemic mechanism rather than local irritation.

107 REFRACTORY PLEURAL EFFUSION FROM PANCREATO-PLEURAL FISTULA: A RARE COMPLICATION OF CHRONIC PANCREATITIS

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Introduction: Pleural effusion due to pancreatico-pleural fistula, a rare complication results from the disruption of the pancreatic duct into the retroperitoneal space with resultant fistulous communication between the pancreas and the pleural cavity. Respiratory rather than abdominal signs and symptoms predominate needing a high index of suspicion, as presentation is often misleading and delay in diagnosis can lead to significant morbidity and mortality. Here we discuss one such case of pancreatico-pleural fistula from chronic pancreatitis.

Aims & Methods: To highlight the misleading presentations from complication of chronic pancreatitis, particularly pancreatico-pleural fistula.

Results: A 55-year-old man presented with increasing breathlessness and cough associated with abdominal pain. He had a background of chronic pancreatitis and alcoholism. Examination revealed massive pleural effusion. His blood tests showed an elevated amylase, normal CRP, LFT and WCC. He was treated with therapeutic chest drainage, however this re-accumulated despite being drained on two separate occasions. Fourteen days after his admission the diagnosis of a pancreatico-pleural fistula was suspected when a pleural fluid analysis showed an amylase of 7751 iu/l. He was treated with TPN and Octreotide for a period of 2 weeks. His recovery was punctuated with repeated pleural effusions, which resolved gradually. At follow-up 6 months later he was well.

Conclusion: This case highlights the importance of identifying the proper aetiology, since repeated pleural drainage would neither have been a wise option, nor a long-term solution. Thoracic complications are seen most often in acute pancreatitis, commonly as pleural effusions in 3–17% of patients. Massive pleural effusions are seen in ≤1% of chronic pancreatitis. Amylase in the pleural fluid is an important test which is usually very high. MRCP or ERCP may help demonstrate a fistula. Conservative management with TPN and Octreotide may close the fistula in up to 40% of the patients. Surgical treatment with excision of the pseudocyst is a further option but can have up to 10% mortality.


110 AN UNCOMMON CASE OF ASCITES

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Case Report: A 52-year-old builder presented with history of lethargy, weight loss of 2 stones, loss of appetite and abdominal distension of 6 months duration. He was a smoker and consumed 40 units of alcohol per week for the past 30 years. He probably had exposure to asbestos and had a family history of bowel cancer. On examination, he was alert and oriented, with stigmata of chronic liver disease but not jaundiced. He had ascites with a tender right hypochondrium and no organomegaly. His blood investigations showed neutrophilia, renal impairment with a creatinine of 1.46 mmol/l, deranged synthetic liver functions with an INR of 4.5 and albumin 27 g/l. The rest of the liver enzymes and serum amylase were normal. The initial diagnostic ascitic fluid showed an exudative ascites with a SAAG of 10 and a neutrophil count of 270/mm³. This was compatible with spontaneous bacterial peritonitis for which he was commenced on appropriate intravenous antibiotics. However his clinical condition remained unchanged. CT scan of his abdomen showed a pleural pseudocyst at the head and body measuring 5 cm. Further fluid analysis showed no growth and it was negative for malignant cells. Interestingly the fluid amylase was markedly raised at 1,4856 IU/l. This confirmed pancreatic ascites and helped differentiate it from spontaneous bacterial peritonitis. An MRCP was arranged to delineate the pancreatic duct architecture. However he deteriorated rapidly and died in ITU due to renal failure and metabolic acidosis.

Conclusion: Pancreatic ascites, which is uncommon, can often be confused with complicated ascites with SBP. Ascitic fluid amylase should be done in all cases to exclude pancreatic ascites which has a significantly higher mortality. Pancreatic imaging to delineate duct anatomy is mandatory to plan further management. Management of these patients remain controversial. This includes conservative management like octreotide or Somatostatin infusions aiming at reducing the pancreatic exocrine secretions, pancreatic stenting or rarely pancreatic irradiation facilitating the closure of the fistula. Surgical options include pancreatocanty or a pancreaticojejunostomy.

111 LAMIN A/C STATUS IS A PROGNOSTIC INDICATOR IN COLORECTAL CANCER

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Introduction: Lamin A/C is a member of a group of proteins known as the A-type lamins. These proteins are expressed in all differentiated somatic cells where they are integral parts of the nuclear lamina—the complex meshwork underlying and supporting the nuclear membrane. Mutations in A-type lamins have been implicated in no less than 9 laminopathies (inherited diseases resulting in premature aging) and several epithelially-derived cancers, but to date, direct involvement in colorectal cancer has yet to be shown.

Aims & Methods: Patient information and tumour material was collected from 734 incident colorectal cancer cases participating in the Netherlands Cohort Study on Diet and Cancer. 4 micron sections were immunohistochemically stained for lamin A/C expression using the J192 mAb. A scoring system was devised for lamin A/C expression and slides were scored by two independent observers blinded to each others findings and patient data. Data analyses were based on 656 participants with available follow-up lamin A/C expression data. Differences in patient, tumour and follow-up characteristics were analysed and subsequent hazard ratios (HR) for colorectal cancer related mortality according to lamin A/C status were estimated using Cox regression analysis.

Results: 463 specimens were scored as lamin A/C positive and 193 were scored as lamin A/C negative. During the follow-up period, from 1989 to 1997, 246 patients died, of which 161 died as a result of colorectal cancer. Patients with tumours expressing lamin A/C were observed to be slightly older, having substantially more colorectal cancer related deaths and a significantly decreased survival period. The lack of expression is associated with a decreased risk of mortality, HR 0.59 (95% CI 0.41 to 0.85, p =0.006) in the overall population as well as in the individual Dukes’ A, B and C stages. Almost all Dukes D patients died within the follow-up period. Conclusion: Our data show that the expression of lamin A/C in colorectal tumours is significantly linked to colorectal cancer associated mortality in patients. Regression analyses including lamin A/C expression and other factors associated with tumour initiation and progression indicate that lamin A/C expression is independently related to survival and is a strong candidate as a prognostic marker for colorectal cancer-related mortality.

112 INCREASED BIOMARKERS OF COLORECTAL CARCINOGENESIS ASSOCIATED WITH OBESITY AND ROUX-EN-Y GASTRIC BYPASS

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Introduction: The mechanistic basis of the link between obesity and increased colorectal cancer (CRC) risk is unclear. One hypothesis is that chronic inflammation associated with obesity drives colorectal carcinogenesis. It is as yet unproven whether weight loss reduces the risk of CRC. Therefore we studied the effect of weight loss on biomarkers of epithelial proliferation, as well as mucosal proinflammatory cytokines and systemic inflammatory markers.

Aims & Methods: Serum and rectal mucosa were obtained from 26 severely obese patients pre and 6 months post Roux en Y gastric bypass
Obese patients (mean BMI (SEM) 54.8 (2.0) kg/m²) had a higher using the comparative \Delta\DeltaCt method. Serum CRP and IL6 were blinded manner. Changes in mucosal mRNA transcripts of genes relating to chronic inflammatory conditions were excluded. Crypt mitosis was determined in 40 microdissected Schiffs reagent stained crypts, in a with RYGB. However, there was a mean 2.1-fold increase in crypt mitosis count (95% CI 1.6 to 2.6) post-RYGB. Upwards expansion of the proliferative zone also occurred following RYGB, with an increase in the proportion of mitoses in crypt zones 4 and 5 (3.2 to 6.3, p=0.02). Following RYGB, the mean serum CRP fell from 8.6 to 3.8 mg/l (p<0.001) (cf to 0.8 mg/l in the normal BMI group) and serum IL6 fell from 5.2 to 3.2 pg/ml (p<0.001) (cf to 1.9 pg/ml in the normal BMI group). Increased mucosal mRNA transcription of COX1, COX2 and Il6 followed RYGB, although obesity-related genes (Adiponectin receptor1, IGFl) and cell turnover-related genes (Mdm2, AkT3, Bax) were downregulated.

Conclusion: Crypt biomarkers of CRC risk were elevated in obese compared to normal BMI individuals, however these increased further post-RYGB. Systemic inflammatory markers were elevated in obese patients compared to individuals with a normal BMI, and fell post-RYGB. In contrast, the pattern of rectal mucosal gene expression was in keeping with a proinflammatory and tumorigenic state. This may reflect changes in the colorectal luminal micro-environment following RYGB. This is the first time that obesity has been shown to be associated with elevated mucosal biomarkers of carcinogenesis. These data also indicate that patients may be at increased risk of CRC following RYGB.

113 DIAGNOSTIC YIELD OF ENDOSCOPIC ULTRASOUND-GUIDED TRUCUT BIOPSY: EXPERIENCE FROM A TERTIARY REFERRAL CENTRE

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Introduction: A major advantage of linear endoscopic ultrasound (EUS) in clinical practice is the ability to get tissue diagnosis. Cytology can be obtained by fine needle aspiration (19 or 22G). Although EUS-guided fine needle aspiration (FNA) has a diagnostic accuracy of 80–90%, accuracy is lower without an on-site cytology facility. Additionally, there are certain lesions that visualisation and characterisation of tissue architecture is needed, in order to reach a diagnosis. To that end, a 19G trucut biopsy needle (TCB) has been designed. Core biopsy has clear advantages over cytology.

Aims & Methods: The aim of our study is to report the largest, single-centre experience of EUS-guided Trucut biopsy (TCB). Clinical details, EUS findings and performance characteristics of EUS-TCB were collected prospectively from 61 consecutive procedures (96 men) with median (range) age of 65 (22–84) years, between December 2002–September 2006.

Results: Lesions with a diameter of range (median) 0.5–9 (3) cm were sampled using 1–7 (3) passes to obtain tissue core of range (median) 0.1–1.9 (1) cm. Passes were made via oesophagus in 45, stomach in 104 and duodenum in 12. In 28 (17%) cases there were technical problems—equipment failure, 10 (6%); problematic penetrations and fragmentation, 18 (11%). In all passes, specificity and PPV were 100%. Two major post-procedure complications were bronchopneumonia (1) and cold abscess formation (1).

Conclusion: EUS-TCB yields diagnostic samples in 88%–90% of cases, the majority of which were accessible through the stomach and oesophagus.

Future studies should compare the cost of EUS-TCB versus EUS-FNA with on-site cytology service.

114 ENDOSCOPIC BALLOON DILATATION AND SEQUENTIAL STENTING PROVIDES SAFE AND EFFECTIVE TREATMENT OF ANASTOMOTIC STRUCTURES COMPLICATING ORTHOTOPIC LIVER TRANSPLANTATION

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Introduction: The biliary anastomosis has long been regarded as the Achilles heel of liver transplantation (OLTx) and anastomotic structures (AS) complicate approximately 12% of primary grafts and 11% of re-grafts undertaken in Birmingham. If left untreated progressive stricturing at the site of the anastomosis will lead to biliary obstruction, graft damage and eventually fibrosis and cirrhosis. Traditional management of AS by surgical biliary reconstruction has begun to be replaced by endoscopic therapy in some centres. We present a prospective study of non-surgical management of AS complicating OLTx in the liver unit at QEH, Birmingham (UK).

Aims & Methods: Fifty three patients (21 male, 32 female; median age 48.5 years) were referred with biliary AS complicating OLTx between July 2000 and August 2006. 31 cases were late anastomotic strictures and the remainder presented in the first 3 months following transplantation. Cases were managed according to the Birmingham protocol and each case discussed with the multidisciplinary team. We present the short and long-term success of endoscopic treatment of AS.

Results: Biliary obstruction was relieved in 92.5% of patients and endoscopic therapy was technically successful in 81% of cases. 94% of patients who completed endoscopic therapy remained stent-free over the follow-up period (median 18 months stent-free follow-up). Two patients required stent re-insertion after developing biliary obstruction after completion of treatment. Patients required a median of 3 ERCPs, 2–24F balloon dilatation and maximal simultaneous insertion of two 10Fr Cotton Leung stents to successfully treat the stricture. Endoscopic therapy was well tolerated and associated with a low rate of complications; there were no severe or fatal complications. Eight patients did not respond to endoscopic therapy and were referred for surgical biliary reconstruction.

Conclusion: Endoscopic dilatation and sequential stent insertion provides good medium/long-term resolution of strictures at the biliary anastomosis and offers a safe and effective non-surgical means of managing early and late AS. 81% of patients with biliary AS referred to our service were successfully treated with endoscopic therapy. We believe that endoscopic dilatation and stenting should now be considered the treatment of first choice in patients with biliary anastomotic strictures complicating OLTx.

115 LAUREN SUBTPING OF CARDIA CANCER PROVIDES FURTHER EVIDENCE OF TWO DISTINCT AETIOLOGIES

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Introduction: There are several reports of cardia cancer resembling oesophageal adenocarcinoma in being negatively associated with H pylori infection and positively associated with reflux symptoms. However, there are also reports of a positive association between cardia cancer and serological evidence of atrophy in H pylori-positive subjects, suggesting that some cardia cancers are aetologically similar to non-cardia gastric cancers.

Aims & Methods: To determine whether cardia cancers in patients with gastric atrophy have a Lauren histological subtype resembling non-cardia cancers
gastric cancer whereas cardia cancers in subjects without atrophy are predominantly intestinal in histological subtype resembling oesophageal adenocarcinoma. We have studied the Lauren histological subtypes of 129 non-cardia cancers and 44 cardia cancers and related the histological findings to the serological presence of gastric atrophy (pylorinigen 1/I/II <2.5). This was performed in a case-control study nested in Norwegian JANUS cohort.

**Results:** The non-cardia gastric cancers were 46% intestinal, 27% diffuse and 24% of mixed histological subtype. In these non-cardia cancers, gastric atrophy increased the risk of each histological subtype to a similar extent. In the 36 cardia cancers without serological evidence of gastric atrophy, the major histological subtype was intestinal (75%) with only 11% being diffuse and 11% mixed (p<0.05). The proportion of cancers with the intestinal histological subtype was significantly greater in these cardia cancers without atrophy compared to the non-cardia cancers. In the cardia cancers with evidence of gastric atrophy, the histological subtype resembled that of the non-cardia cancers being 38% intestinal, 25% diffuse and 37% mixed.

**Conclusion:** These findings provide further support for two distinct aetiologies of cardia cancer, one resembling oesophageal adenocarcinoma occurring in subjects without atrophy and being predominantly of intestinal histological subtype; the other being similar to non-cardia gastric cancer being associated with atrophy and with an equal proportion of intestinal and diffuse histological subtypes. Gastric atrophy and the histological subtype of cardia cancer may allow division of cardia cancers into those, which are gastric versus oesophageal in origin.

**116 MYOFIBROBLAST WNT-5A FACILITATES INTESTINAL EPITHELIAL REPAIR THROUGH A NON-CANONICAL PATHWAY**

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**Introduction:** Subepithelial myofibroblasts are closely involved in the initiation and coordination of intestinal epithelial repair in the inflamed gut, but the molecular signalling pathways are largely unknown. The cellular adaptations that occur during repair range from de-differentiation and migration to proliferation and re-differentiation, in a way that is strongly reminiscent of normal crypt-to-villus epithelial maturation. Because the Wnt/\(\beta\)-catenin signalling pathway has emerged as one of the key likely to play a critical role.

**Aims & Methods:** We used an established scratch wound method in Caco-2 cells to monitor the effects of colonic myofibroblasts (CCD-18bco) on intestinal epithelial repair.

**Results:** Caco-2 wound closure over 24 hours was increased almost threefold by conditioned media from IL-1\(\beta\)-stimulated, but not untreated, CCDs. In parallel, IL-1\(\beta\)-stimulated CCDs downregulated the differentiation markers sucrase-isomaltase and villin in the Caco-2 cells, while the proliferation marker c-myc was upregulated. Expression profiling identified Wnt-5A as the only Wnt-related gene that was differentially expressed between IL-1\(\beta\)-stimulated (up 27-fold) and untreated CCDs. Wnt-5A immunodepletion of the IL-1\(\beta\)-CCD conditioned medium completely abrogated its repair benefit. IL-1\(\beta\)-CCD-mediated repair was not affected by the addition of the Wnt antagonist Dickkopf-1. Total and phosphorylated \(\beta\)-catenin protein levels in Caco-2 cells did not change after exposure to IL-1\(\beta\)-stimulated CCDs. Furthermore, IL-1\(\beta\)-stimulated CCDs did not antagonise LiiCl-induced canonical signalling.

**Conclusion:** These results identify an important role for myofibroblast-derived, non-cannical, Wnt-5A signalling in the de-differentiation and migration stages of epithelial wound repair in the gut.

**117 DRUG DELIVERY SYSTEMS FOR TREATING INFLAMMATORY BOWEL DISEASES: THE EXTENT TO WHICH GASTROINTESTINAL PH INFLUENCES DRUG RELEASE FROM ENTERIC COATED PRODUCTS**

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**Introduction:** A number of enteric coated preparations for targeting drugs to ileo-colonic regions of the gastrointestinal tract (or the treatment of inflammatory bowel diseases are commercially available. Aim of this work was to investigate the extent to which luminal pH affects drug release from these delivery systems and any other physiological factors which may have an influence.
Conclusion: Rates of CS use are higher in this cohort than USA and Danish studies, but similar to other UK studies. TPs are used earlier in the more recent quinquennium, but CS failures remain high. CS dependence remains common despite earlier use of TPs.

Aims & Methods: A large epidemiological research project, guided by an independent steering panel, has been designed to interrogate this database to understand better the overall burden of illness associated with IBD.

Results: The number of admissions per year for IBD increased from 1981 to 2004 (table). The total number of bed days per year increased by approximately 20% during the same period; however, the mean LOS per episode decreased from 15.4 days (1981) to 4.2 days (2004). In the incidence cohort of patients with UC, 278 were below and 160 were at least 50 years of age in 1986. After 19 years, 119 patients had died (mortality rates of 7.9% and 60.3% in each age group, respectively). Six (5%) deaths were related to colorectal cancer.

Conclusion: The number of hospital admissions, individual episodes and total bed days for patients with IBD has steadily increased over the last 19 years. The reasons are likely to be multifactorial, possibly including an increase in surgical procedures and routine endoscopic screening.

Introduction: While the impact of exacerbation on the long-term health and quality of life of patients with inflammatory bowel disease (IBD) has been intensively studied, there is little information on the overall burden of IBD on healthcare systems in terms of clinical and financial resources. The Scottish National Health Service Record Linkage Database (−6.0 million population) holds one of the largest and most accurate patient-linked data sets available, allowing all hospital inpatient and day-case admissions in Scotland from 1981 to the present to be tracked.

Aims & Methods: For the first time for UC in 1986 (without prior cancer or cardiovascular disease) holds one of the largest and most accurate patient-linked data sets available, allowing all hospital inpatient and day-case admissions in Scotland from 1981 to the present to be tracked.

Results: The number of admissions per year for IBD increased from 1981 to 2004 (table). The total number of bed days per year increased by approximately 20% during the same period; however, the mean LOS per episode decreased from 15.4 days (1981) to 4.2 days (2004). In the incidence cohort of patients with UC, 278 were below and 160 were at least 50 years of age in 1986. After 19 years, 119 patients had died (mortality rates of 7.9% and 60.3% in each age group, respectively). Six (5%) deaths were related to colorectal cancer.

Conclusion: The number of hospital admissions, individual episodes and total bed days for patients with IBD has steadily increased over the last 19 years. The reasons are likely to be multifactorial, possibly including an increase in surgical procedures and routine endoscopic screening.

Bone marrow transplantation induces remission in Crohn’s disease. We used a mouse model of Crohn’s disease to elucidate the mechanism of action of BM transplantation.

Aims & Methods: Female mice were lethally irradiated and rescued by a BM transplant from male donors. After 6 weeks experimental colitis was induced by an injection of trinitrobenzene sulfonic acid (TNBS), and colons analysed 1–14 days later. In situ hybridisation for Y chromosome was combined with immunohistochemistry for α-SMA, ICAM-1, EphB4, ephrinB2 and other specific antigens to determine their phenotype. A novel triple staining method combined in situ hybridisation, immunohistochemistry and autoradiography to show cell activity.

Results: Cells derived from BM (Y chromosome expressing) contributed significantly to myofibroblasts and to endothelial cells, pericytes and vascular smooth muscle lining cells in blood vessels. BM contributed to both angiogenesis and neovascularization, confirmed by vessels composed entirely of BM-derived cells. BM-derived myofibroblasts are active shown by their expression of collagen mRNA.

Conclusion: This is the first observation of BM-mediated neovascularization in colitis. We provide an insight into the regenerative function of BM by highlighting the capacity of BM to engraft within inflamed colons and form multiple, functional lineages.

Aims & Methods: Review our clinical experience of the presentation, management and outcome of HPS in association with LTx. All bone marrow examinations performed at King’s College between 1993 and 2004 were reviewed. 186 patients with acute or chronic liver disease (CLD) had undergone bone marrow for unexplained thrombocytopenia (median 32 ± 109/µL, 1–84 ± 109/µL) in association with the sepsis syndrome. Within this cohort 43 patients had received a LTx, 31 patients received a first transplant (12 for acute liver failure (ALF) and 19 for chronic liver disease) and a further 12 were retransplanted.

Results: Presentation was invariably during first ITU admission for those with ALF, but for routine CLD transplants or re-transplantation there were early and late peaks corresponding to the immediate post transplant period or representation at the time of further surgery. Serial organ failure scores (SOFA) were high (median 10, range 4–19). Positive CMV serology was noted in 20/43 cases, with a further 3 having histopathological evidence of CMV, which is significantly higher than in the transplant population as a whole (53% vs 5%, Fischer exact test p < 0.005). Bone marrow examination revealed variable cellularity (9 hypopcellular, 17 normocellular, 9 hypocellular) and differing degrees of macrophage infiltration (8 normal, 7 increased, 21 markedly increased). Specific treatments aimed at the precipitant of the HPS included: human immunoglobulin (HLg) alone 8 cases, HLg and antiviral 23, antiviral alone 6 and in 3 HLg and systemic chemotherapy. Despite aggressive supportive and specific therapies overall ITU mortality was 41% with a median survival of 42 days. Those with previous CLD had the worst prognosis with an 88% ITU mortality. Univariate analysis of laboratory and physiological variables at diagnosis revealed that only the degree of macrophage infiltration predicted outcome (p = 0.04) and this remained significant with logistic regression (p = 0.03). A strong correlation existed between time from LTx to development of HPS.

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Introduction: Haemophagocytic syndrome (HPS) is a life threatening disorder characterised by TH1 cytokine secretion and resulting in accumulation of activated macrophages. HPS have recently been reported as a common finding in patients with multi-organ failure. The literature of HPS in association with liver transplantation (LTx) however, is limited to case reports only.

Aims & Methods: To determine the survival and outcome of HPS in association with LTx. We reviewed. 186 patients with acute or chronic liver disease (CLD) had undergone bone marrow for unexplained thrombocytopenia (median 32 ± 109/µL, 1–84 ± 109/µL) in association with the sepsis syndrome. Within this cohort 43 patients had received a LTx, 31 patients received a first transplant (12 for acute liver failure (ALF) and 19 for chronic liver disease) and a further 12 were retransplanted.

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Abstract 119 Summary data for selected years, total per year for IBD (UC, Crohn’s disease)

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<tr>
<td>Patient admissions (UC, CD)</td>
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<td>1016 (1280)</td>
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<td>2830 (3010)</td>
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<td>7112</td>
<td>11389</td>
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<tr>
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<td>(1401, 2163)</td>
<td>(3255, 3888)</td>
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and time from LTx to positive CMV serology (Pearson p<0.05). CMV positivity, however, was not a predictor of outcome.

Conclusion: HPS carries a very poor prognosis and is common post liver transplant, although frequently undiagnosed. The degree of bone marrow macrophage infiltration is the best prognostic marker.

LYMPHOCYTE STEROID SENSITIVITY IN SEVERE ALCOHOLIC HEPATITIS

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Introduction: Corticosteroids are an established therapeutic option in acute alcoholic hepatitis (AAH), but response to therapy is variable and mortality with steroid treatment remains around 16%. Measurement of ex vivo lymphocyte steroid sensitivity has been used to predict response to steroids in ulcerative colitis. The present study adapts this technique to assess steroid resistance in AAH and evaluate other treatments.

Aims & Methods: Peripheral blood mononuclear cells were isolated from patients with severe AAH (DF>32) and matched controls. Proliferation was stimulated with phytohaemagglutinin, inhibited with concentrations of Dexamethasone from 10^-6 to 10^-11M, and measured by incorporation of 3H-Thymidine. Results were expressed as percentage of uninhibited proliferation and plotted against Dexamethasone Concentration. Maximal inhibition (I_{max}) and IC_{50} were calculated.

Results: Compared to control subjects, the majority of patients with AAH had reduced lymphocyte steroid sensitivity, evident in lower values of I_{max}. Representative data are illustrated.

Conclusion: These results demonstrate that lymphocyte steroid sensitivity, like clinical response to corticosteroids in AAH, is variable and often reduced. Investigation is required to clarify whether this is an intrinsic property of the individuals affected or a result of the disease process. Further studies will investigate the correlation between steroid sensitivity and outcome. Intriguingly, the addition of low-dose Theophylline to the reaction appeared to restore steroid sensitivity in a number of samples, identifying a potential adjunctive therapy to improve clinical response.


CHANGES IN PORTAL BLOOD FLOW AND LIVER OXYGENATION FOLLOWING INTRAPORTAL INJECTION OF PANCREATIC ISLET-SIZED DEXTRAN BEADS

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Introduction: The physiological events which immediately follow the clinical practice of pancreatic islet transplantation, via the portal vein, are poorly understood. This stage of the procedure is estimated to result in a 60% graft loss of islets between their injection and engraftment into the liver. Rises in portal pressure can limit islet graft volume infusions and multiple intraportal grafts are associated with permanent rises in portal pressure. We have studied the effect of portal embolisation on portal vein haemodynamics and liver tissue oxygenation using inert beads in an intraportal rodent transplantation model. Beads were used to distinguish between islet and liver related factors.

Aims & Methods: Male Sprague-Dawley rats (6 week old) were injected intraportally with 500 dextran beads (75–150 μm diameter). Subjects (n=26) were divided into 6 groups as per the day following intraportal bead injection for the measurement of physiological parameters into days 1, 3, 5, 7, 14 and 28. A control group (day 0 or baseline) did not receive any intraportal beads. The following parameters were measured under isoflurane anaesthesia: portal vein pressure, systemic blood pressure (A.D. Instruments pressure transducer), portal blood flow (Transonic doppler flow probe), and liver parenchyma oxygenation (Unisense 25 μm oxygen-sensing needle probe inserted into at least 3 points in each liver).

Results: Portal vein flow rates began to fall from baseline (controls) 13.8 ml/min (1.2) immediately by day 1 to 10.7 ml/min (1.4) in the day 7 group (p<0.05) before rising to 15.2 ml/min (0.9) similar to controls by day 28 (p<0.01). In the control group the portal pressure was 8.6 mm Hg (0.95) which began to rise by day 1 to a peak of 13.1 mm Hg (0.8) in the day 7 group (p<0.05) and falling back to baseline value of 8.4 mm Hg (0.35) by day 28 (p<0.05). Partial pressures of oxygen did not significantly change between control values and any point after bead infusions, being around 5.0 to 6.6 kPa. Mean arterial pressures were on average above 80 mmHg.

Conclusion: These findings document a peak change around day 7, when the highest portal pressure and lowest portal flow is observed, before returning to baseline levels by 28 days. Other studies describing the release of growth factors such as VEGF and HGF demonstrate a peak level at this time point post-transplant. The rat liver has an abundant hepatic arterial supply and we postulate a greater degree of shunting may be occurring from this circulation to compensate for reduced portal blood flow, thus maintaining liver oxygenation. This may have implications for the relatively "oxygen-hungry" islets in the immediate post transplant period.

REPRODUCIBILITY OF VISCERO-VISCERAL AND VICERO-SOMATIC SENSITISATION INDUCED BY INTRADUODENAL CAPSAICIN INFUSION

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Introduction: Capsaicin activates TRPV-1 receptors on spinal and vagal afferents and its infusion into the duodenum evokes burning and cramping sensation and sensitises the duodenum to experimental stimuli. Whether duodenal capsaicin infusion reproducibly sensitises other visceral and somatic structures with convergent spinal innervation is not known.

Aims & Methods: To determine whether duodenal capsaicin infusion reproducibly induces viscerovisceral (oesophagus) and viscero-somatic (abdominal wall) sensitisation. Eight subjects were recruited (7 female). A catheter was positioned in the proximal duodenum with a second in the distal oesophagus. Pain thresholds (PT) to electrical stimulation (ES) were assessed in the oesophagus, area of somatic referral (AOR) and abdominal wall and control region (foot). Capsaicin was then infused into the duodenum (2 ml/min for 30 minutes). The concentration of capsaicin used was 400 μg/ml with a saline control. Subjects were studied on 3 occasions (2×400 μg/ml, 1×saline) in a randomised order and both operators and subject were blinded. PT in all regions were recorded at 15 and 45-minutes post infusion. Visual analogue scales (VAS) for pain, unpleasantness, nausea and anxiety were recorded at 5-minute intervals during the infusion and a short McGill pain questionnaire was used to describe the discomfort.

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Results: Significant and reproducible reductions in oesophageal PT were seen on both occasions at 400 μg/ml (−12.76 mA and −15.25 mA, p = 0.033, p = 0.007) when compared to saline. Significant reductions in AOR PT were seen on both occasions at 400 μg/ml (−9.09 mA and −9.44 mA, p = 0.026) when compared to saline. No differences were seen in foot PT. VAS scores for pain were higher that for the other psychophysical measures. The most common verbal descriptors used to describe the capsaicin infusion were cramping, hot-burning and aching. Tolerance of the infusion falls broadly into 2 groups; those who tolerate the full 30 min, and those who only tolerate a very short infusion (<6 min). There was a correlation between the lengths of infusion tolerated within an individual between the two visits (ICC = 0.729).

Conclusion: Capsaicin infusion into the proximal duodenum induces visceral hypersensitivity.

125 THE FERMENTABLE FIBRE SUBSTRATE PECTIN CAN ENHANCE TUMOUR YIELD IN THE APCMIN/+ MOUSE MODEL OF INTESTINAL CANCER


Introduction: There is some controversy regarding the relationship between dietary fibre intake and colorectal cancer, and it has been suggested that rapidly fermentable fibres may enhance carcinogenesis by stimulating cell proliferation in the colon. Such effects may be influenced by the diet used, as semisemisthetic (SS) diets may be hypoproliferative. This was investigated in a mouse model of intestinal cancer, namely the multiple intestinal neoplasia, ApcMin/+ mouse.

Aims & Methods: ApcMin/+ mice were fed a standard chow diet, SS diet with or without 10% apple pectin. After 8 weeks they were killed, and the intestines fixed for polyp scoring and for the determination of cell proliferation. Two-way analysis of variance was used to test for effects of diet and pectin and any interaction between these.

Results: The caecum and colon were lighter in the SS fed mice and pectin significantly increased the weight of these tissues and the small intestine in both groups. Pectin increased polyp number in the small intestine in both groups, but the effects appeared to be greater in the SS fed mice. Pectin was also associated with a small but significant increase in polyp diameter and thus burden. Few polyps were seen in the colon, but there were significantly less in the mice fed the SS diet and no effect of pectin was detectable.

Conclusion: The trophic actions of pectin and its enhancement of polyp number were not significantly altered by the use of semisemisthetic diets showing that the trophic effect of such colonial substrates and increased tumour yield may be an artefact of the basal diet. The increased tumour yield observed indicates that such fermentable substrates should not be used to boost fibre intake.


126 ESOEMEPRAZOLE FOR TREATMENT OF UNEXPLAINED CHEST PAIN IN PRIMARY CARE: A PROSPECTIVE, RANDOMISED, DOUBLE-BLIND, PLACEBO-CONTROLLED MULTICENTRE STUDY

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Introduction: Chest pain is one of the most common reasons for patients to present to primary care physicians or hospital emergency departments, and is often non-cardiac in origin. In many patients, underlying gastrooesophageal reflux disease is the source of the pain and a trial of proton pump inhibitor therapy is used to identify chest pain with reflux-based aetiology.

Aims & Methods: This study compared esomeprazole with placebo for the relief of unexplained chest pain or discomfort. Primary care patients with >2 weeks of pain or discomfort in the chest (of moderate severity on >2 of the last 7 days) and of unidentifiable cause were included. Patients with identifiable non-cardiac causes of chest pain (eg musculoskeletal disorders, gastrointestinal reflux disease) were excluded, as were patients with known cardiac disorders, abnormal ECG, troponin or exercise test results at baseline. Patients were randomised to esomeprazole 40 mg twice daily (bid) or placebo for 4 weeks, and stratified according to frequency of heartburn or acid regurgitation as follows: <2/day (stratum 1); or ≥2/day (stratum 2). The primary variable was relief of chest pain or discomfort (measured by daily diary on a 7-grade Likert scale), analysed by stratum. Relief was defined as ≤1 d with minimal symptoms during the last 7 d of treatment.

Results: A total of 599 patients were included in the intention-to-treat population (316 males, mean age 46.6 years); 297 patients received esomeprazole 40 mg bid (stratum 1, n = 153 and stratum 2, n = 144) and 302 received placebo (stratum 1, n = 161 and stratum 2, n = 141). Esomeprazole was significantly more effective than placebo for the relief of chest pain in stratum 1 (38.7% vs 25.5%, p = 0.009) and stratum 2 (27.2% vs 24.2%, p = 0.07). Esomeprazole was significantly more effective than placebo when the two strata were combined in a post hoc analysis (33.1% vs 24.9%, p = 0.035). Esomeprazole was well tolerated. One patient (placebo group) developed a non-fatal myocardial infarction during the study. Discontinuations due to adverse events were similar between the esomeprazole and placebo groups (3.3% and 2.9%, respectively).

Conclusion: Esomeprazole is more effective than placebo for relief of unexplained chest pain in primary care patients when patients with identifiable non-cardiac causes of chest pain or known cardiac disorders, abnormal ECG, troponin or exercise test results have been excluded. This treatment regimen is generally well tolerated in these patients.

127 THE NEW RADIOLABELLED SOMATOSTATIN ANALOGUE 90YDOTRIA-OCTREOTIDE FOR THE TREATMENT OF METASTATIC NEUROENDOCRINE TUMOURS: INITIAL RESULTS AND TOLERABILITY IN A SERIES OF 47 PATIENTS


Introduction: Radiolabelled somatostatin analogues are used not only for diagnostic localisation, but also for specific treatment of neuroendocrine tumours. Previous studies have assessed radiolabelled octreotide, but recent evidence suggests that radiolabelled octreotate has even higher binding to type II SSTR.

Aims & Methods: To estimate efficacy and tolerability of a new radiolabelled somatostatin analogue, 90YDOTRIA-octreotide (90Y-DOTA-octreotide), in patients with metastatic neuroendocrine tumours which progressed, despite the administration of other treatments. Forty seven patients (mean age was 60.4 years, range: 34–85 years) with metastatic neuroendocrine tumours were studied. In most patients the tumours were either low or intermediate-grade, while 11 patients had high-grade tumours. The latter had received chemotherapy in the past. All patients received 1–3 cycles of the 90Y-DOTA-octreotide every 2–3 months, either intravenously (19/47, 40.4%) or intra-arterially (28/47, 59.6%). In 8 patients of the latter group the intrarterial administration was combined with particle embolisation of hepatic metastases. Intravenous amino acids were also administered for protection of renal function. Clinical and/or radiological response to treatment was defined as the improvement of symptoms and/or either stabilisation or reduction of tumour growth, respectively. Mean follow-up period was 10.1 months (ranging 2–21 months).

Results: In all patients the post treatment scintigraphic scan demonstrated uptake and localisation by the tumour. Clinical improvement was noted in 28/47 (59.5%) patients after 1–3 treatments. Stabilisation of tumour growth was achieved in 11/17 (64.7%) patients, who had completed the 3 cycles of treatment, and in 7/13 (53.8%) in those who had 2 cycles so far. Radiological response, even lower (4/11, 36.3%), was noted also, in the high-grade group of patients who had progressed despite chemotherapy. Bone marrow toxicity (WHO grade II) was noted in 6/47 (12.7%), persisting at 3 months in two patients with significant bone metastases.
One of them who had chemotherapy in the past, developed also irreversible mild renal failure (WHO grade II), despite prophylactic amino acids.

Conclusion: 90Y-DOTA-octreotate seems to be a well tolerated and safe treatment for patients with progressive neuroendocrine tumours, despite a risk for bone marrow toxicity in patients with large-volume bone metastases. Early results regarding efficacy are promising. Longer follow-up and more patients are required for better evaluation of tumour response.

128 IS RESEARCH WITHIN THE BRITISH SOCIETY OF GASTROENTEROLOGY IN DECLINE?

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Introduction: Abstract presentations at scientific meetings allow rapid dissemination of novel research and opportunity for peer review before submission for publication. The percentage of published abstracts from other medical specialty meetings ranges from 11%–78%. We previously demonstrated that almost 70% of abstracts presented at the BSG spring meeting of 1994 were published as a full paper. However we have also reported that the number of publications achieved by gastroenterology trainees prior to starting consultant posts has fallen over the last decade. We therefore sought to assess the outcome of abstracts presented at the BSG over the period 1994–2002.

Aims & Methods: All abstracts presented at the BSG between 1994 and 2002 were assessed. MEDLINE and EMBASE databases were reviewed using cross-referencing of first and senior author and at least one key word from the abstract title. Abstracts and possible full publications were then examined in tandem to ensure they represented the same study. Publication rates were compared between meetings and study type, design, category, sample size, journal of publication, impact factor and lag time to publication also analysed.

Results: The number of abstracts presented ranged from 578–330 but did not vary significantly between years. However the number of abstracts presented that went on to full publication fell (323 to 142; p = 0.04; 57.63% falling to 30.67 by 2004 (r = 0.761; p = 0.02 Pearson’s correlation). While the number of publications being published in high impact journals did not differ over the years analysed the mean impact factor increased significantly (2.96–4.22; r = 0.90; p = 0.001), while the time to publication fell (mean (months) 23 (SD 15.04) to 19.9 (SD 5.76); p = 0.001; Student’s t test). There was no significant difference with regard to study type, design, category, sample size or journal of publication.

Conclusion: The number of presentations at the BSG going on to achieve full publication has fallen significantly. Possible explanations could be related to a shift in trainees expectations and targets, with acceptance of annual leave or other commitments were used through cross cover. Our observations may explain the documented fall in number of full publications achieved by gastroenterology trainees at the time of entry to consultant level.


129 MAKING A MOLE HILL OUT OF A MOUNTAIN: USE OF BSG GUIDELINES AND GRS PRINCIPLES TO REGAIN WAITING LIST CONTROL IN ENDOSCOPE

P. Jani, K. Safakish, K. Yara, A. Sabra, A. U. Jawhari. Gastroenterology, University Hospitals NHS Trust, QMC Campus, Nottingham, UK

Introduction: The Queens Medical Centre in Nottingham played a major role in research work in the field of colorectal cancer screening in the 1990s. This left the department with a huge screening follow-up population. Principles of service improvement were applied to deal with a major endoscopy waiting list backlog at the Queens Medical Centre in November 2004.

Aims & Methods: The aim of this exercise was to validate all patients on the endoscopy waiting list, through applying BSG guidelines to the follow-up population, and agreed colonoscopy referral guidelines for all first diagnostic examinations. We also aimed to apply service improvement principles to all aspects of endoscopy unit work. Patient records were systematically pulled and clinical details reviewed against the principles of BSG guidelines. Other changes included introduction of partial booking, employment of an endoscopy business manager, pooling of lists, recruitment of an endoscopy fellow, and monitoring of capacity and demand with real-time data, as well as setting up waiting list initiatives at weekends for 6 months.

Results: In November 2004 we had 1431 patients awaiting first diagnostic GI examinations, and 965 on the follow-up or planned list. Waiting times for urgent examinations was 3 months, and for routines up to 3 years. Follow examinations were many years overdue. Of 1431 patients on the first diagnostic list, 16% were no longer appropriate, 20% diverted to Barium enemas, 10% did not respond to validation or declined the test. The remainder 54% underwent colonoscopy. Of the 965 patients on the planned waiting list 33% did not fit BSG guidelines and were removed from waiting list. 5% had their date delayed. 62% were invited to have colonoscopy, of whom 8% did not respond or declined the test. 480 colonoscopies were performed at waiting list initiatives and the remainder accommodated into unit capacity. Partial booking was introduced, and DNA rates fell from 12% to 4%. 85% of all lists previously cancelled due to annual leave or other commitments were used through cross cover.

Conclusion: Application of BSG colonoscopy guidelines and service redevelopment principles allowed reduction of waiting times for routine colonoscopy from 3 years to 6 weeks, and for planned examinations from several years overdue to being up to date.
Colorectal/anorectal posters

[131] MOLECULAR ANALYSIS OF BACTERIAL DIVERSITY IN HEALTHY AND CANCEROUS COLONIC MUCOSAE

S. Ahmed, G. T. Macfarlane, S. Macfarlane. Microbiology and Gut Biology Group, Division of Pathology and Neurosciences, Ninewells Hospital and Medical School, University of Dundee, Dundee, UK

Introduction: Several epidemiological studies have shown differences in intestinal microbiotas between various human population groups in relation to colorectal cancer risk and colorectal adenoma formation. However, mucosa associated bacterial diversity in healthy and cancerous mucosae has not been investigated.

Aims & Methods: This study investigated bacterial diversity in the healthy and cancerous mucosae using molecular analysis. Mucosal biopsies were taken from 25 patients undergoing emergency or elective surgery requiring colonic resection. None had any bowel preparation before surgery and all patients were found to have primary colonic cancer. Eight had right-side colonic tumours, while 14 had left-sided tumours, and three had lesions in the transverse colon. Fourteen patients were males (range 59–81 years) and 11 were females (range 61–76 years). Mucosal sections were taken from cancerous mucosae, and at the point furthest away from the diseased tissue (range 4–20 cm from the tumour). Qualitative analysis of bacterial populations was done using denaturing gradient gel electrophoresis (DGGE) and quantitative measurements by real-time PCR. Mucosal bacteria were also visualised in situ using confocal laser scanning microscopy (CLSM). Wilcoxon matched paired test were used for statistical analysis.

Results: DGGE banding profiles were found to vary between individuals and in healthy and cancer mucosa gels in the same individual. Real-time PCR showed that mucosal cell population densities were significantly higher in healthy colonic mucosa compared with cancerous tissue, and that they were not dependent on location of the lesion. Lactic-acid producing bacteria such as species belonging to the genera Bifidobacterium and Lactobacillus were significantly higher on the healthy mucosa (p < 0.005), while counts of E. coli, other enterobacteria and bacteroides were significantly higher at tumour sites (p < 0.005).

Conclusion: Mucosal-associated bacterial diversity and distribution on healthy and cancerous mucosae were host dependent, in that considerable interindividual variation was observed. Specific patterns of bacterial colonisation at colonic cancer sites may be a contributory factor in the aetiology of CRC, while other bacteria may have protective functions.

[132] REFERRAL LETTERS FOR TWO WEEK WEEK FOR SUSPECTED COLORECTAL CANCER DO NOT ALLOW A STRAIGHT-TO-TEST PATHWAY

M. Aljarabah, N. Borley, T. Goodman. Gastrointestinal Unit, Cheltenham General Hospital, Cheltenham, UK

Introduction: Some clinicians have argued that a 2 week wait rule for suspected colorectal cancer patients can go “straight to test” to facilitate time to diagnosis and treatment. However, others have felt that referral letters are not reliable enough to allow this pathway.

Aims & Methods: We have studied the letters referring patients under the 2 week wait rule for suspected colorectal cancer prospectively over a 6 month period. The examining consultant was asked to outline the tests he would perform having read the letter, and then again after a consultation with the patient. The outcome of these tests was tracked.

Results: Between April 2006 to September 2006, we studied 217 patients with a median age of 73 (range 24–94), referred under the 2 week rule for suspected colorectal cancer. Having only read the referral letter the examining consultant was asked to outline the tests he would perform having read the letter, and then again after a consultation with the patient. The outcome of these tests was tracked.

Conclusion: We conclude that 2 week wait patients for suspected colorectal cancer should be seen in the clinic and should not proceed straight to test.

[133] PREOPERATIVE CARDIAC ASSESSMENT FOR ELECTIVE PELVIC COLORECTAL CANCER SURGERY: DO WE NEED GUIDELINES?

M. Aljarabah, J. Wheeler, T. Goodman, N. Borley. Gastrointestinal Unit, Cheltenham General Hospital, Cheltenham, UK

Introduction: The fundamental role of preoperative assessment in elective surgery is to identify patients who present with specific risk factors that potentially increase the risk of surgical complications or death from the planned surgery. In particular, patients awaiting colorectal surgery are regarded to be at an increased risk simply because of the very nature of this type of surgery which is defined as intermediate to high risk.

Aims & Methods: Our aim was to assess the availability and application of guidelines for the process of cardiac risk assessment of patients undergoing elective pelvic colorectal cancer surgery. We circulated a questionnaire to 400 colorectal surgeons in the UK who are members of the ACPGBI who agreed to circulate details for their further distribution. We then completed two further questionnaires investigating whether departmental/unit protocols existed for the routine preoperative cardiac assessment of patients undergoing colorectal pelvic surgery. We also proposed 3 clinical scenarios and asked respondents to indicate the most appropriate tests for each.

Finally we asked respondents to indicate if they thought there is a role for formal guidelines for the cardiological preoperative workup for ALL elective pelvic colorectal cancer cases.

Results: Of the 400 questionnaires sent, 200 replies were completed (50%). Some 149 (74.5%) indicated that they do not have a departmental/unit protocol for the routine preoperative cardiovascular assessment of patients undergoing pelvic colorectal cancer surgery. Of the 45 (22.5%) who did have such a protocol, 17 (9%) used guidelines based on local research, 12 (6%) used the American College of Cardiology/American Heart Association guidelines and 19 (10%) indicated that they used guidelines obtained from nationally published data. There was wide variation in the answers to choosing the investigations most appropriate in the 3 hypothetical clinical scenarios. Only 80 (40%) thought there is a role for cardiology guidelines in the preoperative workup for all elective pelvic colorectal cancer cases.

Conclusion: In patients undergoing elective pelvic colorectal cancer surgery (surgery with the highest morbidity and mortality rate of all elective colorectal cancer cases) there are no uniform national guidelines and wide variation in local guidelines among colorectal surgeons. Similar patients may be undergoing widely differing preoperative investigations in different centres and it would seem there is a clear need for standardisation in this area in this high risk group.

[134] A NOVEL FINDING—GLOBAL DNA HYPMETHYLATION IN DIVERTICULAR DISEASE: A PILOT STUDY (THE BORICC STUDY)

R. P. Arasaradnam1, D. Commane1, H. Greetham1, M. Bradburn2, I. T. Johnson3, J. C. Mathers1. 1Human Nutrition Research Centre, Newcastle University, Newcastle, 2Surgery, Northumbria Healthcare NHS Trust, Northumbria; 3Institute of Food & Research, IFR, Narwich, UK

Introduction: Structural changes within the colonic wall result in the formation of colonic outpouchings seen in diverticular disease (DD). Consequently, there is some evidence to suggest that changes in gut microbiota with resultant decreased immune response drives a low grade mucusal inflammatory response.1 We hypothesise that this inflammatory response may have effects on the colonicoyte genome, specifically, epigenetic changes such as DNA methylation. There is no data to date on genomic DNA methylation status in DD.

Aims & Methods: To determine the DNA methylation status in a cohort with macroscopically non-inflamed DD and a control group (for initial investigations). Colorectal mucosal biopsies were obtained and DNA extracted. Genomic DNA methylation was measured using the tritium-labelled cytosine extension assay (3[H] dCTP) as described by Pogribny et al2 in this assay, the extent of 3[H] dCTP

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Abstract 134

<table>
<thead>
<tr>
<th>Subject group</th>
<th>Age (SD)</th>
<th>hs CRP (mg/dl)</th>
<th>Genomic DNA methylation (DPM x 10^6/pug DNA)</th>
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<td>58 (11)</td>
<td>1.3 (1.4–3.1)</td>
<td>6.2 (8.2–15.8)</td>
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<tr>
<td>DD (n=10) M:F = 1:1</td>
<td>58 (11)</td>
<td>3.6 (1.8–5.8)</td>
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*Statistically significant. Figures in brackets indicate 95% confidence interval.

Abstract 135

<table>
<thead>
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<th>Subject group</th>
<th>Age (SD)</th>
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<th>% COX deficiency</th>
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<td>3.2 (1.6–5.3)</td>
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</table>

*Statistically significant. Figures in brackets indicate 95% confidence intervals.

Inflammatory markers within faeces with methylation status is underway.

Further studies to correlate systemic subclinical inflammation as determined by elevated hs CRP levels with DD subjects compared to controls. There is evidence of hypomethylation in patients with diverticular disease possibly as a consequence of low grade mucosal inflammation. There is evidence of systemic subclinical inflammation as determined by elevated hs CRP levels in DD subjects compared to controls.

Aims & Methods:
- To characterise the presence of cytochrome c oxidase (COX) deficient crypts in patients with diverticular disease (DD).
- To investigate mtDNA mutations in colonic crypts of patients with diverticular disease (DD). Fresh frozen colorectal tissue from 35 patients; 25 age and sex-matched patients with macroscopically normal colons as well as tissue from 10 patients with DD were analysed.

Introduction:
- We have previously shown that mitochondrial DNA (mtDNA) mutations may act as a putative biomarker for DNA damage. 2
- Oxidative damage which can occur as a result of chronic inflammation, may cause mtDNA mutations which unlike nuclear DNA, is not as well protected.

Results:
- Percentage COX deficient crypts were significantly higher in those with DD (p<0.04). High sensitivity C Reactive Protein (hs CRP), was also higher in the DD group but this did not reach statistical significance (hs CRP was measured in 9 controls).

Conclusion:
- This novel preliminary finding of higher COX deficiency within colonic crypts in DD compared to controls suggests a further role of COX in characterising mt DNA mutations. Further studies to correlate dietary intake with these mutations are underway.

This study is funded by the Food Standards Agency (N12015).


136 PERICUTANEOUS ENDOSCOPIC COLOSTOMY WITHIN A TERTIARY REFERRAL COLORECTAL PRACTICE: EVIDENCE TO SUPPORT CURRENT NICE GUIDELINES?

W. Barazz1, S. Brown1, M. McAlindon2, P. Hurlstone2. 1Colorectal Surgery, The Northern General Hospital; 2Department of Gastroenterology, The Royal Hallamshire Hospital, Sheffield, UK.

Introduction: Percutaneous endoscopic colostomy (PEC) is an alternative to surgery in patients with recurrent sigmoid volvulus, recurrent pseudo-obstruction and severe slow transit constipation. A percutaneous tube, placed under direct endoscopic visualisation in the colon, acts as an irrigation or decompressant channel or, via direct traction and secondary fibrosis, provides colonic ‘fixation’ to the anterior abdominal wall. NICE has recently published official guidance on PEC use in the UK but recommendations are restricted because of the paucity of published experience. We report our prospectively obtained experience particularly concerning the safety and efficacy of PEC insertion at a single tertiary referral centre.

Aims & Methods: Thirty three patients with recurrent sigmoid volvulus, acute or chronic pseudo-obstruction and idiopathic slow transit constipation were selected to undergo the procedure. Using a technique similar to percutaneous endoscopic gastrostomy insertion, PEC tubes were placed in the appropriate colonic sites. Patients with recurrent sigmoid volvulus and constipation had their tubes left in indefinitely whereas patients with pseudo-obstruction had their tubes left in for a variable period of time depending on their symptoms.

Results: Thirty five procedures were performed on 33 patients who were followed up for a median period of 35 months (range 21–89). 19/33 (58%) patients underwent PEC for recurrent sigmoid volvulus. 10/33 (30%) patients underwent PEC for idiopathic slow transit constipation and 4/33 (12%) for recurrent pseudo-obstruction. Three patients (9%) developed peritonitis. Two were fit for operation, 1 having a laparotomy and washout and the other, a sigmoid colectomy. Two patients who had PEC insertion for constipation required subtotal colectomy; one because of faecal urgency and the other because of site pain. There were other minor complications (bleeding, site infection, ‘buried bumper syndrome’ and pain) in 8 patients with PEC resting required in 2 cases. There was one recurrence of sigmoid volvulus because of the removal of one of 2 PECs due to infection. Subsequent resiting of a PEC was successful in this patient. There was no recurrence of symptoms in any other patients with a PEC in situ. Eventual symptom resolution occurred in 29 patients (88%).

Conclusion: This is the largest prospective study to date addressing the safety and efficacy of PEC. It adds to the minimal existing data on the procedure and confirms the addition of the PEC procedure to the therapeutic armamentarium for the treatment of recurrent sigmoid volvulus and colonic motility disorders, particularly in the high surgical risk patient.

137 FLEXIBLE SIGMOIDOSCOPY AND BIOPSY FOR INVESTIGATION OF DIARRHOEA: HIGH RATE OF MICROSCOPIC ABNORMALITY IN MACROSCOPICALLY NORMAL MUCOSA

J. Burdsall1, C. Lim4, M. Ahmed2. 1Gastroenterology, Hereford County Hospital, Hereford, 2Gastroenterology, Good Hope Hospital, Sutton Coldfield, UK

Introduction: Flexible sigmoidoscopy (FS) is frequently used to investigate both acute onset diarrhoea that fails to resolve and chronic diarrhoea. Routine biopsy is recommended to avoid missing diagnoses that may not...
be apparent on macroscopic appearance such as microscopic and collagenous colitis.

Aims & Methods: We conducted a retrospective study to assess biopsy rate and looked at macroscopic findings and histological findings arising from 1 year’s worth of FS performed for investigation of diarrhoea. Details of all FS performed between March 2005 and March 2006 were obtained using the Endoscribe database search facility, where the indication field contained the word “diarrhoea”. These records were exported to a Microsoft Access database and matched with the corresponding histological records from the hospital central datastore. We then determined what proportion of procedures had had biopsies, and what diagnoses made, both macroscopically and with histology. We assessed the correlation between endoscopic diagnosis and histological.

Results: The macroscopic diagnosis was “normal” in 162 cases, “abnormal” in 110 cases and “unknown” in 19 cases (see table). In the macroscopically normal group, biopsy was carried out in 81 (50%) of cases. 18 of these cases (22%) demonstrated significant abnormalities (see table).

Conclusion: Performing biopsies, even with macroscopically normal mucosa, results in a high diagnostic yield. We recommend that routine biopsies should be performed in all new cases of diarrhoea requiring investigation by flexible sigmoidoscopy. Failure to do so could result in missed diagnosis in as many as 22%.

<table>
<thead>
<tr>
<th>Macroscopically normal</th>
<th>Macroscopically abnormal</th>
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<tr>
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<td>110</td>
<td>19</td>
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<td>Biopsied</td>
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<td>8</td>
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<tr>
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<td>3</td>
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<tr>
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</tr>
<tr>
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</tr>
</tbody>
</table>

A. J. Cairns, M. Hendrickse, N. Shariff. Gastroenterology, Blackpool Victoria Hospital, Blackpool, UK

Introduction: It has been suggested that flexible sigmoidoscopy is an effective screening tool for colorectal carcinoma because a high proportion of cancers are within reach of the flexible sigmoidoscope and as many as 50% of proximal cancers will have distal polyps leading to colonoscopic examination. We report our experience of colorectal cancer over a 26 month period and identify how many proximal advanced colorectal neoplasias would be discovered if flexible sigmoidoscopy was the initial investigation and further examination depended on the presence of distal polyps.

Aims & Methods: Endoscopic records were analysed to identify all patients diagnosed with colorectal cancer by colonoscopy or flexible sigmoidoscopy from 11/05/06 to 26/07/06. The histology results were reviewed to confirm the diagnosis. Only adenocarcinomas were included. The presence and position of polyps found on the examination finding a cancer or any previous examinations within the time period were recorded. Cancers were considered either proximal (caecum to splenic flexure) or distal (descending colon to rectum.)

Results: 239 patients were identified as having a tumour by the endoscopist in 2594 colonoscopies and 3682 flexible sigmoidoscopies. 223 patients had an adenocarcinoma confirmed on histology. 49 (22%) of 223 colorectal adenocarcinomas were proximal to hepatic flexure. Of these 49 tumours only 5 (10%) were associated with distal polyps. The 5 patients with proximal cancer and distal polyps, had polyps in sigmoid (4) or descending colon (1), 1 hyperplastic, 1 not biopsied, 3 tubulovillous adenoma with severe dysplasia.

Conclusion: The distribution of colorectal cancer is similar to that reported previously with 22% of colorectal cancers being found proximal to the splenic flexure. These results suggest that the presence of distal polyps may be a less reliable trigger for full colonoscopic examination than previously reported. A proposed method of screening for colorectal cancer using a flexible sigmoidoscope followed by a colonoscopy if distal polyps were identified would miss 44 of 49 (90%) of proximal cancers in this population. However 80% of cancers would still be identified. The finding of a hyperplastic polyp in one patient would not prompt further examination based on previously used criteria (size >1 cm, villous histology, multiple polyps, severe dysplasia or malignancy) therefore 45 of 49 (92%) of proximal cancers would be missed. Previous studies have suggested that 48–54% of proximal colorectal cancers are associated with distal polyps, much higher than our findings. Flexible sigmoidoscopy is safer, cheaper, and more convenient for patients than colonoscopy but its efficacy for detecting proximal cancer in a screening programme may be much lower than previously suggested.

THE ASSOCIATION OF PROXIMAL COLORECTAL NEOPLASIA AND DISTAL POLYPS IN A LARGE DISTRICT GENERAL HOSPITAL

D. R. Chatoor, N. M. Thoua, A. V. Emmanuel. GI Physiology Unit, University College Hospital, London, UK

Introduction: Evacuation difficulties associated with a rectocele often have a coexistent functional component. Ignoring problems such as pelvic incoordination, digitation and straining is associated with poor outcome from surgery. Biofeedback treats abnormal function and addresses concomitant psychological features. Whether psychological or anatomical factors are associated with specific functional symptoms is unknown. The aim of this study was to identify the interplay of functional, psychological and anatomical factors in patients with evacuation disorder. This has potential implications for choice of treatment.

Aims & Methods: Seventy three women with evacuation difficulties attributed to a symptomatic rectocele underwent standard anorectal physiology (manometry and sensitivity) and barium proctography. Psychological assessment was by questionnaire: Hospital Anxiety and Depression Scale to assess anxiety (HAD-A) and depression (HAD-D); psychometric functioning using the SCL-90, focusing on somatisation (SOM) and obsessive compulsive traits (OC). The SCL-90 questionnaire generates a global severity index subscale (GSI), estimating overall burden of psychological morbidity.

Results: Patients who vaginally digitated (22/73, 30%), compared to those who did not, had lower levels of anxiety (8 vs 5.7, p = 0.04) somatisation (SCL-SOM 50.3 vs 55.8, p = 0.01) and psychological morbidity (SCL-GSI 50.3 vs 53.5, p = 0.02). Comparing those who digitated anally (20/73, 27%) to non-digitators there were hypersensitive to rectal distension (urge volume 95 v 74 ml, p = 0.03). This was associated with greater anxiety (HAD-A 9.1 v 6.6, p = 0.03) and higher scores of SCL-SOM (59.9 v 51.9, p = 0.0003), SCL-OC (55.7 v 51.3, p = 0.01) and SCL-GSI (56.6 v 51.1, p = 0.002). For those that strained to evacuate (46/73, 63%) compared to
those who didn’t there was tendency to depression (HAD-D 8.3 ± 6.0, p = 0.04). SCL-OC (53.8 ± 50.2, p = 0.02) and SCI-GSI (53.6 ± 50.8, p = 0.03). There was an inverse correlation between distension threshold and anxiety (aurel 0.18, r = 0.01) and somatisation (aurel 0.3, r = 0.01). There were no correlations between rectocele size and psychological or anorectal physiology variables.

Conclusion: We have shown that specific anorectal symptoms correlate with specific psychological profiles—vaginal digitators have low anxiety and somatisation scores, anal digitators high anxiety, somatisation and abnormal anal continence traits. The relationship between anxiety or somatisation and rectal distension sensitivity highlights the close relation that exists between psychological state and gut function. This study demonstrates the importance of adding psychological influences in patients with evacuation difficulties, even if associated with a large trapping rectocele, a common independent indication for surgery.

**140 COMPONENTS OF THE RECTO-ANAL INHIBITORY REFLEX CORRELATE WITH GUT SYMPTOMS IN FUNCTIONAL AND NEUROPATHIC CONDITIONS**

D. R. Chatot1, K. Thiruppapathy1, P. Dhankan2, A. J. Roy3, A. V. Emmanuel1. 1. GI Physiology Unit, University College Hospital; 2. Medical School, Imperial College, London, UK

Introduction: The recto-anal inhibitory reflex (RAIR) describes the transient relaxation of the anal sphincter in response to rectal distension. It is a measurable reflex that reflects the integrity of an important aspect of the mechanism maintaining faecal continence, namely its sampling mechanism. The anatomic substrate of the reflex is at enteric nerve plexus level, being absent in Hirschsprung’s disease and after lower anterior resections, but being preserved in spinal cord injury (SCI). The aim of this study was to analyse whether distinct components of this reflex can be differentiated in healthy volunteers (HV), patients with idiopathic faecal incontinence (FI), constipation, multiple sclerosis (MS) and SCI.

Aims & Methods: As part of standard anorectal physiology, the following subjects had assessment of their RAIR: 21 HV (14 female, mean age 35), 71 FI (46 female, mean age 45, urge FI in 44, passive FI in 34), 74 constipation (59 female, mean age 32; slow transit (STC) 2.6 s, p = 0.05), 12 SCI (11 female, mean age 47, 7 supracaecal, 25 cauda equina). The reflex was elicited by rapid inflation of 50 ml of air into a latex balloon seated at the top of the anal canal, while recording maximal resting pressure with an 8 channel water-perfused manometry system.

Results: Three phases of the reflex were identified—the latency from stimulus to maximal sphincter relaxation; the duration of maximal relaxation; the time to recovery of resting pressure. FI patients: neither urge nor passive FI was associated with any significant difference in RAIR phase compared to controls. Compared with controls, patients with post-decorticisation reflux had longer maximal relaxation (0.5 ± 1.2 s, p < 0.03) and longer recovery time (4.3 ± 6.3 s, p < 0.003). Constipation: neither STC nor evacuation dysfunction was associated with any changes in reflex phases compared to controls. MS patients with FI, not constipation, had longer latency (2.7 ± 1.8 s, p < 0.03) and longer maximal relaxation (1.2 ± 0.7 s, p < 0.05). SCI: Compared to controls, both supra-caecal and cauda equina patients had longer latencies (1.6 ± 2.6 vs 2.0 s, p < 0.05 both), and cauda equina patients only had longer recovery (6.6 ± 4.3 s, p < 0.02).

Conclusion: Analysing components of the RAIR provides reproducible and potentially helpful information in understanding the pathophysiology of gut symptoms in functional and neuropathic conditions. In functional FI, post-decorticisation soiling had a longer maximal relaxation (0.5 ± 1.2 s, p < 0.03) and longer recovery (4.3 ± 6.3 s, p < 0.003). Constipation: neither STC nor evacuation dysfunction was associated with any changes in reflex phases compared to controls. MS patients with FI, not constipation, had longer latency (2.7 ± 1.8 s, p < 0.03) and longer maximal relaxation (1.2 ± 0.7 s, p < 0.05). SCI: Compared to controls, both supra-canal and cauda equina patients had longer latencies (1.6 ± 2.6 vs 2.0 s, p < 0.05 both), and cauda equina patients only had longer recovery (6.6 ± 4.3 s, p < 0.02).

**141 WHAT DOES MR PROCTOGRAPHY ADD IN COMPARISON TO FLUOROSCOPIC PROCTOGRAPHY IN PATIENTS WITH EVACUATION DIFFICULTY?**

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Introduction: In investigating the functional abnormalities that occur in patients with evacuation difficulties, elicits fluoroscopic barium proctography (FP), the current gold standard, imparts a small but significant dose of ionizing radiation. Furthermore, impaired evacuation is often a symptom of more global pelvic floor dysfunction, and accurate assessment of the anterior and middle pelvic compartments may help optimise therapeutic strategy. Supine MR proctography (MRP) allows assessment of the whole pelvis, although its role in assessing rectal evacuation dynamics has not been validated. Finally, the putative clinical value of MRP over FP has not been evaluated.

Aims & Methods: Thirty women with evacuation difficulty underwent both FP and MRP according to standard protocols. MRP was reported by a GI radiologist, blinded to the result of FP. A consensus committee (gastroenterologist, 2 colorectal surgeons, 2 urogynaecologists, 2 GI radiologists) undertook live reporting of FP, knowledgeable of the clinical findings. Each patient’s MRP was then reviewed by the committee, and additional findings not identified by FP were noted to create a consensus reference standard. Note was then made as to whether FP and MRP agreed, under- or overestimated abnormalities compared to this standard. The impact of each imaging modality on (1) diagnostic confidence and (2) management was assessed by the clinician in charge (visual analogue scale, VAS).

Results: Both tests agreed with the consensus diagnosis in 11/30 (37%), MRP alone in 9/30 (30%) and FP alone in 10/30 (33%). MRP failed to identify: anismus (5/13, 38%), intussusception (8/18, 44%), trapping within a rectocele (1/11, 9%) and pelvic floor descent on straining (8/29, 28%), compared to 1/13, 8%; 5/18, 28%; 3/11, 28% and 3/29, 10% respectively for FP. MRP overestimated rectocele size in 9/30 (30%) but revealed stenotomones in 7/30 cases. In terms of evacuation abnormalities of anterior and middle compartment, MRP was deemed unhelpful in influencing management in 10/30 (30%), (of whom 6 (60%) had underlying anismus), and FP in 6/30 (20%).

Conclusion: MRP identifies abnormalities in anterior and middle pelvic compartments. However, MRP underestimates prevalence of functional rectal evacuation difficulties and intussusception, possibly due to poor positioning and reduced viscosity of contrast gel compared to barium. Fluoroscopic and MR proctography are complementary, and particularly where patients have combined functional and anatomical abnormalities.
nuclear translocation of β-catenin (ratio N:WC 1.064; SD 0.406; p = 0.085).

Conclusion: Mucosal E coli isolates from colon cancer induce nuclear localisation of β-catenin in human colon cancer epithelial cells. This supports the hypothesis that mucosa-associated bacteria may promote development of human colon cancer through regulation of β-catenin signalling.


WHAT IS THE BEST METHOD FOR ASSESSING SEVERITY IN FUNCTIONAL CONSTIPATION—EVALUATION OF SYMPTOMS BY THE CLINICIAN, PERFORMING INVASIVE INVESTIGATION OR SELF-ASSESSMENT OF QOL BY THE PATIENT?

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Introduction: Functional constipation (FC) is assessed by describing symptoms deemed by clinicians to be markers of severity (eg stool frequency, consistency). Results of invasive investigation (eg transit study, proctography) can also be used. However, symptom assessment by clinician is not always precise and the assumption that investigation results correlate with severity is not validated. Evaluating the impact that FC has on quality of life (QOL) may be more representative of severity.

Aims & Methods: To determine whether symptom evaluation by clinician, results of investigations or patient measurement of constipation specific QOL gives the best assessment of severity by correlating with a validated measure of overall QOL. Symptoms in consecutive FC patients (Rome II criteria) assessed by a single clinician using a Likert scale. Cumulative constipation score (CC-score) also calculated. Radio-opaque marker studies (total and segmental transit time) and radio-isotope defecating proctography1 performed (% evacuation, evacuation rate, evacuation time, pelvic floor descent). Patient Assessment of Constipation (PAC-QOL)2 to assess constipation specific QOL (high score = poor QOL). SF36 to assess overall QOL (high score = good QOL). SF-36 includes Physical Component Summary (PCS) and Mental Component Summary (MCS). Normal population reference values are available.2 Analysis by Pearson correlation.

Results: 122 patients: 97% female. Mean age: 43 years. Complete data for all. Mean PCS 43, mean MCS 36 (normal reference 50). No correlation between overall QOL (PCS and MCS) and clinician evaluation of symptoms or CC-score. No correlation between PCS or MCS and colonic transit (either total or segmental). No correlation between overall QOL and proctographic parameters. There was correlation between constipation specific QOL and overall QOL: PAC-QOL vs MCS (r = 0.5, p<0.01); PAC-QOL vs PCS of SF-36 (r = 0.3, p<0.01). PAC-QOL did not correlate with transit, proctographic parameters, CC score or individual symptoms.

Conclusion: Overall QOL is reduced in FC compared to the normal population. Patient self-assessment of QOL is the method of choice for measuring severity in FC rather than symptom evaluation by clinician or the results of invasive investigations. These latter approaches still have a role to play in diagnosis and management. Assessing overall and constipation specific QOL provides information about severity relevant to everyday practice.


CAN ENTEROCUTANEOUS FISTULA BE EFFECTIVELY MANAGED IN A REGIONAL UNIT?

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Introduction: The management of enterocutaneous fistula following surgery involves a multidisciplinary approach. It has been suggested that complex cases should only be managed in selected national centres.

Aims & Methods: This was a prospective study of 51 patients with established enterocutaneous fistula referred to a regional unit over a 16 month period. Six were internal referrals, 45 from institutions elsewhere. 42 were small bowel, 9 large bowel, with 18/51 (35%) associated with inflammatory bowel disease. Mean age was 51, with the median number of previous operations 3. The establishment of nutritional support, eradication of sepsis, appropriate wound management and restoration of normal physiology was attempted in all cases. Definitive surgical management was deferred for at least 6 months after the last abdominal surgical intervention. 11 (22%) were dependent on parenteral nutrition. All patients were followed up for a minimum of 6 months.

Results: The overall mortality was 4 (8%), in all cases before definitive surgery; three from overwhelming sepsis, the other from mesenteric infarction. 18/48 (38%) fistula healed spontaneously. 30 (62%) underwent definitive surgical management with a re-fistula rate of 4 (14%). Only one of these required further surgery, 3 healing spontaneously. There were no postoperative deaths. No patients were left dependent on parenteral nutrition.

Conclusion: The results compare favourably with those obtained in designated national centres for the management of enterocutaneous fistula (overall mortality 9.5–10.8%, operative mortality 3–3.5%).1–2 and suggest that these patients can be effectively managed in regional units. In addition, more local treatment may improve patients’ psychological ability to deal with a condition that involves prolonged in patient care.


145 RECTAL ADMINISTRATION OF HIGH DOSE VANCOMYCIN IS SUCCESSFUL IN INDUCING REMISSION OF CLOSTRIDIUM DIFFICILE ASSOCIATED DIARRHOEA WHICH HAS FAILED TO RESPOND TO STANDARD THERAPY

K. K. Desai, Y. Yiannakou, P. H. Moncur. Gastroenterology, University Hospital of North Durham, Durham, UK

Introduction: Clostridium difficile is a common cause of nosocomial infection in the UK. It is associated with marked morbidity and carries a mortality of up to 2–4%. Failure to respond to medical therapy occur in 7–20% of patients often resulting in total colectomy. Vancomycin resistance is rare. The authors describe an alternative method of antibiotic administration, which promises to reduce the need for surgical intervention.

Aims & Methods: Three patients with CDAD on SHEA criteria were identified who demonstrated failure to induce clinical remission following standard therapy with oral metronidazole, oral vancomycin, Brewer’s yeast and intravenous immunoglobulin. All patients received rectal vancomycin 500 mg in 250 ml of 0.9% saline qds. All patients had plasma vancomycin levels were undetectable throughout the treatment period. No significant side effects were identified in any patients undergoing rectal therapy.

Results: Remission was induced in all patients within six days following which they were converted to oral vancomycin and discharged on a tapering 6-week regime. Despite the theoretical risk of absorption of vancomycin through denuded mucosa in severe colitis, plasma vancomycin levels were undetectable throughout the treatment period. No significant side effects were identified in any patients undergoing rectal therapy.

Conclusion: In patients who have failed to respond to standard medical therapy for proven CDAD, rectal vancomycin appears to offer a promising alternative to colectomy. These encouraging early results will need to be confirmed by a suitably powered randomised controlled trial. However in patients unsuitable or unwilling to undergo colectomy following standard medical management, this approach may offer an attractive alternative.


146 FAILED COLONOSCOPY: THE RADIOLOGICAL SOLUTION FOR ACHIEVING COLORECTAL CANCER TARGETS

K. Flood1, S. Jaggar2, R. Lowe2, J. Luby2, J. Davies1. 1 General Surgery, 2 Radiology, Gastroenterology, Bradford Royal Infirmary, Bradford, UK

Introduction: Introduction of the 31 and 62 day targets in colorectal surgery has increased pressure on colonoscopic resources.1 2 Even in expert hands, incomplete colonoscopy occurs in approximately 10% of
cases. This introduces delay and the need for further investigations while the "clock is ticking".

**Aims & Methods:** To achieve a system that would allow complete radiological imaging for at least 80% of patients undergoing incomplete colonoscopy. This imaging should be provided on the original bowel preparation and therefore within a suitable time period. All patients undergoing colonoscopy over a three-month period were observed. Those having failed colonoscopy were assigned to further bowel imaging (either barium enema or CT colonoscopy (CTC), according to protocol). CTC was indicated if a stricture prevented colonoscopic completion. Patients intolerant to endoscopy underwent barium enema.

**Results:** Out of 470 attempted colonoscopies, 34 failed (5M, 29F), mean age 61 years (range 22–86). Hence a completion rate of 93%. 14(41%) of the failures were due to poor bowel preparation, making them inappropriate to undergo another bowel study on the protocol. 20 (59%) were appropriate to have a further study and 12 (60%) underwent a further test. Two had a CTC and 10 had barium enemas (7 same day, 2 following day, 1 after weekend). Two of the barium enema reports stated poor coating of the bowel. Eight (40%) did not follow the study’s protocol for individual reasons. In 3 patients colonoscopy revealed a tumour and CT staging was required. One patient refused further investigation, and imaging for another was not arranged. Two had a looping/fixed sigmoid and 1 had a sigmoid stricture with no lesion discovered on water soluble study.

**Conclusion:** The incomplete colonoscopy rate of 7% resulted on a practical ability to provide a service for same day preparation imaging. Colonoscopic preparation did not leave the colon “too wet” therefore CTC and barium enema gained reliable results. 13 out of 20 (65%) either had or were offered a further study, therefore, saving diagnostic time and preventing repetitive bowel preparations without risk of swamping an already “full” imaging service. With continuing use of this protocol, complete bowel imaging could be achieved in close to 100% patients.


**147 CLOSTRIDIUM DIFFICILE: EXPERIENCE OF THE HIGHLY-VIRULENT EPIDEMIC STRAIN O27**

I. R. Gooding, M. C. Ilkueveke, G. Biah, M. S. Khan, S. M. Greenfield. Department of Gastroenterology, Queen Elizabeth II Hospital, Welwyn Garden City, UK

**Introduction:** Outbreaks of C difficile-associated diarrhoea (CDAD) due to the strain O27 have occurred since 2001 and are associated with increased complications and mortality. In an 83 case outbreak of CDAD in our hospital, O27 was the predominant strain.

**Aims & Methods:** We studied patient notes and drug charts and compared previous antibiotic exposure to total antibiotic usage in the hospital (expressed as number of days of use or patient-days) during the outbreak to determine the risk of a particular antibiotic being associated with CDAD.

**Results:** We obtained full data for 69 patients, mean age 84.1. Early in the outbreak 12 out of 14 stool isolates were O27. 59 patients received antibiotics in hospital before the onset of diarrhoea. Cefuroxime was the antibiotic most closely associated with CDAD. A significantly weaker antibiotics in hospital before the onset of diarrhoea. Cefuroxime was given as a single prophylactic dose at the time of surgery.

**Conclusion:** To determine the risk of a particular antibiotic being associated with CDAD.

**Abstract 147**

<table>
<thead>
<tr>
<th>Cefuroxime</th>
<th>Gentamicin</th>
<th>Co-amoxiclav</th>
<th>Ciprofloxacin</th>
<th>Amoxicillin</th>
<th>Clarithromycin</th>
<th>Erythromycin</th>
<th>Flucloxacin</th>
<th>Tazocin</th>
<th>Teicoplanin</th>
<th>Benzylpenicillin</th>
<th>Penicillin V</th>
<th>Vancomycin IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>47.8</td>
<td>51.0</td>
<td>52.9</td>
<td>68.0</td>
<td>73.5</td>
<td>104</td>
<td>136</td>
<td>251</td>
<td>530</td>
<td>367</td>
<td>398</td>
<td>0 cases</td>
<td>0 cases</td>
</tr>
<tr>
<td>Comparison with cefuroxime</td>
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<td>p = 0.001</td>
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<td>p = 0.001</td>
<td>p = 0.001</td>
<td>p = 0.001</td>
</tr>
</tbody>
</table>

**Abstract 148 Frequency of symptoms and score**

<table>
<thead>
<tr>
<th>Variable</th>
<th>In cases [n = 117]</th>
<th>In controls [n = 433]</th>
<th>Log OR</th>
<th>Caper score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constipation</td>
<td>46 (39)</td>
<td>125 (29)</td>
<td>0.98</td>
<td>25</td>
</tr>
<tr>
<td>Loss of weight</td>
<td>44 (38)</td>
<td>81 (19)</td>
<td>0.93</td>
<td>20</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>75 (64)</td>
<td>139 (32)</td>
<td>0.62</td>
<td>15</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>55 (47)</td>
<td>146 (34)</td>
<td>0.41</td>
<td>10</td>
</tr>
<tr>
<td>Haemoglobin 12–12.9</td>
<td>11 (9)</td>
<td>18 (40)</td>
<td>0.92</td>
<td>20</td>
</tr>
<tr>
<td>Haemoglobin 10–11.9</td>
<td>21 (18)</td>
<td>46 (11)</td>
<td>1.34</td>
<td>30</td>
</tr>
</tbody>
</table>

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**Abstract 147**

**Use per case of CDAD (patient-days)**

- Cefuroxime: 47.8
- Gentamicin: 51.0
- Co-amoxiclav: 52.9
- Ciprofloxacin: 68.0
- Amoxicillin: 73.5
- Clarithromycin: 104
- Erythromycin: 136
- Flucloxacin: 251
- Tazocin: 530
- Teicoplanin: 367
- Benzylpenicillin: 398
- Penicillin V: 0 cases
- Vancomycin IV: 0 cases

**Comparison with cefuroxime**

- Cefuroxime: p = 0.001
- Gentamicin: p = 0.001
- Co-amoxiclav: p = 0.001
- Ciprofloxacin: p = 0.001
- Amoxicillin: p = 0.001
- Clarithromycin: p = 0.001
- Erythromycin: p = 0.001
- Flucloxacin: p = 0.001
- Tazocin: p = 0.001
- Teicoplanin: p = 0.001
- Benzylpenicillin: p = 0.001
- Penicillin V: p = 0.001
- Vancomycin IV: p = 0.001
pain, loss of weight, diarrhoea or constipation to their GP, but who had not reported severe anaemia (Hb \(< 10.0\, g/dl\)) or rectal bleeding, nor had findings suggestive of colorectal cancer (an abnormal rectal examination or positive faecal occult blood). A multivariable logistic regression analysis of the symptoms reported by these patients was performed. The logarithmic odds ratio was multiplied by a convenient number (24) and rounded to produce an additive scoring system (the CAPER score). The performance of the CAPER score was tested against the whole dataset.

**Results:** 550 patients fulfilled the entry criteria (117 cases, 433 controls). The frequency of the symptoms and the logistic regression results and CAPER score are shown in the table. The area below a receiver operating characteristic curve using the CAPER score only in patients with a soft symptom was 0.78. A threshold of 35 points or more on the CAPER score had a sensitivity of 69% and a specificity of 77%. This score equated to a risk of colorectal cancer of around 2% if used in the whole primary care population with a soft symptom.

**Conclusion:** The CAPER score is the first scoring system aimed at selecting which patients with a soft symptom of colorectal cancer would most benefit from urgent referral. A feasibility study has shown GPs will use it, and that cancers with a positive CAPER score, but who do not fulfil the NICE criteria for urgent referral, do indeed exist.

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**149 RESULTS OF SURGICAL EXCISION OF RECURRENT RECTAL CANCER**

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**Introduction:** Surgery for recurrent rectal cancer is often not undertaken because of the risk of intraoperative technical difficulties and the doubtful benefits. The aim of our study was to assess the outcome of series of patients who underwent resection of locally recurrent rectal cancer with curative intent.

**Aims & Methods:** Twenty four patients (13 female; medium age 52 years, range 33–85) underwent: extended low anterior resection (ELAR), 7 (29%); low anterior resection (LAR), 10 (42%); abdomino perineal resection (APR), 2 (8%); subtotal colectomy (STC), 2 (8%); restorative proctocolectomy, 1 (4%); and transanal excision, 2 (8%) as the primary surgery for an index cancer in the midrectum (7–29%), and lower rectum (17–71%).

**Results:** Median (range) time from primary surgery to recurrence was 12.5 (3–54) months. The majority underwent APR as the second surgical procedure (16), pelvic excentration (1), STC (1), ELAR (1) and local excision (1). Three patients refused surgery.

**Conclusion:** If it is possible to undertake curative surgery for recurrent rectal cancer surgery, it offers worthwhile survival benefit. Most recurrent rectal cancers were found to be originally lower third.

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**150 USING SOMATIC APC MUTATIONS AS CLONAL MARKERS IN COLONIC POLYPS**

S. J. Leedham1, C. Thirwell2, J. Hoare3, I. Tomlinson1, N. A. Wright1.

1Histopathology Department, 2Molecular and Population Genetics, Cancer Research UK; 3Gastroenterology, St Mary’s Hospital, London, UK

**Introduction:** Conventional wisdom suggests that human tumours are clonal in origin as cancer is a disease of stem cells. However earlier work in both humans and mice suggests that up to 79% of adenomas are polyclonal. We sought to investigate this definitively using somatic APC markers as clonal markers.

**Aims & Methods:** We sought to investigate polyp polyphenotypical definitively using somatic APC markers as clonal markers. Paraffin embedded polyp tissue was obtained from patients with classical familial adenomatous polyposis, attenuated FAP and sporadic lesions. Individual crypts were dissected from across the polyps using laser capture microdissection.

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**151 LAPAROSCOPIC ANTERIOR RECTOPEXY IMPROVES BOTH OBSTRUCTED DEFECATION AND FECAL INCONTINENCE IN PATIENTS WITH RECTAL INTUSSUSCEPTION**

R. Collinson1, P. Boons1, P. Van Duijvenblik1, T. Ahmed2, H. Decastro3, C. Cunningham1, I. Lindsey1. 1Department of Colorectal Surgery, 2Department of Gastroenterology, 3Department of Radiology, John Radcliffe Hospital, Oxford, UK

**Introduction:** Classical posterior rectoectomy for obstructed defecation due to rectal intussusception is controversial, 50% complain of similar or worse constipation afterwards. Laparoscopic anterior rectoectomy (LAR) involves limited anterior rectal mobilisation, avoids “dervation inertia”, and improves obstructed defecation in 80% in rectal prolapse.

**Aims & Methods:** We aimed to review our functional results in rectal intussusception and compare them to those in rectal prolapse. Carefully selected patients (grade 3 and 4 rectoanal intussusception with normal transit failing conservative treatment, no history of abuse) operated for rectal intussusception were prospectively analysed. Endpoints were changes in preoperative constipation (Cleveland) and incontinence (FISI) scores at 3 months, complications and length of stay (LOS).

**Results:** Thirty patients underwent LAR. Complications were seen in 13% and median LOS was 2 days. Constipation was improved in 25/30 (83%) (median Cleveland score from 13 to 4, p<0.0001). Incontinence was improved in 22/24 (92%) patients (median FISI score from 33 to 8, p<0.0001). No patients experienced deterioration in function.

**Conclusion:** LAR improves obstructed defecation similarly in both rectal prolapse and rectal intussusception. LAR avoids worsening constipation by avoiding posterior rectal mobilisation and probably rectal denervation inertia. The defecatory disorder in each is similar and predominantly mechanical.

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**152 SIDE POPULATION CHARACTERISTICS AND ROLE OF β1 INTEGRIN IN ADHESION OF ISOLATED HUMAN COLONIC CRYPT EPITHELIAL CELLS**

S. Samuel, A. Robins, J. Webb, Y. R. Mahida. Institute of Infection, Immunity and Inflammation, University of Nottingham, Nottingham, UK

**Introduction:** Intestinal epithelial stem cells are located at the base of crypts and their isolation and characterisation will facilitate investigation of factors regulating their function. The very small population of stem cells from bone marrow (and also other tissues) can be identified by the “side-population” (SP) phenotype. SP cells’ differential ability to efflux Hoechst dye is sensitive to verapamil and fumitremorgin C. Adherence to extracellular matrix (secreted by adjacent cells such as myofibroblasts) is likely to be an...
important property of intestinal stem cells. Previous studies have shown high level of β1 integrin expression by human colonic crypt epithelial cells.

**Aims & Methods:** Determine in isolated crypt epithelial cells, (1) the presence of SP cells and (2) role of β1 integrin in adhesion.

Monolayers of collagen I-expressing intestinal myofibroblasts was studied in the presence or absence of anti-β1 integrin antibody. Intestinal myofibroblasts were isolated from normal colonic mucosal samples denuded of epithelial cells. Expression of collagen I transcripts was studied by RT-PCR. Data are expressed as mean (SEM).

**Results:** Cells able to efflux Hoechst dye (SP cells) represented 0.18 (0.04%) of the total viable colonic crypt cell population (n = 10). Cells with SP characteristics decreased to 73.1 (5.5%) and 87.8 (8.0%) in the presence of verapamil (n = 6) and fumitremorgin C (n = 4) respectively. Anti-β1 integrin antibody significantly reduced adherence of colonic crypt epithelial cells to collagen I (cells/cm²: 196.3 (38.7) v 32.2 (10.4), n = 6; p < 0.05) but did not affect adherence to monolayers of intestinal myofibroblasts (cells/cm²: 2329 (923.5) v 3147.5 (543.4), n = 6; p = 0.05). Expression of collagen I transcripts by myofibroblasts was confirmed by RT-PCR (n = 3). Adhesion to myofibroblasts did not enrich for colon crypt epithelial cells expressing high levels of β1 integrin (assessed by flow cytometry).

Conclusion: 1. Isolated human colonic crypt epithelial cells contain a very small population of cells with SP phenotype, similar to that described for stem cells in the bone marrow. 2. Anti-β1 integrin antibody inhibited adherence of isolated colonic crypt epithelial cells to collagen I but not to monolayers of collagen I-expressing intestinal myofibroblasts.

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**153 ASSESSMENT OF MACROPHAGE FUNCTION WITHIN THE STROMA OF SPORADIC COLORECTAL POLyps**

M. H. McLean1, G. I. Murray2, N. Fyle2, G. L. Hold3, A. G. Mowat4, E. M. El-Omar1, 1Medicine and Therapeutics, 2Pathology, Aberdeen University, Aberdeen, UK

**Introduction:** We have previously reported an increased population of macrophages in the stroma of colonic adenomatous polyps but the functional nature of these cells remains unclear. The balance of activated proinflammatory macrophages to regulatory ones determines the overall direction of the inflammatory process and each type of cell has different metabolic activities. Classically activated macrophages produce inducible nitric oxide synthase (iNOS) to increase intracellular nitric oxide and reactive oxygen species while regulatory macrophages express arginase I in order to reduce intracellular NO.

**Aims & Methods:** The aim of this study was to investigate the phenotype of macrophage infiltration within sporadic colonic adenomas compared to the normal adjacent normal mucosa. Macrophage phenotype was assessed using an immunohistochemical double staining technique based on sequential staining of 2 discrete cell markers in 15 colonic polyps and 12 normal mucosal biopsies from 12 patients attending for colonoscopy as part of the colorectal cancer screening program. Macrophages were identified by CD68, a macrophage surface glycoprotein, using alkaline phosphatase as enzyme tracer with DAB as chromogen. The activated T cell and T helper cell infiltrate was assessed in 40 sporadic adenomatous polyps incorporating a peroxidase enzyme tracer with DAB as chromogen. Classically and alternatively activated macrophages were identified by expression of either iNOS or arginase I, respectively, by immunostaining incorporating a peroxidase enzyme tracer with DAB as chromogen. The number of CD68 positive cells was counted to represent macrophage stromal population. In addition, each tissue was stained for both iNOS and arginase I and the predominant macrophage type was identified within that specimen.

**Results:** In adenomas, there was a statistically significant increase in the number of CD68 positive macrophages compared to adjacent normal mucosa (p = 0.001). 91% of the CD68 positive cells expressed iNOS within the polyps, compared to 20% within normal mucosa (p = 0.001). There was also a statistically significant increase in the number of arginase I positive macrophages in the adenomas compared to normal mucosa (p = 0.014), although these only represented up to 20% of the macrophages within the polyps.

**Conclusion:** Our data have shown that macrophages within the stroma of adenomatous colonic polyps predominantly express iNOS, suggesting classical activation with proinflammatory function. Stromal-epithelial interactions in the presence of this macrophage population may contribute to induce a pro-oxidant microenvironment, rich in mutagenic reactive oxygen species and subsequently exert genotoxic pressure with direct and indirect influences on early carcinogenesis. These findings are likely to be relevant to the pathogenesis of sporadic colorectal cancer.

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**155 SURVEILLANCE COLONOSCOPY FOR ADENOMATOUS POLyps: ARE WE COMPROMISING THE PATIENT CARE?**

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**Introduction:** British Society of Gastroenterology (BSG) has published guidelines for follow-up of colonic adenomatous polyps. The study aimed to survey the practice of surveillance of adenomatous polyps in comparison with BSG guidelines.

**Aims & Methods:** A questionnaire based on BSG guidelines was sent to 242 clinicians in the North West region of England. The clinicians not performing colonoscopy were excluded and the data analysed according to three stratification groups (low, intermediate and high risk groups).

**Results:** Response rates were 53.72% (130 of 242) of which 75 (63.08%) were performing colonoscopy (gastroenterologists (GE)-25, general surgeons (GS) - 23, colorectal surgeons (CRS) - 27). In low risk group, the follow-up practice matched with the guidelines in 57.14% of responses (GE, 64%; GS, 43.48%; CRS, 70.37%) and the rest were doing more frequently. In the intermediate group, the practices of 45.33% (GE, 56%; GS, 30.43%; CRS, 48.15%) were in accordance with the guidelines. In high-risk group, only 46.67% (GE, 68%; GS, 45.45%; CRS, 30.43%) of responses were in accordance with the guidelines and surprisingly, more than one third of responses revealed less frequent follow-up in contrast to the other groups, where roughly 40% did more frequent follow-up. For the large sessile adenomatous polyps, two third responses revealed less frequent follow-up.

**Conclusion:** Overall, surveillance practices of only half of the consultants were in accordance with the BSG guidelines with the low/intermediate group being of this more frequently exposing patients to unnecessary risks and increasing work load on the unit and the high-risk group followed less frequently with risk of delayed diagnosis. Adherence to the guidelines may decrease the workload on the endoscopy unit without compromising patient care.
Introduction: The field of colorectal cancer screening has dramatically changed in the past two decades. The growing evidence base behind screening has prompted the introduction of national screening programmes in several countries. The exact form of screening is still under debate and this was the basis of our survey.

Aims & Methods: Our aim was to ask what BSG members would opt for if the patient offered screening. A questionnaire-based survey was sent in Jan 2006 to 150 BSG members selected randomly from the BSG members register. Recipients were asked which screening method they would choose and what they would then do if this test was positive.

Results: Fifty nine questionnaires were returned. Of routine screening at age 50 only 17 (28%) opted for FOBT, 31 (55%) for colonoscopy every 10 years, 11 (18%) for virtual colonoscopy every 10 years, 2 (3%) for flex sig every 10 years, 7 (11%) for no screening. If FOBT testing chosen 14 (23%) would follow-up with colonoscopy if positive. One recipient (5%) would repeat FOBT, 1 opted for flex. sig. with 1 for barium enema. If 1 first degree relative had been affected by bowel cancer below age 50 then 48 (81%) opted for colonoscopy, 1 (1%) for virtual colonoscopy, 1 (1.5%) for FOBTs, 1 for flex. sig. with 1 for barium enema. The colonoscopy group (48) were asked how often for screening. 35 (70%) opted for every 5 years, 6 (13%) for 10 yearly, 3 (6.5%) for 2 yearly. 6 (13%) in the virtual group opted for every 5 years, 7 (14.5%) for after 10 years, 2 (4.1%) for no screening. Again groups were asked how often. In the colonoscopy group 25 (52%) opted for every 5 yearly, 15 (41%) for 10 yearly. At the end of the survey the recipients were asked which screening method they thought was most cost effective. 24 (40%) said colonoscopy, 22 (37%) FOBTs, 5 (8%) flex sig, 4 (7%) virtual colonoscopy with 2 for flex sig and barium enema.

Conclusion: Our results highlight the differences in the approach to screening. It is interesting that most BSG members would opt for colonoscopy above FOBTs, particularly given the introduction of the national screening programme. Is this based around growing evidence for colonoscopy above FOBTs, particularly given the introduction of the national screening programme? Another interesting aspect raised was the growing acceptance of virtual imaging. This is not widely used as a screening tool in the UK but is perhaps a method that will be increasingly useful as technology advances. It will be interesting to see how colorectal screening progresses with time and the emergence of more evidence and technology.


COLONIC ANATOMICAL VARIATIONS AS SEEN BY VIRTUAL COLONOSCOPY SCOUT IMAGES: WHY COLONOSCOPY IS TECHNICALLY CHALLENGING


Introduction: There is considerable variability of colon anatomy as indicated by the diversity encountered during colonoscopy. V3D virtual colonoscopy (Viatronix) recreates a 3D endoscopic view of the large bowel from multiplanar CT images. Following rectal air insufflations, a scout image is obtained which provides a 3D rotatable image of the colon. This image provides a picture of the native lie of the colon and provides the opportunity to study colon anatomy in vivo.

Aims & Methods: 100 patients underwent same day V3D and optical colonoscopy (OC) by experienced endoscopists. The supine V3D scout images were reviewed independently by two advanced gastrointestinal trainees. The lie of the ascending and descending colon is constant as they are in the retroperitoneal space. The variable segments (sigmoid, splenic flexure, transverse colon and hepatic flexure) of the colon were classified according to their complexity. A convoluted colon was defined as three or more distinct segments (sigmoid, splenic flexure, transverse colon and hepatic flexure) of the colon were classified according to their complexity. A convoluted colon was defined as three or more distinct segments (sigmoid, splenic flexure, transverse colon and hepatic flexure) of the colon were classified according to their complexity. A convoluted colon was defined as three or more distinct segments (sigmoid, splenic flexure, transverse colon and hepatic flexure) of the colon were classified according to their complexity. A convoluted colon was defined as three or more distinct segments (sigmoid, splenic flexure, transverse colon and hepatic flexure) of the colon were classified according to their complexity. A convoluted colon was defined as three or more distinct segments (sigmoid, splenic flexure, transverse colon and hepatic flexure) of the colon were classified according to their complexity.

Results: See table and example of a convoluted colon.

Conclusion: Results revealed complexity. The type of colon lie was then related to colonoscopy times and completion rates.

Abstract 157

<table>
<thead>
<tr>
<th>Anatomical pattern</th>
<th>Number (%)</th>
<th>Time OC (mins)</th>
<th>Completion rate (%)</th>
</tr>
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<td>36.7</td>
<td>93</td>
</tr>
<tr>
<td>Straight colon</td>
<td>18</td>
<td>21.6</td>
<td>100</td>
</tr>
<tr>
<td>Difficult sigmoid</td>
<td>13</td>
<td>26.3</td>
<td>85</td>
</tr>
<tr>
<td>Difficult sigmoid and splenic</td>
<td>19</td>
<td>24.4</td>
<td>94</td>
</tr>
<tr>
<td>Transverse dip</td>
<td>20</td>
<td>25.7</td>
<td>80</td>
</tr>
</tbody>
</table>

POTASSIUM CHANNEL BLOCKADE PREVENTS INCREASED COLONIC PERMEABILITY DURING ISCHAEMIA: A NOVEL THERAPEUTIC STRATEGY TO REDUCE SEPSIS ASSOCIATED WITH LIVER SURGERY

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Introduction: Gut ischaemia during major liver surgery increases intestinal permeability and bacterial translocation, increasing the risk of systemic sepsis. Cell hypoxia activates potassium (K+) channels in a variety of tissues, and the ability of mastoparan (a G protein agonist) to enhance paracellular permeability in T84 colonic cell monolayers is linked to an increase in basolateral membrane K+ conductance.

Aims & Methods: We evaluated the effect of acute metabolic stress on basolateral K+ channels in human colonic crypts, and the effect of K+ channel blockade on ischaemia-induced changes in colonic paracellular conductance. Crypts were isolated from human colonic biopsies (Bowley et al. Gut 2003;52:854–60). Crypts were exposed to metabolic inhibitors 100 μM dinitrophenol (DNP) + 5 mM deoxyglucose (DG), and sheets of resected human sigmoid colon mounted in Ussing chambers were exposed to 100 μM DNP without oxygenation. Whole cell K+ currents in intact crypts were measured using the perforated patch-clamp technique (0.24 mg/ml amphoterine in pipette). Paracellular conductance in colonic...
sheets was estimated from changes in electrical parameters following apical membrane permeabilisation by nystatin, under control oxygenated conditions, and during addition of 100 μM DNP without oxygenation, in the absence or the presence of the intermediate conductance K\(^+\) channel blocker chlorotoxin (CLT).

**Results:** Within 5 minutes, DNP + DG activated whole-cell K\(^+\) currents, increased whole-cell conductance from 0.9 (0.2) nS to 2.7 (0.5) nS (p<0.001; n=7), and hyperpolarised crypt cells from −55.6 (3) mV to −74.5 (3) mV (p<0.015). 10 μM CLT completely inhibited this increase in whole-cell conductance (p<0.015). In colonic sheets, exposure to DNP without oxygenation increased paracellular conductance from 5.7 (1.1) mS.cm\(^{-2}\) to 12.8 (1.7) mS.cm\(^{-2}\) (p<0.01; n=6), this effect being completely inhibited by 20 μM CLT (n=4).

**Conclusion:** Metabolic stress associated with acute cell hypoxia causes a profound increase in colonic paracellular conductance (permeability), which is dependent on the activation of basolateral K channels. Interoceptive use of drugs that block inhibit IK channels may minimise the risk of sepsis associated with ischaemic injury to the gut.

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**159 STREPTOCOCCUS BOVIS BACTERAEMIA: A MARKER FOR COLONIC AND LIVER DISEASE**

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**Introduction:** Streptococcus bovis is non-enterococcal group D streptococcus which is a normal inhabitant of gastrointestinal tract in humans. Streptococcus bovis bacteria/endocarditis is known to be associated with colonic pathology mainly cancer and hepatic dysfunction has been suggested to predispose patients to systemic bacteremia in previous studies.

**Aims & Methods:** We conducted a 10-year retrospective study to evaluate the incidence of streptococcus bovis bacteraemia and its associated disease conditions in a district general hospital. This was a retrospective study conducted over 10 years between January 1996 and January 2006. All patients diagnosed with streptococcus bovis bacteraemia during this period were included. The data were collected through the microbiology department. Seven patients were identified in total and all their case notes were analysed.

**Results:** Of the seven patients, five were male. The age range was 56–90 years (median 83 years). Two patients were diagnosed to have infective endocarditis associated with the bacteraemia. Two patients who were already known to have colorectal cancer associated with bacteraemia. Two patients who were already known to have colorectal cancer and underwent elective colorectal cancer surgery developed S bovis bacteraemia in the post-operative period. Two patients who had bacteraemia associated with infective endocarditis were diagnosed with colorectal cancer, two weeks and one month respectively, after the episode of bacteraemia by colonoscopies. Both patients did not have any significant bowel symptoms. Three out of the seven did not have any formal bowel investigations due to advanced age and coexistent medical problems. All seven patients had liver function tests done and six had ultrasonography of the abdomen done. One patient was noted to have deranged liver function tests (Bili>4 mmol/L, Alk Phos 459 IU/L, ALT 327 IU/L and AST 603 IU/L) and the ultrasound of the same patient showed diffuse parenchymal liver disease. All the other patients had normal liver function tests and ultrasound.

**Conclusion:** Our study illustrates that the incidence of S bovis bacteraemia is very low. It also confirms its association with colorectal cancer and hepatic dysfunction. So, all patients with documented Streptococcus bovis bacteraemia/endocarditis should have colonic investigations and baseline liver function tests done, with further ultrasound/CT of liver if they are abnormal.

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**160 COMPARISON OF HIGH RESOLUTION MAGNIFICATION ENDOCOPY, NARROW BAND IMAGING WITH MAGNIFICATION AND CHROMOENDOSCOPY WITH MAGNIFICATION IN THE ASSESSMENT OF NEOPLASTIC AND NON-NEOPLASTIC COLONIC LESIONS**

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**Introduction:** The distinction of non-neoplastic from neoplastic colorectal polyps can increase the efficiency of treatment by eliminating the time and cost of unnecessary biopsies or polypectomy. Though chromoendoscopy has long been propagated as a technique to improve mucosal visualisation, it has not been widely practised in the West. Narrow band imaging (NBI) with magnification is a novel endoscopic imaging technique that enhances the visualisation of surface microstructure and microvasculature without the need for dye spray. We evaluated the diagnostic accuracy of high resolution magnification endoscopy (HRME), NBI with magnification and chromoendoscopy with magnification to assess various colorectal lesions.

**Aims & Methods:** A total of 31 colorectal lesions in 24 patients (15 men, mean age 68.2 years) were assessed during routine colonoscopy using the Olympus prototype NBI video endoscopy system. Each lesion was evaluated using three modalities: first by HRME then by NBI with magnification and finally by chromoendoscopy with magnification using 0.4% indigo carmine spray. Polyps were classified based on the Kudo’s pit pattern (KPP). Additionally, in the assessment of these lesions with NBI and magnification, the meshbrown capillary network (MBCN) of each polyp was described (Type I—regular pattern, Type II—irregular capillary network, Type III—irregular capillary network). The KPP and MBCN description of each polyp was recorded during the procedure. The accuracy of differentiating neoplastic (Types III, IV and V—KPP, Type II and III—MBCN) from non-neoplastic lesions was then compared with reference to the final pathological diagnosis.

**Results:** The lesions were located in the caecum (2), ascending colon (4), descending colon (2), sigmoid colon (9) and rectum (9). According to the Paris Classification, morphologically, 9 were classified as type I, 7 type IIa, 1 type IIA, 13 type IIIa and 1 type IIb. The sensitivity, specificity, positive and negative predictive values for HRME for differentiating neoplasm from non-neoplastic lesions was 75%, 33%, 91% and 13% respectively; NBI with magnification (without MBCN) 85%, 50%, 92% and 33% respectively, NBI with magnification (with MBCN) 90%, 30%, 93% and 67% respectively and chromoendoscopy 96%, 50%, 93% and 67% respectively.

**Conclusion:** With the addition of the MBCN classification, NBI with magnification is as effective as chromoendoscopy in predicting neoplastic from non-neoplastic polyps in real-time colonoscopy.

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**161 ADENOMATOUS POLYPS ARE UNCOMMON IN PATIENTS WITH ULCERATIVE COLITIS BUT INCREASE THE RISK OF DEVELOPING COLORECTAL CANCER**

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**Introduction:** Risk of cancer in patients with ulcerative colitis (UC) is higher than the general population. The importance of adenomatous polyps in contributing to this increased cancer risk is unclear. Recent evidence suggests that the prevalence of adenomatous polyps is less common in this patient population. We aimed to ascertain the prevalence of adenomatous polyps in UC patients with colorectal cancer associated with adenomatous polyps.

**Aims & Methods:** We performed a retrospective audit of endoscopic and histological records of patients with a confirmed diagnosis of UC from 1991–2004. Patients undergoing colonoscopy for altered bowel habit or abdominal pain were used as a control group. Data were obtained from the electronic patient data records of St George’s hospital.

**Results:** Twenty three (5.8%) of patients with UC had adenomatous lesions in the colon of which 16 (4%) were thought to be sporadic adenomas and the rest dysplasia associated lesion or masses (DALMs). In contrast 77 (9.3%) of 828 controls had at least one adenomatous polyp. Adenoma’s were significantly less common in patients with UC (p=0.04). Risk of developing adenocarcinoma was 4.4/1000 patient years duration (pyd) for UC patients without detectable adenomas or DALMs and 16.4/1000 pyd for patients with sporadic adenomas detected and 36.4/1000 pyd for patients with DALMs detected.

**Conclusion:** Adenomatous polyps, occur less frequently in patients with UC compared to controls but cause a fourfold increase in the risk of developing a colorectal cancer in this patient population.

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**162 IRON DEFICIENCY ANAEMIA AND THROMBOCYTOSIS: PREDICTORS OF MORTALITY IN COLORECTAL CANCER**

I. J. Tanswell, R. Desai, J. Burdall, M. Hall, R. Ransford. Gastroenterology, Hereford County Hospital, Hereford, UK

**Introduction:** Colorectal cancer (CRC) is the second most common cause of cancer related deaths in the UK. In 2002 approximately 35 000 new cases of CRC were diagnosed in the UK. Beele et al suggested that three fifths of patients with CRC are iron deficient at presentation, of which two thirds are...
anaemic. This loss of iron is thought to be secondary to chronic gastrointestinal haemorrhage and is related to the site and size of the tumour. Consequently one would expect individuals with CRC and a coexisting IDA to be more likely to have an advanced disease process and thus suffer a reduced survival rate. Yet there is a paucity of evidence to support this theory.

Aims & Methods: Demographic and pathologic data were gathered retrospectively in all individuals diagnosed with CRC in 2004 at a single centre, Hereford County Hospital. Subjects were divided into anaemic and non-anaemic groups. A haemoglobin (Hb) level below 11.1 g/dl defined the anaemic population. Iron deficiency status was determined by a mean corpuscular volume (MCV) <76 fl and/or mean cell haemoglobin (MCH) below 27 pg and/or hypoferrinaemia (<15 μg/l). Criteria studied included mortality at 18 months, tumour site and dukes stage, haemoglobin level, markers of iron status and thrombocytosis. Results: The study population included 106 subjects, with 45 anaemic and 61 non-anaemic individuals. Demographic variables were similar between the two groups. Iron deficiency was present in 31 out of 45, and 0 out of 61 of the anaemic and non-anaemic patients respectively. Anaemic patients compared to non-anaemic patients had a significantly higher mortality at 18 months (p = 0.008, Fisher’s exact test), more advanced Dukes stage (p = 0.04), right sided in site (p = 0.002) and a higher prevalence of thrombocytosis (p = 0.001). No significant difference in mortality was found when comparing those with a normal iron status in the anaemic and non-anaemic populations (p = 0.3), and those with a normal or low iron status in the anaemic group (p = 0.5). Non-anaemic subjects more commonly presented with rectal cancer (46% v 16%, p = 0.002). Thrombocytosis was significantly associated with mean cell haemoglobin (p = 0.001). Conclusion: Anaemia is a marker of increased mortality in CRC but has been little studied. Thrombocytosis and a low MCH are particular risk factors. Both of these are thought to be representative of significant gastrointestinal blood loss. We propose increased blood loss from advanced tumours is the cause and urgent evaluation of the entire colon is essential in such patients.


163 COLORECTAL CANCER: MAPPING EXPRESSION STUDIES: FROM MURINE MODELS ONTO HUMAN DISEASE

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Introduction: Inactivation of the adenomatosis polyposis coli (APC) gene is recognised as one of the first important genetic lesions in the pathogenesis of colorectal cancer. Inactivation of APC stabilises β-catenin, which translocates into the nucleus activating TCF/LEF with subsequent transactivation of many target genes through the Wnt signalling pathway. A Cre-Lox mouse model has been previously developed, wherein an inducible Cre transgene deletes APC within the intestinal epithelium, showing that loss of APC causes immediate activation of the Wnt signalling pathway, failure in cell migration and cell differentiation, perturbation of the normal crypt/villus homeostasis, induction of cell death, and induction cell proliferation. A microarray gene analysis of this unique mouse model has identified a cohort of Wnt regulated gene alterations for which there has been little previous association with neoplasia.

Aims & Methods: To determine if genes that are dysregulated following deletion of APC in mice, as identified by our previous microarray analysis, are also dysregulated in human colorectal cancers. Total RNA samples were extracted from colorectal cancer tissues with matched neighbouring ‘normal’ mucosa from the random patients. The selection of candidate genes was based on the previous work from the Cre-Lox mouse model. mRNA expression levels for the homologous human candidate genes were determined by performing taqman, real-time PCR assay on paired tumour and normal samples of patients. Candidate gene expression levels in tumour tissues were presented as the fold changes relative to the normal tissues for each patient.

Results: 12 homologous human candidate genes have been tested on the first random paired patient samples. mRNA expressions of 4 (out of 12) genes showed dramatically elevated levels as the fold change median values: AXIN2 (7.6-fold); Fnn14 (5.5-fold); CITED1 (6.4-fold); CD44 (5.2-fold), respectively.

Conclusion: Data from taqman real-time PCR analysis demonstrate how transferable the candidate genes identified in the mouse model are to the study of human colon cancer. Elevated AXIN2 gene and CD44 gene expressions and corresponding gene encoded protein functions have been well studied, which again validates the process. The upregulations of Fn14 (TNFRSF12A) gene and CITED1 gene as Wnt pathway targets have not previously been detected in human colon cancer and therefore are novel candidates for future investigation.

Gastroduodenal posters

164 MUCOSAL ASSOCIATED BACTERIAL DIVERSITY IN THE STOMACH AND DUODENUM

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Introduction: Little is known about mucosa-associated gastric and duodenal microorganisms, their diversity, the distribution of microorganisms in different regions of the upper gut, or the influence of Helicobacter pylori on bacterial colonisation.

Aims & Methods: The aim of this study therefore was to compare mucosal microbiotas in different parts of stomach and duodenum, and to investigate the effects of H pylori on bacterial densities on the mucosal surface. Polymerase chain reaction in combination with denaturing gradient gel electrophoresis was used for quantitative analysis and real-time PCR and fluorescent in situ hybridisation for quantification and visualisation of bacterial communities. Samples were taken from 15 patients undergoing upper GI endoscopy for non-specific upper gastrointestinal symptoms. Seven were male, mean age 41 years and 8 were female, mean age 43. Samples were taken from the antrum and pylorus of the stomach, and the first and second part of the duodenum. All endoscopic and histopathological examinations were reported as normal. Test for H pylori were negative in all samples. Wilcoxon matched pair test was used for statistical analysis.

Results: DGGE analysis of the gastric antrum and pylorus showed band profiles that were similar in some patients, but different in others. Similar observations were made for duodenal DGGE gel patterns, suggesting a large degree of host dependency. Sequences analysis positively identified H pylori in five gastric samples and four duodenal samples despite their being considered negative using traditional methods. The main sequences obtained from DGGE gels from the stomach and duodenum were species from the genera Lactobacillus, Bifidobacterium, Streptococcus, Candida, together with Staphylococcus aureus, H pylori and Peptostreptococcus anaerobius. Quantitative analysis showed total mean bacterial densities were ca. 3.9 and 4.1 (log10 per mg mucosal biopsy sample) in the gastric antrum and pylorus, respectively (p > 0.5). Similarly, in the duodenum mean bacterial densities were ca. 4.1 and 3.8 (log10 per mg mucosal biopsy sample) in the first and second part of the upper small gut (p > 0.5). H pylori, Lactobacillus, Candida and Staphylococcus aureus were the most abundant organisms in the stomach, as determined by real-time PCR, with only a few bifidobacteria being found, while H pylori, bifidobacteria and candidas formed the bulk of bacterial communities in the duodenum. Helicobacter positive patients had higher bacterial colonisation in the stomach and duodenum, but carriage of this pathogen did not affect the overall species composition of mucosal communities.

Conclusion: Mucosal bacterial communities in the stomach and duodenum are considerably more complex than was previously thought, with differences in the diversity and distribution.

165 HELICOBACTER PYLORI dupA IS NOT ASSOCIATED WITH DUODENAL ULCERS IN POPULATIONS FROM SOUTH AFRICA, SCOTLAND, CHINA AND USA

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Introduction: A novel H pylori gene (dupA) has recently been shown to be significantly associated with duodenal ulceration (DU) and protective against gastric cancer (GC), in populations from South Korea, Japan, and Colombia. Strains that possessed dupA also induced more IL-8 secretion from gastric epithelial cells (Lu et al. Gastroenterology 2005;128:833). We therefore looked at the presence of this gene in H pylori isolates from four other countries, and determined disease associations.
Aims & Methods: Forty five South African strains (13 DU, 18 GC, 15 gastritis), 51 Scottish strains (7 DU, 18 GC, 26 gastritis), 31 Chinese strains (12 DU, 4 GU, 2 DU/GU, 1 GC, 12 gastritis), and 45 American strains (21 DU, 2 GU, 2 DU/GU, 20 gastritis) were used for dupA typing by PCR using a set of novel primers. Strains that were negative for dupA for the first two reactions, which amplifies the 3’ and 5’ regions, were repeated with six further reactions, and were then considered as positive for dupA if they had at least five positive PCR products. The vacA and cag pathogenicity island ( Pai) status of all strains had been previously determined. IL-8 secretion from AGS cells co-cultured with H pylori strains for 6 h was determined by ELISA.

Results: 84.4% South African strains (92% DU), 41.2% Scottish strains (14.3% DU), 32.3% Chinese strains (16.7% DU), and 44.4% American strains (47.6% DU) were positive for dupA. There was no significant association between dupA and disease status in any population, but when the data were combined, although there was no association with DU, GU, PUD, or gastritis, there was a significant positive association with GC (p = 0.003). The presence of dupA was also significantly associated with s1/m1 vacA types (p = 0.002), and the cag Pai (p = 0.01). H pylori strains (either possessing or occasionally for genetic transformation) is this enabled by a complex network of ComH proteins, located close to and within the bacterial cell membrane. H pylori alone possesses the ComH gene and when deleted, the organism loses competence. We were able to express the ComH protein in our earlier work. Here we report on its purification and partial characterisation.

Aims & Methods: To determine if ComH protein is a nuclease and to identify its location within the cell. The H pylori laboratory strain 26695 was cultured and its DNA isolated. The comH gene was amplified by PCR, cloned, and expressed in various expression vectors. Antibodies against ComH were raised in rabbits and the antisera used to detect the protein in vivo.

Results: (1) As reported earlier, the optimum conditions for expression were achieved with the pGEX-KG system. High levels of GST-ComH fusion protein were obtained but proved insoluble. (2) The ComH gene was cloned in a pET21-histidine (his), an expression vector. The his-tagged ComH protein expressed was purified using affinity and anion exchange in a pET21-histidine (his), an expression vector. The his-tagged ComH we presume is in some way essential in making H pylori able to bind ssDNA with high efficiency. Its function remains unknown but partially characterised. Against expectation, it is not a nuclease but it is unique

Conclusion: This is the first time the ComH protein, the product of the comH gene, has been expressed, purified and characterised. Against expectation, it is not a nuclease but it is able to bind ssDNA with high efficiency. Its function remains unknown but we presume it is some way essential in making H pylori competent.

Konstantinos Kostidis is a Research Fellow of the Bardhan Research and Education Trust (Registered Charity No 328452).


166 COMH: ISOLATION, PURIFICATION AND CHARACTERISATION OF A UNIQUE H PYLORI PROTEIN

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Introduction: Many organisms, including H pylori share the property of DNA uptake from their environment (competence) which is used as an energy source and occasionally for genetic transformation. This is enabled by a complex network of ComH proteins, located close to and within the bacterial cell membrane. H pylori alone possesses the ComH gene and when deleted, the organism loses competence. We were able to express the ComH protein in our earlier work. Here we report on its purification and partial characterisation.

Aims & Methods: To determine if ComH protein is a nuclease and to identify its location within the cell. The H pylori laboratory strain 26695 was cultured and its DNA isolated. The comH gene was amplified by PCR, cloned, and expressed in various expression vectors. Antibodies against ComH were raised in rabbits and the antisera used to detect the location of the protein in vivo.

Results: (1) As reported earlier, the optimum conditions for expression were achieved with the pGEX-KG system. High levels of GST-ComH fusion protein were obtained but proved insoluble. (2) The ComH gene was cloned in a pET21-histidine (his), an expression vector. The his-tagged ComH protein expressed was purified using affinity and anion exchange chromatography. (3) ComH was tested for nuclease activity in liquid assays, and under various conditions. No nuclease activity was detected. (4) Nevertheless, ComH was able to bind single-stranded (ss) DNA, electrophoretic mobility assays, with a binding constant (Kd) of 36 nM at pH 7. (5) Antibody against GST-Com H protein was raised in rabbits and then purified. Western blotting and FACS showed that the purified antibody adhered to the cells, indicating that the ComH against which it is directed is present in the outer membrane and that its surface is exposed.

Conclusion: This is the first time the ComH protein, the product of the unique H pylori competence gene comH, has been expressed, purified and partially characterised. Against expectation, it is not a nuclease but it is able to bind ssDNA with high efficiency. Its function remains unknown but we presume it is some way essential in making H pylori competent.
with atrophy. The association of cardiac cancer with atrophy was quadratic in form with the lowest PG I/II quintile (1st) being associated with significantly increased cancer risk, but a progressive falling risk associated with quintiles 5 to 2. GORD symptoms showed a significant inverse relationship with non-cardia cancer, and a potent direct association with oesophageal adenocarcinoma. There was a direct relationship between severe form of GORD symptoms and cardia cancer. Conclusion: The positive association of severe atrophy with cardiac cancer indicates some cases being similar to non-cardia gastric cancer. The relationship with severe GORD indicates other cardiac cancers are similar to oesophageal adenocarcinoma.

## 170 TO BIOPSY OR NOT TO BIOPSY? IS COELIAC SEROLOGY THE ANSWER—THE GUIDELINES SAY SO

A. D. Farmer, G. Sadler, B. T. Cooper. Department of Gastroenterology, City Hospital, Birmingham, UK

Introduction: The British Society of Gastroenterology (BSG) guidelines for iron deficiency anaemia (IDA) state that all patients should be initially screened for coeliac disease (CD) with serological markers, and if negative the need for small bowel biopsy at oesophago-gastro-duodenoscopy (OGD).

Aims & Methods: Data were collected retrospectively on all patients who underwent an OGD from May 2005 to August 2006 for IDA to assess whether screening for CD had been undertaken either serologically, in accordance with the guidelines, or histologically.

Results: 285 patients underwent investigation for IDA, during the study period. 63.4% were female with a median age of 63.4 years (range 17–93). All patients were screened for CD. 120 patients (42%) were screened serologically for CD prior to OGD. Of these, 10 patients had positive CD serology. 269 patients (94.5%) had a small bowel biopsy, 12 of whom had CD. All patients with positive CD serology had subsequent biopsy and consistent histology. No patients with normal CD serology had abnormal small bowel histology.

Conclusion: These results support the guidelines; serology is a robust screening method for CD as a cause of IDA. However, the majority of patients with IDA are still having a small bowel biopsy despite normal serology. The guidelines, if followed, should alter the way that CD is screened for in IDA and consequently reduce the number of small bowel biopsies taken. Although controversial, the guidelines have significant implications for both time and financial terms.


## 171 A CROSS-SECTIONAL SURVEY TO ASSESS THE USEFULNESS OF THE ROME III DYSPESIA SYMPTOM SUBGROUPS IN A LARGE COMMUNITY SAMPLE

A. C. Ford¹, A. G. Bailey¹, D. Forman², A. R. T. Axon¹, P. Moayyedi³. ¹Centre for Digestive Diseases, Leeds General Infirmary; ²Centre for Epidemiology and Biostatistics, Leeds University, Leeds, UK; ³Gastroenterology Division, McMaster University Medical Center, Hamilton, Canada

Introduction: The Rome III classification of functional gastroduodenal disorders were published earlier this year and recommended the subdivision of functional dyspepsia into two distinct symptom subgroups:

### Table 1: Usefulness of the Rome III dyspepsia symptom subgroups in a large community sample

<table>
<thead>
<tr>
<th>Number of risk factors for UGIH</th>
<th>PPI prescribing (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero</td>
<td>10%</td>
</tr>
<tr>
<td>1 or 2</td>
<td>20%</td>
</tr>
<tr>
<td>3 or 4</td>
<td>30%</td>
</tr>
<tr>
<td>5 or 6</td>
<td>40%</td>
</tr>
</tbody>
</table>

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epigastric pain syndrome and postprandial distress syndrome. As yet this classification has not been validated in a community sample of individuals with dyspepsia.

**Aims & Methods:** The authors examined dyspepsia symptom subgroups in a large number of individuals originally randomly selected from the general population who were invited to participate in a community screening programme for Helicobacter pylori. All individuals completed a validated 15-item dyspepsia questionnaire (the Leeds dyspepsia questionnaire (LDQ)) at study entry, and the presence or absence of dyspepsia was assigned using these data. Those reporting heartburn or regurgitation at a frequency of once a week or more were classified as suffering from gastro-oesophageal reflux disease, and excluded from further analysis. Symptom subgroups were created using individual symptom items from the LDQ (epigastric pain, early satiety, nausea or vomiting). The degree of agreement between different subgroups was then examined.

**Results:** 8407 individuals were originally recruited of whom 3177 (38%) had dyspepsia according to the LDQ. However, 1290 described heartburn or regurgitation at a frequency of once a week or more and were therefore excluded, leaving 1887 (22%) individuals with Rome III dyspepsia with a mean age of 45 years, 1008 (53%) of whom were female. 1269 (67%) reported epigastric pain, of whom 730 (57.5%) described it as their predominant symptom. 684 (36%) reported nausea and/or vomiting, of whom 126 (18%) described either as their predominant symptom. 609 (32%) reported early satiety, of whom 88 (14.5%) described it as their predominant symptom. Furthermore 337 (18%) individuals were not classifiable into any of these three symptom subgroups. Of the 1550 individuals who described symptoms compatible with one of the three subgroups, 781 (50%) were in at least two subgroups, and 234 (15%) were in all three.

**Conclusion:** The new symptom subgroups recommended by the Rome III process still led to considerable overlap of classification in this large population-based sample. In addition, a significant minority of individuals with dyspepsia remained unclassifiable using these criteria. Data are required from other population-based studies examining this issue to assess the usefulness of these subgroups in clinical practice.

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### 172 OUTPATIENT MANAGEMENT OF MINOR UPPER GASTROINTESTINAL HAEOMORRAGE


**Introduction:** There are two validated scoring systems which predict outcome in patients with upper G1 haemorrhage (UGIH): the Rockall Score (RS) and the Glasgow Blatchford Score (GBS). We have previously shown that GBS is a significantly more sensitive pre-endoscopy predictor of death and the need for endoscopic therapy, blood transfusion or surgery than RS in patients presenting with UGI. In this study, patients with a GBS < 2 and a mean age of 70 years who required no intervention and none of them died. The aim of the current study was to apply these findings to clinical practice and to study outcomes and patient preference.

**Aims & Methods:** From June 2006 all patients presenting with UGIH have had a pre-endoscopy GBS calculated. If the GBS is ≥ 2 and the patient is > 70 years they are allowed home and have an outpatient endoscopy on the next working day. However, such patients are not sent home (and thus have an inpatient endoscopy) if they have active comorbidities, a history of varices, are anticoagulated, or are unaccompanied at home or have no transport or telephone. Data were prospectively recorded regarding outcome (all endoscopic intervention, transfusion and surgery), length of hospital stay, and patient preference.

**Results:** Over a 4-month period, 125 patients presented with UGIH. 29/125 (23.2%) fell within the above criteria for outpatient endoscopy. 12/29 (41.4%) were discharged, 11/12 had an outpatient endoscopy, 1/12 declined further investigation, 0/11 required endoscopic intervention. 7/11 perceived outpatient management as preferable, 2/11 would have preferred inpatient management, 2/11 were undecided. 17/29 patients fell within discharge criteria but were treated as inpatients as they had other factors that prevented their discharge, including alcohol excess/without a safe place (2), significant pain or nausea (2), a significant person in the middle of the night (3) and reasons unknown (2). 16/17 did not require any form of intervention, 1/17 patients received endoscopic intervention for a Mallory–Weiss tear and none died.

**Conclusion:** These preliminary data suggest that outpatient management of minor UGIH may be safe in patients > 70 years and with a GBS < 2. This cohort comprises of 23.2% of admissions for UGIH, 41.4% of whom were managed safely in the outpatient setting. Most patients with minor UGIH prefer outpatient management, which on average saves 2.5 bed days per patient.

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### 173 A COMPARISON BETWEEN IRAQI AND IRANIAN HELICOBACTER PYLORI STRAINS

N. Hussein¹, R. Argent¹, D. Leel⁴, M. Mahammodi⁴, J. Atherton¹. ¹Wolfson Digestive Diseases Centre and Institute of Infection, Immunology and Inflammation, QMC, Nottingham, UK; ²Pasteur Institute, Tehran, Iran (Islamic Republic of)

**Introduction:** Helicobacter pylori causes peptic ulceration and gastric cancer. Virulence factors include (1) the cag pathogenicity island (cag- strains are associated with gastric ulceration and cancer and strains with more CagA EPIYA motifs are associated with cancer), (2) VacA (s1, i1, and m1 types are associated with gastric cancer) and (3) dupA (dupA- strains are associated with duodenal ulcer). Although pangastriitis is common in Iraq, gastric atrophy is rare. Additionally, the incidence of gastric cancer in Iraq appears lower than that of Iran.

**Aims & Methods:** In this project, virulence determinants of both Iraqi and Iranian strains were studied and compared. 49 and 60 strains from patients with different clinical outcomes were collected from Iraq and Iran respectively (DU Iraq 15, Iran 8; GU 5, 9; non-ulcer 29, 43). We specifically excluded strains from cancer patients, and we have reported those separately. PCR was performed to determine the presence of cagA and its EPIYA motif number, the status of dupA genotype, and allelic variation of vacA.

**Results:** The rate of cagA positivity was similar among strains from Iraq and Iran (35/49 (71%) and 46/60 (77%), respectively) and its presence was significantly associated with PUD in Iraq (p <0.05) but not Iran. The presence of cagA alleles with >3 EPIYA motifs was significantly higher among Iranian strains than those from Iraq (p <0.01). There was no association between vacA signal and mid region and PUD in either population. In Iraq, there was a significant association between i1 genotype and GU (p <0.01) (4/5 (80%) of GU compared with 7/35 (20%) of non-GU patients), but not in Iran. Finally, 16/49 (33%) and 23/60 (38%) of Iraqi and Iranian strains respectively typed positive for dupA. While a significant association between infection with dupA-positive strains and DU was observed for Iraqi patients (p <0.01), there was no association for Iranian subjects.

**Conclusion:** Virulence factors present in both Iraqi and Iranian H pylori strains are similar to those in Western strains. The presence of cagA with more EPIYA motifs in Iran may help explain the high cancer incidence rate. A novel association was found between i1 genotype and GU in Iranian strains. Despite the similarity of virulence factors between Western countries and Iraq, the cancer rate in Iraq is still low which may indicate the presence of an enigma in the region.

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### 174 INVESTIGATION AND MANAGEMENT OF PATIENTS REFERRED WITH NON-RESPONSIVE COELIAC DISEASE: RESULTS OF 110 CASES


**Introduction:** Coeliac disease (CD) affects 1% of European and North American populations. It is treated with a gluten-free diet (GFD). Unfortunately 30% of patients diagnosed with CD fail to improve with a GFD or later relapse. ¹As small number have refractory coeliac disease, defined by persistent enteropathy on a strict GFD with other causes excluded (at 6 months).**

**Aims & Methods:** To report our experience of the investigation and management of 110 patients referred to a tertiary centre over a 2-year period with non-responsive CD (NRCD). Notes of all patients with NRCD referred over 2 years were reviewed; those with abnormal duodenal histology and no other cause identified were assumed to have RCD.

**Results:** 110 patients (33 males) were identified as having NRCD. 12 were incorrectly diagnosed. 45 patients were not adhering to a strict GFD; of these 24 were inadvertently ingesting gluten and 21 admitted non-compliance. In those with NRCD, more than 1 case for symptoms was found during investigation of most patients. The most common causes are shown in the table. Of 9 patients thought to have RCD 2 had ulcerative jejunitis, and 3 had developed small intestinal lymphoma. 27 other diagnoses were made.

**Conclusion:** The management of NRCD requires establishing a clear cause that can be found in 90% of cases. Continued gluten ingestion is the main reason for NRCD. Microscopic colitis and bacterial overgrowth are common treatable causes of continued symptoms. Overall 9.2% of...
non-responders were diagnosed with RCD. Such individuals should be considered for treatment with immunosuppressive therapy and undergo frequent review to monitor for the potential development of lymphoma.


175 INVESTIGATING THE RELATION OF SOCIAL DEPRIVATION AND RATES OF HELICOBACTER PYLORI INFECTION USING STOOL ANTIGEN TESTING: ANALYSIS OF 2368 CASES

J. Parr, A. Saeed, K. Collins. Gastroenterology, Queen Elizabeth Hospital, Gateshead, UK

Introduction: Helicobacter pylori is the most common chronic bacterial infection in humans. It is thought to be more common in areas of social deprivation and with increasing age. Testing for the presence of H pylori is an integral part of investigating dyspepsia without alarm symptoms in UK patients. The H pylori stool antigen test (HPSA) is currently utilised for this purpose in both primary and secondary health care in Gateshead, England. Our results have been collected in a central database which was used to perform an analysis.

Aims & Methods: We analysed the database to determine rates of H pylori in our community and then correlated this with age, sex and social deprivation (based on postcode). Patient demographics and HPSA results were taken from the database. Postcodes were converted to local ward codes and these were allocated a deprivation score. Ward level scores based on 1991 census data were obtained. The deprivation score used was the Carstairs index (combines local measures of unemployment, car ownership, overcrowding and social class — higher scores = greater deprivation). Each ward was also given a quintile score based on the degree of deprivation when compared to the nation as a whole (1 being least deprived and 5 the greatest) to allow for subgroup analysis of positive results.

Results: There were 2994 tests between 01/03/05 and 03/04/06. Cases were excluded where no postcode was available or if the test was a repeat test. There were 74 for patients testing negative. In patients from less deprived groups (1 and 2) 29.8% (n = 431) and 38.13% (n = 217) in the 30–60 age group, 25.77% (n = 91) tested positive in the 14–30 age group, 25.77% (n = 91) tested +ve, rising to 29.8% (n = 431) and 38.13% (n = 217) in the 30–60 and over 60 age groups respectively. The p values for the differences between groups were <0.001 except when comparing risk of positivity in the <30 and 30–60 group (p = 0.076).

Conclusion: H pylori infection is common in patients with presenting with dyspepsia in our region. The risk of infection increases with age and greater deprivation as determined by the Carstairs index. Analysis of central databases may allow for targeted health education and promotion in areas of highest risk.

176 DISCREPANCIES BETWEEN SEROLOGY AND HISTOLOGY FOR THE DIAGNOSIS OF COELIAC DISEASE IN A DISTRICT GENERAL HOSPITAL. IS THIS AN UNRECOGNISED YET COMMON PROBLEM IN HOSPITALS THROUGHOUT THE UK?

R. R. Sveiss1, L. Peet2, G. Smith-Laing3. 1Gastroenterology, Darenth Valley Hospital, Dartford, UK; 2Gastroenterology, Medway Maritime Hospital, Gillingham

Introduction: Published data on the sensitivity and specificity of serological testing for coeliac disease indicate that serology can be relied upon to diagnose or exclude disease without the need for a gastroscopy and duodenal biopsies. Most hospitals around the UK rely on such serology with confidence and often combine more than one test to improve the specificity and sensitivity of the test to near 100%. At Medway hospital we noticed a growing number of patients with histological positive biopsies but negative serology.

Aims & Methods: We collected all serology done for coeliac disease for the three years from 2003–5 (3056), and the total number of positive duodenal biopsies which had a serology done as well (26). We then correlated the serology with the histology results.

Results: A total of 42 patients had positive biopsies; 16 patients proceeded directly to biopsy because there was such a strong clinical suspicion of coeliac disease. Of the 26 patients with positive D2 biopsies and serology, 12 (46%) had negative tissue transglutaminase (tTG), 17 (65.4%) had negative IgA antigliadin and 1.5 (57.7%) had negative IgG antigliadin. When combining tTG with IgG and IgA antigliadin to improve the sensitivity, 5 patients (19.2%) had completely negative serology results and 6 (23%) had equivocal serology. Therefore 11 patients (42%) had non-predictive serology.

Conclusion: Gastroenterologists have grown to rely on serology for the diagnosis and more importantly, for the exclusion of coeliac disease. These results show a significant discrepancy between serology and histology results at Medway Hospital. The laboratory techniques used at this hospital are standardised and probably similar those used in most hospitals in the country. Even if this discrepancy were to be mirrored in a small number of hospitals, how many patients with coeliac disease are being missed every year across the UK?

177 UPPER GASTROINTESTINAL BLEEDING AND THE CHANGING USE OF COX-2 SPECIFIC NON-STEROIDAL ANTI-INFLAMMATORY DRUGS

A. S. Taha1, W. J. Angerson1, R. Prasad1, C. McClaskey1, R. P. Knill-Jones2, O. Blatchford3, 1Gastroenterology, Crosshouse Hospital, Kilmarnock, 2Surgery, 3Section of Public Health and Health Policy, University of Glasgow, 4Public Health Medicine, Glasgow & Clyde NHS Board, Glasgow, UK

Introduction: With the concerns over the vascular side-effects of COX-2 specific non-steroidal anti-inflammatory drugs (NSAIDs), rofecoxib was withdrawn, a study of celecoxib was halted, and alternative therapies were recommended by the regulatory authorities.

Aims & Methods: Given the relative gastrointestinal safety of COX-2 NSAIDs and the greater ulcerogenic potential of alternative conventional NSAIDs, we aimed to assess the incidence of upper gastrointestinal bleeding in light of the changing use of these compounds. We examined the numbers and clinical characteristics of patients developing haematemesis and/or melaena in the South West of Scotland (population of 290 000). Comparisons were made between data collected over one calendar year BEFORE and the year AFTER rofecoxib was withdrawn. Drug intake and prescriptions were documented including those for NSAIDs, low-dose aspirin (75-mg) and other antithrombotic drugs (clopidogrel, dipyridamole, and warfarin). Other clinical details, smoking and excess alcohol intake (>20 units/week) were also noted.

Results: The table shows the incidence of upper gastrointestinal bleeding (numbers per 100 000 of the population) in one calendar year BEFORE as compared with the year AFTER rofecoxib was withdrawn in all patients and in relation to peptic ulcer risk factors. The withdrawal of rofecoxib was associated with a drop in the use of celecoxib, a rise in the use of other relatively mild NSAIDs (meloxicam, etodolac, and etoricoxib), and continued rise in the use of low-dose aspirin and other antithrombotic Drugs.

Conclusion: The rise in the incidence of upper gastrointestinal bleeding is not related to the changing use of NSAIDs. Instead, it reflects the increasing use of low-dose aspirin and other antithrombotic drugs, and the rise in alcohol-related bleeding.
Aspirin ingestion has almost doubled (24%) in year 1 to 44% in year 10 (p = 0.02) and has been accompanied by a rise in the comorbid disease. There has been a slight increase in bleeding GU. The median age for all patients has remained stable.

Despite an ageing population with more comorbid disease, decreasing incidence of DU is likely to be as a result of decreased rates of H pylori infection and usage of proton pump inhibitors.

Aims & Methods: This dedicated unit provides an ideal opportunity to assess the natural history and epidemiology of peptic ulcer bleeding. Analyses were performed on the prospectively collected data from all admissions to GIBU with bleeding from a peptic ulcer from October 1991 to 2001.

Results: Of 1978 admissions, 737 had a bleeding gastric ulcer (GU) and 1241 bled from a duodenal ulcer (DU). The total number of bleeding ulcers has fallen (p = 0.001), principally among the male patients with DU, but there has been a slight increase in bleeding GU. The median age for all peptic ulcer bleeders has increased from 67 in year 1 to 70 in year 10 (p = 0.02) and has been accompanied by a rise in the comorbid disease. Aspirin ingestion has almost doubled (24%) in year 1 to 44% in year 10 (p = 0.001), as have those taking warfarin therapy from 3.8% to 7.2% (p = 0.002). The percentage taking NSAID (24%) and acid suppression (22%) has remained unchanged. Despite a population decrease in smoking, the percentage of peptic ulcer bleeding patients who smoke has increased from 31% in year 1 to 36% in year 8 before falling to 27% in year 10. The number of significant bleeds has remained unchanged at 64%, although the number requiring a blood transfusion has decreased (p = 0.002). In the first 2 years, as part of the management protocol, only a few (8%) had endoscopic therapy, by year 10 this number had increased to 28%. During the same period the surgical referral rate has progressively fallen from 46% in year 1, to 19% in year 3 and 8% in year 10 (p = 0.0001). On the other hand, the rebleeding rate has been stable at 16% and the 30 day all cause mortality rate for DU bleeding has remained stable at around 7%.

Conclusion: The natural history of peptic ulcer bleeding is changing. The decreasing incidence of DU is likely to be as a result of decreased rates of H pylori infection. Despite an ageing population with more comorbid disease, aspirin and antiacogulation use, alongside use of endoscopic therapy, a decrease in blood usage and need for surgical intervention, the mortality rate has remained stable.

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
<th>x^2</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>98.7</td>
<td>143.4</td>
<td>21.126</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>NSAIDs</td>
<td>13.3</td>
<td>16.1</td>
<td>0.658</td>
<td>0.42</td>
</tr>
<tr>
<td>Low-dose aspirin</td>
<td>26.6</td>
<td>38.4</td>
<td>5.442</td>
<td>0.02</td>
</tr>
<tr>
<td>Other antithrombotics</td>
<td>12.1</td>
<td>30.2</td>
<td>19.626</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Aspirin plus other antithrombotics</td>
<td>11.8</td>
<td>7.726</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td>Excess alcohol</td>
<td>23.5</td>
<td>36.4</td>
<td>7.140</td>
<td>0.008</td>
</tr>
</tbody>
</table>

Gastrointestinal pathology posters

The putative stem cell marker CD24 is present as variably glycosylated isoforms in colorectal cancer

S. J. Crook1, D. Jackson1, A. Akinyele1, J. Kim1, R. Seth1, N. Watson2, L. Durrant3, J. Scholefield2, M. Ilyas1. 1Division of Pathology, University of Nottingham, Nottingham, 2Molecular and Population Genetics Laboratory, CR-UK, London, UK

Introduction: CD24 is a heavily glycosylated cell surface protein that is bound to the cell membrane via a glycosylphosphatidylinositol anchor. The antigen is normally expressed on human neutrophils, pre B-lymphocytes, T-cells, ganglion cells but is thought to be a stem cell marker in the human intestine. Upregulation of CD24 has been reported in a variety of solid tumours, and in colorectal cancer strong cytoplasmic CD24 staining has been shown to be significantly associated with tumour progression and shortened patient survival times.

Aims & Methods: The aim of the study was to investigate CD24 expression in human colorectal cancers and cell lines. mRNA levels of CD24 were tested in 17 colorectal cancer cell lines by quantitative real-time PCR using locked nucleic acid technology in the form of the UniversalProbe Library (Roche). Western blot analysis was used to examine protein levels in these cell lines with a mouse monoclonal anti-CD24 antibody (Labvision Corp). In order to study the expression of CD24 in tumours, a tissue microarray (TMA) panel derived from 462 colorectal cancers together with whole tissue sections from a smaller number of colorectal cancers (n = 10) underwent immunohistochemical (IHC) staining using same antibody.

Results: CD24 mRNA was found to be expressed in every single cell line tested. There was however a large variation in the levels of CD24 message expression with nearly a 1000-fold difference between the highest and lowest expressers (VACO10MS and RKO respectively). This correlated with the level of protein expression as evaluated by Western Blots. CD24 is glycosylated and, unexpectedly, different glycosylation patterns are present in different cell lines with some cell lines expressing up to three different isoforms. Immunohistochemical analysis showed that CD24 was not expressed in normal colonic mucosa but could be detected in stromal lymphocytes. In the TMA, 351/462 (76%) tumours showed fairly homogeneous cytoplasmic CD24 expression.

Conclusion: CD24 is not expressed in normal colonic mucosa but shows intense expression in a most colorectal tumours. The level of expression varies up to 1000-fold between tumours and there are differentially glycosylated protein isoforms. The specific roles of these isoforms as well as secondary messengers remain to be elucidated.

Novel and concomitant mutations of KRAS and BRAF in colorectal cancer cell lines

S. J. Crook1, R. Seth1, D. Jackson1, I. Tomlinson1, M. Ilyas1. 1Division of Pathology, University of Nottingham, Nottingham, 2Molecular and Population Genetics Laboratory, CR-UK, London, UK

Introduction: KRAS and BRAF encode small proteins which form part of the RAS/RAF/MAP kinase cascade. This is an important pathway that mediates a variety of functions such as cell growth, differentiation and apoptosis. Gain-of-function KRAS and BRAF mutations occur in a variety of different cancer types. Mutations of both genes are found in colorectal cancers and, since both activate the same signalling pathway, have been shown to be significantly associated with tumour progression and shortened patient survival times. We aimed to ascertain whether KRAS and BRAF mutations of the KRAS and BRAF genes may occur in the same tumour. Different cancer types. Mutations of both genes are found in colorectal cancers and, since both activate the same signalling pathway, have been shown to be significantly associated with tumour progression and shortened patient survival times. We aimed to ascertain whether KRAS and BRAF mutations of the KRAS and BRAF genes may occur in the same tumour.

Genetics Laboratory, CR-UK, London, UK

Aims & Methods: We aimed to ascertain whether KRAS and BRAF mutations occurred as true concomitant events or whether previous reports tested. There was however a large variation in the levels of CD24 message expression with nearly a 1000-fold difference between the highest and lowest expressers (VACO10MS and RKO respectively). This correlated with the level of protein expression as evaluated by Western Blots. CD24 is glycosylated and, unexpectedly, different glycosylation patterns are present in different cell lines with some cell lines expressing up to three different isoforms. Immunohistochemical analysis showed that CD24 was not expressed in normal colonic mucosa but could be detected in stromal lymphocytes. In the TMA, 351/462 (76%) tumours showed fairly homogeneous cytoplasmic CD24 expression.

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Results:

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<th>Before</th>
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<th>x^2</th>
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THE PUTATIVE STEM CELL MARKER CD24 IS PRESENT AS VARIABLY GLYCOSYLATED ISOFORMS IN COLORECTAL CANCER

S. J. Crook1, D. Jackson1, A. Akinyele1, J. Kim1, R. Seth1, N. Watson2, L. Durrant3, J. Scholefield2, M. Ilyas1. 1Division of Pathology, University of Nottingham, Nottingham, 2Molecular and Population Genetics Laboratory, CR-UK, London, UK

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Results: CD24 mRNA was found to be expressed in every single cell line tested. There was however a large variation in the levels of CD24 message expression with nearly a 1000-fold difference between the highest and lowest expressers (VACO10MS and RKO respectively). This correlated with the level of protein expression as evaluated by Western Blots. CD24 is glycosylated and, unexpectedly, different glycosylation patterns are present in different cell lines with some cell lines expressing up to three different isoforms. Immunohistochemical analysis showed that CD24 was not expressed in normal colonic mucosa but could be detected in stromal lymphocytes. In the TMA, 351/462 (76%) tumours showed fairly homogeneous cytoplasmic CD24 expression.

Conclusion: CD24 is not expressed in normal colonic mucosa but shows intense expression in a most colorectal tumours. The level of expression varies up to 1000-fold between tumours and there are differentially glycosylated protein isoforms. The specific roles of these isoforms as well as secondary messengers remain to be elucidated.
were heterozygous and most were the commonly described V600E. However, we also provide the first ever reports of mutations in codon 529 and 581 — both are evolutionarily conserved residues in the kinase domain. Concomitant KRAS and BRAF mutations were found in 2/26 (7%) cell lines confirming that these mutations can occur together. **Conclusion:** Activation of the RAF/RAF pathway occurs frequently in colorectal cancers and mutations occur at a wider range of residues than previously reported. The occurrence of homozygous KRAS mutations and concomitant KRAS/BRAF mutations shows that this pathway may be gene dosage dependent.

**181 INVESTIGATING EPIGENETIC PATHWAYS IN COLORECTAL CANCER**

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**Introduction:** Colorectal cancer (CRC) develops due to sequential somatic gene mutation. It is also apparent that this is accompanied by gene silencing through methylation of CpG islands located within gene promoter regions (epigenetic change). Some tumours appear to have a propensity for both gene mutation and promoter methylation—the so-called CpG Island Methylator Phenotype (CIMP) and CRCs can be subdivided into CIMP+ and CIMP− categories using a panel of genes that can discriminate between the tumour types. However, the impact of the CIMP+ phenotype on tumour biology is uncertain since (1) many genes undergo age-related methylation, (2) frequently only one allele at a locus is methylated (partial methylation) causing uncertain changes in gene dosage, and (3) the relationship of the CIMP and genetic pathways is unclear.

**Aims & Methods:** The aim of this study was to investigate epigenetic changes in a series of 26 colorectal cancer cell lines and correlate these with genetic changes. DNA and RNA was extracted from all cell lines. DNA and RNA was extracted from all cell lines. DNA underwent bisulphite modification followed by methylation specific PCR to evaluate promoter methylation of the 5 genes comprising the CIMP panel (NEUROG1, SOCS1, IGF2, RUNX3, CACNA1G). This identified the CIMP status of the cell line and was followed by further analysis of 5 different tumour suppressor genes (CDH1, APC, p14, p16, MLH1) and 2 genes of biological interest (CDX1, MGMT). Finally, all cell lines were tested for levels of MGMT expression using real-time PCR.

**Results:** The CIMP panel was successfully completed in 22/26 cell lines. CIMP+ was defined as promoter methylation at ≥3 loci and, by this criterion, 11 cell lines fell into each category. 83% of cell lines with microsatellite instability (MSI) were CIMP+ and whilst not statistically significant (due to small numbers) it does reflect the association between MSI and CIMP+ described in primary tumours. There was no association with BRAF mutation. CIMP− was associated with MLH1 methylation (p=0.03) and there was an association with p16 methylation and, interestingly, a negative association with APC methylation. Partial methylation was seen at many loci and quantitative PCR of MGMT showed no significant difference between cell lines showing partial and non-methylation. There was complete abrogation of expression when both MLH1 alleles were methylated.

**Conclusion:** Our data show that CRC cell lines are a good model of CRC. There were interesting associations between CIMP+ status and methylation of certain promoters which need further investigation. Partial methylation at a locus does not appear to significantly alter gene expression and is therefore of uncertain biological relevance.

**182 IRON INDUCED UPPER GI EROSIONS: A COMMON PATHOLOGICAL FINDING**

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**Introduction:** Although iron induced gastrointestinal injury has been long known about, it is not generally recognised as a cause of upper GI pathology by gastroenterologists or pathologists and until recently there has been little in the literature.

**Aims & Methods:** This study aimed to document cases of iron related upper GI pathology and relate this to clinical parameters and iron treatment. The pathology database was searched for cases of iron deposition in oesophageal, gastric and duodenal biopsies between 1999 and 2006. In addition, cases were collected prospectively from November 2005 to July 2006 as part of an audit of endoscopy in iron deficiency anaemia. Cases were examined to determine the site and pattern of iron deposition (luminal/surface, lamina propria, macrophages, epithelial, vascular) and associated pathology. Patient notes were examined for indication for endoscopy, details of iron and other treatment, haematology and underlying diseases.

**Results:** Fifty nine patients were identified, 44 from past records and 15 prospectively. 64 episodes of iron deposition were identified: 7 oesophageal, 28 body, 18 antrum and 10 duodenal. There was a steep increase in annual frequency in diagnosis from retrospective series (1999:2, 2000:13) while 9.3% of patients endoscopy for iron deficiency anaemia (15/161) showed detectable iron on routine H&E staining. In the oesophagus, iron deposition was frequently accompanied by ulceration (6/7) while in the stomach, 39/46 showed reactive or erosive gastritis with 29/46 showing erosion or ulceration. Here, iron was typically deposited superficially in strips of crystalline material and/or in lamina propria. Duodenal deposition was usually in villus tips in macrophages without ulceration. The notes of 47 patients were reviewed. All 47 had a history of prior iron treatment (43 ferrous sulphate, 1 ferrous fumarate, 3 unknown) which varied from 1 day to 3 years (median 2 months) with cumulative dose from 0.4–324 g (median 30 g). 25 patients were on aspirin and/or NSAIDs. No patient had haemosiderosis or haemochromatosis.

**Conclusion:** This is the largest reported series of iron induced upper GI pathology. Iron deposition in the upper GI tract is commonly seen in patients on oral iron and it is frequently associated with erosions in oesophagus and stomach. It likely represents the pathological manifestation of concurrent clinical complications of GI intolerance to oral iron and in such patients an alternative iron preparation or route should be considered. Pathologists and gastroenterologists should be aware of this common pathological finding.

**183 A BLINDED COMPARISON OF CAPSULE ENDOSCOPY AND HISTOLOGY IN THE EVALUATION OF NON-RESPONSIVE COELIAC DISEASE**

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**Introduction:** Non-responsive CD may be due to failure to adhere to a gluten-free diet (GFD), an additional diagnosis, incorrect initial diagnosis, assessment too soon after commencing a GFD or refractory CD. Complications of refractory CD include ulcerative jejunitis and lymphoma. This study aimed to evaluate capsule endoscopy (CE) in identifying patients with histological evidence of refractory CD and excluding those who did not, as well as detecting complications.

**Aims & Methods:** Patients with non-responsive CD (on a GFD for at least 12 months with continuing symptoms) underwent a CE. All had a repeat endoscopy with distal duodenal biopsies, at least 3 months after the capsule. The videos were analysed by an experienced observer (UM). CE changes consistent with CD (eg villous atrophy, scolloping of folds) were classified as mild or moderate to severe. The observer was blinded to the results of the histology. Concordance between CE and histology (Marsh 1–2 or 3–4) was calculated using the kappa statistic.

**Results:** Nineteen patients (14 female; mean age 57 years, range 18 to 82) underwent a CE. In 3 studies the video ended in the terminal ileum (passage of the capsule subsequently confirmed by patients). CE reported 10 (53%) videos as normal (2 had incidental angiodyplasia), 3 (16%) had mild changes and 6 (31%) had moderate/severe changes. Two (11%) had acute ulcers along the jejunum and ileum, consistent with ulcerative jejunitis. No small bowel tumours were seen. Histology was available in 18 of the 19 patients. CE demonstrated concordance with histological changes in 14 of the 18 patients (78% concordance). Twelve had histological features of CD on a GFD. Of those 12 CE identified endoscopic features of CD in 8 (67%). CE was normal in those 6 patients with no histological changes (ie sensitivity of 67%, specificity of 100%, positive predictive value of 100% and negative predictive value of 60%). The kappa statistic was 0.65.

**Conclusion:** The kappa statistic suggests a substantial degree of concurrence between histological and CE findings. Ulcerative jejunitis is frequently missed on biopsy and in this study it was detected in only 1 of the 2 cases diagnosed by CE. The negative predictive value of CE in this study suggests up to 40% of patients with a normal CE may have refractory CD. Endoscopy with distal duodenal biopsies is superior to CE in detecting refractory, proximal small bowel CD but since its complications are often out of reach of the biopsy the strength of CE lies in its ability to visualise the entire small bowel. CE has a complementary role to histology in detecting refractory CD and is helpful in investigating its complications as well as other causes of non-responsive CD.
**184 NATURAL POLYMORPHISM IN THE HELICOBACTER PYLORI VACUOLATING CYTOTOXIN SIGNAL SEQUENCE AFFECTS TOXIN PRODUCTION**

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**Introduction:** The H pylori vacuolating cytotoxin gene, vacA, is naturally polymorphic in the most diverse regions being the signal region (type s1 or s2). Signal type determines vacuolating activity: type s1 strains are vacuolating; and type s2 strains are non-vacuolating. Heterogeneity in VacA levels between strains also exists, and analysis of type s1 and s2 signal sequences has shown that they differ in the cleavage recognition site at positions -3 and -6. In type s1 the more favourable serine and proline residues are at positions -3 and -6 respectively, whereas type s2 strains have leucine present at -3 and glycine at -6.

**Aims & Methods:** We aimed to characterise the effect of polymorphic differences in the vacA signal cleavage site on VacA production. Isogenic H pylori mutant strains of 60190 (type s1; tox+) encoding vacA alleles, in which serine at position -3 was replaced by leucine, and proline at -6 was replaced by glycine were prepared. Mutant strains of Tx30a (type s2; tox-) encoding vacA alleles, in which leucine at position -3 was replaced by serine, and glycine at position -6 was replaced by proline were also prepared. For strains of 60190 and Tx30a both cultures of each isogenic mutant were prepared, and separated. Supernatant and cell pellet samples were corrected for bacterial density and analysed by western blotting and ELISA with anti-VacA antibody. The positions of the signal cleavage site were determined using N-terminal protein sequencing.

**Results:** For strain 60190, replacing serine with leucine at position -3 did not significantly reduce VacA production compared to the control. However replacing proline with glycine at the -6 position significantly reduced VacA production compared to the control (28% reduction (p<0.05)). Substitutions at both the -6 and -3 positions also significantly reduced VacA production compared to the control (23% reduction (p<0.05)). For Tx30a, replacing leucine with serine at position -3 significantly reduced VacA production compared to the control (54% reduction (p<0.005)). Replacing glycine with proline at position -6 significantly reduced VacA production compared to the control (51% reduction (p<0.005)). Substitutions at both the -6 and -3 positions also significantly reduced VacA production compared to the control (77% reduction (p<0.005)).

**Conclusion:** These results indicate that differences in the VacA signal sequence affect VacA production. We speculate that these naturally-occurring differences affect signal sequence processing efficiency. The reduction seen in VacA production for the Tx30a isogenic mutants was surprising and may reflect differences in signal peptide sequence specificity.

**185 VITAMIN D CONTROLS CDX-1 AND 2 TUMOUR SUPPRESSOR FUNCTION IN COLORECTAL CANCER**

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**Introduction:** CDX-1 and CDX-2 transcription factors regulate embryonic tissue differentiation, and have also been identified as tumour suppressor genes. Currently the factors which regulate the tumour suppressor function of CDX-1/2 are unknown.

**Aims & Methods:** The aim of this study was to identify the factors which regulate CDX-1/2 tumour suppressor function. Paired samples of colorectal adenocarcinoma and adjacent normal colon from 6 patients, were harvested and then cultured for 24 hours with sodium butyrate, vitamin D or control medium only. mRNA was extracted by standard techniques, and quantified using newly developed 3'-end specific primers. Expression data was normalised to glyceraldehyde 3-phosphate dehydrogenase expression and used to identify genes showing similar expression patterns in both normal and tumour tissue. Upregulated genes were validated by real-time reverse transcription polymerase chain reaction (RT-qPCR).

**Results:** For individual patients, Vitamin D decreased CDX-2 mRNA expression levels in adenocarcinoma cells (median 4.5-fold difference, p<0.005), compared to butyrate or media only cultures. No clear pattern of CDX-1 regulation could be identified. In contrast, cultivating adjacent normal colonic epithelial cells with butyrate or vitamin D showed no change in CDX-1,2 mRNA expression levels, when compared to medium only cultures.

**Conclusion:** This work indicates for the first time that the tumour suppressor function of CDX-2 may be regulated by vitamin D. Further investigation of CDX-1/2 tumour suppressor function may provide a basis for future novel therapies for colorectal cancer.


**186 HOX GENE GRADIENTS WHICH PATTERN THE EMBRYONIC GUT ARE ALSO PRESENT IN THE ADULT HUMAN GUT**

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**Introduction:** In the embryo differentiation of the gut occurs in response to segmental HOX gene transcription, with contrasting relative mRNA expression patterns in small and large bowel. In the adult human it has been hypothesised that maintenance of gut morphology occurs by continued HOX gene expression both postnatally and throughout adulthood. Transcription factors which regulate HOX genes have been linked with pathological transformation of bowel morphology (eg Barrett’s oesophagus, intestinal metaplasia of the gallbladder, colorectal adenocarcinoma), but the involvement of individual HOX genes in such conditions cannot be assessed due to inadequate descriptive expression in normal tissue gut.

**Aims & Methods:** The aim of this study was to identify and quantitate the expression pattern of HOX genes in normal adult human small and large bowel. Paired samples of ileum and colon from 3 patients were harvested with four unmatched rectal samples. mRNA was extracted using standard techniques, and RNA was quality assessed using 2100 Bioanalyzer. Quantitative reverse transcription polymerase chain reaction (RT-qPCR) was performed using standard techniques, and RNA was quality assessed using 2100 Bioanalyzer. Quantitative reverse transcription polymerase chain reaction (RT-qPCR) was performed using standard techniques, and RNA was quality assessed using 2100 Bioanalyzer.

**Results:** Clear differences in relative HOX factor mRNA expression were found in ileal samples, as compared to ascending colon/rectum. Relative mRNA expression pattern in terminal ileum was: CDX2>B6>C3>A3—CDX1 below. In contrast relative mRNA expression levels in both large bowel and rectal tissue with CDX2>B6>C3>A3—CDX1.

**Conclusion:** Relative HOX mRNA expression levels differ between adult human small and large bowel, in a similar fashion to embryonic gut. These findings provide evidence for the previously hypothesised role of HOX genes in the maintenance of tissue morphology in the adult human gut. In addition, further investigation of HOX function in normal tissue may subsequently allow a meaningful examination of their role in changes of gut morphology caused by pathological processes.


**Neurogastroenterology/motility posters**

**187 ABDOMINAL DISTENSION IS RELATED TO DELAYED GASTROINTESTINAL TRANSIT IN IRRITABLE BOWEL SYNDROME WITH CONSTIPATION**

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**Introduction:** Patients with irritable bowel syndrome with constipation (IBS-C) often have slow gastrointestinal (GI) transit1 and exhibit a diurnal increase in abdominal girth (ie abdominal distension) that is related to a feeling of worsening bloating.2

**Aims & Methods:** The aim of this study was to investigate whether IBS-C patients with delayed GI transit exhibit greater abdominal distension and more severe bloating than do patients with normal transit. Abdominal girth was recorded for 24 hours using the validated technique of Ambulatory Inductance Plethysmography3 in 27 IBS-C (Rome II) patients, aged 18–68 years (3 male) and 24 healthy volunteers (HV), aged 21–58 years (3 male). Within 2 weeks of this recording, both small (SIB) and large (LBT) bowel transit were assessed. SIB was determined from the rise in breath hydrogen after a standard meal,4 and LBT from the number of 3 differently shaped radio-opaque markers (24 of each ingested on 3 consecutive days) identified on plain abdominal x ray 72 hours after ingestion.5 The severity of abdominal bloating was also assessed on a scale of 0–3, where 3 = severe.

**Results:** As anticipated, IBS-C patients reported more severe abdominal distension (HV: 0.33 (0.07 to 1.02) cm; p<0.001), and exhibited greater abdominal distension (change in HV: 0.33 (0.07 to 1.02) cm; p<0.001), and exhibited greater abdominal distension (change in HV: 0.33 (0.07 to 1.02) cm; p<0.001), and exhibited greater abdominal distension (change in HV: 0.33 (0.07 to 1.02) cm; p<0.001), and exhibited greater abdominal distension (change in HV: 0.33 (0.07 to 1.02) cm; p<0.001), and exhibited greater abdominal distension (change in HV: 0.33 (0.07 to 1.02) cm; p<0.001), and exhibited greater abdominal distension (change in HV: 0.33 (0.07 to 1.02) cm; p<0.001).


IS VISCERAL HYPOSENSITIVITY ASSOCIATED WITH ABDOMINAL DISTENSION IN IRRITABLE BOWEL SYNDROME?

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Introduction: Irritable bowel syndrome (IBS) patients with a history of bloating can be divided into those who distend (ie exhibit an increase in abdominal girth) and those who do not.1 Those who bloat alone have been shown to be more viscero-sensitively sensitive than those who bloat and distend.2

Aims & Methods: The aim of this study was to examine whether abdominal distension differs between IBS patients who are hypo-, normo-, or hypersensitive to balloon distension. Abdominal girth was recorded for 24 h using the validated objective technique of Ambulatory Inductance Plethysmography1 in 70 IBS patients (Rome II) with a history of bloating, aged 18–73 years (39 IBS-C, 26 IBS-D, 5 IBS-alt, 62 female) and 44 healthy volunteers, aged 18–67 years (42 female). Within 7 days of this recording, rectal sensitivity was assessed using a barostat technique, in which pain thresholds were determined using the ascending method of limits followed by tracking.

Results: Compared with our departmental 95% normal reference range for the sensory threshold for pain of 24–38 mmHg,3 22 (32%) were found to be normo-sensitive, 31 (44%) hypersensitive and 17 (24%) hyposensitive to distension. Hypo-sensitive patients distended significantly more (change in girth from beginning to end of day = 7.8 cm (6.2 to 9.4) cm; mean (95% CI)) than both normo-sensitive (=4.0 (2.1 to 6.0); p < 0.001) and hypersensitive (3.1 cm (1.7 to 4.5); p = 0.001) patients. In addition, significantly more of the hyposensitive patients (14/17) distended beyond the normal reference range of >6.9 cm than either normo- (9/22, p = 0.01) or hypersensitive (5/31, p = 0.01) patients. Although there was no significant difference in diurnal changes in girth between hyper- and normo-sensitive patients (p = 0.42), fewer of the hyposensitive patients exhibited changes in girth beyond the normal reference range than those who were normo-sensitive (p = 0.06).

Conclusion: These results show for the first time that IBS patients who are viscero-hypersensitive are more likely to exhibit the greatest changes in abdominal girth (ie distend). Furthermore they confirm our previous preliminary observations that hyper-sensitivity is more likely to be associated with the symptom of bloating alone.


IRRITABLE BOWEL SYNDROME IN THE ELDERLY: AN OVERLOOKED PROBLEM?

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Introduction: It is well known that irritable bowel syndrome (IBS) patients commonly consult about their problem between the ages of 30 and 50, although in a large proportion of these individuals, symptoms have been present for many years.1 It is also known that in secondary care IBS is commonly associated with multiple non-colonic symptoms including lethargy, backache, urinary symptoms and chest pain which result in referral to different specialties in conditions remaining unrecognised.2 However, there is very little information on whether the condition persists into old age, and no data on how it manifests itself in the elderly or its prevalence in elderly care clinics.

Aims & Methods: Using the previously validated Elderly Bowel Symptom Questionnaire (EBSQ)3 this study aimed to assess the extent of this problem in consecutive outpatients attending elderly care clinics relating the results to the presenting complaint, non-colonic symptomatology and final diagnosis. Of the 430 consecutive patients who attended the Elderly clinics in Wythenshawe Hospital, 211 completed the questionnaire and were included in the study.

Results: Fifty-six (26%) of 211 patients had symptoms compatible with a diagnosis of IBS irrespective of their presenting complaint. However despite the exclusion of abdominal pathology a diagnosis of IBS was only documented in one patient. 69.6% of patients had suffered from their IBS symptoms for over 5 years. Not surprisingly abdominal pain, bloating and bowel dysfunction including urgency were more common in IBS patients (p < 0.001). However other symptoms significantly more common in the IBS patients compared to non-IBS patients were backache (76.7% vs 52.9%, p < 0.001), constant lethargy (73.2% vs 49.7%, p = 0.002), chest pain (62.5% vs 44.5%, p = 0.02), headaches (55.3% vs 26.4%, p < 0.001) and urinary frequency (37.5% vs 23.2%, p = 0.04). Independent predictors of IBS on logistic regression have been listed in the table.

Conclusions: A previous report relating to being elderly care clinics even after negative investigation. Making the diagnosis, despite the presence of coexistent disease, could reduce the overall burden of suffering, improve quality of life, prevent repetitive investigations and have significant economic advantages.


WHAT IS THE OPTIMAL DURATION OF OESOPHAGEAL PH MEASUREMENT AND SYMPTOM ASSESSMENT? A PROSPECTIVE STUDY USING 96 H BRAVO RECORDINGS

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Introduction: The day-to-day variability of oesophageal acid exposure in patients with the gastro-oesophageal reflux disease (GORD) is high and 20–30% of patients receive a different diagnosis on repeated 24 h catheter based pH testing. Preliminary reports by the authors and others suggested that 48 h pH testing by the catheter-free Bravo system increase measurement reliability and diagnostic accuracy; however these reports were retrospective and underpowered to determine the optimal duration of reflux investigation.

Aims & Methods: Prospective study of 40 consecutive patients with typical reflux symptoms (18M:22F, 46 (21–70) years). Endoscopy and trans-oral delivery of the Bravo capsule 6 cm above the Z-line were performed. Patients returned after 48 and 96 h to download data. The day-to-day variability of pH measurements was calculated. Patients were classified by acid exposure (abnormal: >4.2% time pH<4) and symptom index (positive SI: >50% association of reflux events and any symptom) during each 24 h and 48 h test period. The reliability of 24 h v 48 h pH testing was assessed with 96 h results as the reference standard.

Results: Complete four-day recordings were available for 32/40 (80%) patients (n=4 detachment <96 h, n=4 consent withdrawn due to symptoms off treatment). There was no difference in pH measurement or SI over time (p = 0.1). Oesophageal acid exposure: Within patient variability was higher for 24 h (±30%) than 48 h (±22%) test periods relative to the 96 h reference standard (p < 0.01). Pathological acid exposure was present in 18–19 patients on any test day and 13 patients on every test day. Different diagnoses were reported in 11/32 (34%) and 3/32 (9%) patients on 24 h and 48 h pH testing respectively (p < 0.01).

Diagnostic reproducibility of pH testing was improved by prolonged studies (kappa score, 24 h = 0.32 [poor] v 48 h = 0.81 [very good]). Results were similar for the DeMeester score and alternative pH “diagnostic cut-offs” for GORD. Symptom assessment: different results were reported in 21/32 (76%) and 12/32 (37%) patients on 24 h and 48 h SI assessment respectively (p = 0.07). A positive 96 h SI was found in 2/15 (13%) and 13/17 (77%)
patients in whom <2/4 days and <2/4 days had a significant association between reflux events and symptoms respectively (p<0.01).

Conclusion: Increasing the duration of pH testing from 24 h to 48 h improves the reliability of pH testing and symptom assessment (compared to testing >1 week longer by a "reference standard"). Prolonging pH testing beyond 48 h provides little improvement in diagnostic yield but may be justified in borderline cases and to confirm the association between reflux events and symptoms in patients with inconsistent results on the first two test days.

Aims & Methods: The stress model described previously was performed under three experimental paradigms. Experiment 1—does lumbosacral spinal convergence occur?: 15 patients with c-IBS (12 female, mean age 31) and 11 control subjects (71, mean age 35) underwent two CP studies, each separated by 1 week and 1 week apart. Experiment 2—adaptation develops to DL?: 16 patients with c-IBS (13f, mean age 32) and 9 control subjects (6f, mean age 37) underwent 3 DL studies each, <1 week apart. Experiment 3—can this adaptation be avoided?: 14 patients with c-IBS (11f, mean age 32) and 11 control subjects (7f, mean age 37) underwent 3 DL studies supplemented by mental arithmetic, each <1 week apart. Endpoints for all experiments were subjective stress perception (VAS), autonomic function (rectal mucosal blood flow, RMBF) and visceral sensitivity (rectal electrosensation, RES).

Results: Experiment 1: lower limb CP induced identical stress physiological response on upper limb. As in previous studies, c-IBS patients had a stress-induced reduction in RMBF and RES pain threshold, while controls only showed the RMBF reduction. Experiment 2: in c-IBS, stress-induced reduction in RMBF was 34% v 24% (1st test v 3rd, p<0.05) and RES threshold (23% v 19%, p<NS). Controls showed no significant differences between 1st and 3rd tests (RMBF 26% v 28% resp; RES 1% v 1% resp). Experiment 3: there was no significant difference in stress induced reduction in RMBF or RES threshold between 1st and 3rd tests in c-IBS or controls.

Conclusion: The physical stress model suggests that convergence of visceral and somatic input at the spinal cord is not an important mechanism in man, but lower limb CP response being similar to upper limb CP, the interplay of psychological stress, repeated DL testing may induce tolerance in IBS patients—especially in terms of autonomic response. Supplementing DL testing with mental arithmetic prevents this adaptation. Finally, the validity and reproducibility of the gut response to physical and psychological stress has been demonstrated.

USING THE GUT RESPONSE TO ACUTE STRESS TO STUDY THE PATHOPHYSIOLOGY OF IRritable BOWEL SYNDROME

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Introduction: Evolving knowledge of the stress response has offered insights into the aetiology of irritable bowel syndrome (IBS). We have previously shown that acute physical (cold pressor-CPR) and psychological (dichotomous listening-DL) stress alters gut specific autonomic tone and gut sensitivity in patients with IBS (Murray et al. Gastroenterology 2004;127:1699). This model provides both the opportunity to study putative novel IBS drugs, and the opportunity to study aspects of visceral physiology. Firstly, does convergence ofafferent input at spinal level occur (by comparing effect of upper limb v lower limb CP)? Secondly, does tolerance to stressful stimuli occur with repeat exposure, and can it be avoided.

POOR QUALITY OF LIFE PREDICTS THE NEW ONSET OF IRRITABLE BOWEL SYNDROME: A LACTONAL 10-YEAR FOLLOW-UP STUDY

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Introduction: Studies have indicated that irritable bowel syndrome (IBS) is associated with poor quality of life, but it is unclear whether IBS causes poor quality of life, or whether those with poor quality of life are more likely to develop IBS. This is the first study to address this issue.

Aims & Methods: The authors performed a longitudinal 10-year follow-up study of individuals previously recruited into a community screening programme for Helicobacter pylori. All surviving, traceable participants were contacted via postal questionnaire that utilised the Manning criteria to diagnose IBS. Baseline demographic data (including: age; gender; social class; tobacco, alcohol, and coffee consumption; and ethnicity), quality of life (assessed via the psychological and general well-being index and split into tertiles), IBS symptom data, and dyspepsia symptom data (captured via validated questionnaire) were already on file. Written informed consent was sought to examine primary care records, and data on use of non-steroidal anti-inflammatory drugs (NSAIDS) and aspirin over the 10-year period were extracted from these. The associations between these data and new onset of IBS at 10 years in those asymptomatic at baseline were explored using univariate analysis. Independent risk factors were determined by performing multivariate logistic regression to control for all these demographic data and lifestyle factors.

Results: Of 8407 individuals originally involved, 4003 (48%) responded to the questionnaire. Mean age of responders was 55 years, and 2247 (56%) were female. 220 (5.6%) of 3948 individuals providing data at baseline had IBS, compared to 696 (18%) of 3925 individuals providing data at 10-year follow-up, while 3728 individuals without IBS at baseline, 542 (14.5%) developed new onset IBS at 10 years. Female gender (odds ratio (OR) 2.15; 99% confidence interval (CI) 1.66 to 2.79), dyspepsia at baseline (OR 2.23; 99% CI 1.71 to 2.92), lower social class (IV and V versus I and II: OR 1.99; 99% CI 1.35 to 2.93), NSAID use, 1 week and >2 weeks, and poor quality of life (bottom v top tertile: OR 4.60; 99% CI 3.26 to 6.48) all significantly increased likelihood of new onset IBS at 10 years, while consumption of alcohol reduced the likelihood (OR 0.57; 99% CI 0.39 to 0.84). Following multivariate logistic regression female gender, dyspepsia at baseline, NSAID use, and lower quality of life remained significant risk factors for new onset IBS.

Conclusion: New onset IBS developed at a rate of almost 1.5% per year. Low quality of life at baseline exerted a strong effect on development of IBS at 10 years in our model.
WHO CONSULTS WITH IRRITABLE BOWEL SYNDROME? A LONGITUDINAL 10-YEAR FOLLOW-UP STUDY

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Introduction: Irritable bowel syndrome (IBS) is a chronic relapsing, remitting disorder, the natural history of which has been studied extensively. However, few studies have examined factors that influence the likelihood of consulting a general practitioner (GP) with symptoms in those who are symptomatic, particularly over a long time period.

Aims & Methods: In the present study we have investigated the distribution of six major Kv1 channel subunits in mouse gastrointestinal tract, and human stomach, small bowel and colon using the avidin-biotin peroxidase complex (ABC) method. Polyclonal anti-Kv1.1, Kv1.2, Kv1.3, Kv1.4, Kv1.5 and Kv1.6 were used as primary antibodies. Sections were examined under light microscopy and staining scored by two investigators after reaching consensus and independently by an experienced third investigator.

Results: Significant variation was seen in the distribution of subunits in different parts of the bowel wall (p<0.05). The greatest concentration of Kv1 subunits was found in the intestinal surface epithelial cells, gastric chief cells and enteraic ganglia. Kv1.1, 1.2, 1.3, 1.4 and 1.5 immunoreactivities were similar in small bowel surface epithelium whereas Kv1.6 was detected at a lower intensity. Colonic surface enterocytes were intensely stained with anti-Kv1.2, 1.3 and 1.4 antibodies. In the stomach, Kv1.1, 1.2 and 1.3 immunoreactivities were prominent in chief cells. Gastric myenteric ganglia showed the same levels of immunoreactivity, although as seen in the surface epithelium, Kv1.6 staining was moderate. Colonic ganglia were at least moderately positive for all six Kv1 subunits. Myenteric ganglia showed the same levels of immunoreactivity, although as seen in the surface epithelium, Kv1.6 staining was moderate. Colonic ganglia were at least moderately positive for all six subunits. Gastrinostestinal smooth muscle, including vascular smooth muscle was negatively or weakly positive for Kv1 subunit expression.

Conclusion: This is the first comprehensive description of the distribution of voltage-gated K channels throughout the gastrointestinal tract. The high density of Kv1 subunits in surface epithelial cells and enteraic ganglia was unexpected. The demonstration of a common antigenic profile provides a potential mechanism whereby damage to enterocytes could produce an immune response with enteric neuron cross reactivity leading to impaired motility, for example in post-infective irritable bowel syndrome.


GASTROINTESTINAL SYMPTOMS IN PATIENTS WITH MARFAN SYNDROME

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Introduction: Fibroblasts-1, an essential component of elastin, is deficient in Marfan syndrome (MS). We postulate that this may be associated with abnormal gastrointestinal (GI) function. However, the frequency of gastrointestinal symptoms in MS has not previously been studied.

Aims & Methods: To assess the prevalence of GI symptoms in patients with MS. All patients aged 18 or over, included in the database of a specialist MS clinic were invited to take part in this postal study, to complete a previously validated Rome II questionnaire and the hospital anxiety and depression score. Sex and age matched (±7 years) outpatients attending a hospital hypertension clinic were also invited to complete the same questionnaire as well as the anxiety and depression score. They were compared with age- and sex-matched community controls.

Results: Of 203 MS patients contacted, 118 (58%) returned the questionnaire. MS patients experience frequent more frequent abdominal discomfort and IBS compared to community controls. They also experience

<table>
<thead>
<tr>
<th>Patients from hypertension clinic</th>
<th>Community controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male/Female</td>
<td>56/62</td>
</tr>
<tr>
<td>Age in years (mean, range)</td>
<td>50, 18–82</td>
</tr>
<tr>
<td>Abdominal discomfort</td>
<td></td>
</tr>
<tr>
<td>IBS</td>
<td>47 (40%)</td>
</tr>
<tr>
<td>Diarrhoea predominant IBS</td>
<td>9 (8%)</td>
</tr>
<tr>
<td>Constipation predominant IBS</td>
<td>12 (10%)</td>
</tr>
<tr>
<td>Constipation</td>
<td>22 (19%)</td>
</tr>
</tbody>
</table>

IBS, irritable bowel syndrome. *p<0.01; **p<0.0001.
more abdominal discomfort than hypertensive controls. The latter difference is unaffected by the presence or absence of anxiety and depression.

**Conclusion:** There is a higher prevalence of frequent abdominal discomfort and IBS among MS patients compared to controls. Further studies are required to elucidate the pathophysiological basis of these symptoms, and to determine their impact on the quality of life of patients with MS.

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**THE RELATION BETWEEN EXOCRINE PANCREATIC HYPOFUNCTION AND PATIENTS FULFILLING THE ROME II CRITERIA FOR IRRETRISIBLE BOWEL SYNDROME (DIARRHEA-PREDOMINANT): A PREVALENCE STUDY WITH CONTROLS AND THERAPEUTIC OUTCOMES**

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**Introduction:** Patients who meet the Rome II criteria for IBS may have other underlying pathologies. A historical study suggested that 20% of patients with IBS had an abnormal stool appearance test. Recent data describe a higher prevalence for chronic pancreatitis within the general population than previously reported. For these reasons, we wished to determine the prevalence of exocrine pancreatic insufficiency in patients with diarrhoea predominant irritable bowel syndrome (D-IBS) and investigate the role of pancreatic enzyme supplementation.

**Aims & Methods:** 403 consecutive patients were referred to our unit over an 18-month period who met the Rome II criteria for D-IBS. Those willing to participate had baseline stool frequency and stool consistency recorded along with demographics and weight. Patients were then investigated as per British Society of Gastroenterology IBS guidelines (2000). A stool sample was provided and faecal elastase-1 (Fel-1) was determined. Those patients with a Fel-1 level of less than 100 μg/g of stool were offered pancreatic enzyme supplementation in the form of Creon 4000 units tds. Concurrently, age and sex matched D-IBS (therapeutic controls) with a Fel-1 greater than 100 were also offered the same pancreatic enzyme supplementation.

**Results:** 63 patients (16.2%) had a Fel-1 <100 whereas 0/50 prevalence controls had an abnormal Fel-1 (p = 0.08). Pancreatic enzyme supplementation reduced median stool frequency from 6/day to 1.5/day in 18/19 (94.7%) D-IBS with a Fel-1 <100 (p = 0.0001). By comparison median stool frequency was reduced in 1/15 (6.7%) with Fel-1 >100. In 4 patients with a Fel-1 <100 there were abnormalities on pancreatic imaging (3 chronic pancreatitis and 1 atrophic pancreas).

**Conclusion:** This is the first study to assess the relationship between exocrine pancreatic hypofunction and D-IBS. Reduced faecal elastase-1 appears to be common in patients with D-IBS. In addition, patients suffering from D-IBS were responsive to pancreatic enzyme supplementation. These data suggest that patients with D-IBS should be investigated for exocrine pancreatic hypofunction.

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**RECTAL ENDOCRINE CELLS: NO POST-INFLAMMATORY HYPERPLASIA IN COLITIS**

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**Introduction:** Gut endocrine cells (EEC) produce regulatory peptides to coordinate gut function, and may be implicated in the response to injury. EEC decline in active colitis, yet in post-infectious irritable bowel syndrome (PI-IBS) and murine gut infection EEC numbers increase, a process possibly driven by inflammation. Measurements of EEC numbers in IBD, including IBS-D are poorly understood. We have previously shown that bran accelerates scintigraphic small bowel transit and increases small bowel secretions in healthy controls.

**Aims & Methods:** To serially quantify mucosal EEC in colitis and correlate EEC changes with non-colitic symptoms. Rectal biopsies were taken in active ulcerative colitis (n = 9 subjects), and repeated after 4 months normal treatment. A bowel symptom questionnaire was completed. Matched healthy controls were also biopsied. Immunohistochemistry (chromogranin A, 5-HT, PYY, enteroglucagon) were blindly scored. Analysis used Mann–Whitney.

**Results:** (a) Baseline biopsy: all colitic samples had significantly fewer EEC than controls per ~200 high power field (hpf) (mean absolute EEC count 37.5 ± 16.7 ± 134.0 ± 20.9, p < 0.01), and also fewer EEC per crypt (mean relative EEC count 3.4% ± 1.3 % 8.6% ± 1.1 %, p < 0.01). The relative percentage of EEC type was observed to differ between colitics and controls: 5-HT 32 ± 44%, PYY 50 ± 39%, EG1 18 ± 17%. (b) Second biopsy: inflammation improved in 4 subjects. EEC increased in each, but remained significantly fewer than control values (mean change +18±9/hpf). In two subjects the inflammation had entirely resolved histologically, but EEC numbers remained low (9 and 33 ± 134 in controls). In 5 subjects inflammation showed no improvement, with no recovery in EEC numbers (mean change -19±17/hpf). The ratio of EEC types was unchanged: 5-HT 29%; PYY 55%; EGG 16%. (c) Symptoms: despite improved inflammation the score of two patients deteriorated, with IBS-like features. These two had the lowest proportion of 5-HT cells in the first (4% and 20% respectively v 32% group) but not second biopsy (22% and 28% respectively v 29%)

**Conclusion:** The data confirm the prior report that EEC numbers decrease in colitis, adding that EEC counts remain suppressed even with histological resolution. Inflammatory mediators may remain active despite histological resolution. The data also suggest a switch in lineage commitment toward PYY-secreting cells with a reduction in 5-HT cells. In particular, a post-inflammation increase in 5-HT cells, as observed in PI-IBS was not supported, even in the small group of patients with prominent functional symptoms. Further studies are required to address the molecular mechanisms controlling EEC differentiation in IBD.

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**ABNORMALITIES OF SMALL BOWEL AND COLONIC WATER CONTENT IN DIARRHOEA-PREDOMINANT IRRITABLE BOWEL SYNDROME: NOVEL INSIGHTS FROM MAGNETIC RESONANCE IMAGING**

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**Introduction:** Diarrhoea-predominant irritable bowel syndrome (IBS-D) symptoms are often exacerbated by bran but the underlying mechanisms are poorly understood. We have previously shown that bran accelerates scintigraphic small bowel transit and increases small bowel secretions in healthy controls.

**Aims & Methods:** To assess small intestinal secretion, transit and colonic response to a bran-containing meal in diarrhoea-predominant IBS (IBS-D) patients. Nine IBS-D patients (5 male, 4 female) meeting Rome III criteria for IBS-D in whom microscopic colitis and coeliac disease had been excluded and 16 healthy controls (8 male, 8 female) attended at the MRI unit having fasted overnight. After fasting scans they ate a standard 331 kcal rice pudding with 1 g of coarse wheat bran. Serial MRI imaging was then performed at 45 min intervals for 4.5 hours. The volume of fluid in the bowel at each time point was calculated by integrating all image pixels containing water signal above a given threshold.

**Results:** Shown as mean (SEM). Fasting SBWC in IBS-D patients at 80 (16) ml was significantly reduced versus controls 138 (17) ml p <0.05. AWC in IBS-D was 65 (5) ml significantly greater than controls 2 (1) ml (p = 0.003). SBTT of the meal was significantly faster in IBS-D, 145 (15) min versus control 239 (15) min, values very similar to published. SBTT of the meal was significantly faster in IBS-D, 145 (15) min versus control 239 (15) min, values very similar to published. SBTT of the meal was significantly faster in IBS-D, 145 (15) min versus control 239 (15) min, values very similar to published.
200 FACTORS DETERMINING THE PERCEPTION OF THE REFLUX EVENTS IN GORD PATIENTS
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Introduction: Only a minority of the reflux episodes detected by intraluminal ambulatory monitoring are perceived by patients. We investigated the determinants of perception of gastro-oesophageal reflux events in patients who presented with typical reflux symptoms.

Aims & Methods: In 36 patients with symptoms suggestive of gastro-oesophageal reflux, 24-h ambulatory Combined Multichannel intraluminal impedance-pH monitoring was performed after cessation of acid suppressive therapy. In the 21 patients who had at least one symptomatic reflux episode, characteristics of symptomatic and asymptomatic reflux episodes were compared.

Results: 1501 reflux episodes were detected in these 36 patients; they reported 292 symptoms, of those 141 symptoms correlated to reflux events. 1501 reflux episodes were detected in these 36 patients; they reported 292 symptoms, of those 141 symptoms correlated to reflux events. Results: 1501 reflux episodes were detected in these 36 patients; they reported 292 symptoms, of those 141 symptoms correlated to reflux events. 1501 reflux episodes were detected in these 36 patients; they reported 292 symptoms, of those 141 symptoms correlated to reflux events.

Conclusion: Heartburn and regurgitation are more likely to be experienced by the patients when the pH drop is large, proximal migration of the refluxate is high, and bolus and acid clearance from the oesophagus is delayed. It appears that sensitisation of the oesophagus by prior repeated exposure of the mucosal lining could be responsible for increased perception of acid reflux. Pure gas reflux associated with a pH drop can be perceived as heartburn and regurgitation.


201 EXPLORING PSYCHOPHYSIOLOGICAL PHENOTYPES FOR VISCERAL PAIN
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Introduction: Neonatal pain reactivity and temperament correspond with differences in autonomic regulation. The relevance of these psychophysiological phenotypes for adult visceral pain responses is unknown.

Aims & Methods: To determine if similar psychophysiological phenotypes exist for visceral pain in a healthy adult population. 19 volunteers (8 male, ages 20–55) had 10 painful oesophageal balloon distensions delivered by a swallowed catheter. Autonomic regulation (cardiac vagal control (CVC), cardiac sympathetic index (CSI), heart rate (HR)) was measured pre-intubation (baseline) and during pain. Personality traits were determined separately.

Results: Baseline CVC correlated negatively with neuroticism (r = −0.6; p = 0.007), baseline HR (r = −0.4; p = 0.07), baseline CSI (r = −0.5; p = 0.02) and with CVC in pain (r = −0.5; p = 0.028) but positively with HR in pain (r = 0.6; p = 0.01). HR in pain correlated positively with extraversion (r = 0.5; p = 0.02) but negatively with neuroticism (r = −0.5; p = 0.03). Hierarchical and K-wise cluster analyses confirmed impressions from correlation analysis of 2 psychophysiological profiles for visceral pain: one group (group 1, n = 11) with lower baseline CVC (p = 0.0001) but higher baseline HR (p = 0.02) and CSI (p = 0.015) an increase in CVC during pain (p = 0.01) but an attenuated HR response in pain (p = 0.016) higher neuroticism (p = 0.0004) and lower extraversion (p = 0.016). The other group (group 2, n = 8) had a converse profile. In other words group 1 had a paucity of parasympathetic (PNS) regulation at rest but a PNS predominant defence response whereas group 2 had high resting PNS regulation but a predominantly sympathetic defence response with PNS withdrawal. These results are similar to ANS profile differences between high (group 1) and low (group 2) anxiety animals at rest and in pain and may reflect different passive (freeze/tonic immobility—group 1) and active withdrawal (group 2) coping/defence repertoires.

Conclusion: Two psychophysiological phenotypes for visceral pain were found which could represent a psychobiological basis for active and passive coping repertoires. The prevalence and relevance of these for clinical visceral pain warrants further assessment.

202 BLOOD PRESSURE RESPONSES TO DISTAL OESOPHAGEAL ACIDIFICATION AND THEIR RELATION TO SENSITISATION IN A HUMAN MODEL OF VISCERAL PAIN HYPERSENSITIVITY
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Introduction: Visceral pain hypersensitivity (VPH) is a common feature of functional gastrointestinal disorders (FGID). Life stress has been associated with both the onset and exacerbation of FGID. How it modulates visceral sensory perception is unknown, but may be mediated, in part by the autonomic nervous system (ANS). We have shown previously that distal oesophageal acidification induces sensitisation of spinal dorsal horn neurones leading to the development of VPH in the non-acid exposed proximal oesophagus (PO). Variability exists in the degree to which individuals sensitise but whether differential ANS responses between individuals explain this is unknown.

Aims & Methods: To determine whether differences in autonomic reactivity, as measured by continuous real time BP monitoring, predict the degree of VPH in oesophageal acidification. In nine healthy volunteers, pain thresholds (PT) to electrical stimulation (in milliamperes, mA) were determined in the PO and foot (somatic control) pre- and post a randomised double-blind 30-minute distal oesophageal infusion of either 0.15% HCl or saline. All subjects had BP monitoring before and during the infusion via a non-invasive Portapress system.

Results: All subjects bar one sensitised to acid infusion with a full in PT of ≥6 mA. Acid infusion resulted in a significant fall in PT in the PO compared to saline (mean change in PT averaged over all time points −5 mA (4.5 mA SD) Vs −1.4 mA (2.9 mA SD) p < 0.01). Average maximum change in PT was −9.5 mA (8.7 mA SD) for acid and 4.4 mA (5.6 mA SD) for saline. There were no significant differences in mean arterial pressure (MAP) averaged over 5 minutes at baseline (81.0 mm Hg (14.4 mm Hg SD) acid visit v 81.3 mm Hg (16.9 mm Hg SD) saline, p = 0.82) and during the first 5 minutes of the infusion (94.1 mm Hg (14.4 mm Hg SD) acid visit v 94.2 mm Hg (18.2 mm Hg SD) saline, p = 0.73). However, acid infusion caused a greater rise in MAP compared to saline (99.3 mm Hg (17.7 mm Hg SD) v 94.6 mm Hg (17.9 mm Hg SD), p = 0.05), an effect more pronounced on the exclusion of the one non-sensitiser (p = 0.03). With simple linear regression the degree of sensitisation (maximum fall in PT, From baseline) inversely correlated with baseline PT at the end of the acid infusion in those 7 individuals that sensitised ≥6 mA (p = 0.0002), suggesting that those individuals that were able to raise their BP most to acid infusion sensitised the least.

Conclusion: Oesophageal acidification raises MAP, an effect that is greater in those that develop VPH. In turn those that mount the greatest BP response to this stressor sensitise the least. Further work in larger numbers incorporating other autonomic measures is now warranted.


203 FUNCTIONAL HEARTBURN PATIENTS WITH SOMATISATION TRAIT DEMONSTRATE GENERALISED VISCERAL HYPERSENSITIVITY
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Introduction: Visceral hypersensitivity (VH)—heightened perception to experimental visceral stimuli—is a commonly observed phenomenon in patients with functional gastrointestinal disorders (FGIDs). It is often associated with somatic hypersensitivity. One proposed mechanism of VH is augmented afferent input at spinal cord level (“central sensitisation”). With overlapping afferent input from different regions of the GI tract, central sensitisation may explain symptom overlap between different FGIDs. Functional heartburn (FH) is a FGID characterised by heartburn with normal oesophageal mucosal appearances and normal acid exposure. We hypothesised that FH patients without symptoms of irritable bowel
sensitivity occurs in FH patients who do not have symptoms of IBS, central sensitisation to oesophageal acid infusion. This development of

Conclusion:

Patients with FH—and not ERD or controls—demonstrate.

Aims & Methods: Eighteen consecutive patients with FH (7 male, mean age 40) and no symptoms of IBS (Rome II) were compared with 16 patients with erosive reflux disease (ERD). 9 male, mean age 40 (FH male, mean age 42). All subjects underwent (in random order) either infusion of pH1 HCl or saline >1 week apart. At baseline and 30 minutes they underwent a rectal barostat study (perception and pain), anal manometry and interstitial pressure, and VAS assessment of abdominal pain. All patients completed the BSI questionnaire, particularly to assess somatization (BSI-som score >61 suggests significant somatization tendency).

Results: With saline, FH patients had lower barostat thresholds than ERD and controls (perception 22.9 v 29.2 v 28 mmHg resp, p<0.03 for both; pain 36.9 v 43.9 v 43.4 mmHg resp, p<0.01 for both). Anal pain threshold was lower in FH (11.1 mA) than ERD (13.6 mA, p<0.05) but not control (11.6 mA, p=NS). Acid infusion reduced thresholds for (1) barostat thresholds in FH, not ERD or controls (perception 19.7 v 30 v 25.6 mmHg resp, p=0.01 for both; pain 27.8 v 41.1 v 36.1 mmHg resp, p<0.05 for both) (2) VAS pain intensity (3.2 v 1.8 v 1.1 resp, p<0.01 for both) and (3) anal pain threshold (10.1 v 14.7 v 12.3 mA resp, p<0.03 for both). Compared to saline, acid infusion reduced thresholds for barostat volumes and anal pain, and increased abdominal pain in FH patients only. This VAS was in 13 of 18 (72%) patients, all of whom had BSI-som >61. Of 5 patients not showing FH tendency, 4 had BSI-som >61.

Conclusion: Patients with FH—and not ERD or controls—demonstrate central sensitisation to oesophageal acid infusion. This development of sensitivity occurs in FH patients who do not have symptoms of IBS, suggesting an underlying tendency that is present in a significant proportion of these patients, particularly those with somatization trait.

Oesophagus posters

204 THE EFFECTS OF OBESITY ON OESOPHAGEAL FUNCTION AND ACID EXPOSURE IN PATIENTS WITH REFUX SYMPTOMS

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Introduction: The increasing prevalence of obesity and gastro-oesophageal reflux disease (GORD) suggests an association between these two conditions. The link remains controversial although a recent study using high resolution manometry demonstrated that obese subjects have raised intra-gastric pressure, gastro-oesophageal reflux pressure gradient, and are more likely to have a disruption of the oesophago-gastric junction leading to hiatus hernia or reflux to occur.

Aims & Methods: This study aimed to establish whether these demographic and manometric changes are associated with increased oesophageal acid exposure in clinical practice. A prospective study of 574 patients referred for oesophageal investigation. Height, weight and waist circumference (WC) were measured. Reflux symptoms were assessed by a validated questionnaire. Manometry assessed lower oesophageal sphincter (LOS) pressure, total and abdominal LOS length and peristalsis for 10 water swallows in the seated position. 24-h ambulatory pH studies were performed. Multivariate regression identified associations of oesophageal acid exposure (24-h pH<4/24 h) with demographic and manometric measurements.

Results: Patients referred for reasons other than reflux symptoms or patients who failed intubation or to attend were excluded (n=167). Complete manometry and pH data were available for 407/494 (84%); M:F 45%-55%. The prevalence of obesity was similar in both sexes; obesity tended to increase with age. Oesophageal acid exposure was positively associated with reflux symptoms (p<0.001). Increasing body mass index (BMI kg/m2) and WC were associated with more severe oesophageal acid exposure (both p<0.002) but not reflux symptoms (p<0.01). Increasing oesophageal acid exposure was associated with shorter abdominal LOS length (p<0.001), lower LOS pressure (p<0.002), and peristaltic contractile pressures (p<0.04). Increasing WC was also associated with shorter abdominal LOS length (p<0.001), lower LOS pressure (p<0.004), and peristaltic contractile pressures (p<0.05). None of these associations were present when a correction for height was included in the regression analysis (ie BMI). The magnitude of the effect on LOS and contractile pressure across the observed range was similar to that expected from increasing intragastric pressure with central obesity (1-5 mmHg).

Conclusion: In patients referred for investigation of reflux symptoms obesity is associated with increasing oesophageal acid exposure. Analysis of the demographic and manometric data suggests that this is due to a rise in intragastric pressure and gastro-oesophageal pressure gradient related to central adiposity. Longitudinal studies are needed to confirm whether variation in intra-abdominal pressure due to weight change has effects on oesophageal function and acid exposure in GORD.

205 INFLAMMATION AND BARRETT’S METAPLASIA; THE ROLE OF TNFα IN CLONAL EXPANSION

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Introduction: Evidence thus far would indicate that the inflammatory response plays a role in the early stages of Barrett’s metaplasia. However much less is known about the influence of inflammatory signalling in the clonal expansion of the Barrett’s lesion, leading to increased malignancy.

Aims & Methods: We have used in vitro and ex vivo cell models to investigate the effect of TNFα signalling, as a surrogate for inflammation, on a number of biological endpoints important to clonal expansion, including cell growth, cell death, apoptosis, anchorage-independent growth, and invasion.

Results: Using Western Blotting and immunohistochemistry, both in vitro and ex vivo cell models were found to express a protein consistent with the TNF receptor 1 (TNFR1). In two squamous carcinoma cell lines OE21, and TE10; and two adenocarcinoma cell lines OE33, SEG1, TNFα concentrations between 5 and 25 ng/ml was found to induce a significant decrease in cell number (p<0.05) over 72 hours, as measured microscopically. This decrease in cell numbers may be in part due to TNFα induced blockade of the cell cycle but more significantly due to a TNFα induced decrease in cellular apoptosis (60–70%). Addition of the TNFα antagonist Infliximab blocked the growth arrest induced by TNFα treatment (p<0.05). All cell lines were able to form colonies in an agarose colony forming assay, indicating autonomy to anchorage-dependent growth. TNFα reduced the ability of cells to form large colonies in an agarose medium, indicating an increase in the ability of cells to grow in an anchorage-independent mechanism. Treatment with TNFα did not affect cellular migration as measured using a migration scratch assay.

Conclusion: In conclusion, this data shows that TNFα can affect epithelial cell biology including changes in cellular endpoints important to clonal expansion and thus neoplastic progression. Furthermore, it is clear that addition of the anti-TNFα treatment Infliximab blocked some of the TNFα-induced endpoints, importantly at a physiological concentration, and thus may provide an alternative therapeutic modality to Barrett’s metaplasia, but not later on the disease stage such as adenocarcinoma.

206 A ROLE FOR NITRIC OXIDE IN THE INVASIVE PROCESS IN OESOPHAGEAL ADENOCARCINOMA

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Introduction: Oesophageal adenocarcinoma (AC) generally arises within areas of metaplasia known as Barrett’s oesophagus (BO). Increasingly it is recognised that reflux components are important in promoting progression of BO to AC. Work to date has principally focussed on acid and bile salts as the drivers of progression. Recently, high concentrations of nitric oxide (NO) in the lumen have been demonstrated in patients during reflux. Luminal NO is produced as a consequence of a reaction between salivary nitrite and low pH in the presence of vitamin C. Importantly, NO has been shown to play a role in a number of cancer related processes including DNA damage, angiogenesis, apoptosis, tumour migration and invasion. To investigate the ability of physiological levels of NO to modulate invasive activity of oesophageal cell lines in an in vitro model. The following oesophageal cell lines were used in this study: FLO (AC, gift of Dr Beer), GikTERT (high-grade dysplasia) and GhTERT (BO, both gifts of Dr Rabinovitch). The NO donor MAHMA NONOate (Axxora) was used to deliver NO to cells in culture. Long-term survival following NO was assessed by clonogenic assay. For the in vitro invasion assay, cells were added to Matrigel (BD) coated trans-well inserts (BD), treated with 25–100 µM NO and incubated for 24 h. NO-induced changes in gene expression were examined by SYBR-green real-time PCR.

Results: Oesophageal cell lines tolerated physiological levels of NO without any loss of clonogenic survival. All of the cell lines showed some level of invasion in vitro in the absence of NO with FLO cells showing the highest level of invasion, consistent with the stage of disease from which the cell lines were derived. The addition of NO enhanced the ability of GikTERT
and FLO cells but not QH TERT cells to invade through Matrigel (p = 0.05 for 25 μM NO and above). NO-induced invasive behaviour correlated with the induction of matrix metalloproteinases (MMPs) 1 and 9 and tissue inhibitor of MMP 1 (TIMP1), all of which have previously been implicated in invasion. Maximum gene expression was observed 1–3 h after the addition of NO (p = 0.05) and had returned to basal levels after 22 h (p = 0.05). Osteopontin, an important regulator of cell adhesion, displayed a biphasic response with decreased expression 1 h after the addition of NO followed by increased expression after 3 h. A number of other genes (MMP2, MMP3, MMP7, TIMP1 and TIMP2) did not show statistically significant changes (p > 0.05).

**Conclusion:** Concentrations of NO known to be generated in the lumen of the oesophagus in vivo are insufficient to induce cell death of oesophageal cell lines in vitro. NO may promote disease progression in the later stages of carcinogenesis by increasing invasive potential through the regulation of genes known to be involved in invasion.

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**207 RISK OF MORTALITY AND CANCER INCIDENCE IN BARRETT’S OESOPHAGUS**

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**Introduction:** There are very few prospective follow-up studies of Barrett’s oesophagus (BO) cohorts assessing the risk of extra-oesophageal cancer incidence or mortality. Such studies are necessary in order to understand the overall risks of cancer and death experienced by BO patients.

**Aims & Methods:** This analysis set-out to assess the risk of such outcomes in a cohort of 597 BO patients recruited at Leeds General Infirmary. Patients were excluded from the analysis if they had a cancer diagnosis (excluding non-melanoma skin cancer) prior to or within 6 months of their BO diagnosis or if they were aged less than 18 years at BO diagnosis. Mortality and cancer incidence information were provided by the Office of National Statistics. Using the general population of West Yorkshire for calculation of expected numbers of events, standardised mortality ratios (SMRs) and standardised incidence ratios (SIRs) were calculated using indirect standardisation and STATA 8.2.

**Results:** After exclusions, 502 BO patients remained for analysis, of which 431 had a BO diagnosis of specialised intestinal metaplasia (SIM) and 71 had a diagnosis of columnar-lined oesophagus. Each analysis was conducted for all BO patients and the SIM group alone, results of which did not differ. Therefore the results of the full BO cohort are discussed. All-cause mortality was found to be elevated in BO patients (SMR = 1.21; 95% CI 1.06 to 1.37; p = 0.001) and remained so after oesophageal cancers were excluded (SMR = 1.16; 95% CI 1.01 to 1.32; p = 0.05). Increased risks were also found for malignant neoplasm of the oesophagus (SMR = 7.26; 95% CI 3.87 to 12.42; p = 0.001) and diseases of the digestive system (SMR = 2.03; 95% CI 1.11 to 3.40; p = 0.05). No altered risks were seen for all other mortality analyses including colorectal cancer, cerebrovascular diseases and circulatory diseases, although for the SIM group alone mortality from circulatory disease was borderline statistically significant (SMR = 1.24; 95% CI 1.00 to 1.52). In the cancer incidence analysis, oesophageal malignancy (SMR = 8.66; 95% CI 4.73 to 14.53; p = 0.001) and OA (SMR = 14.29; 95% CI 7.13 to 22.56; p = 0.001) were found to be increased in BO. There was a statistically significant increased found for malignant neoplasm of digestive organs, but this disappeared once oesophageal malignancies were excluded. No altered risk was seen for other analyses including that of colorectal cancer.

**Conclusion:** Although this analysis provides anticipated increased risk estimates for oesophageal cancer incidence and mortality in BO, it finds no evidence for increased risks of other forms of cancer or causes of death as have been occasionally proposed.

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**208 OESOPHAGEAL CARCINOMA IN THE WEST MIDLANDS: CHANGING INCIDENCE AND THE INFLUENCE OF SOCIOECONOMIC STATUS AND ETHNICITY**


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**Introduction:** The incidence of oesophageal cancer, especially oesophageal adenocarcinoma (OA), has risen in the developed world in the last 30 years. In the US, oesophageal squamous cell carcinoma (OSCC) is associated with deprivation and black ethnicity and oesophageal adenocarcinoma (OA) with affluence and white ethnicity. The influence of social deprivation and ethnicity on oesophageal cancer has not been studied in the UK.

**Aims & Methods:** West Midlands Cancer Intelligence Unit (WMCIU) data were used to study the incidence of OSCC and OA and to examine the influence of age, gender, socioeconomic status (Townsend Quintiles by postcode) and ethnicity (Hospital Episode Statistics). The WMCIU covers 10% of the population of England. Validation of coding of cancer morphology and site was performed in 28% (n = 4252) of cancers by examination of patient records.

**Results:** From 1977–2004, 15,138 oesophageal cancers were identified within the unchanging borders of the registry. Oesophageal cancer incidence increased—five year rolling directly age standardised incidence rates per 100,000 (95% CI): 1977–81 men 8.57 (8.03–9.11), women 5.04 (4.69–5.39); 2000–4 men 13.73 (13.13–14.32), women 6.28 (5.92–6.64). OSCC incidence has not significantly altered, but OA incidence is rapidly rising, particularly in men: 1977–81 men 2.14 (1.87–2.4), women 0.52 (0.41–0.64); 2000–4 men 8.53 (8.06–9.0), women 1.72 (1.53–1.9). The median age of diagnosis of OA (IQR) has risen: 1977–81: men 65 (58–71.8), women 72.5 (63.3–78); 2000–4 men 70 (61–77), women 78 (69–83). OSCC was strongly associated with the most socially deprived quintile (5) (1977–81: men quintile 5 6.59 (5.05–7.33) versus quintile 1 1.85 (1.31–2.4); women quintile 5 3.67 (2.88–4.45) versus quintile 1–2 0.23 (1.52–2.54). This association persisted until 1999–2003 when the rising incidence in the most affluent quintile converges with the most deprived quintile. OA was not associated with differences in social deprivation or affluence. OA was significantly more common in white men 7.30 (6.92–7.68) and women 1.49 (1.34–1.64) compared with black and Asian populations. OSCC was not associated with any particular ethnic group.

**Conclusion:** Within the West Midlands, the incidence of OA is rapidly rising, particularly in men. The incidence of OSCC has not significantly altered in the last three decades. OSCC has been strongly associated with deprivation, but this association has recently been lost. OA is not associated with differing socioeconomic status. OA is associated with white ethnicity.
ACID-RELATED OESOPHAGEAL SENSITIVITY, NOT DYSMOTILITY, DIFFERENTIATES SUBGROUPS OF PATIENTS WITH NON-EROSE REFUX DISEASE

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Introduction: Patients with non-erosive reflux disease (NERD) account for 50–70% of patients with gastro-oesophageal reflux disease. They experience reflux symptoms in the absence of any endoscopic mucosal breaks or erosions. In clinical practice, they experience symptoms with a similar frequency and severity as those with erosive reflux (ERD). Patients with NERD can be stratified by whether there is a relationship between symptoms and acid exposure (NERD:acid+), or not (NERD:acid−). Differences in the intraesophageal distribution and the perception of acid reflux have been demonstrated between NERD and ERD patients, which may relate to differences in oesophageal motility and sensitivity between the two groups. The aim of this study was to investigate the effect of oesophageal infusion of hydrochloric acid (HCl) on oesophageal motility and sensitivity in patients with NERD.

Aims & Methods: Thirty-nine consecutive patients with reflux disease (11 NERD:acid−, 14 NERD:acid+ and 14 ERD demographically-matched groups) attending for oesophageal function studies were studied, along with 12 healthy controls. HCl pH1 or saline were infused at 400 ml/h in random order into distal (5 cm above lower esophageal sphincter (LES)) then proximal (20 cm above LOS) sites in the oesophagus. The following observations were made at baseline and after 30 minutes of each infusion: oesophageal contraction amplitude, duration and waveform, LOS pressure, pain intensity by VAS.

Results: NERD patients had significantly higher pain sensitivity to acid compared to ERD and controls (proximal VAS 6.6 ± 3.9 vs 2.8 ± 2.3, p<0.03 both; distal 4.6 ± 3.2 v 2 resp, p<0.04 both). ERD patients differed from controls (p<0.05 for both proximal and distal acid). Proximal acid infusion caused greater pain than distal only in NERD patients that acid and saline sensitivity were more pronounced in the former (proximal acid 7.2 ± 5.8 resp, p<0.03; distal acid 5.5 ± 3.9 resp, p<0.01; proximal saline 4 v 3.1 resp, p<0.05). There were no significant differences in oesophageal contraction or LOS pressure between the groups in any of the motility parameters.

Conclusion: NERD patients, and to a lesser extent ERD patients, are sensitive to acid in the oesophagus, being more sensitive proximally than distally. Hypersensitivity is most marked with NERD patients who have a normal pH profile. The relationship of these changes to symptom index and psychological state remains to be determined. This sensitivity is independent of significant motility change.

COX-2 AND INOS GENE POLYMORPHISMS IN THE REFLUX OESOPHAGITIS–BARRETT’S OESOPHAGUS–OESOPHAGEAL ADENOCARCINOMA SEQUENCE

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Introduction: Chronic inflammation is implicated in carcinogenesis, as it can result in tissue damage due to production of free radicals. These cause activation of “pro-survival” genes including cyclo-oxygenase 2 (COX-2) and inducible nitric oxide synthase (iNOS), which can lead to carcinogenesis through DNA damage, angiogenesis and immunosuppression. There is extensive evidence that expression of both COX-2 and iNOS is increased in oesophageal adenocarcinoma (OAC), its precursor Barrett’s oesophagus and in reflux oesophagitis (RO).

Aims & Methods: The aim of this study was to investigate possible associations between variations in the COX-2 and iNOS genes and these increasingly common oesophageal conditions. In a case-control study, patients with OAC (n = 210), BO (n = 212), RO (n = 230) and population controls (n = 248) were recruited from throughout Ireland. Using genomic DNA extracted from blood samples, single nucleotide polymorphisms in the COX-2 3’ untranslated region (8473 T>C) and iNOS coding 608 (Ser>Leu) were genotyped using a TaqMan 5’ nuclease assay. Allele and genotype frequencies were compared between cases and controls using the Chi-squared test. Logistic regression analysis was used to test for association between genotype and disease whilst adjusting for potential confounding factors including age, sex, body mass index, smoking and alcohol intake.

Results: A significantly higher COX-2 8473 C allele frequency was observed in OAC cases than controls (p = 0.02). The COX-2 8473 TC genotype was associated with an increased risk of OAC (OR = 1.54, 95% CI 0.99 to 2.39), and this risk was higher in association with the COX-2 8473 CC genotype (OR = 1.75, 95% CI 0.89 to 3.43). No significant differences were observed in the distribution of iNOS Ser608 alleles or genotype between the different disease groups.

Conclusion: The variant COX-2 8473 C allele was associated with an increased risk of OAC compared to the wild type allele. To our knowledge this is the first study to date investigating these genetic variations in association with oesophageal disease. Further larger studies are required to address whether the variant COX-2 8473 C allele may be a useful potential genetic marker for susceptibility to OAC.
213 ORNITHINE DECARBOXYLASE AS A MARKER OF DYSPLASIA IN BARRETT’S OESOPHAGUS
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Introduction: Barrett’s oesophagus (BO) is a pre-malignant condition and current practice is to perform periodic surveillance endoscopy to detect dysplastic change. A reliable biomarker of malignant progression would allow more effective surveillance targeted at high risk patients. Ornithine decarboxylase (ODC) is a rate limiting enzyme in the biosynthesis of polyamines, which have a vital role in cell proliferation and differentiation. Levels of ODC are elevated in various malignancies including colorectal cancer.

Aims & Methods: We hypothesise that ODC levels are higher in BO than in non-metaplastic gastric mucosa, and higher in dysplastic compared to non-dysplastic BO. From each patient, endoscopic biopsies were taken from the Barrett’s segment and the upper stomach, immediately frozen in liquid nitrogen, and subsequently incubated with a radiolabelled substrate. The amount of 14CO2 released is proportional to the amount of ODC in the original tissue sample. Results are expressed as pmol of ODC per hour per mg of tissue (pmol/h/mg). Groups were compared using non-paired t test.

Results: Twenty three patients with non-dysplastic BO and 11 with dysplastic BO were studied. 10 patients had low grade dysplasia, 1 high grade. Baseline demographics were similar in the two groups. The mean ODC level was 40.28 pmol/h/mg in gastric mucosa, 126.98 pmol/h/mg in non-dysplastic Barrett’s mucosa, and 369.0 pmol/h/mg in dysplastic BO (gastric v non-dysplastic BO, p<0.01: non-dysplastic v dysplastic BO, p=0.03).

Conclusion: ODC levels are higher in Barrett’s mucosa than in gastric mucosa. Levels are significantly higher in dysplastic BO than in non-dysplastic BO. ODC warrants further study as a potential marker of dysplastic change and subsequent malignant progression in BO. Inhibitors of ODC may have a role to play in the chemoprevention of adenocarcinoma related to Barrett’s oesophagus.


214 THE RELEVANCE OF LOW-GRADE DYSPLASIA IN COLUMNAR-LINED OESOPHAGUS
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Introduction: The incidence of adenocarcinoma (AC) in columnar-lined oesophagus (CLO) with low-grade dysplasia (LGD) has been variously reported as around between 0% and 12% per annum (pa) in small series. The fate of non-progressive LGD is also controversial.

Aims & Methods: The aim of this study was to examine the population with LGD in CLO, the rate of development of high-grade dysplasia (HGD) and AC and also examine those patients who remained with LGD or reverted to non-dysplastic CLO (ndCLO) in a large cohort from UK National Barrett’s Oesophagus Registry (UKBOR). Medical records of 283 patients with LGD in CLO from 7 UK centres registering with UKBOR were examined and data extracted on histological follow-up. Incidence data were modelled using an exact Poisson distribution.

Results: 144 patients had 290 biopsies prior to LGD diagnosis (median time from CLO diagnosis to LGD 2.77 years, maximum 17.36 years). Of these, 141 patients (97.9%) had ndCLO at diagnosis (including 18 (12.5%) with indefinite changes for dysplasia (INDEF)), 2 had HGD and 1 had AC (with LGD being biopsied at an urgent follow-up OGD); 3 patients had findings of HGD between initial diagnosis of ndCLO and LGD and 38 (26.4%) had findings of INDEF.

Conclusion: 148 patients (68.2%) had reverted to ndCLO/INDEF at final follow-up. Patients found to have LGD are at a significant risk of developing HGD and AC compared to those without dysplasia and should be followed-up closely to enable early detection of HGD/AC.

215 EFFECTIVENESS OF TWO WEEK RULE REFERRAL SYSTEM FOR PATIENTS WITH SYMPTOMS OF DYSPHAGIA
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Introduction: The Department of Health (DOH) in July 2000 introduced guidelines on referral of patients suspected to have upper gastrointestinal cancer. Purpose of guidelines is to help general practitioners (GPs) identify those patients who are more likely to have cancer and would require urgent assessment and upper GI endoscopy within two weeks that is under the two week rule (TWR) referral system. DOH has predicted that 1 out of 15 of upper GI endoscopy referrals under the TWR guidelines would have cancer.

Aims & Methods: To assess effectiveness of TWR referral system in picking up cancer in patients with symptoms of Dysphagia and to assess appropriateness of referrals by GPs. It was a retrospective study carried out at West Cumberland Hospital (District General Hospital). Data were collected from the computer software Endoscribe and patients’ notes were consulted as required. All patients referred with complaints of Dysphagia during the year 2004 were included in the study. Patients were categorised as being under the TWR or the routine or non-two week rule (NTWR) referral system.

Results: The study included 206 patients (female: 106; male: 100) referred with dysphagia. Their mean age was 64 (TWR 66 years: NTWR 62 years). There were 108 patients referred under TWR and 98 under NTWR. Cancers were detected in 9% (n = 18) patients. Out of these 12% (n = 13) were under TWR and 5% (n = 5) under NTWR. Thus overall 1 out of 11 of all the patients of dysphagia had cancer. Benign oesophageal strictures were detected in 14% (n = 29) patients (TWR:15% and NTWR:13%) and reflux disease was detected in 41% (n = 85) patients (TWR: 42% and NTWR:40%).

Conclusion: Cancer pick up rate in the category of dysphagia was 1:11. This was more than the overall cancer detection rate predicted by the DOH under the TWR for upper gastrointestinal cancers. Thus to improve early cancer detection rate, it is recommended that dysphagia should be appropriately assessed as a serious symptom with a view to refer under the TWR system. This will not only improve the early cancer detection rate, but will also be helpful in early management.

216 NON-ENDOSCOPIC IMMUNOCYTOLOGICAL SCREENING TEST FOR BARRETT’S OESOPHAGUS
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Introduction: The incidence of oesophageal adenocarcinoma (AC) is increasing rapidly with a 5-year survival of less than 20%. AC generally occurs on the background of the metaplastic condition Barrett’s oesophagus (BO), which affords the opportunity for early detection and intervention. However, the majority of patients with BO remain undiagnosed. Population screening for BO by endoscopy is impractical and expensive although it has been recommended by the American College of Gastroenterology for male patients over 50 years with reflux symptoms.

Aims & Methods: The aim of this study was to develop a non-endoscopic screening test for BO suitable for primary care. A non-endoscopic sampling device, a capsule-spunge attached to a string, was used to obtain oesophageal specimens from 43 BO patients (confirmed on endoscopy and biopsy) and 53 healthy volunteers. Liquid based cytology was used to create a cell-monolayer. Since cytology alone lacks sensitivity and specificity we developed an immunocytological test based on the abnormal proliferation characteristics of the surface of the Barrett’s mucosa. The immunomarker used was minichromosome maintenance protein 2 (Mcm2). Samples were considered positive if columnar cells had nuclear staining. Three individuals unaware of the clinical diagnosis assessed the slides. To determine the acceptability of the test, the patients used a linear rating tool (10 enjoyable, 5 neither unpleasant nor pleasant, 0 very unpleasant).
Results: The acceptability of the capsule was rated as 4.4 (0.3). Adequate specimens were retrieved from 91/96 (94.8%) patients. The mean number of slides made from 1 specimen was 11.9 (0.7). 27/41 (66%) BO 3 specimens were positive. MDM2 positive staining compared with 17/52 (33%) specimens from healthy volunteers giving a sensitivity and specificity of 67%. The negative (NPV) and positive predictive values (PPV) of the test are 72.9% and 61.3% respectively. One of the limitations of the study is that healthy volunteers were not endoscoped. Hence, in a subgroup analysis comprising control patients without a history of heartburn (41 subjects) the specificity increased to 80%. The corresponding NPV and PPV were 71.1% and 77.1%.

Conclusion: The sampling device is generally acceptable to patients and it gives a large yield of cells amenable to RT-PCR, FACS or immunocytochemical analysis. The preparation and analysis of the resultant immunocytochemical material could be automated thus reducing the cost. However, although the sensitivity and specificity of the test compares well to other screening test in current clinical practice, other markers may perform better and should be investigated.

Elastic Scattering Spectroscopy for the Detection of Aneuploidy in Barrett’s Oesophagus


Introduction: Aneuploidy (altered DNA copy number) is an independent marker of future cancer risk in patients with Barrett’s oesophagus without high grade dysplasia (HGD). Such a patient has a five year adenocarcinoma risk of 38% if they have aneuploidy compared to 0% in the absence of aneuploidy in a cohort study of 322 patients. Elastic Scattering Spectroscopy (ESS) is a real-time in vivo technique which detects changes in the physical properties of cells. We have already demonstrated a sensitivity for detecting HGD in Barrett’s oesophagus of 92%. The measurement of aneuploidy by either image or flow cytometry is labour intensive and therefore at present is not deliverable in routine clinical practice. If a fast, reliable, in vivo method such as ESS could detect aneuploidy during routine surveillance endoscopy, biopsies could be targeted to high-risk patients.

Aims & Methods: Can ESS detect aneuploidy in vivo in Barrett’s Oesophagus in the absence of HGD? Matched optical and conventional biopsies were taken from patients with Barrett’s oesophagus. Biopsies demonstrating HGD were excluded. The biopsies were then processed for aneuploidy using image cytometry analysis. Paraffin was removed from a 40 µm section and nuclei were liberated with protease. The nuclei were spun onto a slide and stained with Feulgen for automated image analysis and histogram generation.

Results: 97.6 spectra from 258 sites were collected from 60 patients with Barrett’s oesophagus. Histograms were blindly analysed by two observers and 257 sites was reached in all cases. 205 sites were classified as diploid and 53 sites were classified as having image abnormalities. No sites contained HGD. We constructed a new statistical algorithm using both jacknife and bootstrap training techniques to discriminate between aneuploid and diploid sites without HGD. The results were almost identical using both statistical techniques. ESS correctly identifying aneuploid sites with a specificity of 83% and sensitivity of 78% and the area under the ROC curve was 0.86 displaying “good” discrimination.

Conclusion: ESS can detect aneuploidy in Barrett’s oesophagus in vivo in the absence of HGD. Over 85% of patients undergoing surveillance do not have aneuploidy in their Barrett’s oesophagus so if ESS could successfully exclude aneuploidy, these patients would not require a further endoscopy for at least five years. Resources could then be focused on the surveillance or even treatment of patients with aneuploidy. This ESS algorithm for the detection of aneuploidy requires prospective testing.
experienced a further improvement following subsequent surgery (p<0.01) despite having had optimal PPI treatment beforehand.

Conclusion: Both optimal PPI therapy and laparoscopic Nissen fundoplication are effective and durable treatments for GORD. However, surgery offers additional benefit for those who have only partial symptomatic relief whilst on PPIs.

### 220 THE EFFECTS OF ORAL SUPPLEMENTATION WITH N-3 FATTY ACIDS ON BARRETT’S EPITHELIUM IN HUMANS

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Introduction: Evidence from animal and in vitro studies indicates that n-3 fatty acids may inhibit carcinogenesis, and epidemiological studies suggest a reduced risk of oesophageal cancer in populations with high consumption of fish. One of the possible mechanisms for this chemopreventive effect is by suppression of eicosanoid production through inhibition of the enzyme cyclo-oxygenase (COX)-2. In this study we have determined the effects of dietary supplementation with the n-3 fatty acid eicosapentaenoic acid (EPA) on tissue eicosanoid levels (PGE2 and LTB4) and cyclooxygenase-2 (COX-2) activity in Barrett’s oesophagus.

Aims & Methods: Fifty participants with known Barrett’s oesophagus agreed to take part in this study. Endoscopic biopsies were taken at a recorded level from the area of Barrett’s, and then 30 randomly assigned patients consumed EPA capsules (1.5 g/day) for 6 months, the other 20 acted as controls. At the end of this period patients were re-endoscoped and biopsies taken at the same level. Tissue samples were analysed for mucosal lipid profile, PGE2, LTB4 and COX-2 protein and RNA levels. Levels of cellular proliferation were also measured by Ki-67 immunohistochemistry.

Results: There was a significant increase in mucosal EPA content after dietary supplementation (6 months v baseline: 2.4% ± 0.6% of total lipid content; p<0.001). EPA supplementation significantly reduced levels of COX-2 protein in Barrett’s biopsies as measured by immunoblotting and ELISA (p<0.05) but had no influence on COX-2 RNA levels. Levels of PGE2 and LTB4 were concordant between biopsies (r=0.6 p<0.01) but supplementation had no influence on these levels or on Ki-67 as measured by immunohistochemistry.

Conclusion: In this study supplementation with 1.5 g/day EPA significantly altered levels of n-3 fatty acids and reduced COX-2 levels in Barrett’s tissue. However, total eicosanoid levels, and moreover proliferative activity, remained unchanged—we hypothesise that any chemopreventive effect of fish oils is independent of these mechanisms.

### 221 OESOPHAGEAL METAL STENTS: NOT EXACTLY “FIRE AND FORGET”

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Introduction: Metal stents are commonly used in the palliative treatment of oesophageal cancer. However, stent insertion is often followed by problems which lead to a substantial hospital workload.

Aims & Methods: A prospective audit was undertaken between Nov 2004 and Oct 2006 of patients treated by the insertion of self-expanding metal stents. Data were recorded at diagnosis and when a stent was placed. The patients alive at the end of the study period had a median survival to date of 131 days. Minor complications (chest pain, reflux) were almost universal immediately after stenting. The patient with the lung primary had a severe bleed during insertion and died. Two patients were found to have minor perforations which resolved on conservative treatment. In one man the first stent was incorrectly positioned and a second had to be placed. Thirty one of the patients discharged after stenting used the telephone support line; the number of calls for advice ranged between 1 to 17 with a median of 3. Most surviving patients spent further time in hospital (37 out of 48), the number of admissions ranging from 1 to 9 with total hospital stays between 1 and 45 days. On average, those who later died spent 20.6% of their remaining lives in hospital. Thirty four follow-up endoscopies were needed in 21 patients. In 10 subjects with possible obstruction the stent was replaced and the problem was regurgitation. Seven patients developed bolus obstruction. A possible benign stricture proximal to a stent was dilated 3 times in 1 patient before a recurrent tumour was confirmed. Ten cases of tumour ingrowth occurred; 3 of these were treated by argon plasma coagulation and 4 by implantation of a second stent. The other 2 endoscopies were to remove stents inserted as a temporary measure before surgery.

Conclusion: Metal stents are useful in the palliation of oesophageal cancer. However, placement is associated with considerable later problems both for the patient and for the GI team managing this difficult condition.

### 222 HB-EGF AND TGF-α MEDIATE LEPTIN-INDUCED EPIDERMAL GROWTH FACTOR TRANSACTIVATION AND PROLIFERATION IN OESOPHAGEAL ADENOCARCINOMA CELLS

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Introduction: Obesity is a risk factor for oesophageal adenocarcinoma (OAC). Hyperleptinaemia is a feature of obesity. Expression of the epidermal growth factor receptor (EGFR) has been demonstrated in OAC and it has been shown to correlate with severity of disease. We recently showed that leptin may promote oesophageal adenocarcinogenesis by stimulating proliferation and inhibiting apoptosis of OAC cells in an EGFR-dependent manner. The details of this leptin-induced intracellular signalling mechanism in OAC are, however, yet to be fully elucidated.

Aims & Methods: The aim of this study was to examine the role of the EGFR and its ligands in leptin-induced EGFR transactivation and proliferation in OAC. Leptin receptor (Ob-R) expression in OE33, OE19, BIC-1 and FLO-1 OAC cultures was examined with reverse transcriptase-polymerase chain reaction (RT-PCR) and immunoblotting. The effects of leptin on gene expression of the EGFR and the EGFR-ligands, amphiregulin (AR), transforming growth factor alpha (TGF-α) and heparin binding-EGF (HB-EGF) were assessed using real-time quantitative RT-PCR. The effect of leptin on secretion of AR, TGF-α and HB-EGF by OAC cells was determined by ELISA. The role of AR, TGF-α and HB-EGF in leptin-induced OAC cell proliferation was determined using neutralizing antibodies. Proliferation was assessed by the thiazolyl blue (MTT) assay and apoptosis by ELISA of intracellular nucleosomes.

Results: OE33, OE19, BIC-1 and FLO-1 OAC cells all expressed both long and short forms of the leptin receptor (Ob-R) mRNA and protein. Leptin treatment for 4–24 hours did not significantly affect EGFR mRNA expression, but significantly increased mRNA expression of HB-EGF by 287%, TGF-α by 60% and AR expression by 56%; however leptin only increased the secretion of HB-EGF and TGF-α. Leptin stimulated transactivation of OAC cells and this was abolished by two distinct EGFR kinase inhibitors (AG1478 and PD153035). EGFR inhibition also abolished the anti-angiogenic effects of leptin. Pretreatment of OE33, OE19, BIC-1 and FLO-1 OAC cells with neutralising antibodies to HB-EGF and TGF-α but not to AR abolished the proliferative effects of leptin. Leptin stimulated a significant increase in tyrosine-phosphorylation of the EGFR.

Conclusion: Leptin driven OAC cell proliferation requires transactivation of the EGFR. Leptin stimulates OAC cell proliferation via upregulation and increased release of HB-EGF and TGF-α but not AR, which are responsible for the EGFR transactivation. Consequently, the EGFR is a potential therapeutic target in OAC and the pathways linking the leptin receptor with EGFR-ligand expression are potential chemopreventive targets in Barrett’s oesophagus.

223 GLOBULAR ADIPONECTIN INHIBITS LEPTIN-INDUCED PROLIFERATION OF OESOPHAGEAL ADENOCARCINOMA CELLS VIA ACTIVATION OF ADIPONECTIN RECEPTOR-1

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Introduction: Obesity is a potent risk factor for oesophageal adenocarcinoma (OAC). Adipose tissue secretes the peptide hormones leptin and adiponectin, these are reciprocally regulated. Obesity is characterised by hyperleptinaemia and hypoadiponectinaemia and we have recently shown that leptin stimulates proliferation and inhibits apoptosis of OAC cells by stimulating a cascade of intracellular signalling mechanisms, including several key phosphorylation steps. Consequently, we hypothesised that leptin and adiponectin may interact to regulate oesophageal epithelial cell proliferation.

Aims & Methods: The aim of this study was to investigate the interaction between leptin and adiponectin on oesophageal epithelial cells and the underlying cellular mechanisms. Expression of adiponectin receptors on OE33, OE19, BIC-1 and FLO-1 human oesophageal adenocarcinoma cells, ChTRT high grade dysplastic Barrett’s cells and non-tumorigenic IEC-18 rat intestinal epithelial cells was determined by RT-PCR and western blotting. The effects of leptin and adiponectin on proliferation were assessed using the MIT assay. The role of adiponectin receptors was assessed with RNA interference and the serine-phosphatase inhibitor okadaic acid was used to examine aspects of intracellular signalling.

Results: OE33, OE19, BIC-1, FLO-1 and ChTRT cells all expressed both isoforms (AdipoR1 and AdipoR2) of the adiponectin receptor. IEC-18 cells expressed only AdipoR1. Leptin induced a dose-dependent increase in cell number of oesophageal and IEC-18 cells. Full-length adiponectin (fAd) did not affect basal or leptin-induced proliferation in OAC cells. However when added to unstimulated cells, globular adiponectin (gAd) caused a dose-dependent decrease in oesophageal cancer cell numbers. Similarly gAd caused a decrease in IEC-18 cell numbers compared to control treatment. In co-treatment experiments gAd dose-dependently reduced the proliferative responses of oesophageal adenocarcinoma and IEC-18 cells to leptin. Transfection of a specific AdipoR1 siRNA reversed the anti-proliferative effect of gAd, but okadaic acid had no effect.

Conclusion: Increasing concentrations of leptin stimulate proliferation of oesophageal adenocarcinoma cells, but increasing concentrations of gAd cause a decrease in cell numbers. Concentrations of globular adiponectin (gAd) caused a dose-dependent decrease in oesophageal cancer cell numbers. Similarly gAd caused a decrease in IEC-18 cell numbers compared to control treatment. In co-treatment experiments gAd dose-dependently reduced the proliferative responses of oesophageal adenocarcinoma and IEC-18 cells to leptin. Transfection of a specific AdipoR1 siRNA reversed the anti-proliferative effect of gAd, but okadaic acid had no effect.

224 AUDIT ON BARRETT’S COLUMNAR-LINED OESOPHAGUS SURVEILLANCE IN A DISTRICT GENERAL HOSPITAL: THE IMPLICATIONS OF BSG GUIDELINES

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Introduction: The aim of Barrett’s surveillance is to detect early oesophageal carcinoma (OAC) arising in dysplastic columnar-lined oesophagus (CLO). The British Society of Gastroenterology (BSG) has issued guidelines for the management of CLO, but is limited by the lack of evidence of the natural history of the disease.

Aims & Methods: To evaluate our current practice in the management of patients with CLO and the implications of BSG guidelines. A retrospective analysis of all patients with the diagnosis of CLO from January 2001 to December 2005, identified from endoscopy and pathology database.

Results: From 1/1/2001 to 31/12/2005, there were 508 patients diagnosed with CLO. 366 males and 142 females; median age range 60–69. There were 261 patients with a new diagnosis of CLO and 248 patients were undergoing surveillance endoscopy. 10 patients in the former group developed OAC in the background of CLO. In the surveillance group, 5 had developed OAC. This gives a prevalence rate of 2.0%. Surveillance intervals were based on the degree of dysplasia. Nearly half of CLO patients with evidence of indefinite dysplasia or atypia were rescoped within 1 year. 50% of CLO patients with low grade dysplasia were surveyed within 1 year. Those with high grade dysplasia were surveyed between 1–3 monthly intervals; 40% within the group developed OAC. Our current practice on the management of CLO estimates a cost of £25,000 per year. An estimate of an extra £5,000 per year is required to adhere to the recent BSG guidelines.

Conclusion: Our current surveillance practice is the management of patients with CLO is not done in a consistent manner. Only 1/3 of patients with CLO associated OAC were identified in the surveillance group. There are financial implications of implementing BSG guidelines in the management of patients with CLO.


225 INTERVENTIONS FOR CHRONIC COUGH ASSOCIATED WITH GASTRO-OESOPHAGEAL REFLUX: SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMISED CONTROLLED TRIALS

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Introduction: Gastro-oesophageal reflux is a condition where the lower oesophageal sphincter is abnormally relaxed and allows the stomach’s acidic contents to flow back or “reflux” into the gullet (oesophagus). It can also cause heartburn. Gastro-oesophageal reflux is a common condition and the most frequent cause of indigestion in the UK. The aim of this paper is to investigate the efficacy of treatment for gastro-oesophageal reflux disease (GORD) on chronic cough in children and adults without an underlying respiratory disease.

Aims & Methods: Systematic review and meta-analysis was conducted searching Cochrane, Medline, and Embase databases (from September 1966 to October 2006), and references from relevant review articles. Included in the review were Randomised controlled trials on GORD treatment for cough in children and adults without primary lung disease. Two reviewers independently selected studies and extracted paediatric and adult data on primary (clinical failure) and secondary outcomes.

Results: Seventeen studies were selected. Meta-analysis was limited to eight studies in adults that compared proton pump inhibitors with placebo. All outcomes favoured proton pump inhibitors: the odds ratio for clinical failure (primary outcome) was 0.25 (95% CI 0.05 to 1.29); numbers needed to treat (NNT) was 6 (harm 51 to 0 to benefit 2.6). For secondary outcomes, the standardised mean difference between proton pump inhibitors and placebo was −0.52 (−1.03 to 0.02) for mean cough score at the end of the trial and −0.30 (−0.64 to 0.05) for change in cough score at the end of the trial. Subgroup analysis with generic inverse variance analysis showed a significant mean change in cough (−0.43 SD units; −0.76 to −0.08).

Conclusion: The results show that the use of a proton pump inhibitor to treat cough associated with GORD has some effects in some adults. The effect, however, is less universal than suggested in consensus guidelines on chronic cough and its magnitude of effect is uncertain.

226 NOVEL GENOMIC ABERRATIONS IN OESOPHAGO-GASTRIC CANCER

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Introduction: Oesophageal junctional adenocarcinoma is increasing in incidence and has a poor outcome. It is envisaged that molecular tumour characteristics will ultimately aid prognostication and lead to targeted therapies. Previously chromosomal analysis of oesophageal and junctional tumours has identified gains in chromosomes (chr17, 8, 17 and 20 and losses in chr 3–6 and 17–20. A whole genome analysis of a large oesophago-gastric sample set has not been undertaken. Thus, we performed whole genome chromosomal analysis of snap frozen samples collected from patients diagnosed with OAC.
Aims & Methods: 167 Oesophageal, gastric and junctional tumours were prospectively collected from 1993–1998. Histological diagnoses were confirmed and DNA extracted using Proteinase K/RNaseA. ArrayCGH analysis was performed using a 30K, 60-mer oligomicroarray slide, which provided a mean resolution of 350 kb. Data were analysed using the snapCGH package of the R (Bioconductor) statistical system and Microsoft Excel, amplifications were identified using the common regions of amplification algorithm, while deletion were identified, and amplifications confirmed, by direct inspection of chromosome plots.

Results: Systematic analysis revealed frequent genomic aberrations on chr 7 and 11 while chr 19 showed a smaller number of low level amplifications and minimal deletions. 24% of samples showed chromosomal aberrations at one or more loci, while 41% of samples showed aberrations on Chromosome 11. Detailed analysis of chr 7 showed high level amplifications at a number of loci including 7q21.13 with increased copy number of claudin 12,7q21.2 with increased copy number of CDK6 and also 7p11.2 with increased copy number of receptor tyrosine-protein kinase ErbB-1. Chromosome 11p15.4 revealed a common deletion resulting in loss of copy number of homolog sapiens matrix metalloproteinase 26 (MMP26).

Conclusion: A whole genome approach to arrayCGH analysis has successfully identified common regions of gain and loss. It confirms common genomic amplifications such as ErbB-1 and more interestingly identifies genomic aberrations affecting genes involved in cell cycle control (CDK6), adhesion (Claudin12) and matrix proteolysis (MMP26), thus identifying potential novel therapeutic targets that require further investigation.
localisation of dysphagia, acid reflux and duration of symptoms) identified a group of patients (48.6% of total referrals) with 20% diagnosis of cancer. In this latter group, all but one cases of diagnosed cancer were included.

**Conclusion:** In this study we were able to identify two subgroups of patients; a very low risk for cancer, that endoscopy can be done in a more elective basis and a high risk one that would require urgent endoscopy. This approach can help in the prioritisation of endoscopy in busy endoscopy units by reducing the number of “unnecessary” urgent endoscopies, in favour of those patients who may need them most.

### Pancreas posters

**230 EVALUATION OF THE USE OF CA 19-9 IN THE SETTING OF A DISTRICT GENERAL HOSPITAL**

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**Introduction:** The suitability of tumour markers in the context of screening, diagnosis, prognosis and monitoring is influenced by their specificity and sensitivity. Carbohydrate antigen 19-9 (CA 19-9) is a sialylated glycoprotein detected by the monoclonal antibody 1116 NS 19-9. It was first discovered in human colorectal carcinoma cell lines and is associated with cell adhesion. Specificity for pancreatic and biliary malignancy make it useful in determining diagnosis and recurrence of pancreatic cancer and cholangiocarcinoma.

**Aims & Methods:** The aim of this study is to assess the use of the tumour marker CA 19-9 in the setting of a District General Hospital. The medical records of patients for whom a request for CA 19-9 had been made over an 8-month period at QMH were identified. Information including patients’ age, sex, consultant speciality, concomitant illnesses, indication for request, further investigations, diagnosis, treatment and follow-up was analysed.

**Results:** Ninety nine patients were identified for whom CA 19-9 was requested and further data were available. The indication for requests for CA 19-9 were divided in 5 main categories: diagnosis of pancreatic or biliary cancer (13/99 = 13.1%), diagnosis of colorectal cancer (30/99 = 30.3%), follow-up of colorectal cancer (19/99 = 19.2%), screening for other gastrointestinal cancers (32/99 = 32.3%) and unspecified cancer screening (5/99 = 5.1%). Levels of CA 19-9 were higher than 1000 U/ml (normal range 0-37) in 3/99 (3%) patients (including one pancreatic adenocarcinoma, one cholangiocarcinoma and one colon cancer). CA 19-9 levels were between 120 U/ml and 1000 U/ml in 7/99 (7.1%) patients (including one cholangiocarcinoma, two breast cancers, one tubulovillous adenoma and three normal findings). In 14/99 (14.1%) patients levels of CA 19-9 were between 37 U/ml and 120 U/ml. 8/14 (57.1%) patients had further investigations (CT scan or barium enema). No malignancy was found in these patients. In 6/14 (42.9%) no further test were arranged to investigate the elevated CA 19-9 levels. 75/99 (75.8%) patients had normal CA 19-9 levels (less than 37 U/ml). In 5/75 of these (6.7%) malignancy was found (4 colon cancer, one renal cell carcinoma).

**Conclusion:** CA 19-9 is frequently requested in a DGH. Its use is not limited to the diagnosis and follow-up of pancreatic and biliary carcinoma. The indication for the majority of requests was for the diagnosis and follow-up of colon cancer for which CA 19-9 has a low specificity and sensitivity. This leads to false positive results leading to unnecessary investigations and stress for patients. False negative results may lead to delayed cancer diagnosis although this was not detected in this study.


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**231 VASCULAR ENDOTHELIAL GROWTH FACTOR AND CALPROTEIN IN BLOOD AND BILE FOR DIAGNOSIS OF PANCREATO BILIARY CARCINOMA: A PILOT STUDY**

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**Introduction:** Pancreatobiliary carcinomas are difficult to diagnose even with advanced imaging, endoscopic and histopathological techniques. Serum tumour markers, in particular CA 19.9, can help in guiding difficult surgical and oncological decisions where other investigation is equivocal. Calprotectin has been proposed as a tumour marker for colorectal cancer in both serum and stool as well as for ovarian cancers. Vascular endothelial growth factor (VEGF) is expressed by cholangiocarcinoma cells in vitro and is thought to have a major role in tumour angiogenesis.

**Aims & Methods:** We aimed to test whether calprotectin in plasma and/or VEGF levels in serum, and calprotectin and/or VEGF levels in bile could distinguish between patients presenting for ERCP with pancreatobiliary carcinomas or non-malignant causes. We validated commercially available ELISA kits for calprotectin (PhiCal, Calpro AS, Norway) and VEGF (Quantikine, R&D systems, USA). Samples of venous blood and bile were collected from consecutive patients were analysed for calprotectin and VEGF. Measurement was also made of serum CA19-9 with a standard commercial assay.

**Results:** Both assays were assessed as suitable for use in the study, after testing for: detection limit, linearity on dilution, inter- and intra-assay precision and recovery of analyte from a spiked sample. 21 patients were recruited, 6 had pancreatic adenocarcinoma (2 cholangiocarcinoma, 2 pancreatic, 2 ampullary carcinoma). There was a significant difference between levels of serum CA 19.9 between malignant and non-malignant groups, p = 0.006, but not for serum VEGF or plasma calprotectin, or VEGF or calprotectin in bile, p = 0.4, Mann-Whitney test. Differences between malignant and non-malignant samples were twofold or less for calprotectin and VEGF compared to over 100-fold for CA 19.9. No combination of the three markers was better than CA 19.9 alone.

**Conclusion:** Calprotectin and VEGF do not look to be promising candidates for distinguishing between pancreatobiliary carcinomas and non-malignant processes. Their performance was considerably inferior to the tumour marker CA 19.9, which is in day-to-day use. It remains possible that a subgroup of tumours might be identified better, for example cholangio- carcinoma, but our sample was too small to determine this. Efforts towards non-invasive diagnosis of pancreatobiliary malignancy should probably focus on other candidate molecules.

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**232 PANCREATIC FUNCTION TESTS FROM PATIENT POINT OF VIEW: A QUESTIONNAIRE SURVEY**

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**Introduction:** Pancreatolaural (PRL) test, butter fat test (BFT) and faecal elastase (FE-1) test are commonly used non-tube tests in the evaluation of exocrine pancreatic insufficiency. Although straightforward, they can be very difficult from the patient point of view with regards to stopping the medication, food restrictions, understanding the instructions and duration of the tests.

**Aims & Methods:** To compare the three tests, PRL, BFT and FE-1 from patient point of view with regards to the degree of difficulty. This questionnaire survey was done along with the comparative study of the above mentioned tests in the evaluation of exocrine pancreatic insufficiency.
All the study subjects were given following questionnaire prior to the tests along with a self addressed envelope to return the answers.

**Results:** Regarding overall difficulty of having PFTs, they have felt that tests were very easy (38%), easy (42%), moderately difficult (15%) and difficult (5%). Regarding straight forwardness of the tests, they have responded in favour of FE (31%), BFT (30%) PRL (23%) and all tests (8%). Regarding most difficult part of individual test, in PRL group, food and medication restriction was thought to be difficult (54%) followed by urine collection (23%). In BFT group, eating test meal was thought to be difficult (62%) followed by overnight fasting (23%). In FE group, transfer of sample into the pot was thought to be difficult (54%) followed by collection of stool (31%).

**Conclusion:** Overall these tests were perceived as easy by 80% of the study group and FE-1, BFT were considered straightforward compared to PRL.

1. How easy was it to perform the test? (PRL, BFT and FE-1) very easy/ easy/moderately difficult/difficult.
2. What did you consider to be the most difficult part of the PRL test? (A) food/medication restriction, (B) urine collection, (C) two day duration, (D) technical details.
3. What did you consider to be the most difficult part of the BFT test? (A) overnight fast, (B) eating the test meal, (C) blood sampling, (D) technical details.
4. What did you consider to be the most difficult part of the FE-1 test? (A) collection of stool sample specimen in the pot (B) transfer of sample into container, (C) technical details, (D) Other—please specify.
5. Of the three tests which did you find was the most straight forward to perform? (A) pancreateo, (B) buter fat, (C) faecal elastase.

Acknowledgements: Dr W Madira, Mr A Dennison and Mr DP Berry for their support. This study was supported by Scheno.Biotech UK Limited.

### 233 CLINICAL IMPACT OF SYMPTOMATIC RECURRENT CHRONIC PANCREATITIS IN PATIENTS WITH CYSTIC FIBROSIS

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**Introduction:** The majority of patients with cystic fibrosis (CF) are pancreatic insufficient by the perinatal period. 10-15% are pancreatic sufficient for a variable period. A subgroup of these develop symptomatic chronic recurrent pancreatitis.

**Aims & Methods:** The Royal Brompton Hospital CF database of adult patients (>16 years, 1986–2005) was searched to identify all patients with symptomatic pancreatitis.

**Results:** Sixteen of 1012 patients (1.6%) were identified, 9 male and 7 female. Diagnosis of CF had been confirmed by sweat chloride in all. The role of endoscopic ultrasound-guided fine needle biopsy (EUS-FNA) has been designed, but its efficacy in the diagnosis of pancreatic neuroendocrine tumours (PNETs) has not been reported.

**Conclusion:** Symptomatic chronic pancreatitis is a significant problem in a small group of patients with CF. Most have severe mutations. In most cases this occurs as pancreatic insufficiency develops. An expectant approach is appropriate. Complex pancreateobiliary intervention may be required with close cooperation between specialist hepatobiliary and CF centres.

### 234 ARE THE BSG GUIDELINES ON Pancreatic CANCER ACHIEVABLE?

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**Introduction:** Pancreatic cancer is currently the sixth commonest cause of cancer death in UK. In June 2005 the BSG published guidelines aiming to standardise the management of patients with pancreatic, periampullary and ampullary carcinomas across the UK. We assessed clinical practice within our trust comprising two small district hospitals against these guidelines and compared our results to the minimum standards set out by the BSG.

**Aims & Methods:** A retrospective analysis of case notes of all patients with pancreatic, peri-ampullary and ampullary carcinomas between April 2005 to March 2006 was carried out using a standard audit proforma. Cases were identified by ICD10 coding system.

**Results:** Forty six patients were identified. 18 (39%) were males and 28 (61%) were females. Mean age at presentation was 75 years with most (68%) patients presenting between 70 and 90 years. Out of 46, 12 (26%) were referred under 2 week rule, 8 (17%) as routine outpatient, 20 (44%) as direct inpatient while 6 (13%) presented themselves directly to A&E. Weight loss (74%) was the most common presenting symptom followed by epigastric pain (54%), jaundice (46%), anorexia (41%) and backache (30.5%). CT scan (47%) was the most commonly used modality to confirm diagnosis followed by cytology (31%), EUS FNA (17%) and USG scan (5%). 67% patients had metastatic disease on presentation while 24% and 9% had locally advanced and localised disease respectively. 11% patients underwent surgical resection, 22% had chemotherapy, 43.5% underwent palliative stenting (24% via ERCP and 19.5% via PTC) while 23.5% were supported by general palliative care alone. 74% of patients consulted clinicians within 40 days of onset of symptoms. 83% of patients were diagnosed within 20 days of presentation to the local cancer unit. Majority (66%) of patients were referred to the specialist centre within 30 days of presentation to the cancer unit. 50% of patients underwent definitive treatment within 40 days of being referred to the specialist centre. 37 (80%) patients were alive and 9 (20%) had died. 18 (39%) patients had definitive treatment within more than 200 days and most of these had definitive treatment in the form of surgery and or chemotherapy. Mean duration of hospital stay was 18 days.

**Conclusion:** Overall the trust performed well against BSG guidelines. We had accurate demographic information on all cases. All patients referred under the 2 week rule were seen within 2 weeks. Following referral, the specialist centre responded within 2 weeks in all cases. However mean duration from referral to definitive treatment was 52.5 days. Resection rate was 11% and there was no post-operative hospital mortality.

Radiology posters

236 WIDE ANGLE 3D ENDOVLUMINAL CT COLONOGRAPHY: IMPACT ON MISSED AREAS AND POLYP CONSPICUITY
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Introduction: Ability to comprehensively visualise the colonic luminal surface at optical or virtual colonoscopy with a uni- or bidirectional view is dependant on the viewing angle used.1 Recent data suggests even with a bidirectional 90° view, 5.9% of the surface remains unseen, with a mean of 16 missed regions 300–1000 mm² and 4 over 1000 mm².2 Most CT colonography (CTC) software however does not alert the reader to regions of unsewn mucosa, risking missed neoplasia. We hypothesised that increasing the 3D endoluminal angle of view to 140°, matching that of optical endoscopy, would ensure adequate mucosal visualisation using a 3D bidirectional flythrough.

Aims & Methods: CTC software (ViatranixV3D colon) was customised such that the endoluminal viewing angle could be altered, and the size and number of missed regions could be recorded. Missed areas were subdivided into size categories: >1000 mm², 300–1000 mm² and all areas, and documented after bidirectional flythrough at 90 and 140°.3

Subdivided into size categories:
- >1000 mm²: 140° 4.1 (1.8) 1–6 4 3–5
- 300–1000 mm²: 140° 1.1 (1.4) 0–6 1 0–1.3
- All areas: 140° 8.6 (8.5) 1–38 6 4.8–9.3

Results: Twenty datasets were reviewed, mean age 66 years (range 41–81), 11 female; prone acquisition unavailable in 2. Supine data presented and then in a side by side comparison.

Conclusions: Bidirectional 3D endoluminal flythrough with a 140° viewing angle almost eliminates missed areas and increases confidence for adequate mucosal visualisation, particularly if software does not provide a ‘missed regions tool’. Polyp conspicuity however was reduced at 140°, an observation only apparent after direct side-by-side comparison. The clinical impact of this requires further study, but suggests optical colonoscopists using very wide angle (170°) colonoscopes might suffer similar changes in conspicuity.


237 SMALL BOWEL IMAGING: COMPARISON OF SMALL BOWEL MAGNETIC RESONANCE IMAGING WITH SMALL BOWEL FOLLOW THROUGH
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Introduction: Small bowel follow through (SBFT) is widely available and well tolerated by patients1 but risks overlooking important abnormalities2 and uses ionising radiation. High soft tissue contrast, multi planar imaging and ability to provide functional information3 with no use of ionising radiation make magnetic resonance imaging (MRI) increasingly popular.

Aims & Methods: To compare small bowel MRI findings with those of SBFT and to determine clinical usefulness of MRI. Retrospective review of MRI reports and comparison of MRI and SBFT findings on patients who underwent MRI at Western General Hospital between July 2004 and April 2006.

Results: MRI findings: 71 patients, majority (54) females, underwent MRI. Average age was 39.9 years. The main indication (43, 60.6%) was Crohn’s disease and 35 (49.3%) had previous bowel surgery. Small bowel dilatation was detected in 19 (26.8%), wall thickening in 14 (19.7%), strictures in 9 (12.7%), lymphadenopathy in 3 (4.2%), enterocutaneous or enterorectal fistulae in 3 (4.2%) and infra-abdominal abscess in 1 (1.4%). Active Crohn’s disease was diagnosed in 10 (14.1%). Extra intestinal findings were present in 43 (60.6%). SBFT v MRI: Of the 71 who underwent MRI, only 38 (53.5%) had had SBFT. The average interval between MRI and SBFT was 20.1 months. 28 (73.7%) of the 38 were known to have Crohn’s disease and 20 (52.6%) had previous bowel surgeries. Of the 14 with small bowel dilatation in MRI, only four had dilatation in SBFT. Strictures were demonstrated in 7 MRIs; 5 of them were also detected in SBFTs. Of the 10 who had strictures on SBFT, only 5 were detected on MRI. Bowel wall thickening was found in 8 patients on MRI; only one of them had active disease on SBFT. Three had ulcers seen on SBFT which were not seen on MRI. 24 (63.2%) had extra intestinal findings on MRI.

Conclusion: MRI was more sensitive than SBFT in detecting small bowel thickening and fistula. Disease activity was better assessed with MRI. MRI was unable to detect mucosal ulcers, due likely to its low spatial resolution. Although MRI was less able to detect strictures, it gave more information on disease activity and helped characterise strictures. MRI was also able to provide extra intestinal information. Taking into account the young age, complicated disease course and the functional and extra intestinal information it provides MRI is definitely a better test.


238 DETERMINING THE PROXIMAL EXTENT OF ULTERATIVE COLITIS: WHITE CELL SCAN CORRELATES WELL WITH HISTOLOGICAL ASSESSMENT
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Introduction: Assessing the extent of ulcerative colitis (UC) determines therapeutic strategies and provides prognostic information. Colonoscopy with mucosal biopsy is usually considered unsafe in patients with severe disease. The aim of this study was to assess the correlation between the proximal extent of UC as determined by Technitium-99m hexamethylpropylenamine oxime labeled leucocyte scan (white cell scan) with that determined by histological assessment.

Aims & Methods: 135 patients with histologically-confirmed UC in the computerised histopathology database who had both white cell scan and histological assessment of colonic inflammation (either by multiple mucosal biopsies during colonoscopy or by colectomy) during the years 1991–2004 were included. Both assessments were performed within 6 months of each other. Overall agreement, quadratic weighted kappa (κ) and polychoric correlations (r) were calculated to estimate the interrater reliability (extent based on histology and leucocyte scan) of the ordered categorical rating of proximal extent of colitis.

Results: Correlation between white cell scan and histological extent was excellent (κ=0.72; r=0.82), while macroscopic appearance on colonoscopy did not correlate as well with histological extent (κ=0.62; r=0.67).

Abstract 236 Missed areas at bidirectional 3D endoluminal flythrough

<table>
<thead>
<tr>
<th>Area size</th>
<th>Viewing angle</th>
<th>Mean (SD)</th>
<th>Range</th>
<th>Median</th>
<th>IQR</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;1000 mm²</td>
<td>140°</td>
<td>0.1 (0.4)</td>
<td>0–2</td>
<td>0</td>
<td>0–0</td>
</tr>
<tr>
<td>300–1000 mm²</td>
<td>90°</td>
<td>4.1 (1.8)</td>
<td>0–5</td>
<td>4</td>
<td>0–3.3</td>
</tr>
<tr>
<td>All areas</td>
<td>140°</td>
<td>15.4 (7.4)</td>
<td>7–32</td>
<td>13</td>
<td>8.8–20.3</td>
</tr>
</tbody>
</table>

All comparisons 140 < 90, p<0.001.
Higher C-reactive protein (CRP) values were not significantly associated with better concordance between histological and white cell scan based estimation of proximal extent of disease (p = 0.34). White cell scans correlated significantly better in patients with more extensive disease (p = 0.02), while colonoscopy predicted disease extent significantly more accurately in patients with more limited colitis (p = 0.002).

Conclusion: The proximal extent of UC determined by white cell scans correlates well with histological assessment especially in patients with more extensive disease. White cell scans offer a reasonable alternative to colonoscopy in determining the proximal extent of colitis, not only in patients with active disease but also in those who do not tolerate or decline colonoscopy.

Service development posters

239 BLOOD COUNT MONITORING OF AZATHIOPRINE IS IMPROVED BY INFLAMMATORY BOWEL DISEASE NURSE SUPERVISION

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Introduction: With increasing use of azathioprine in inflammatory bowel disease, robust monitoring systems are required to ensure blood tests are taken and bone marrow suppression acted upon promptly.1 Inflammatory bowel disease (IBD) specialist nurses are able to take on this role, and previous studies have shown that IBD nurses can reduce hospital visits and hospital length of stay, and coordinate blood count monitoring. Previous studies have shown that IBD nurses can reduce hospital visits and hospital length of stay, and coordinate blood count monitoring. Previous studies have shown that IBD nurses can reduce hospital visits and hospital length of stay, and coordinate blood count monitoring.

Aims & Methods: 181 patients with Crohn’s or ulcerative colitis were taking azathioprine or 6-mercaptopurine at some stage between 1999 and 2006. Monitoring of blood counts was previously done by doctors in clinics, and shared with GPs. In July 2003 a specialist nurse was appointed, and took over the role, maintaining a list of patients on azathioprine, ensuring they were supplied with blood test kits prior to the nurse appointment, (Jan–Jul 2003) and after (Jul–Dec 2005), instruct patients to stop the drug if the total white cell count falls below 4.0. We reviewed effectiveness of monitoring for a 6-month period (between July 2003 and December 2003).

Results: No patients in either period experienced problems as a result of leucopenia. In the nurse-monitored group, the 3 patients with leucopenia were contacted to stop their drug after 1, 4 and 7 days. This information was not available in the pre-nurse group.

Conclusion: Nurse-led monitoring significantly improved thoroughness of monitoring, but 1/3 patients still do not have blood tests as regularly as intended, (even allowing 2 weeks leeway beyond an 8-weekly target). With increasing emphasis on GP-led monitoring, IBD nurses may still have an important role in coordinating monitoring and ensuring compliance.


FEASIBILITY OF USING AN ELECTRONIC HRQOL QUESTIONNAIRE ROUTINELY IN PATIENTS ATTENDING A BUSY GASTROINTESTINAL OUTPATIENTS DEPARTMENT: TIME INVOLVEMENT AND SYMPTOM REPORTING

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Introduction: Electronic data capture to assess health-related quality of life (HRQOL) using validated questionnaires allows real time analysis and presentation of results to clinicians prior to the consultation. Their implementation however is still poor with very few data on their use routinely especially within busy medical or gastroenterology clinics.

Aims & Methods: We are currently involved in a pragmatic single-centre RCT to assess the suitability of measuring HRQOL data routinely in busy medical clinics and its impact on the clinical process and cost implications. We are using the Gastrointestinal Symptom Rating Questionnaire (GSRQ) as the intervention instrument. It is a validated GI system-specific HRQOL questionnaire for assessing GI symptoms developed during the MINuET study (Health Technol Assess 2006;10:1–214). 20 items within 4 dimensions underlie the GI symptoms (upper GI, lower GI, wind and defecation related). Randomised patients complete the questionnaire while in the waiting room prior to clinic consultation. Completion times are recorded and family/friends may assist. A research officer, involved in recruiting, is available to provide minimal help. We aimed to analyse the first 150 patients to use this intervention and assess its feasibility. The questionnaire is a HTML based program with mouse-based simple point and click. Results are recorded on Access database and standardised dimension and total GSRQ scores are calculated.

Results: 157 patients were randomised to complete the questionnaire during the first 2 months of the study (age range 17–87 years). All patients completed the questionnaire. Only 5 patients took >15 mins to complete questionnaire (3%). Majority required no or minimal help. The table

<table>
<thead>
<tr>
<th>Age range</th>
<th>No of patients</th>
<th>Mean</th>
<th>Median</th>
<th>Time</th>
<th>Upper GI</th>
<th>Lower GI</th>
<th>Wind</th>
<th>Defec</th>
<th>Total GSRQ</th>
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</tbody>
</table>

GSRQ scores (0–100): 0 no symptoms, 100 max symptoms.

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summarises the completion times and GI symptom scores between the different age groups. 41.4% of patients reported sleep disturbance due to symptoms. Questionnaire completion time does have a positive correlation with increasing age groups but times are still acceptable.

Conclusion: Dr. The first 200 letters of the complete expertise amongst patients, completion of electronic GSRQ questionnaire is feasible among all age groups including the elderly attending busy GI clinics and will assist in the collection of HRQOL routinely. Younger patients tend to report more GI symptoms with wind-related symptoms being by far the commonest reported symptoms in all groups.

**241** IS OUTFORCING OF DICTATION CHEAPER THAN MEDICAL SECRETARIES?
R. Haidry, N. U. Beejay. Gastroenterology, Newham University Hospital NHS Trust, London, UK

Introduction: In the current circumstances of significant cost pressures on the NHS, digital dictation and international outsourcing of medical transcription has been shown to be an effective and viable method enabling faster turnaround and accurate transcription. Nevertheless, the implications of rolling out such a service on the current job roles of medical secretaries are unclear. Indeed concerns have been raised as to whether such a service will erode rather than transform these job roles. Moreover the financial implications associated with international outsourcing of medical transcription have not hitherto been published.

Aims & Methods: To calculate the cost associated with the provision of medical transcription by international outsourcing. Data were retrospectively collected from a comprehensive database of a single consultant gastroenterologist using digital dictation/outourcing system from an established service provider (ScribeTech UK Ltd) from June 2005–August 2006. Dictation was performed with a digital voice recorder (Olympus DS-330). The anonymous files were downloaded to the hospital server and routed via secure FTP to a transcription centre in Bangalore, India. The transcription was then routed back to the hospital, merged with patient demographics on the hospital electronic patient record (EPR), and was then available for review before approval and printing. Data were collected on the number of transcriptions, total lines, turnaround time, cost data, and error rate.

Results: 1566 transcriptions (36 782 lines) were sent through the system over 15 months (mean 32 letters/week). All transcriptions were processed error free. The average number of transcriptions, total lines, turnaround time, cost data, and error rate are as follows:

- Total cost for all transcriptions was £3310.38, which was equivalent to £0.09 per line. The assumptions on cost for medical secretaries included: (1) mean secretarial salary £2166 per month (full time); (ii) 50% of secretarial time spent on analogue system; (3) 2800 lines typed per month/consultant. Under these assumptions, the cost of producing medical transcription by outsourcing was 77% cheaper than the cost of analogue transcription per line. This may have implications in redefining the role of medical secretaries in the future.

**242** COPY LETTERS TO PATIENTS: USE AND IMPACT ON WORKLOAD
A. Saeed, S. Bradbur, D. W. Bullmore. Medicine, Barnsley NHSFT, Barnsley, UK

Introduction: Copying all outpatient letters to patients helps meet the requirements for good communication but potentially altering the style of the letter to aid patient understanding, and resultant enquiries, could impose a considerable extra workload. We assessed the impact of copying letters to all patients and undertook a re-audit at 2 years.

Aims & Methods: All new and follow-up patients seen by consultant were included. The purpose of the copy letter as an information sharing exercise was explained and a header on the copy letter repeated this. Planned study size was initially 200, later extended to 311. The consultant noted changes in letters including text content or additional length used to provide clarification for the patient (2 lines or more). The length of text in the body of the letter was compared with a pre-study sample of letters and a post study sample at 2 years. The personal assistant noted the number of enquiries related to the study sample letters, their nature and how long they took to be dealt with.

Results: We sent copy letters to 311 study patients. None indicated they did not want a letter. The first 200 letters generated no enquiries, extending the study to 311 letters generated one enquiry. 6% of letters were consciously lengthened for clarification, 4% had substantial language modification. 1% of letters were censored as having information which had not been discussed with the patient and which was not suitable for notification other than by face-to-face contact. Length of follow-up letters was little changed in the pre-study sample, study sample and re-audit sample at an average of 8.2, 8.7 and 7.4 lines. New patient letters increased from an average of 12.1 lines pre-study to 18.7 lines during the study, indicating some unconscious tendency to lengthen text, but in the re-audit had dropped back to 15.9 lines. Patient enquiries remain negligible. Informal patient comment indicated during the study (and continues to indicate) that they find the copy letter useful to summarise clinic discussion and management plans.

Conclusion: Patient enquiries related to copy letters were, and remain, negligible in terms of frequency and extra workload. This may be because the explanation in clinic was followed quickly by the letter in 2-4 working days and it contained little new material. Increase in length of new patient letters since the study is modest and follow up letters are slightly shorter than before. Letters were appreciated as providing a summary of significant complex information in a manner of openness” by the doctor, and, in a few cases, a means of convincing a partner absent from clinic that all relevant issues had been addressed. A copy letter from clinic should routinely be sent to each patient.

**243** AN “ENDOSCOPY OUTCOMES SHEET” IMPROVES PATIENT EXPERIENCE AFTER ENDOSCOPIC PROCEDURES: RESULTS OF A PILOT STUDY AT A DISTRICT GENERAL HOSPITAL
K. Finder1, A. Allan,1 A. Wilson1, A. Dhar2. Endoscopy Unit, Bishop Auckland General Hospital, County Durham and Darlington NHS Trust, Bishop Auckland, Gastroenterology, Bishop Auckland General Hospital, County Durham and Darlington NHS Trust, Bishop Auckland, UK

Introduction: Patients in the UK are traditionally given a verbal report of their endoscopy findings before discharge from the unit. However, most patients when reviewed in clinic admit to remember very little about the result of their endoscopy. There is a need for a better system of communicating results of endoscopic procedures to our patients.

Aims & Methods: A pilot project was prospectively carried out between July-August 2006 to provide consecutive patients on a consultant endoscopy list with a single A4 sheet containing information of the outcome of endoscopy and colonoscopy in lay and medical terminology including intended follow-up. The discharging nurse also verbally explained the outcome sheet to the patient. A Patient Satisfaction questionnaire containing 4 structured questions was also provided, to be returned in a Freepost envelope. Results were analysed by the Clinical Governance department in a blinded manner.

Results: 36% completed questionnaires were returned. 97.2% respondents felt that it was a good idea to provide information after the endoscopy in lay terminology. 44.1% felt that they preferred the sheet to take away; 74.4% felt that they would prefer to have a nurse explain the results to them and 18.5% felt that they would prefer to get both kinds of information. 38.8% felt that they would not like to receive information in medical terms, as it would worry them. Overall 91.7% respondents felt that this service was satisfactory to very satisfactory.

Conclusion: The result of this pilot study shows that providing a written explanation of the results of the endoscopy is welcomed by most patients and improves their experience of the procedure. It should be the standard of care for all endoscopy units.

**244** THE INVESTIGATION OF IRON DEFICIENCY WITH OR WITHOUT ANAEMIA
R. Mason1, A. J. Dimambro2, J. Sufflebotham3, C. S. Probert2. 1Medicine, Bristol Royal Infirmary; 2Gastroenterology, Bristol Royal Infirmary, Bristol, UK

Introduction: In June 2000 the British Society of Gastroenterology published guidelines for the investigation of iron deficiency (ID) with or without anaemia. Patients above the age of 45 years old with ferritins below the normal range should be investigated with upper endoscopy (OGD) and barium enema (+/- sigmoidoscopy) or colonoscopy. In 2003 a retrospective study at the Bristol Royal Infirmary over a three month period, was published showing that only 49% of patients with iron deficiency were being investigated according to the BSG guidelines. Changes were implemented where by the BSG guidelines were automatically typed on the computer report of any patient with a low ferritin result; this study aims to evaluate the effectiveness of this change.

Aims & Methods: A retrospective study was undertaken identifying patients with iron deficiency using the hospital pathology computer. Data were collected using a proforma including age, sex, symptoms, investigations, diagnosis and follow-up. Drug and medical histories were also recorded. Patients below the age of 45 years were excluded from the study.
Results: Fifty seven patients were identified over a three month period in 2005. 20 with iron deficiency anaemia (IDA) and 37 with iron deficiency anaemia (IDA). Male:female 24:33; age range 45–92 years. Most presented with an incidental finding of ID or anaemia; some had symptoms such as tiredness, abdominal pain, bloating or weight loss. Those with anaemia were more likely to complain of symptoms than those with isolated ID. 15 (26%) were asymptomatic; 12 patients (21%) were on some form of NSAID at the time of presentation. Of those patients with IDA only 9 had OGD and colonoscopy or barium enema (24%). Three patients with isolated ID were investigated (15%) according to guidelines. Diagnoses included peptic ulcer disease, microscopic colitis, oesophagitis and diverticula disease. Four patients had celiac disease (3 IDA; 1 ID). One patient presenting with IDA had colonic carcinoma.

Conclusion: The results fall far short of the expected improvement following wider distribution of the BSG guidelines. Specialties outside that of gastroenterology are less likely to be familiar with the BSG guidelines and patients with ID present to a wide variety of specialties. With clear instructions printed on the hospital results page, it would appear that the guidelines were either not read or ignored. Despite efforts to improve the service to these patients, the investigation of iron deficiency has deteriorated since the publication of the 2003 study. These guidelines need to find a wider audience outside those with an interest in gastroenterology. Pathology may be going undiagnosed for longer and treatment delayed, because early warning signs (such as ID) are being ignored.

### Abstract 245 INFORMED CONSENT: DO SUBJECTS UNDERSTAND THE INFORMATION SHEETS?

P. J. Fortun, L. Chalkley, A. Shonde, J. West, C. Hawkey. Wolfson Digestive Diseases Centre, University Hospital Nottingham, Nottingham, UK

**Introduction:** Information sheets for clinical research are becoming increasingly complex but the extent to which they are understood is uncertain.

**Aims & Methods:** We assessed comprehension by healthy volunteers of a patient information sheet in a phase 3 clinical trial. Healthy volunteers participating in a capsule endoscopy study were given a standard 13 page written information sheet, as per COREC guidelines, and allowed to ask questions. The trial compared as a primary endpoint the incidence of small bowel erosions or ulcers in subjects randomised to take a selective COX2 inhibitor, non-steroidal anti-inflammatory (NSAID) plus proton pump inhibitor, or placebo. After indicating they were ready to give consent and had read and understood the information sheet, the volunteers were asked to complete a 6-item questionnaire covering the identity and adverse events of trial treatments and of the procedure, the duration of the trial and value of the inconvenience allowance. 

**Results:** Eighty two healthy volunteers were approached and all completed the questionnaire. 74 (90%) of the volunteers had university level education and 49 (60%) were clinical medical students. Only 10 subjects (12%) could name the three trial drugs, Only 14 (17%) could name 3 or more potential risks of the medication they might be exposed to, whilst 17 (20%) could identify none. Most subjects (77/82, 90%) identified capsule endoscopy as the trial procedure and impaction/obstruction as its main risk (52/82, 64%). The maximum number of potential adverse events recalled was 6 (n=2) of 23. All but one subject (98.8%) could recall the exact value of the inconvenience allowance (table). While accurate recall was higher in the medical students than non-medical volunteers, both groups showed deficiencies of understanding (table).

**Conclusion:** A comprehensive information sheet resulted in limited understanding of trial risks. Shorter information sheets with a test and feedback session should be trialled so that informed consent becomes valid informed consent.

| **Aims & Methods:** Increasingly complex but the extent to which they are understood is uncertain. Information sheets for clinical research are becoming.

| **Introduction:** The two week wait target for all suspected cancers was implemented at our institution in January 2001. A rapid access protocol was introduced enabling patients with suspected upper gastrointestinal (GI) malignancy to be fast tracked directly to endoscopy within 2 weeks. This is part of the pathway to ensure all cases are diagnosed and treatment is commenced within 62 days. In 2002 we retrospectively analysed all patients diagnosed with oesophageal or gastric cancer and the number of cases diagnosed via the rapid access protocol.

| **Aims & Methods:** To see if the number of two week wait referrals has changed since 2002 and to find out if there has been a significant change in the number of upper gastrointestinal cancer cases diagnosed by this route. A retrospective review of all two week wait referrals for 2005 was carried out. All upper GI referrals were identified and the number diagnosed with gastric or oesophageal malignancy were compared with a database of all upper GI cancers diagnosed at our institution in 2005 and cross referenced with pathology records, endoscopy records and the local cancer registry. Patients with suspected pancreatic or biliary cancer were excluded from the analysis. These results were compared with those from 2002.

| **Results:** In 2005 a total of 261 patients were referred under the two week rule. 24 (9.2%) of these cases were diagnosed with having upper GI malignancy. A total of 62 cases were diagnosed over this time period. Therefore 39% of all upper GI malignancies were referred and diagnosed via the two week protocol. Figures from 2002 demonstrate a diagnostic yield of 3.8% when 6 out of 157 two week rule referrals were found to have upper GI malignancy. A total of 57 upper GI malignancies were diagnosed. Thus only 10.5% of all upper GI malignancies were identified under the two week rule in 2002. The total number of referrals has increased by 166% over the 4 year period and the “positive yield” of malignancy has increased by 28% overall and by 5.4 per 100 referrals. The total number of upper GI malignancies diagnosed remained unchanged.

| **Conclusion:** Demand on the service provided by the two week wait initiative has increased significantly since its introduction. All patients were seen within two weeks in 2005 in our institution. The vast majority of two week referrals (90%) still do not result in a diagnosis of malignancy, although a much greater proportion of the cancers diagnosed are now referred by this route (increase from 3.8% to 9.2%). This partly reflects the increased number of cases seen by this route; modification of the referral protocol; awareness and increased uptake of the form; and education and feedback given to local GPs. This has resulted in a larger number investigated with increased pressure upon endoscopy and outpatient services for the same number of cases diagnosed in the local population.

**The Impact of a 24-Hour Telephone Helpline on the Management of Patients with Inflammatory Bowel Disease**

S. Geethins, T. Duckett, J. Mayberry, J. de Caestecker, R. Robinson. Gastroenterology, University Hospitals of Leicester Leicester General Hospital, Leicester, UK

**Introduction:** BSG Guidelines recommend that an inflammatory bowel disease (IBD) service should allow “rapid access to advice and clinic appointments in the event of a relapse”. We introduced an IBD nurse-led 24 hour telephone helpline in order to improve accessibility to advice and reduce the number of patients requiring urgent outpatient (OP) review.

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| **Abstract 245 Comprehension of medical v non-medical volunteers**

<table>
<thead>
<tr>
<th></th>
<th>Correct, n</th>
<th>%</th>
<th>Medical, n</th>
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Aims & Methods: We audited use of a 24-hour telephone helpline on management and OP attendance in a large teaching hospital setting. Patient satisfaction with the service was also evaluated. We reviewed all calls received by the IBH helpline over a 1-year period. Individual calls are recorded in a standard manner with reason for call, advice provided and outcome documented. If treatment change resulted from the telephone consultation, it was considered to have avoided an OP review.

To investigate patients' views on quality of service, questionnaires were randomly sent to 150 patients who had contacted the helpline during the 12month study period.

Results: In total 709 patients (ulcerative colitis, n=405) made 2087 calls. Admission as a result of the call was required in 45 (6%) patients. Investigations were arranged in 335 (47%) cases and early review in 84 (12%). Treatment was changed in 285 (40%) patients. Completed questionnaires were returned by 100 (66%) of the 150 patients. 88 patients (88%) said the helpline avoided them seeing their GP and 98 (98%) felt their disease was managed more effectively as a result of the helpline. The quality of care provided by the helpline was considered excellent or good by 95 (95%) of respondents.

Conclusion: A dedicated telephone helpline is an important addition to specialist IBH services. It is valued by patients and the advice and treatment changes suggested can significantly reduce the need for primary care consultation and specialist OP review.

248 OUTCOME OF A NURSE-LED OUTREACH SERVICE FOR PRISON INMATES WITH CHRONIC HEPATITIS C INFECTION


Introduction: UK prison inmates have a relatively high prevalence of hepatitis C (HCV) infection, most acquired from past intravenous drug use. In 2004, a dedicated nurse-led HCV service was established in Bristol to address the needs of inmates at 5 prisons (4 male, 1 female). Previously, inmates' accessibility to HCV clinics had been restricted; patients often missed hospital appointments due to prison shortfalls, or inter-prison transfers.

Aims & Methods: To evaluate the clinical outcome of patients referred to a nurse-led prison outreach HCV service. Inmates with past intravenous drug use were advised to be tested for bloodborne viruses at prison entry by the prison healthcare team. Those found to be HCV antibody positive (Ab+) or initial testing were referred to the HCV specialist nurse for further management. Those inmates whose remaining sentence exceeded 2 years were considered eligible for HCV treatment whilst in prison. Outcome data were recorded for all patients referred from 1 July 2004 to 31 July 2006.

Results: 247 HCV Ab+ patients were seen by the specialist nurse, 200 (81%) of whom were PCR positive (+). Hepatitis B or HIV coinfection was found in 6 patients (3 and 3, respectively). 174 HCV PCR+ patients were male (87%), with mean ages of 34.8 years (range 17–65 years) and 30.7 years (range 17–53 years), for males and females, respectively. The majority of PCR+ patients were white (n=194); 72 patients (31%) had short sentences (<2 years) and were referred to their own GP or to hospital outpatient services post-release, while 58 (29%) did not wish further intervention. 70 patients (35%) were considered for treatment whilst in prison and underwent liver ultrasound and/or liver biopsy. 15 of these (21%, 7.5% of total seen) commenced HCV treatment (response rates to be presented). 22 patients being assessed for HCV therapy were transferred to another Bristol prison after initial assessment.

Conclusion: Nurse-led prison outreach clinics for patients with chronic HCV may improve the accessibility of this high-risk group to specialist services. Sentence length may be used to help target HCV specialist resources.

249 A WEB-BASED ENDOCOSIS REFERRAL AND TRIAGE SYSTEM FOR QUALITY ASSURANCE

R. Kasturi, E. Said, G. Clifford, J. Singh, A. Saeed. Gastroenterology, Queen Elizabeth Hospital, Gateshead, UK

Introduction: Endoscopy referrals are generated from multiple sources including hospital and community physicians with varying levels of clinical experience. The evidence base and consensus statements regarding indications of management of endoscopic procedures evolve over time. The current guidelines are perceived to be complex and difficult to access and hence may not be routinely reviewed prior to requesting endoscopy. A web-based referral form with embedded guidelines was developed and published on the intranet in our hospital.

Aims & Methods: Intervention 1: The BSG guidelines regarding dyspepsia, iron deficiency anaemia, GI bleeding and surveillance endoscopy procedures were reviewed and summarised. The Rockall score was used to determine prognosis in GI bleeds. Protocols were developed to optimise patient management in all cases and compiled with those requiring antibiotic prophylaxis, diabetics, anti-coagulated patients and for ERCP, to maximise day case procedures within limits of safety. All of the above guidelines were made available as summary sheets or simple flow charts. A new unified referral form was developed for inpatient and outpatient referrals with prompts to refer to the guidelines. Rockall scoring table was added. This form was made available in electronic format on the hospital intranet in addition to print format. The guidelines could be accessed from intranet version by clicking on the embedded hyperlinks. The medical staff were sent a web link via email and requested to use these guidelines. Intervention 2: All procedure requests were triggered by the physician or nurse user accessing the above system. Booked surveillance colonoscopy procedures were reviewed and the responsible referring consultant was contacted if indications were not in conformity with the published guidelines, with a view to cancelling or rescheduling them.

Results: An audit done in 2005 showed that 60% of the surveillance colonoscopies were being done prematurely or were not necessary. This represented 30% of all colonoscopy procedures. Re-audit for the month of November 2006 (after the introduction of the web-based system) has shown that a total of 75 procedures were booked. 30 were surveillance colonoscopies (41%). After nurse triage, 6 procedures were inappropriately requested (20% of surveillance procedures, 8% of all colonoscopies) and these were cancelled or deferred. Prospective audits are under way to assess the impact of above interventions, in terms of quality assurance, resource utilisation and user satisfaction. Initial indications are positive in all these areas.

Conclusion: Due to the large amount of information needed for decision making in endoscopy referral, hospital intranets offer a very useful resource, in terms of ease of access and the ability to regularly update information.

250 PROSPECTIVE AUDIT OF A NURSE-LED IRON DEFICIENCY ANAEMIA SERVICE IN COMPLIANCE WITH THE BSG GUIDELINES

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Introduction: Following increasing demands on the gastroenterology service, a specialist nurse-led iron deficiency (IDA) service was established. The aim of this service was to diagnose, investigate and provide treatment options for GP referrals with a provisional diagnosis of IDA. A prospective audit was carried out to determine the safety and appropriateness of IDA assessment of patients within a nurse-led setting and to audit the service against the BSG guidelines.

Aims & Methods: A prospective audit of the first 53 patients referred to the nurse-led service, of which 3 proved not to have IDA based on haematins, leaving a study group of 50. Evidence of IDA was documented in the notes of all patients. Risks of investigations were outlined to each patient, who was subsequently able to make an informed choice between barium or endoscopic investigations. The investigations were carried out and outcomes recorded.

Results: A total of 50 patients were included in the audit. 39 female (18 pre-menopausal), and 11 male. The median age was 64 years (range 83). Six patients had FOBs performed by GP prior to referral. Only 9 patients had a cause for IDA identified. Two patients had gastric cancer (both inoperable) and one patient had a treatable rectal cancer. One patient had Crohn's disease and 1 patient had gastritis identified as the cause of anaemia. Coeliac pathology was identified in 4 of the pre-menopausal women. Of the pre-menopausal women, 3 had +FOBs and were investigated, nil on pathology. Other pre-menopausal women investigated had upper or lower GI symptoms and investigated appropriately. Four pre-menopausal women were not investigated as per BSG guidelines. 41 (82%) of patients had no findings for the cause of their anaemia. All patients had appropriate investigations including screening for coeliac disease. All patients received iron replacement therapy. The 8 (16%) patients not responding to iron therapy were investigated further.

Conclusion: The nurse-led service rigorously followed the BSG IDA guidelines and complied with the guidelines in all cases. All IDA patients were diagnosed and treatment instigated within 6 weeks of referral, complying with the 18 week government target due in November 2008. The specialist nurse can play a safe and essential role in developing gastroenterology services.
Abstract 250 Investigations

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251 RED CELL DISTRIBUTION WIDTH: ANOTHER USEFUL INDEX FOR IRON DEFICIENCY

1Gastroenterology, Warrington Hospital, Warrington; 2Gastroenterology, Queen Elizabeth Hospital, Gateshead, UK; 3Gastroenterology, 424 Army Hospital, Thessaloniki, Greece; 4Internal Medicine, Sunderland Royal Infirmary, Sunderland, UK

Introduction: The BSG guidelines for management of iron deficiency anaemia (May 2003) suggest confirmation of the iron status with the use of mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) or serum ferritin. In the last decade, the measurement of soluble transferrin receptor (sTfR) and its calculated ratio to Log10 ferritin (sTfR/Log10 ferritin—Index) provides a useful alternative to bone marrow examination (the gold standard test for determination of iron status).

Aims & Methods: Red cell distribution width (RDW) is like MCV and counter measurement. It provides MCH and other Couler information about the homogeneity of the produced red cell population. It is raised when red cells are produced under precarious iron stores. The BSG guidelines, on the other hand, suggest that high RDW indicate coexistent B12 or folate deficiency. We aimed to examine the validity of RDW as indicator of iron deficiency. We used the Index as surrogate “gold standard” of iron deficit. A total of 68 patients from gastroenterology and rheumatology clinics were included in the study. They were all anaemic with normal MCV.

Results: Forty two patients were iron deficient (Index >2). Twenty five of them had high RDW, 17 had normal RDW. Six patients were iron-repleted (Index <1). All six had normal RDW values. The use of RDW (on the above cohort) had 59.52% sensitivity and 100% specificity in the detection of iron deficiency, while its positive predictive value (PPV) and negative predictive value (NPV) were 100% and 26.09%, respectively.

Conclusion: RDW is highly specific for iron deficiency. Its better use would be in combination with MCV and MCH values and not as a surrogate index for management of the tube and stoma site. Gastrostomy tubes can cause long-term problems if not managed properly. There was also no routine follow-up and no planned replacement for short term tubes nor any formal training for staff in the acute and community hospitals or in the community. These factors resulted in frequent admissions usually after accidental tube displacement, and accounted for 128 bed nights per annum.

Aims & Methods: A Gastrostomy Tube Follow-up Service has been run by the Nurse Consultant in Stroke (NCS) for 18 months, managing community-based patients in all relevant Trusts in the area (a population of 500,000). The service was set up in conjunction with the medical gastroenterologists and the Dietetic Department. The aim of the clinic was to proactively manage the gastrostomy tubes, routinely replacing balloon gastrostomy tubes and providing informal patient, carer and staff training and information. A record was kept of the time spent in direct contact with gastrostomy patients (mean 1 session per week), together with projected savings from prevented admissions.

Results: On average there were between 175 and 200 patients with gastrostomy tubes at any one time (initially only 70 of these were known), though this is a fluid population. In the first year of the pilot there was a 50% reduction in admissions for PEG complications (previously accidentally displaced PEGs) of 100 bednights. The number of “emergency” endoscopy appointment slots for replacing displaced balloon gastrostomies fell from 84 to 7 (with resultant reduction in ambulance/transport costs). Few patients could visit outpatient clinics and the service is now totally domiciliary. Urgent referrals are forwarded from, and telephone advice is frequently sought by: community nurses, dieticians, GPs, nursing home staff, learning disability staff, acute and community hospital staff and by patients and carers.

Conclusion: There were many patients across the county with gastrostomy tubes in situ than had been previously known and they required a great deal more support than was originally envisaged. Savings in reduced admissions and emergency gastrostomy replacements in endoscopy unit have been considerable. Long term, following a countywide rolling training programme for all relevant staff, the service will transfer to locally-based teams with support from the NGIS for complex patients.

253 VALIDATING THE PLANNED COLONOSCOPY WAITING LIST: WORTH THE EFFORT

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Introduction: In 2002, the British Society of Gastroenterology issued guidelines for colorectal cancer screening in high-risk groups. These were designed to reduce inappropriate screening/repeat colonoscopies to reduce risks and ensure efficient use of resources as well as identifying those who would benefit from repeat procedures.

Aims & Methods: We reviewed the casenotes of 418 patients on the planned (repeat) colonoscopy waiting list to determine whether their procedure was appropriate and timely based on the guidelines. Where appropriately inappropriate, the referring clinician was asked to review the notes and the patient was removed or had their appointment altered accordingly.

Results: There were 202 males, 196 females, mean age 62.7 years (range 18–87). 278 (66%) were being followed-up for polyps, 55 (13%) for colitis, 54 (13%) for family history of cancer, 18 (4%) previous colorectal cancer, 9 (2%) for renal transplant, 3 (1%) for acromegaly and 1 for hyperplastic polyposis syndrome. 18 patients were over 80 years old, 37 patients (8.8%) were removed from the waiting list mainly because of inappropriate follow-up following polyp removal (13), inappropriate family history follow-up (10), and also because of development of advanced malignancy (3), patient request (5) and limited proctitis (2). 18 patients had their procedures expedited and several more had their delay giving a net reduction in colonoscopy of “45 patient years”.

Conclusion: Patients were left on the waiting list outside the BSG guidelines at their Consultant’s discretion. In particular, patients with strong family history but not HNPCC or FAP had 5 years colonoscopies until aged 55 years. Patients were
generally not removed from the planned waiting list on the basis of age alone (BSG guidelines advise patients follow-up stop aged 70 years before cancer, or after 75 years for polyp surveillance). Renal transplant guidelines suggest surveillance for colorectal cancer but do not state how this should be done.

**Conclusion:** Waiting list validation resulted in a significant removal of patients from a medical planned waiting list and a slight overall reduction in frequency of follow-up. Greater reduction could have been achieved with complete adherence to the guidelines.

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**254 DYSPHAGIA HOTLINE: THE FIRST 600 PATIENTS**

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**Introduction:** The “one-stop” dysphagia hotline (DHL) service allows rapid access to investigation of dysphagia and has now served over 600 patients. These patients are investigated by consultation, barium swallow and/or upper GI endoscopy. Latterly a nurse endoscopist telephones patients to determine the best means of investigation. We studied which symptoms are most predictive of cancer, and whether the likely diagnosis was best assessed by a medical consultation, or telephone interview by Consultant or nurse.

**Aims & Methods:** The DHL database was analysed for patients referred March 2003–May 2006. The health professional interviewing patients was asked to give a provisional diagnosis prior to investigation and this was compared with the final diagnosis.

**Results:** Of 625 patients referred, 69 were excluded from further analysis, due to admission or death before investigation, patient declining investigation or no telephone. Mean age was 68.4 years (range 21–103 y). 12.0% had cancer, 1.8% pharyngeal pouch and 9.0% peptic stricture. The majority of the remainder had gastro-oesophageal reflux disease, oesophageal dysmotility or both, although 4.7% had Barrett’s oesophagus, 1.1% achalasia and 1.4% peptic ulcer disease. 21% of patients referred denied dysphagia. True dysphagia was commonly found in serious pathology (cancer OR 1.78, benign stricture OR 3.67) but not in milder pathology. Weight loss is significantly more likely with cancer (OR 4.2) compared to other pathologies. Dysphagia to liquids and solids was more likely to be indicative of cancer than for solids alone (OR for solid dysphagia was 1.3) however this was also true for peptic stricture and pharyngeal pouch. Cancer was more likely to present with a shorter duration of dysphagia, with only 2.8% of all the referrals after 6 months diagnosed with cancer. Nurse endoscopist telephone calls predicted more patients to have cancer (30.2% vs 16.3% and 20.5% for Consultant telephone or direct review) although the PPV for each methods was very similar (29.0% vs 26.7% and 32.1% respectively). Cancer was correctly predicted in 46.8% of cancer patients by nurse endoscopist vs 66.7% and 64.3% by other methods respectively.

**Conclusion:** Over 20% of patients referred to DHL had peptic stricture or cancer. Progressive dysphagia, weight loss and dysphagia to both solids and liquids were predictive of significant pathology. Nurse endoscopist telephone triage for DHL has similar PPV and NPV for malignancy as medical triage.

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**255 GASTROINTESTINAL TRACT PATHOLOGY IN PATIENTS WITH ASYMPTOMATIC ANAEMIA AND CHRONIC KIDNEY DISEASE**

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**Introduction:** Anaemia frequently complicates chronic kidney disease (CKD) and the prevalence significantly increases when the glomerular filtration rate (GFR) falls below 60 ml/min/1.73m². Although anaemia in this setting is most likely due to intrinsic renal disease, laboratory markers of iron deficiency are less reliable in this group and consequently upper and lower gastrointestinal (GI) endoscopy is often performed to exclude bleeding lesions. The diagnostic yield and justification of GI investigations in this group of patients is unclear.

**Aims & Methods:** We conducted a retrospective, case control study of patients referred for endoscopic investigation of asymptomatic anaemia. We identified 94 patients with anaemia and CKD (estimated GFR <60 ml/min/1.73 m² based on the abbreviated MDRD equation). The group was subdivided into patients with supporting evidence of iron deficiency (serum ferritin <30 g/m/l) and those without. The control group comprised 217 patients with normal serum creatinine and iron deficiency anaemia (IDA) low haemoglobin and ferritin. All patients underwent OGD and 92.2% of control patients and 55.3% of CKD patients underwent a colonic investigation. The prevalence of lesions potentially accountable for the anaemia was then calculated.

**Results:** In patients with CKD without supporting evidence of iron deficiency there were significantly fewer upper (11.5% vs 24.4%, OR = 0.40 95% CI 0.20 to 0.83) and lower (6.5% vs 19.8%, OR = 0.28 95% CI 0.10 to 0.79) GI lesions potentially accountable for IDA as compared to controls. The prevalence of GI malignancy was 0% in patients with CKD without evidence of iron deficiency as compared to 17.1% in controls (p<0.0001). In patients with CKD and evidence of iron deficiency the number of benign and malignant lesions with potential to cause IDA was statistically equivalent to control patients with normal renal function and IDA.

**Conclusion:** The prevalence of GI lesions potentially accountable for IDA is low in patients with asymptomatic anaemia and CKD, unless typical laboratory features of iron deficiency are present.
THE GENDER IMBALANCE IN ACADEMIC MEDICINE: HAVE WE BRIDGED THE GAP OVER 35 YEARS? A UK PERSPECTIVE

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Introduction: Historically there has been a shortfall in the number of women in senior academic posts. Currently the number of female medical students in the UK has increased and now represent up to 60% of the yearly intake. However, despite this there continues to be a perceived disparity between the sexes in academia. A recent publication from the US made an assessment of this problem by using genders of authors in peer reviewed journals as a surrogate marker for representation of women in academia. No such study has ever been conducted in the UK and no data exist for gastroenterology.

Aims & Methods: To determine the degree of UK female author representation in two peer-reviewed British journals. Data were collected for first and senior authors of Gut and the British Journal of Surgery (BJS) for the years of 1970, 1980, 1990, 2000 and 2004. The sexes of British authors were identified by inspection of their first name. In cases where it was unclear, the gender was determined using the medical directory, internet search engines, Medline, Embase, institutional websites or by direct contact with the individual institution.

Results: We determined the sex of 93.9% of British authors in the two journals over the period of 35 years. In 1970, 65% & 84% of the total number of original articles originated from the UK compared to 23% and 36% in 2004 for Gut (p<0.001) and BJS respectively (p<0.001) There was a significant rise in the number of female first authors for both journals: from 7.7% in 1970 to 19% in 2004 (p=0.002). The number of female senior authors has remained relatively constant over this period (p=0.8). Individual comparisons made between the two journals between 1970 to 2004 showed a fourfold rise in the number of female first authors in BJS (4% to 15.6%, p=0.0072) compared to a two fold increase in Gut (12% to 26%, p=0.052). While for senior authors, a rise of 1.52% was noted in BJS (p=0.74) and in contrast, a decline of 1.43% was noted in Gut (p=1). When comparing the number of female first authors between the two journals, there was a significant difference in 1970 (p=0.04) but this is no longer the case in 2004 (p=0.14).

Conclusion: There has been an encouraging increase in the number of female doctors who participate in academic medicine (as judged by first authorship). In contrast, the number of senior female authors has stayed relatively the same for both divisions of gastroenterology and surgery. Despite an attempt of narrowing the gap in the field of academic surgery, women still comprise a minority of original research in the UK. Further evaluation at national level such as the Athena and WAM (Women in Academic Medicine) project would help to address factors that could narrow the gender gap.

PATIENT ACCESS TIMES AND SURVIVAL BEFORE AND AFTER INTRODUCTION OF A RAPID ACCESS UPPER GASTROINTESTINAL CANCER SERVICE

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Introduction: The “Improving outcomes” guidance for upper GI cancer (DoH, 2001) led to major changes in the organisation of cancer services in the UK. The “two week rule” (TWR) aimed to encourage rapid diagnosis of suspected cancer. Our centre in North Liverpool receives the highest volume of TWR referrals in the UK and we have reported that <4% of patients with alarm features have oesophagogastrectomies. However, not all cases of cancer will access care via the preferred fast-track route. A key question is whether service redesign and the provision of the Rapid Access Upper Gastrointestinal Cancer Service (RAUGICS) has led to an overall improvement in cancer processes and outcomes.

Aims & Methods: [1] To compare waiting times and survival before and after implementation of the RAUGICS system; [2] To compare survival according to route of diagnosis in the post-RAUGICS era. A cancer centre serving a local population of >330 000. All cases of oesophageal or gastric cancer identified via pathology records during two 2-year periods: Period 1 (Pre-RAUGICS), Period 2 (Post-RAUGICS), Hospital IT systems and case notes audited to establish access times (GP referral to endoscopy; GP referral to histological diagnosis), tumour type, stage, treatment outcome, studies have shown that physician extenders (nurses) can be used in CE reporting to save physician time.

Aims & Methods: To assess the ability of Specialist Registrars (SpRs) to interpret CE videos and compare against controls (medical students). Six SpRs in gastroenterology and four final year medical students were asked to read and interpret 10 CE videos. The gold standard was taken as the CE findings reported by a gastroenterology consultant with CE expertise (MEM). All of the SpRs (3rd–5th year) had performed more than 1000 gastroscopies. One SpR had already read 50 CE videos under supervision whereas the others were naive of any CE training. All participants were given the same introduction to the CE software and were blinded to the referral indications and each other’s findings. Parameters assessed were time taken to read, gastric emptying time (GET), small bowel transit (SBT), number of thumbnails (TN) including false positives and negatives, pathology missed and the ability to make the appropriate diagnosis. The data were analysed using SPSS version 12.0.

Results: The average time taken for the SpRs to read the videos was 54 minutes (range 45–69) as compared to 56 minutes (range 46–73) for the controls. There was no significant difference in minutes to the accepted GET between the two groups (p=0.133). However the mean difference in minutes to the accepted SBT (within 1 minute) was 20 minutes for the SpRs and 89 minutes for the students (p=0.046) in all 10 videos. SpRs were more likely to record true positives and less likely to record false positives when compared to controls (p=0.011 and p=0.005 respectively) and the SpRs were also more likely to reach the correct diagnosis (p=0.007). On comparison between the individual SpRs, the SpR with CE experience had a detection rate of 100% while for the other five SpRs this ranged from 50–90%. There was no significant correlation in time taken to read the videos against number of true positives for both groups (students: p=0.92, SpRs: p=0.424).

Conclusion: Our study has shown that SpRs in gastroenterology had a significantly higher pick up rate for pathology on CE when compared to controls (with no endoscopic experience). However, SpRs failed to reach the correct diagnosis in some cases. This study has shown that prior endoscopic experience is beneficial but focussed training would enable SpRs to reliably identify and interpret small bowel pathology on CE.
**BSG abstracts**

3-year survival. For the Post-RAUGICS period, route of diagnosis was designated as: "RAUGICS" (fast-track; n = 3008 total referrals); "Other" (includes non-urgent open access endoscopy, GI clinic and emergency admission) and Barrett’s surveillance (BarS; n = 420 patients; cancer rate 0.5%).

**Results:** See table. In the Post-RAUGICS era, only 43.1% of all cancers were diagnosed by fast-track route. Survival was not significantly different for symptomatic patients diagnosed via the "other" referral routes. BarS patients had better survival than symptomatic cancer cases (p = 0.0025).

**Conclusion:** Service reorganisation has led to significantly improvement in overall access times, reducing the median delay from referral to diagnosis by two weeks. This provides prompt treatment decisions and more rapid palliation. However, the fast-track system selects patients with poor survival. Overall 3-year survival from these tumours in our locality is unaltered. Patients on BarS have significantly better survival than others.

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**260** EVALUATION OF EFFICACY OF AN ENDOSCOPE STORAGE AND DRYING CHAMBER IN AN ENDOSCOPY UNIT AND ITS IMPACT ON WORKING PRACTICE

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**Introduction:** Exogenous infection transmitted during endoscopy is rare. The current BSG guidelines stipulate that all scopes to be used on each day must be exposed to a cycle of automatic reprocessing not more than 3 hours prior to use. This caused problems with utilisation of endoscopes in morning lists and for emergency procedures. Taking this into consideration the endoscopy unit at Kettering general hospital purchased an endoscope drying and storage cabinet. (Lancer FD8 hereafter will be called FDB). Due to lack of data on microbiological safety we subjected the FDB to in house tests.

**Aims & Methods:** Tests for drying were conducted on internal channels and external surfaces of endoscopes stored in FDB. Tests were also conducted on sterility after normal processing and disinfection. Tests on external surfaces used tests to detect protein (Protect M) and ATP (Lighting MVP) in addition to standard microbiological testing at 0.5, 12, 24, 36, 48, 72 h intervals. Tests were conducted after external contamination of endoscopes using standard microbiological tests at regular intervals as above. Tests were also conducted on simulated parts of endoscopes after contamination by known amount of Pseudomonas aeruginosa. This was to mimic a situation where dismantled parts of endoscopes were contaminated by waterborne bacteria during the last rinsing stage. Tests were also conducted when endoscope channels were contaminated after standard cleaning and disinfection with water, containing known amount of Pseudomonas aeruginosa. The endoscopes were tested using standard microbiological tests at regular intervals as above.

**Results:** FDB was very efficient in keeping the external surfaces and internal channels of endoscopes dry. The FDB also kept external surfaces of all the different types of endoscopes sterile up to the period of 72 h as confirmed on routine microbial cultures. These were reconfirmed by tests for protein and ATP. Following contamination the simulated parts of endoscopes were washed after a period of 30 minutes. However there was an increase in viable bacteria in the first 12 h of storage time when endoscopes were stored at 37°C. Therefore the test was redone at a reduced temperature of 30°C. This showed reduction of bacterial contamination depending on storage time up to 72 h.

**Conclusion:** FDB was very effective in drying the external and internal surface of endoscopes. It also maintained sterility of washed and disinfected endoscopes. BSG guidelines caused duplication of work in endoscope reprocessing. Nursing staff had to turn up at work at 7 am each working day to put the endoscopes in the reprocessor. Also caused wastage of disinfectant and wear and tear to the endoscopes. FDB had an impact on working practices and working life of the staff at Kettering in last year. Staff are redeployed in a more productive way improving patient care. All clean endoscopes are always available for emergency procedures. There are also savings on the cost of disinfectant.

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**261 USEFULNESS OF A DEDICATED NURSE SPECIALIST-LED CLINIC FOR FAMILIAL COLORECTAL CANCER**

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**Introduction:** Risk stratification of patients with a family history of colorectal cancer (CRC) can be time consuming. A hospital based nurse led familial colorectal cancer service (FRCRS) can be useful in identifying and providing specific information to patients who are predisposed to such risk.

**Aims & Methods:** To determine the usefulness of a hospital based nurse led FRCRS and the diagnostic yield of screening colonoscopies in patients with a familial risk of colorectal cancer. Patients referred from the community with a family history of CRC were identified from the FRCRS database from March 1996–2006. Patients without polyposis syndromes were risk stratified based on the Amsterdam criteria. A dedicated nurse specialist confirmed the presence of tumour in families and counselled patients accordingly. Information on screening colonoscopy and histology were obtained from the endoscopy and histology database.

**Results:** Of the 339 patients 200 were females with a median age of 48 years (IQR 39–58). Risk stratification was as follows: low-risk: 17.4%, moderate: 5%, low–moderate: 19%, high–moderate: 30% and high-risk: 25.3%. Overall 123/339 (36%) patients had 165 screening colonoscopies (low-risk: 8/59, low–moderate: 23/64, high–moderate: 45/102, and high-risk: 46/89). Four patients refused screening and 12 patients did not attend. If 59 patients in the low-risk group who did not warrant screening are excluded, 107/265 (40%) remaining patients were too young for screening to be initiated. No pathology was encountered on screening the low and moderate-risk group.

**Conclusion:** More than a third of the patients referred with familial cancer are in the low or low–moderate risk group. A nurse-led FRCRS can avoid unwanted colonoscopies in 17.4% of low-risk cases and in addition delay the inception of screening in 40% of the referred cases. We therefore recommend all patients be risk stratified in a nurse led FRCRS prior to initiating screening.


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**262 A MULTIDISCIPLINARY APPROACH TO PERCUTANEOUS ENDOSCOPIC GASTROSTOMY REDUCES THE NUMBER OF INAPPROPRIATE PROCEDURES AND DECREASES MORTALITY**

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**Introduction:** The National Confidential Enquiry into Patient Outcome and Death indicated that outcomes from percutaneous endoscopic gastrostomy (PEG) are variable and inappropriate placement of a PEG tube is not possible as a safe insertion site could not be identified. These patients were referred for radiologically inserted gastrostomy. A total of 30 patients had PEG tubes inserted. There was >1 death within 30 days of PEG insertion and >1 major complication (buried bumper with sepsis that required surgical removal). Rates of local and systemic sepsis were low following the procedure (6.6%). There was no statistical difference in infection rates related to antibiotic prophylaxis, but the sample size was small.

**Conclusion:** A formal PEG referral form requiring input from all members of the multidisciplinary team at 30% many teams significantly reduced the number of inappropriate referrals. The form in combination with pre-assessment by a member of the gastroenterology team limited 30-day mortality to 3.3%. A formal PEG referral form should be standard practice with all patients being pre-assessed prior to PEG placement.


www.gutjnl.com
Aims & Methods: The aim of the development was to reduce unnecessary endoscopies, ensure complete investigation and reduce times to cancer diagnosis. To do this we formulated local guidelines, based on BSG recommendations, and set up a Specialist Nurse IDA clinic which takes place twice a week alongside gastroenterology outpatients. Patients are referred via a structured referral form and seen and investigated under the two week rule, with dedicated endoscopy slots allocated. The clinic has 40 minute appointments to allow time for a full history and examination (based on a proforma) and to give patients sufficient information and time to decide on whether to go ahead with invasive testing. Gastroenterology and haematology physicians are available for advice if needed.

Results: The IDA clinic has become well-established in the hospital. It undertakes an audit of all patients referred for endoscopy from GPs. In 2005, 555 new patients have been seen in 2 years with 11% having a gastrointestinal malignancy. The median wait between referral to the clinic and diagnosis of cancer is 2.5 months, compared with 4.5 months prior to the clinic being set up. The “Did Not Attend” rate for patients referred for endoscopy from the IDA clinic is 2%. An anonymous questionnaire-based survey of local GPs revealed that 93% were happy to refer to a nurse led clinic. 31% of GPs felt that the service had improved their diagnosis and management of IDA. We repeated the initial 2002 audit of referrals to endoscopy for anaemia in 2005, after the clinic had been established. Patients with anaemia were referred for endoscopy from the IDA clinic, direct from GPs, and from other consultant teams. Only 2% of this group of patients had no evidence of IDA (0% of patients referred from IDA clinic). 82% were optimally investigated (ie gastroscopy with D2 biopsies and colonoscopy combined).

Conclusion: We have demonstrated significant improvements in the management of IDA by setting up a dedicated IDA nurse-led service. There has been a significant reduction in unnecessary endoscopic investigation of non-iron deficiency anaemia (mainly anaemia of chronic disease, an improvement in completeness of investigation and a fall in the delay between referral and diagnosis of GI malignancy. To do this we formulated local guidelines, based on BSG recommendations, and set up a Specialist Nurse IDA clinic which takes place twice a week alongside gastroenterology outpatients. Patients are referred via a structured referral form and seen and investigated under the two week rule, with dedicated endoscopy slots allocated. The clinic has 40 minute appointments to allow time for a full history and examination (based on a proforma) and to give patients sufficient information and time to decide on whether to go ahead with invasive testing. Gastroenterology and haematology physicians are available for advice if needed.
ENDOSCOPY IN PEOPLE AT RISK OF V CJD: FROM SCOPE QUARANTINED TO ACCESS DENIED

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Introduction: In 2005 the Advisory Committee on Dangerous Pathogens (ACDP) defined classes of patients at potential risk of variant CJD (vCJD). These include up to 6500 recipients of blood products prepared from large pools of donated plasma during the time when individuals with preclinical vCJD may have donated blood (1980–2001). Consensus was reached with the BSG in defining an “invasive procedure”, the most frequently performed being bowel biopsy. A biopsy could potentially contaminate the working channel of an endoscope with gut lymphoid tissue and pose a potential risk of infection to others. Quarantine of endoscopes used for invasive procedures is advised, because there is no certain method for decontaminating prior particles.

Aims & Methods: Two independent surveys of Haemophilia Centres and the endoscopy units serving them were undertaken to determine: (1) whether access to endoscopy is being restricted in people with bleeding disorders; (2) what precautions endoscopists are taking to avoid endoscope contamination; and (3) the extent to which endoscopes are being quarantined.

Results: The United Kingdom Haemophilia Centre Doctors Organisation (UKHCDO) conducted a survey of the impact of recommendations made for high risk endoscopic procedures. 43 Haemophilia Centres responded. There was evidence that referrals for endoscopy in “at risk” patients are being delayed or declined by endoscopy units serving 21 of these 43 Centres. A BSG survey found that 10 responding endoscopy units commonly endoscope people with haemophilia (median 10 such patients per year, range 3–20) and one unit routinely scopes other patients with or at risk of vCJD. Of these 11 units, two do not perform any mucosal biopsy, four perform biopsy but take no special precautions against endoscope contamination, two use a dedicated endoscope, one unit performs biopsy per procedure and withdraws the endoscope with forceps protruding, and two quarantine endoscopes after biopsy in such patients (as per the ACDP/BSG guidelines). From the survey findings it is understood that at least 11 units have quarantined at least 33 endoscopes, but only one of these has access to dedicated resources for replacing quarantined endoscopes.

Conclusion: There is wide variation in the interpretation of national recommendations and in clinical practice, both in the acceptance of patients at risk of vCJD for endoscopy and in the precautions taken to avoid endoscope contamination. Endoscopists must balance the need for endoscopic biopsy and therapy against any alternative avenues for diagnosis and therapy. Access to endoscopy for patients at risk of vCJD would probably improve if central funding were to be made available for the replacement or refurbishment of quarantined endoscopes.

IS FLUID DEPRIVATION REQUIRED PRIOR TO ENDOSCOPY?

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Introduction: There are no national guidelines for the length of time patients should be starved prior to upper GI endoscopy. Indeed there are very few papers in anaesthetic journals examining the period of starvation prior to general anaesthesia. Even in our own trust practice varies widely as it does nationwide. We examined the effect of allowing patients to drink 500 ml of clear fluids in the 4 h prior to upper GI endoscopy.

Aims & Methods: We performed a prospective single blind controlled study in which half the patients attending for upper GI endoscopy were starved for 4 h and half were allowed to drink 500 ml of clear fluids. Particular reference was given to food and drink safety of the procedure, degree of patient distress and overall patient satisfaction. Data were collected using visual analogue scale based questions, via questionnaires. Gastric fluid volume and pH was also recorded. Ethical approval was granted by the South East Wales ethical committee.

Results: Of 41 patients, 18 in group A were starved and 23 in group B were allowed to drink. We demonstrated that patients in Group B tolerated the preparation better and found it more acceptable than those in group A (p < 0.05) respectively. Following the endoscopy the thirst score was significantly less in group B (p = 0.05). There was no difference in pH and the endoscopist reported no difference in patient distress or difficulty in performing the procedure. There were no adverse events recorded.

Conclusion: Permitting patients to drink up to 500 ml of clear fluid prior to endoscopy make the procedure better tolerated, more acceptable and also reduces thirst. There is a small increase in gastric fluid volume (15 ml) which does not adversely affect the procedure. We propose that this practice would improve patient experience during diagnostic endoscopy.

THE NEED FOR NURSE-LED PRE-ASSESSMENT IN A COMMUNITY BASED ENDOSCOPY CLINIC

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Introduction: Flexible sigmoidoscopy is an invaluable investigation for change in bowel habit, PR bleeding and surveillance of the distal colon. This has historically been carried out in the hospital setting but with increasing pressures to reduce waiting times and improve access, this service is now being offered in community based clinics.

Aims & Methods: This study attempts to quantify the effect of a nurse-led pre-assessment service on “Did Not Attend” (DNA) rates in a community based endoscopy unit in Newcastle upon Tyne. A prospective database of all patients attending for flexible sigmoidoscopy was kept for 13 months with the pre-assessment service and 13 months without. These data were then used to compare the DNA rates with and without the pre-assessment service. The phone based pre-assessment service was costed at £3.36 per patient. An endoscopy appointment whether it is used or wasted costs £470. A total of 1539 patients were included in the study, 820 with pre-assessment and 719 without.

Results: With the pre-assessment service there were 53 DNAs, 28 cancellations and 5 appointments not used for other reasons, representing a total of 86 (10.5%) wasted appointments. Without the pre-assessment service there were 88 DNAs, 36 cancellations and 10 unused appointments for other reasons, representing a total of 134 (18.6%) wasted appointments.

Conclusion: If entirely attributable to the pre-assessment service being withdrawn then the increase in wasted appointments translates into a cost of £32,195. The cost of providing the pre-assessment service for those 719 people would have been £2416.
**270 SUCCESS OF REPEAT ERCP FOLLOWING INITIAL THERAPEUTIC FAILURE**

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**Introduction:** The recent BSG national audit shows that endoscopic retrograde cholangio-pancreatography (ERCP) is performed with therapeutic intent in 90% of cases in the UK, but is unsuccessful in 29%. Optimal further management for these patients remains unclear. While percutaneous transhepatic drainage (PTD) is one therapeutic option, this may not be definitive and carries a risk of complications. We report the outcomes of repeat ERCP in a tertiary centre, following failed ERCP elsewhere.

**Aims & Methods:** All patients referred to our centre for therapeutic ERCP following a previous failed procedure from Sept 2002–Sept 2005 were included. Indications for ERCP and reasons for failure in the referring unit were documented. Difficulty of the procedure was graded according to the Schutz grading system as modified by Cotton. Repeat ERCP was defined as successful when biliary drainage was achieved. Reasons for failure in our centre, complications, and subsequent management and outcome were recorded.

**Results:** 121 patients were referred from 27 hospitals, after a median of 1 ERCP (range 1–4). Indications: obstructive jaundice, 95 (79%); bile duct stones without jaundice, 18 (15%); biliary dilatation and abnormal liver biochemistry, 2 (1.7%); biliary leak, 5 (6%). 76 procedures (63%) were sustained retroperitoneal perforations which resolved with conservative management. Endoscopic biliary drainage was unsuccessful in 15 patients. Predictors of failure included polya gastrectomy (failed in 1/8 patients, 13%), duodenal obstruction/distortion (1/7, 14%), duodenal diverticulum (3/19–12%), bile duct transection (1/1, 100%), and overall Schutz grade 3 (4/33, 12%) of the failures, further management included PTD in 9 (9.6%) patients treated by surgery and endoscopy (p = 0.01). There was no difference in the outcome according to the degree, the level of the stricture. Recurrence rate was less in patients treated by surgery alone (4/5) or surgery and endoscopy (15/16); as well as were correlated to a less initial hospital stay (p < 0.01) and total hospital stay (p < 0.01). There was no difference in the outcome according to the aetiology and the level of the stricture.

**Conclusion:** In a high volume tertiary centre, repeat ERCP may be successful when biliary drainage was achieved. Reasons for failure in our centre, complications, and subsequent management and outcome were recorded.

**271 DO UC WHAT I SEE? IMPACT OF ENDOSCOPY SCORING ON THE OUTCOME OF A CLINICAL TRIAL**

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**Introduction:** The impact of interobserver variation in endoscopy on trial outcomes to our knowledge has not been previously explored. A clinical study of a peptide versus mesalazine provides evidence of the influence of the variability of endoscopic scoring on clinical outcome.

**Aims & Methods:** To investigate the efficacy of a peptide over mesalazine, 335 patients with moderately active ulcerative colitis (UC) were randomised in two independent cohorts to receive peptide 200 mg or 600 mg daily plus mesalazine 2.4 g daily, or mesalazine 4.8 g daily for 8 weeks. Modaﬁn UC was defined as a Mayo score score (7–11), with a sigmoidoscopy score (SS) endoscopic, histologic and clinical data were collected of entry and 8 weeks. To minimise variability, investigators (INV) and an independent blinded observer (Central) were trained to score sigmoidoscopies to prespecified standards. Three definitions of remission were used: clinical (stoil frequency (SF) subscore 0 and rectal bleeding subscore (RB) 0); complete (SF 0, RB 0 & SS < 1) and registration (RB 0 and SS < 1). Data were analysed for 305 patients with >14 days of treatment and adequate end point information.

**Results:** Central disagreed with INV scoring for endoscopic disease severity at entry by 12–23% across both cohorts. The impact of the “observer” on the treatment effect of peptide versus 5-ASA control for absolute clinical, complete and registration remission rates within each cohort was a median difference of 9.5% (range 6.6 to 41.2%). Results were more variable for registration remission than clinical or complete remission outcomes.

**Conclusion:** Observer assessment of endoscopic activity for UC needs to be validated and outcomes with biliary stricture who underwent surgical treatment, minimally invasive treatment (ERCP, PTCD) or both.

**272 MANAGEMENT OF BENIGN BILIARY STRICTURES: ERCP AND ALTERNATIVE METHODS**

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**Introduction:** The effectiveness of various benign biliary stricture treatments has not been evaluated systemically. The authors reviewed the treatment and outcome of patients with benign biliary stricture who underwent surgical treatment, minimally invasive treatment (ERCP, PTCD) or both.

**Aims & Methods:** Between 2002 and 2006 Patients(n=49) treated for benign bile duct strictures due to chronic pancreatitis (17), sclerosing cholangitis (12), bile duct injuries (11), choledochal cysts (3), pancreatic pseudocyst (3), Crohn’s disease of the duodenum (2) and aberrant anatomy (1). Surgery and/or endoscopic treatment were performed according to the degree, the level (Bismuth-Collins classification) and the aetiology of the stricture. Multivariate and univariate analysis of clinical and pathologic factors in relation to patient’s outcome, hospitals stay and survival were done.

**Results:** Twenty eight patients had only endoscopic intervention (stenting, balloon dilatation). 16 patients were managed with both surgical and minimally invasive procedure. 5 patients underwent only surgical treatment. Repeated minimally invasive treatments gave less complications (4/28) than surgery alone (4/5) or surgery and endoscopy (15/16); as well as were correlated to a less initial hospital stay (p < 0.01) and total hospital stay (p < 0.01). There was no difference in the outcome according to the aetiology and the level of the stricture. Recurrence rate was less in patients treated by surgery and endoscopy (p < 0.01).

**Conclusion:** Successful management of benign biliary stricture requires a multidisciplinary approach. Initial endoscopic treatment should be attempted and repeated minimally invasive procedures are a real option. Combination of surgery and endoscopic intervention provides the best outcome.

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**Abstract 271 Central and investigator readings agree (difference when readings disagree)**

<table>
<thead>
<tr>
<th>Outcome measure of remission</th>
<th>Peptide 200 + 2.4 g</th>
<th>Placebo + 4.8 g</th>
<th>Peptide 600 + 2.4 g</th>
<th>Placebo + 4.8 g</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n in disagree)</td>
<td>68 (20)</td>
<td>73 (18)</td>
<td>51 (9)</td>
<td>60 (6)</td>
</tr>
<tr>
<td>Clinical</td>
<td>22.4% (+2.6%)</td>
<td>23.3% (-6.6%)</td>
<td>24.0% (+20.4%)</td>
<td>30.0% (+3.0%)</td>
</tr>
<tr>
<td>Complete</td>
<td>7.7% (+7.3%)</td>
<td>11.1% (0.0%)</td>
<td>6.3% (+15.9%)</td>
<td>13.6% (+19.7%)</td>
</tr>
<tr>
<td>Registration</td>
<td>15.9% (+4.1%)</td>
<td>14.7% (+18.6%)</td>
<td>10.6% (+11.6%)</td>
<td>25.5% (+41.2%)</td>
</tr>
</tbody>
</table>

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extent of this relationship and risk conferred to patients undergoing ERCP is uncertain. Cardiac troponin T (cTnT) is a highly sensitive and specific marker of myocardial injury, allowing detection of minor degrees of myocardial damage. This study examines whether there is evidence of myocardial damage in patients undergoing ERCP, assessed by measurement of cTnT.

**Aims & Methods:** 181 ERCP procedures in 163 patients were studied. Pre-endoscopy assessment included resting ECG and routine bloods with extra bloods pre and post (>12 h) procedure for cTnT. ERCP was performed as per normal standard of care. Where resources allowed, continuous cardiac monitoring was performed with a Lifecard Holter monitor, for development of tachycardia (>100 beats/min) and arrhythmia and with 12 lead ECG for ST segment changes.

**Results:** Age of the study population (105F/76M) was 25–100 (median 77). Continuous cardiac monitoring was performed in 99 (54%) procedures. No significant differences were found in baseline data between the group who had monitoring and those who didn’t. 47 had sinus tachycardia, 14 of whom had arrhythmias (8 atrial fibrillation, 4 bundle branch block, 1 Wenkebach and 1 SVT). Nine (9%) patients had significant ST depression (>1 mm depression for >1 minute). Post ERCP blood results were available for 150 patients, 141 had a post procedure cTnT below the assay detection limit (<0.03 μg/l). Of 9 patients with detectable cTnT, 6 were marginally increased (<0.1 μg/l) and 3 were significantly increased (>0.1 μg/l), a level suggestive of myocardial injury. Of those with a marginal increase, 3 had detectable cTnT pre-procedure. Of the 3 patients with cTnT levels >0.1 μg/l, only one was a rise from an undetectable level. In the second, the post procedure level rose from 0.06 μg/l to 0.19 μg/l, whilst in the third it fell from 0.30 μg/l to 0.19 μg/l.

**Conclusion:** Our study is the only one measuring cTnT as a marker of myocardial damage in patients undergoing ERCP. Cardiac monitoring identified evidence of ischaemia in a similar proportion of patients to that reported in previous studies. These results suggest a small risk of myocardial damage in patients undergoing ERCP. However the number of positive findings appears too small to be conclusive. In view of our identified evidence of ischaemia in a similar proportion of patients to that myocardial damage in patients undergoing ERCP. Cardiac monitoring for ST segment changes. Procedure cTnT below the assay detection limit (<0.1 μg/l). Of 9 patients with detectable cTnT, 6 were marginally increased (<0.1 μg/l) and 3 were significantly increased (>0.1 μg/l), a level suggestive of myocardial injury. Of those with a marginal increase, 3 had detectable cTnT pre-procedure. Of the 3 patients with cTnT levels >0.1 μg/l, only one was a rise from an undetectable level. In the second, the post procedure level rose from 0.06 μg/l to 0.19 μg/l, whilst in the third it fell from 0.30 μg/l to 0.19 μg/l.

**Conclusion:** Our study is the only one measuring cTnT as a marker of myocardial damage in patients undergoing ERCP. Cardiac monitoring identified evidence of ischaemia in a similar proportion of patients to that reported in previous studies. These results suggest a small risk of myocardial damage in patients undergoing ERCP. However the number of positive findings appears too small to be conclusive. In view of our findings, it may be worthwhile considering cardiac monitoring and troponin measurement in patients undergoing ERCP who are deemed to be at risk of myocardial ischaemia.

**Conclusion:** Our audit identified poor adherence with national guidelines. Many patients referred for open-access UGIE should have been referred under the ZWR system, and most patients under 55 referred for UGIE did not conform to NICE guidance on management of dyspepsia. Rates of ‘test and treat’ and appropriate trials of medical therapy prior to endoscopy were low. These problems impact on clinical governance, lead to increased waiting times for UGIE and result in poor performance on the GRS scale. This audit highlights the need for Endoscopy units to examine their open access services in light of new national guidelines, and stresses the importance of clear communication between primary and secondary care to develop robust treatment and diagnostic pathways.
a mean age of 66 years (range 63–69 years and 70% were over 60 years), sex ratio (1.4M:1F), mean mortality 11% (range 10–17.2%), Rockall score (>3) 85%, proportion with peptic ulcers (33%) and varices (6%). There have also been some significant changes in haemodynamic parameters, haemoglobin and urea results and the presence of major comorbidities. There have been a few apparent changes and these are summarised in the table above. In addition the proportion of normal OGD has decreased from 25.8% to 12.4%, mean duration of stay has decreased from 6 days to 4 days and H pylori eradication rates have increased from 40% to 78%.

Conclusion: As with other published studies we have shown that the majority of patients with UGIB are elderly with significant comorbidities. We have shown a few potentially important trends over this time period including a greater proportion of patients who bleed after admission for other reasons and a higher number of bleeds occur whilst taking warfarin—these areas merit further exploration. The increase in cases done out of hours, with more endotherapy but increasingly performed by consultants, has important implications for training our juniors.

**277 POLYP DETECTION RATE IS IMPROVED WITH POSITION CHANGES DURING COLONOSCOPE WITHDRAWAL: A RANDOMISED, CROSSOVER TRIAL, MID-POINT ANALYSIS**

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Introduction: Changing patient position during colonoscopy withdrawal is recommended by some experts to improve mucosal visualisation, but anecdotally this is not routine in most units. We have previously demonstrated that changing patient position during the withdrawal phase of colonoscopy improves visualisation through better luminal distension; however it is not clear that this translates into improved polyp and adenoma detection rates.

Aims & Methods: A randomised, crossover trial was performed. The proximal colon was examined in three segments: caecum to hepatic flexure; transverse; splenic flexure to descending colon. Patients were randomised to either examination in left lateral position alone or with position changes first. Each segment was examined twice for 2 minutes, either in left lateral then with position changes or vice versa. Position changes were: caecum to hepatic flexure, left lateral; transverse, supine; splenic to descending, right lateral. After examination with both options with recording of all polyps, polyps were then removed and sent for histological analysis.

Results: Sixty four patients (of a planned 130) were randomised, mean age 63 years, 29% male. Median sedation: midazolam 1.25 mg, pethidine 25 mg IV. Data are expressed as the number of patients with at least one polyp detected by segment in each position (see table). When transverse, splenic and descending polyp counts were combined (areas where positions were different between examinations) the difference in patients with at least 1 polyp detected, 21 (33%) left lateral v 30 (47%) position changes, was significant, p = 0.03. The total number of polyps in these areas was 31 v 42, and total adenomas 18 v 26, for left lateral v position changes respectively. There was no significant difference in the number of patients with at least one polyp, caecum, ascending and hepatic flexure combined, 32 (50%) v 34 (53%), left lateral v position changes (left lateral in these areas) respectively, p = 0.75.

Conclusion: Changing the patient’s position during colonoscopy withdrawal, a cost-neutral intervention, improves polyp detection rates overall in the transverse colon, splenic flexure and descending colon combined. This intervention has the potential to improve the effectiveness of the National Bowel Cancer Screening Program without increasing costs.

ClinicalTrials.gov Identifier: NCT00234650.


**278 FACIAL RESPONSE TO ANAESTHETIC SPRAY IS A PREDICTOR OF PATIENT TOLERANCE FOR GASTROSCOPY**

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Introduction: Upper GI endoscopy is a high volume, high turnaround procedure. Many units encourage topical pharyngeal anaesthesia alone rather than sedation. The advantages include shorter procedure time and quicker recovery time, in addition to the lower incidence of respiratory complications and lack of antegrade amnesia. Predictors of poor tolerance to the procedure have included female patients, young age and high level of pre-test anxiety.1

Aims & Methods: To determine whether the immediate response to throat spray can predict the patient tolerability of unsedated gastroscopy. Consecutive day case patients referred for a gastroscopy who had selected to receive throat spray alone were assessed. All patients had written information in the post and had opportunities for further discussion with the admitting nurse and the endoscopist prior to giving consent to the procedure. The endoscopy nurse allocated a spray score (1 = smile or neutral; 2 = grimmace; 3 = cough or choke). The endoscopist (SM) allocated an endoscopy score whilst blinded to the spray score (1 = well tolerated; 2 = poorly tolerated: retching >50% of the time, panicking, pulling out scope). Chi-squared tests were used to analyse the data.

Results: 121 patients were assessed (M = 65, F = 56). A total of 82 (group 1), 26 (group 2) and 13 (group 3) patients received a spray score of 1, 2 or 3 respectively. In group 1, 95% (n = 78) tolerated the procedure with ease (endoscopy score 1) compared with 73% (n = 19) for group 2 and 38% (n = 5) for group 3 (p < 0.001). Of 102 patients with an endoscopy score of 1, 76.4% (n = 78), 18.6% (n = 19) and 5% (n = 5) had a throat spray score of 1, 2 and 3 respectively (p < 0.001). Of the 19 patients with an endoscopy score of 2, 21% (n = 4), 36.8% (n = 7) and 42.1% (n = 8) had throat spray scores of 1, 2 and 3 respectively. Among female patients, 25% (n = 14) poorly tolerated the procedure compared with 8% of men (n = 5) (p < 0.01). The male-female differences were independent of their spray score. The mean age of females with poor tolerance was 49.8 years versus 61.9 years if it was tolerated.

Conclusion: This prospective blinded study has demonstrated a reliable means of predicting tolerance to unsedated gastroscopy by noting the facial reaction to topical pharyngeal anaesthesia. The study also confirms previous reports that young female patients are less likely to tolerate the procedure. This should be incorporated into the informed consent
Aims & Methods: The aim of our study was to determine if these scores accurately reflect patients’ discomfort level. Data were collected by an independent observer from 150 consecutive colonoscopies. The sedation and discomfort scores were recorded by the nursing staff using the Leeds criteria. After colonoscopy each patient used the Leeds criteria to rate their own experience of colonoscopy.

Results: The overall caecal intubation rate on an intention to treat basis was 90% with an average time to caecum of 15.2 minutes. 74 females and 76 males completed the study. The correlation coefficient between the nurses and patients score for discomfort (D) and sedation (S) was 0.34 and 0.28 respectively (not significant). Nursing staff consistently underestimated the patient level of discomfort. The patient D score was > 2 points above the nurse’s score in 35% and was >1 point above the nurse’s score in 60% of the cases.

Conclusion: Discomfort and sedation scores assessed by nurses showed little correlation to the patient’s score in our study. We propose that discomfort score should be recorded by the patient if it is to be included as a criteria for assessing the performance of units.

Conclusion: General gastroenterologists can provide endoscopic services for children safely and promptly in their local hospital. This would seem to be appropriate in the management of common gastrointestinal problems affecting children.
intensive one-to-one hands-on colonoscopy training course includes 3 micro-teaching, 2 computer simulator and 4 hands-on training sessions within 4 days, and has been shown to improve core knowledge and clinical skills in colonoscopy.\textsuperscript{3} JAG guidelines state that trainees should be performing at least 100 colonoscopies within the course of a year,\textsuperscript{4} which equates to less than two procedures per week.

\textbf{Aims & Methods:} The aim of the study was to assess whether trainees continue to practise in accordance with JAG guidelines and improve their skills following the course. The first 50 trainees were asked to complete and return a questionnaire asking how many colonoscopies they had performed during the 6 months following the course and the frequency of training lists. If they were not receiving regular training, explanations were recorded. Individual trainees’ caecal intubation rates were compared with their pre-course rates.

\textbf{Results:} Twenty questionnaires (40\%) were returned. Fewer than half the trainees had performed over the minimum 50 colonoscopies recommended by JAG within 6 months (mean 60.5, range 12–130). Five trainees (25\%) did not have a regular training list. Military service, a research post and a specialist hepatology post were given as explanations in three of the cases. Despite this, caecal intubation rates improved by a mean of 11.8\% (71.6\% v 83.4\%), with no significant difference in improvement between those who performed over 50 procedures and those who did not (10.4\% v 13.8\%, p = 0.78). Less experienced trainees (<100 previous colonoscopies) showed the most improvement, from 46.3\% to 75.5\%, but those with moderate previous experience (101–200 colonoscopies) achieved caecal intubation rates consistent with independent practice, with the mean improving from 77.5\% to 92\%.

<table>
<thead>
<tr>
<th>Colonoscopies (n)</th>
<th>0–25</th>
<th>26–50</th>
<th>51–75</th>
<th>76–100</th>
<th>&gt;100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trainees (n)</td>
<td>3</td>
<td>8</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

\textbf{Conclusion:} Trainees are falling far short of JAG guidelines with regard to adequate experience and supervised lists. However, following an intensive training course, juniors appear to make good progress and more senior trainees may become independent despite low numbers of procedures. This highlights the continuing need for ongoing procedure exposure and training after intensive training courses.


\textbf{283 \ Aims & Methods:} To investigate the efficacy of DS versus SHA for the en bloc resection of Paris type I/II and LST lesions (<30 mm). Primary end-points were histologically proven R0 resection and complication rates. A power calculation (\(\alpha = 0.05, \beta = 0.2\)) indicated that a sample size of 80 lesions per group was sufficient to detect a 5\% difference in resection completeness and recurrence rates. Inclusion/exclusion criteria were: Paris type I/II/LST lesion <30 mm diagnosed using double contrast barium enema or index colonoscopy. Patients were randomised in a 1:1 ratio by random number codes: group A, EMR using DS; and group B, EMR using SHA.

\textbf{Results:} 193 patients fulfilled eligibility criteria (19 exclusions; 17 on table stage compatible with stage T2 disease/2 participant refusers). 174 patients were therefore randomised in a 1:1 ratio (87 patients per group) to receive EMR using DS or SHA. The median age of the SHA and DA group was 58 years (range 32–83) and 56.5 years (range 29–84) respectively. There were no statistically significant differences between the SHA and DA group regarding baseline demographical characteristics or when comparing morphological Paris class, anatomical location or post resection histopathology. R0 resection was achieved in 59/82 (72\%) of lesions in the DS group versus 56/81 (69\%) in the SHA group (p = 0.1) with no significance reached when comparing the median lesion diameters (DS group median 18 mm; range 6–35 mm/SHA group median 20.2 mm; range 4–40 mm)—p = 0.1. 163 (100\%) patients randomised attended for post EMR surveillance. The median number of post resection surveillance colonoscopies in the DS and SHA group were 3 (range 1–6) and 4 (range 2–6) respectively (p = NS). The median post index EMR resection follow-up period in the DS group was 20 months (range 4–26) and 18 months (range 3–22) in the SHA group (p = NS). Recurrence rates were 4/82 (5\%) and 5/81 (6\%) is the DS and SHA group respectively (p = NS). There was no significance reached when comparing bleeding (immediate/delayed) or perforation rates between the two study groups (p = 0.1/p = 0.5) respectively.

\textbf{Conclusion:} EMR using dextrose solution is as effective as hyaluronic acid comparing the end-point parameters of resection completion, recurrence rates and complications. Significant cost savings can be achieved.
interobserver agreement in capsule endoscopy reporting between trainee and consultant gastroenterologists

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Introduction: Video capsule endoscopy is a safe and effective test for assessing the small bowel. It is particularly useful in the investigation of patients with unexplained iron deficiency anaemia. Training in capsule endoscopy for gastroenterology registrars in the UK is limited to a few centres. Previous studies have suggested that with minimal training, nurses and novice readers were able to detect positive findings with good interobserver agreement with a trained consultant gastroenterologist.1,2 We perform about 100 capsule endoscopies per year in our institution and are interested in assessing the outcomes of training. In particular, this study was performed to assess the effects of basic training in capsule endoscopy for specialist registrars who are competent in gastroscopy and colonoscopy.

Aims & Methods: To assess agreement on positive diagnostic findings and pyloric and caecal detection times for 12 patients capsule videos between two trainee gastroenterologists with minimal training in capsule endoscopy and a consultant gastroenterologist with experience of 280 capsule endoscopies.12 capsule endoscopy studies were selected randomly and basic clinical information was provided to all three authors. We then reviewed the images independently and recorded positive findings, pylorus and caecal entry times and a provisional diagnosis. Each author recorded their confidence in each diagnostic finding on a standardised ordinal scale of 1–5.

Results: There was excellent agreement between the three authors for both positive findings and pyloric detection times. There was less agreement on caecal entry times between the trainees and the consultant. A consultant gastroenterologist trainee had 100% agreement with both trainees.

Conclusion: Minimal training in capsule endoscopy for gastroenterology trainees who are already trained in conventional diagnostic endoscopy is effective and allows reliable clinical reporting with good agreement with an experienced capsule endoscopist. This has positive implications for training in capsule endoscopy and on the potential provision of this service in hospitals in the UK.


Conclusion: These data suggest a significant number of lesions are missed at initial endoscopy. Our recommendations are to ensure precision during endoscopy, with clear mucosal views especially in the setting of “alarm symptoms”, and adequate biopsy sampling.


289 DIAGNOSTIC YIELD OF COLONOSCOPY IN CHRONIC DIARRHOEA

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Introduction: Diarrhoea is one of the most common symptoms for referral to gastroenterology department. Full colonoscopy is usually recommended in those over 45 years of age. In patients less than 45 years, diagnostic yield of flexible sigmoidoscopy is not substantially different when compared with colonoscopy.

Aims & Methods: To assess the diagnostic yield of colonoscopy in patients with chronic diarrhoea, to assess the diagnostic yield of biopsies taken from right and left sides of the colon and total number of microscopic colitis in the study sample. It was a retrospective study carried out at West Cumberland Hospital (District General Hospital). Data were collected from the Endoscribe/Revive databases and patients’ notes. All patients who underwent Colonoscopy for investigation of chronic diarrhoea during 2004 and 2005 were included in the study. Patients were categorised as those <45 years of age and those >45 years.

Results: Colonoscopy was performed by consultant gastroenterologist in 90% of the cases (n = 140) with caecal intubation rate of 93% (n = 144). Colonic biopsies were taken in all of the patients (100%). Mean age was 55 years (range 16–81). 46% (n = 71) of the patients were male and 54% (n = 84) were female. Basic investigations including FBC, U&E, LFTs, TFT, CRP, ESR and Albumin were normal in 66% of patients. None of the patients was positive for endomyseal IgA antibody. C-reactive protein and erythrocyte sedimentation rate were raised in 21% (n = 32) and 19% (n = 30) patients respectively. Colonoscopy was found to be normal in 62% (n = 96) patients. Colonic histology was normal in 63.9% (n = 99). Ulcerative colitis, Crohn’s disease, microscopic colitis, colonic polyp, tubular adenoma and cancer were diagnosed histologically in 3.9% (n = 6), 8.4% (n = 13), 2% (n = 3), 5.2% (n = 8), 5.2% (n = 8) and 3.2% (n = 5) respectively. Histological diagnosis of borderline significance was found in 8.39% (n = 13) cases. Number of patients <45 years of age with normal or abnormal basic investigation were 28% (n = 49) and out of these 84% (n = 41) had normal biopsy results. Among the remaining, 8% (n = 4) had unclassified inflammatory changes, 8% (n = 4) had IBD (one indeterminate colitis and one Crohn’s disease) and 10% (n = 4) had microscopic colitis. Diagnostic biopsy was apparent both in left and right sided colonic biopsies in these patients. 100% of the cancers were found in patients >45 years. Out of a total of 19 cases of IBD 79% (n = 15) were found in >45 years age group.

Conclusion: Diagnostic yield of colonoscopy is low in patients aged <45 years. Hence flexible sigmoidoscopy should be considered as the initial endoscopic investigation. None of the cancer was found in patients under 45 years. Three patients were diagnosed with microscopic colitis. Endoscopically they had normal colons. 1. Saurine TJ, Brewer JM, Eckstein RP. Microscopic colitis with granulomatous inflammation. Histopathology 2004;45:82–6.

290 LONG-TERM FIVE-YEAR PROSPECTIVE FOLLOW-UP OF ENDOCINCH THERAPY FOR GASTRO-OESOPHAGEAL REFLUX DISEASE (GORD): RETENTION OF PlicationS ARE ESSENTIAL TO CONTROL GORD

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Introduction: Endocinch therapy for gastro-oesophageal reflux disease (GORD) has been reported to be effective in the short term. However recently long-term failure of Endocinch has been reported due to loss of stitches. This is the first long-term five year prospective follow-up study to assess the efficacy of Endocinch and an impact of loss of stitches on GORD.

Aims & Methods: To evaluate the long-term benefit of Endocinch technique in patients seen up to five years post procedure and also to assess the GORD in patients who retained stitches and those who lost stitches at five years post procedure.

Twenty two patients were prospectively studied who had Endocinch therapy in year 2000 and 2001 and had up to one year post procedure follow-up previously. Three patients were lost to follow-up. One patient had successful anti-reflux surgery and one failed to submit the data. Seventeen patients successfully completed their symptom scoring, proton pump inhibitors requirement and quality of life (QOL) questionnaires. However only 13 patients agreed for follow-up endoscopy. Five years post procedure data were compared with baseline pre-procedures parameters.

Results: Mean age 44 (27–65 years), female:7 male:10. Heartburn symptom score significantly reduced from mean of 18.55 at baseline to 8.4 at 5 year post procedure (p = 0.002). Regurgitation score also reduced significantly from mean of 2.27 at base line to 1.17 at five years (p = 0.001). Similarly all QOL assessments remained significantly better (p = 0.01) and use of PPI was reduced by 53% at 5 year post procedure. Only 13 patients agreed for endoscopy (F: 5; M: 8). Both plications were present in 70% (n = 9), group 1 of cases whereas 30% (n = 4, group 2) lost all plications. An improvement in oesophagitis grade, symptom scoring (p = 0.01), regurgitation score (p = 0.007) and quality of life (p = 0.02) remained significantly better in those who retained plications at five years post procedure.

Conclusion: The Endocinch procedure is an effective out patients therapy that offers GORD patients significant long-term improvement in symptomatology, QOL and reduced requirement for PPIs at five-year period. Retention of plications seems to be an important factor in maintaining significant long-term improvements in symptom scores, QOL and reduced requirement of PPIs.

291 A STUDY TO ASSESS EXPERTISE AND TRAINING IN SENGSTAKEN-BLAKEMORE TUBE PLACEMENT AMONG TRAINEE GASTROENTEROLOGISTS

P. F. Marden, B. Collepyriest, D. Gavin, M. Farrant. Gastroenterology, Royal United Hospital, Bath, UK

Introduction: The average mortality of the first episode of variceal bleeding in most studies is 50%. BSG guidelines on the management of variceal haemorrhage state that balloon tamponade with a Sengstaken-Blakemore (SB) tube is highly effective and controls acute bleeding in 90% of patients although 50% rebled when the balloon is deflated. Although the use of SB tubes in the management of variceal haemorrhage has reduced with the advent of vasoactive treatments and endoscopic advances, it is still an effective treatment. Despite clear reference to its value in the control of variceal haemorrhage in BSG guidelines, the JCHMT gastroenterology curriculum 2005 makes no recommendation on gastroenterology SpR training in this subject.

Aims & Methods: This study aims to determine the level of training and competence in SB tube placement among gastroenterology SpRs in a training region (Wessex). All gastroenterology SpRs in the Wessex deanery received a questionnaire to assess their training in SB tube placement and clinical expertise.

Results: Thirty one SpRs were eligible for the study and 71% responded. Only 57% had practical experience of SB tube placement. None had a written training record of their experience, and none had been formally assessed using DOPs or an equivalent assessment format. 10% had never seen a senior colleague deploy an SB tube and only 36% felt confident using an SB tube independently. Although 42% had placed a SB tube within the last year only 3% currently worked in a hospital with local guidelines on SB tube placement. With regards to clinical expertise, 31% felt the gastric balloon should be inflated with water rather than air and only 31% would inflate the balloon to 300 ml. Other answers to this question varied from 20 ml to 500 ml in volume! No trainees knew the maximum time an oesophageal balloon should be inflated, and only 30% gave correct figure

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for the gastric balloon. 80% could not quote the correct percentage of patients that develop serious complications such as aspiration pneumonia and oesophageal ulceration in association with SB tube placement. Importantly all trainees felt gastroenterology SpRs should be trained in SB tube placement.

Conclusion: This study shows that trainees in gastroenterology have a low level of practical and theoretical knowledge with regards to SB tube placement. SB tube placement is still an essential skill for gastroenterologists involved in the management of acute variceal haemorrhage. The JCHMT gastroenterology curriculum does not currently give guidance on the training of SpRs in the use of SB tubes. Neither JAG or the BSG has published guidelines on this topic. If gastroenterology SpRs in the UK are to be safely trained in SB tube placement, a more formal framework of educational guidelines and methods of assessment are required.


292 ABDOMINAL PRESSURE DURING COLONOSCOPY: A SURVEY TO ASSESS ATTITUDES AND TRAINING AMONG ENDOSCOPY NURSES

P. F. Marden, V. Cambridge, B. Colleypriest. Gastroenterology, Royal United Hospital, Bath, UK

Introduction: Abdominal pressure is a valuable way to facilitate complete colonoscopy. In the majority of endoscopy departments this vital adjunct to colonoscopy is carried out by endoscopy nurses. Formal training in colonoscopy is mandatory and well structured but the role of training for endoscopy nurses is less well defined. This survey aims to assess endoscopy nurses level of training in abdominal pressure and their attitudes and understanding of the technique and its rationales.

Aims & Methods: Endoscopy nurses, in five UK hospitals were asked to complete a postal questionnaire.

Results: In total 59 endoscopy nurses were surveyed and 69% replied. Of these 98% performed abdominal pressure on a regular basis. None had read, or been presented with any evidence based literature on the subject. Only 2% had received formal training in the technique whilst 43% had received informal or ‘on-the-job training’. 100% felt endoscopy nurses should have formal, structured training in abdominal pressure. Only 39% had any understanding of terms used in the literature to describe different manoeuvres in abdominal pressure such as the ‘caecal lift’ or ‘sigmoid lift’, and 30% felt they didn’t understand what the term ‘looping of the colonoscope’ meant. Interestingly 71% felt competent to perform abdominal pressure but none had any formal objective assessment of their competence. Only 30% always understood the anatomical terms used to describe areas of the abdomen by the endoscopist, when asked to perform abdominal pressure.

Conclusion: Endoscopy nurses are frequently asked to perform abdominal pressure during colonoscopy as a recognised manoeuvre to improve chances of satisfactory completion and patient comfort. Neither the BSG nor JAG provides any guidance on how this technique should be applied. Quality and effectiveness of colonoscopy in all its aspects is important and education of the whole endoscopy team is necessary to achieve best clinical outcomes. This survey would suggest training and assessment amongst nurses performing abdominal pressure is inadequate. Endoscopy nurses should have guidelines and training on the application, contraindications and complications of abdominal pressure. Such training is not currently undertaken in the UK despite endoscopy nurses’ apparent willingness to participate in an educational programme.


AUDIT OF 30-DAY MORTALITY FOLLOWING PEG INSERTION AT A DISTRICT GENERAL HOSPITAL, THE KENT AND SUSSEX HOSPITAL TUNBRIDGE WELLS, KENT: COMPARED WITH NCEPOD RESULTS

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Introduction: Percutaneous endoscopic gastrostomy (PEG) was first described in 1980. A large number of PEG procedures are performed in hospitals throughout the UK. There are no national guidelines regarding the use of PEG tubes. Mortality post procedure is currently a concern for the BSG, following the recent first ever NCEPOD audit on endoscopy.

Aims & Methods: To establish the 30-day mortality following PEG at our institution.

Methods: Data on indication, demographics, anaesthetic spray, sedation, complications and cause of death collected from the endoscopy department computer system on all patients who had a PEG inserted during 2003. Medical notes of all patients who died following the procedure were reviewed and data compared with NCEPOD findings.

Results: Of the 66 patients who had a PEG tube inserted during 2003, 28 are still alive 18–24 months later. 30-day mortality, 24% (16 pts); national 30-day mortality, 6%; 1-year mortality, 53% (34 pts). Indication for procedure: CVA, 26; head injury, 2; cancer esoph, 1; unclear, 1; poor oral intake, 1; poor swallow, 1; dysphagia, 1. Anaesthetic technique: 64 patients received both lignocaine throat spray and sedation; 1 patient required naloxone; 1 patient required flumazenil. Causes of death at 30-days: pneumonia, 6; aspiration, 6; stroke, 2; sepsis, 1; sedation, 1. Causes of death at 1 year: pneumonia, 14; aspiration, 8; unknown, 8; stroke, 2; sepsis, 1; sedation, 1.

Conclusion: The 30-day mortality in this study is higher than that reported by NCEPOD, possibly because of an open access service. Our deaths also occur later and this may be because following PEG most of our patients are discharged to a nursing home. The mortality falls dramatically after 50 days and is highest in the first 21 days (where most deaths are due to comorbidity rather than the procedure itself). Therefore more care needs to be taken over both timing and selecting patients for PEG in order to reduce this early mortality. This could be achieved by introducing a PEG referral protocol, reviewing all patients by a MDT on a nutritional ward round and increasing the time between referral and procedure. Urgent review of current PEG policy should be undertaken. Throat spray and sedation should not be co-administered due to the increased risk of aspiration. Ultimately we should almost certainly be inserting fewer PEGs. A further audit should be performed following change in practice to confirm a positive outcome.


294 LONG-TERM, FIVE-YEAR FOLLOW-UP OF PATIENTS WITH IRON DEFICIENCY ANAEMIA AFTER A NEGATIVE GASTROINTESTINAL EVALUATION

M. T. McLaughlin, T. C. K. Thom. Division of Gastroenterology, Ulster Hospital, Belfast, UK

Introduction: Current guidelines suggest that OGD and a lower gastrointestinal (GI) investigation (colonoscopy or barium enema with or without sigmoidoscopy) are sufficient in the evaluation of iron deficiency anaemia (IDA). These guidelines are based on two small studies from the mid 1990s which concluded, after long-term follow-up of patients with IDA, that this approach was safe.

Aims & Methods: Patients who had negative upper and lower GI investigations for IDA between 1997 and 2000 were identified. Our aim was to determine if these patients subsequently developed recurrent anaemia or significant pathologies. Patients with overt GI bleeding or a positive diagnosis (gastric Ca, colorectal Ca, colonic polyps, coeliac disease, inflammatory bowel disease) were excluded. 67 patients were included and their hospital records were reviewed. Where these were incomplete the patient’s primary physician was contacted. Two patients were excluded because of inadequate follow-up data.

Results: Sixty five patients (52 female, 13 male), with a mean age of 65.6 years (range 29–87), were followed up long term. Follow-up was for a median of 5 years and nine months (range 7–109 months). In 54 patients (83%) the anaemia resolved after the initial treatment period. Five patients (8%) developed chronic IDA severe enough to require recurrent blood or iron transfusions. Two of these were pre-menopausal women with menorrhagia. Four patients (6%) were diagnosed with GI malignancies during follow-up. One of these was diagnosed with colon cancer on barium enema 9 months after a normal OGD and barium enema. Another patient was diagnosed with a small bowel adenocarcinoma 13 months after initial investigations, which included a small bowel series, and a third patient was found to have a gastric tumour 42 months after a negative evaluation. One other patient was diagnosed with a malignant colon polyp 7.5 years after her first presentation. 11 patients (17%) died of other illnesses during the follow-up period, 4 of these (6%) at a non-GI malignancy.

Conclusion: For the majority of patients with a negative GI evaluation for IDA the outcome is favourable although a small percentage may subsequently be found to have significant GI pathology. The current approach to IDA investigation is probably safe but a change in symptoms
or persistent anaemia should prompt further investigations. We suggest long-term annual FBP check.

295 SEDATION FOR ENDOSCOPIC PROCEDURES: ARE WE SAFE ENOUGH?
M. McMahon, P. Dunne, G. R. Lipscomb. Gastroenterology, Royal Bolton Hospital, Bolton, UK

Introduction: Previously published reports have shown that excessively high doses of benzodiazepines and opiates were used to sedate patients for endoscopic procedures, particularly in the elderly, which leads to increased morbidity and mortality. This has led to British Society of Gastroenterology (BSG) recommendations on safe sedation dosage for elderly patients which were recently highlighted by the National Patients Safety Association (NPSA). In particular, a change in benzodiazepine (midazolam) concentration was advised in order to allow smaller doses to be easily titrated in elderly patients. Patient Comfort Scores assess patients’ overall comfort before, during, and after endoscopic procedures and give a good indication of a patient’s perception of the procedure and appropriateness of sedation. Flumazenil has also been established to be a good surrogate marker of over sedation.

Aims & Methods: To determine whether endoscopic sedation practice has improved in our department since recent recommendations were issued, and to compare Patient Comfort Scores over this time period. A retrospective analysis of endoscopic reports for all patients undergoing gastrointestinal endoscopy was carried out during two months prior to, and two months after, the introduction of change in midazolam concentration. Mean sedation doses and flumazenil usage were recorded. Patient Comfort Scores were recorded for a period of two weeks before and after the recommendations.

Results: A total of 2332 procedures were reviewed. An overall reduction in midazolam use for all procedures was observed. This was demonstrated in both those <70 years (mean midazolam dose 4.0 mg (SD 2.7) v 3.0 mg (SD 2.8), p=0.0001), and in those >70 years (3.0 mg (SD 2.2) v 2.7 mg (SD 2.2); p=0.02). A decrease in midazolam use in elderly patients undergoing gastroscopy was also seen (2.3 mg (SD 1.9) v 1.9 mg (SD 1.7); p=0.011). There was no significant reduction of midazolam dose in both patient groups undergoing colonoscopy. Pethidine use did not fall. There was no significant change in Patient Comfort Scores or flumazenil use during the period studied. Flumazenil was used in 0.6% of patients receiving midazolam.

Conclusion: By highlighting recommendations for safe sedation use, a reduction in midazolam use is demonstrated in our unit. Patient’s overall comfort levels are not compromised by this reduction in use. The sedation doses used are also in line with BSG recommendations, and the overall use of flumazenil is low.


296 FIVE-YEAR EXPERIENCE WITH ENDOCLIPS IN THE MANAGEMENT OF GASTROINTESTINAL BLEEDING
F. Mohammed, K. Peddi, C. Babbs. Gastroenterology, Hope Hospital, Manchester, UK

Introduction: Endoscopic therapy is first line treatment for upper gastrointestinal (GI) bleeding. Adrenaline injection alone leads to high rebleeding rates and addition of a second method particularly heater probe is advocated. Endoscopic application of endoclips provides an alternative method of achieving haemostasis in upper GI bleeding (UGIB) but published experience is limited compared with other haemostatic methods.

Aims & Methods: To evaluate the use of endoclips in the treatment of gastrointestinal bleeding over a 5-year period (2001–6) with reference to appropriateness and outcomes from their use. Endoscopy report database analysed for reports containing the term “endoclip”.

Results: Forty six reports identified with the term “endoclip” of which 3 were not appropriate. Forrest classification score Patients (n)

<table>
<thead>
<tr>
<th>Forrest classification score</th>
<th>Patients (n)</th>
</tr>
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<tbody>
<tr>
<td>1a: active bleeding (spouting)</td>
<td>3</td>
</tr>
<tr>
<td>1b: active bleeding (oozing)</td>
<td>5</td>
</tr>
<tr>
<td>2a: non-bleeding visible vessel</td>
<td>11</td>
</tr>
<tr>
<td>2b: adherent clot</td>
<td>7</td>
</tr>
<tr>
<td>2c: flat pigmented spots</td>
<td>0</td>
</tr>
<tr>
<td>3: clean ulcer base</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
</tr>
</tbody>
</table>

applied at first endoscopy and only 7 (26%) of these rebled of which 3 went directly to surgery. Of the 13 who did not have endoclips at first endoscopy 11 (85%) rebled. 15 patients who rebled had a second endoscopy and endoclips (range 1–7, mean 3) were applied to 14. Haemostasis was achieved in 12 of these while 2 proceeded to surgery. There were a total of 6 deaths in the audit population but only one of these was due to uncontrolled bleeding. There were no complications from endoclip application.

Conclusion: Over a 5-year period endoclips have proven to be a safe and effective method of achieving haemostasis in high risk UGIB in combination with adrenaline injection.

297 DIRECT PERCUTANEOUS ENDOSCOPIC JEJUNOSTOMY: TECHNIQUE AND A FIVE-YEAR REVIEW
G. W. Moran, N. C. Fisher. Department of Gastroenterology, Dudley Group of Hospitals, Dudley, West Midlands, UK

Introduction: Direct percutaneous endoscopic jejunostomy (DPEJ) is a potentially valuable technique for artificial nutrition in selected patients, particularly those who require palliative nutritional support due to inoperable or recurrent upper gastrointestinal (GI) malignancy, where a PEG may not be feasible. We review our here technique and outcome.

Aims & Methods: The procedure is done with a gastroscope, paediatric colonoscope or enteroscope, under conscious sedation, and with fluoroscopy available. The endoscope is advanced into a loop of jejunum and an appropriate point for abdominal wall puncture identified by finger indentation and/or fluoroscopy. A conventional Frennies PEG kit is used and puncture is done with the conventional PEG trochar or a long drainage access (Keltt) needle, prior to completion of the procedure as for a PEG.

Results: Twenty eight cases were done between 2001 and 2006. 23/28 cases had malignant disease (oesophagus 5, stomach 15, pancreas 3); 12 had inoperable disease and 11 were postoperative; 7/11 postoperative cases had recurrent malignancy (median interval from surgery to PEGJ was 12 months). Median DPEJ endoscopy and time was 20 mins and there were no procedural complications. 12/28 patients (35%) died within 30 days although 20/28 patients (71%) were discharged from hospital with the PEGJ in use. 5/20 PEGJs were removed (no longer used, 3, infected, 2). Median survival was 83 days.

Conclusion: DPEJ placement is safe and has a role in selected patients, particularly for palliative nutritional support in patients with advanced malignancy. Discharge from hospital is feasible in most cases and a minority of cases have long-term survival.


298 PREOPERATIVE STAGING OF PANCREATICOBILIARY TUMOURS: THE ROLE OF ENDOSCOPIC ULTRASOUND (EUS) WITH EUS FINE NEEDLE ASPIRATION WHEN COMPUTED TOMOGRAPHY IS INCONCLUSIVE
C. Mounford1, M. Nayar1, B. Jacques1, J. Scott2, D. Manas1, R. Charnley1, V. Wadhwa1, K. Oppong1, Hepatopancreaticobiliary Unit, 1Radiology, Freeman Hospital, 2Cytopathology, Royal Victoria Infirmary, Newcastle Upon Tyne, UK

Introduction: Multislice computed tomography (CT) and endoscopic ultrasound (EUS) are both used for the local staging of pancreatic malignancies. However there is little published data on the additional
diagnostic power and benefit offered by EUS fine needle aspiration (FNA) performed concurrently for cases where CT imaging is inconclusive.

Aims & Methods: This was a retrospective study of data collected prospectively via the hepatobiliary unit database between January 2004 and April 2006. We analysed the CT and EUS findings, EUS FNA cytology and final histology after surgery. The aim of the study was to determine if the combination of EUS and FNA assisted diagnosis and therefore surgical decision making in cases where CT imaging was inconclusive. CT and EUS reports were classed as definite, inconclusive or benign. Only definite reports were taken as indicative of malignancy.

Results: We identified 65 patients who had pancreatic and biliary resections during this period. Male to female ratio was 1.5:1. All patients had CT scans and 60 patients had EUS performed. 51 patients had a definite diagnosis of malignancy on CT scan alone. 14 patients had malignancies identified as benign and 10 were made up the study group. Of these 14 patients, the combination of EUS and EUS FNA confirmed a diagnosis of malignancy in 10 (77% sensitivity, 100% specificity, positive predictive value (PPV) 100%, negative predictive value (NPV) 25%). Of these 10 patients, 3 had malignancy confirmed on both EUS cytology and EUS morphology, 5 on EUS morphology alone and 2 on cytology alone. Of the remaining 4 patients who had inconclusive CT, EUS and FNA cytology in the study group, 2 had malignant adenocarcinomas of the head of pancreas, 1 a cholangiocarcinoma and the other a benign stricture on final histological diagnosis.

Conclusion: In patients where CT pathology was inconclusive, the combination of EUS and EUS FNA cytology is useful in establishing the diagnosis of pancreatic and biliary lesions and thus provides additional information to guide surgical decision making.


299 SENSITIVITY AND SPECIFICITY OF ERCP BRUSHINGS OF SUSPECTED MALIGNANT BILIARY STRICTURES

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Introduction: There are a wide range of values quoted in the literature for sensitivity and specificity for ERCP brushings. We wished to assess the specificity and sensitivity for ERCP brushings performed in our hospital.

Aims & Methods: To assess the sensitivity and specificity of ERCP brushings in patients presenting with suspected malignant biliary strictures over a five year period. A retrospective search was performed using an endoscopy database over a five-year period between 2000 and 2005 for patients with suspected malignant biliary strictures. Endoscopic and demographic data were obtained from charts and a pathology database. Brushing results were reviewed and biopsy results were where available.

Results: 102 ERCPs and brushings were performed on 93 patients during this period. Eight patients had repeat ERCPs, 44 brushings were malignant (43%), 24 were suspicious for malignancy (24%), 19 showed cellular atypia (19%) and 15 showed benign epithelial cells only (14%). 22 patients had both brushings and biopsies to compare with, of whom had two ERCPs. 14 brushings were malignant or were suspicious for malignancy and were found to be malignant at surgery/biopsy. Four brushings showed normal epithelial cells or cellular atypia, which were found to be malignant at surgery. Six patients had brushings which showed benign epithelial cells with benign findings in surgery/biopsy and 2 had brushings suspicious for malignancy with benign surgery/biopsy findings. Sensitivity, specificity, positive predictive value and negative predictive value for ERCP brushings were 78%, 75%, 88% and 60% respectively. Overall accuracy of brushings at ERCP compared to final histology was 77%. In 45 (48.4%) patients there was a stricture at lower 1/3 bile duct, 27 (29.0%) had a stricture at mid bile duct, 13 (14.0%) had a stricture at junction of hepatic and bile ducts ( hilar stricture), and 8 (8.6%) had a stricture at the ampulla. 30 patients had a mass seen on abdominal imaging and of these 20 had malignant/suspicious brushings (67%) and 10 had normal/ atypia brushings (33%). There were 9 patients who had a normal Ca 19-9 level but malignant brushings (20.5% of those with malignant brushings). The average age of the patients was 72 years (range 35–95). Duration of presenting symptoms were less than 1 week in 25%, 1 week to 1 month in 35%, greater than 1 month in 35%. Symptoms at presentation were as follows jaundice (53%), weight loss (24%), pain (28%) and nausea (9%). Malignant biliary strictures prior to ERCP was 212.53 mm/l. Mean survival for patients post ERCP was 209 days (74 patients).

Conclusion: In our hospital the accuracy of biliary brushings at ERCP in patients presenting with suspected malignant biliary strictures was 77%. This compares favourably with other published studies.

300 ROLE OF REPEAT ENDOSCOPIC ULTRASOUND-GUIDED FINE NEEDLE ASPIRATION IN OBTAINING TISSUE DIAGNOSIS IN SOLID PANCREATIC LESIONS: IS IT WORTHWHILE?

M. K. Nayar1, V. Wadehra2, M. Egan3, K. N. Oppong1, 1Gastroenterology, Freeman Hospital, Newcastle Upon Tyne; 2Cytopathology, Royal Victoria Infirmary, UK

Introduction: Endoscopic ultrasound fine needle aspiration (EUS-FNA) is established as an effective technique for tissue diagnosis of solid pancreatic lesions. Sensitivity of 64% to 96% and specificity ~ 95% is reported in the literature. In general higher sensitivities are reported by units with the availability of an in house cytopathologist. There are limited published data on the utility of a repeat procedure in individuals with initial negative cytology and a residual suspicion of malignancy. Definite cytological diagnosis is particularly required in inoperable patients being considered for chemotherapy.

Aims & Methods: We report our experience of repeat EUS-FNA in a tertiary referral centre in patients who did not have a definite tissue diagnosis after the first FNA. We retrospectively analysed data from all patients who had a repeat EUS-guided FNA performed between January 2004 to April 2006.

Results: 440 patients had EUS guided FNA performed for various lesions during the study period. Of these 24 patients had 48 procedures performed for solid pancreatic lesions (21), hilar lesions (1) and a suspected cholangiocarcinoma (2). The reasons for repeat sampling were either inadequate tissue for diagnosis (PANIC 0.1/2 = 13) or atypia (PANIC 3/4 = 11). The mean age was 59.92 years (range 36–70). There was equal M:F distribution. The average number of passes was 2.75 (range 1–4). Mean follow-up period was 15.6 months (range 4–38). Repeat EUS guided FNA provided a final diagnosis in 20 (83%) patients. These include: adenocarcinoma (12), metastatic disease (2) and benign (6). The sensitivity, specificity, positive predictive value and negative predictive value were 93.3%, 100%, 100% and 90% respectively. Surgical pathology was obtained in 4 patients.

Conclusion: Our data support repeat pancreatic EUS-FNA in individuals with inconclusive cytology in whom there remains a suspicion of malignancy.

301 FLEXIBLE SIGMOIDOSCOPY IN THE COMMUNITY: IS MEDICAL SUPERVISION NECESSARY?

P. M. O’Loughlin, E. Stoker, A. F. Horgan, K. Chalam, Surgery, Freeman Hospital, Newcastle upon Tyne, UK

Introduction: In March 2004 Newcastle Hospital Trust established a nurse-led flexible sigmoidoscopy service to complement existing endoscopy facilities. The aim was to allow direct access referrals to sigmoidoscopy for GP and hospital referrals, provide prompt investigation, and where appropriate offer management and advice that may reduce the burden on existing hospital outpatient services. Initially the service was supervised by medical staff, but for the last 16 months the service has been exclusively run by nurse endoscopists.

Aims & Methods: To audit the activity of the nurse-led endoscopy service and compare 12 months under medical supervision with the same period run independently. Since the service was established all referral data, patient histories, procedure findings and outcomes have been prospectively entered into a database. This study assesses whether the effectiveness of the nurse-led service has changed with respect to outcomes.

Abstract 301

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<tr>
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<tbody>
<tr>
<td>Sigmoideoscopies (n)</td>
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<td>754</td>
</tr>
<tr>
<td>Mean waiting times</td>
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<td>34 days</td>
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<tr>
<td>Completion rate (40–cm)</td>
<td>88.3%</td>
<td>94.2%</td>
</tr>
<tr>
<td>Biopsy rate</td>
<td>46.5%</td>
<td>50.5%</td>
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<tr>
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<td>Polyp diagnosis</td>
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<td>12.5%</td>
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<tr>
<td>Outcomes</td>
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<tr>
<td>Discharge</td>
<td>28.5%</td>
<td>26.5%</td>
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<td>Outpatient clinic to</td>
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<tr>
<td>Colonoscopy</td>
<td>18.4%</td>
<td>14.2%</td>
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<tr>
<td>Barium enema</td>
<td>10.9%</td>
<td>1.6%</td>
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<td>Nurse clinic</td>
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<td>Notes to consultant</td>
<td>1.9%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Further bx</td>
<td>1.8%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Repeat flexi</td>
<td>0.9%</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

Wwww.gutjnl.com
Results: See table.

Conclusion: Community flexible sigmoidoscopy run by nurse endoscopists is safe and effective. There is no significant difference between completion rates and diagnosis of serious pathology when nurse endoscopists have medical supervision. Most common outcomes have remained unchanged including hospital outpatient follow up, discharge and colonoscopy referral. Decrease in number of barium enemas and other investigations ordered may reflect the corresponding increase in number in cases requiring discussion with a consultant.

302 PERCEPTION OF THE MALIGNANT POTENTIAL OF GASTRIC ULCERS IS INFLUENCED BY ACID SUPRESSING MEDICATION

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Introduction: Approximately 10% of malignant lesions are “missed” at endoscopy. Even when lesions are seen, misdiagnosis occurs because of insufficient biopsies. The number of biopsies taken depends on the suspicion of malignancy which in turn may be affected by changes in appearances due to acid-suppressing therapy (AST).

Aims & Methods: To determine how reliable endoscopic opinion was at determining whether an ulcer was benign or malignant and the effect of AST. A prospective study of all patients diagnosed with a gastric ulcer at gastroscopy over a 20-month period were identified (mucosal breach >5 mm). The endoscopist’s macroscopic judgement of the ulcers was recorded (benign, suspicious or malignant) and correlated with both prior AST and histology results.

Results: 196 ulcers were included. The predictive value of the endoscopist’s macroscopic judgement regarding the “suspicousness” of an ulcer can be estimated as the proportion of correct macroscopic diagnoses (PV pos) (table). The PPV of endoscopy in suspicious ulcers fell from 0.65 to 0.3 if patients had received prior AST. Clinicians need to be aware of this and adopt a more rigorous biopsy protocol.

Conclusion:

Abstract 302 Positive predictive value of macroscopic judgement

<table>
<thead>
<tr>
<th></th>
<th>Benign</th>
<th>Suspicious/malignant</th>
</tr>
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<tbody>
<tr>
<td>All (overall)</td>
<td>0.96 (131/137)</td>
<td>0.58 (26/45)</td>
</tr>
<tr>
<td>All +AST</td>
<td>0.94 (27/29)</td>
<td>0.3 (3/10)</td>
</tr>
<tr>
<td>All –AST</td>
<td>0.97 (102/105)</td>
<td>0.65 (20/31)</td>
</tr>
<tr>
<td>List (overall)</td>
<td>0.94 (45/48)</td>
<td>0.59 (14/24)</td>
</tr>
<tr>
<td>List +AST</td>
<td>0.85 (11/13)</td>
<td>0.67 (2/3)</td>
</tr>
<tr>
<td>List –AST</td>
<td>0.97 (31/32)</td>
<td>0.61 (11/18)</td>
</tr>
<tr>
<td>OAG (overall)</td>
<td>1.0 (21/21)</td>
<td>0.71 (5/7)</td>
</tr>
<tr>
<td>OAG +AST</td>
<td>1.0 (13/13)</td>
<td>0.51 (1/2)</td>
</tr>
<tr>
<td>OAG –AST</td>
<td>1.0 (0/0)</td>
<td>0.8 (4/5)</td>
</tr>
<tr>
<td>Emergency (overall)</td>
<td>0.95 (63/66)</td>
<td>0.50 (7/14)</td>
</tr>
<tr>
<td>Emergency +AST</td>
<td>1.0 (3/3)</td>
<td>0.4 (2/5)</td>
</tr>
<tr>
<td>Emergency –AST</td>
<td>1.0 (61/61)</td>
<td>0.5 (4/8)</td>
</tr>
</tbody>
</table>

303 INADEQUATE NUMBERS OF BIOPSIES RESULTS IN DELAYED DIAGNOSIS OF UPPER GASTROINTESTINAL ADCENOCARCINOMA

S. J. Panter1, M. Bramble2, P. Hungin3, R. Jones4, H. O’Flanagan3. 1Gastroenterology, South Tyneside District Hospital, South Shields; 2Gastroenterology, James Cook University Hospital, Middlesbrough; 3Centre for Integrated Health Care Research, University of Durham, Durham; 4Pathology, South Tyneside District Hospital, Middlesbrough, UK

Introduction: Up to 30% of patients diagnosed with an upper GI adenocarcinoma have had a prior gastroscopy in the 3 years before diagnosis. The inference is that the abnormality was missed.

Abstract 303 Number of biopsies taken at prior OGD

<table>
<thead>
<tr>
<th>Principal finding at prior endoscopy (n = 183)</th>
<th>n</th>
<th>Mean number of biopsies taken (median, range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal/Hi/DU</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>Oesophagitis</td>
<td>25</td>
<td>2.3 (2, 0–14)</td>
</tr>
<tr>
<td>Oesophageal stricture</td>
<td>11</td>
<td>1.1 (1, 0–3)</td>
</tr>
<tr>
<td>“Gastritis”</td>
<td>14</td>
<td>1.9 (1.5, 0–6)</td>
</tr>
<tr>
<td>Gastric ulcer</td>
<td>71</td>
<td>2.0 (1, 0–7)</td>
</tr>
<tr>
<td>Benign looking polyp</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Suspicious mass</td>
<td>10</td>
<td>2.9 (3, 1–5)</td>
</tr>
<tr>
<td>Pyloric stenosis</td>
<td>6</td>
<td>2.3 (2.5, 0–5)</td>
</tr>
</tbody>
</table>

Aims & Methods: To determine the nature of the findings at the initial gastroscopy, the time interval between gastroscopy and diagnosis and the biopsy rate. Endoscopy records from 685 patients diagnosed in South Tees Health District (population ~ 350 000) over a 10-year period were analysed having been identified from the pathology and NYCRIS databases.

Results: 747 patients were identified (April 1991–April 2001), 92% had primary adenocarcinomas (29% oesophageal; 71% gastric). Of the 685 patients, 183 (26.6%) had a prior endoscopy in the 3 years before diagnosis. Of the 685 patients, 183 (26.6%) had a prior endoscopy in the 3 years before diagnosis. However 120 of these had a planned follow-up endoscopy at which the diagnosis was made. In only 63 (9.2%) was there no abnormality seen or other diagnosis made, not requiring follow-up. Inadequate biopsy numbers account for the high incidence of failure to diagnose malignancy first time round, influenced by previous antisyecretory therapy. The table shows the findings at the prior endoscopy.

Conclusion: In the majority of cases lesions were seen at the first gastroscopy but many were thought to be benign. Inadequate numbers of biopsies were taken and so the opportunity to diagnose the cancer at initial gastroscopy was missed. It must be emphasised that benign looking ulceration in patients on antisycretory therapy should be regarded as potentially malignant and an adequate numbers of biopsies must be taken to avoid delayed diagnosis. The “true” miss rate for gastric cancer is the same as in Japan.

304 SIZE DOESN’T MATTER: SAFETY AND EFFICACY OF ERCP IN A SMALL DISTRICT GENERAL HOSPITAL

T. A. Mehta, K. Ofori-Adar, K. A. Roberts, D. R. Parker. Gastroenterology, Weston General Hospital, Weston-super-Mare, UK

Introduction: It has been suggested that an annual ERCP caseload of less than 100 is an independent risk factor for complications. In 2005 the BSG Endoscopy Committee recommended an annual ERCP caseload of 150.

Aims & Methods: To determine the safety and efficacy of ERCP in our small volume practice, a retrospective 7-year casenote analysis was carried out on all ERCPs performed between January 1998 and December 2004. Cotton criteria were used to categorise post-ERCP complications.

Results: 685 ERCPs were attempted; 47 were unsuccessful, 136 were diagnostic. Median (range) age of patients was 73 (22–94). Most requests were for gallstone disease (63%) or malignant common bile duct obstruction (16%). Complications occurred in 6.3% of all procedures. 47% of complications occurred after sphincterotomy and 21% after stenting.

Conclusion: Over a 7-year period, rates of success and complication in our unit with an annual caseload of around 100 compare well with published data from larger units. This suggests an annual ERCP caseload of approximately 100 can be effective and safe.

Abstract 304 Comparisons with published data (%)

<table>
<thead>
<tr>
<th>Results at Weston (all ERCPs)</th>
<th>Results at Weston (therapeutic ERCPs only)</th>
<th>Published data ranges$	extsuperscript{a,b,c}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannulation of desired duct</td>
<td>95.8</td>
<td>89–99</td>
</tr>
<tr>
<td>Mortality (30-day all cause)</td>
<td>0.9</td>
<td>0–4.2</td>
</tr>
<tr>
<td>Pancreatitis</td>
<td>2.2</td>
<td>5–10</td>
</tr>
<tr>
<td>Cholangitis</td>
<td>2.2</td>
<td>4–5</td>
</tr>
<tr>
<td>Haemorrhage</td>
<td>1.6</td>
<td>0.7–3.9</td>
</tr>
<tr>
<td>Perforation</td>
<td>0.3</td>
<td>0.1–2.4</td>
</tr>
</tbody>
</table>


doi: 10.1136/gut.2006.093097.1

Aims & Methods: We aimed to compare the utility of the Given PC system with BFT in patients at high risk of CR. We reviewed the records of all patients referred for CE at our institution between July 2004 and August 2006. During this period, any patient considered high risk for CR received a PC prior to CE. An abdominal x-ray (AXR) 3h after ingestion was used to confirm PC passage. If the PC was visible, gastrografin was used to confirm position (small or large bowel). If the PC was retained in the small bowel, CE was not performed and a BFT was carried out.

Results: In each case comparison was made between the PC result, prior radiology, and subsequent BFT (if performed). 324 patients were studied over 26 months. 275 (85%) low-risk patients did not receive a PC, with no cases of CR at CE. 49 (15%) high-risk patients received a PC. The PC passed in 38 (77%)—at CE: 35 passed easily; 1 transient hold-up; 1 retained in stomach; 1 retained in small bowel (but AXR review showed PC in small bowel, ie false negative). 25 of 38 had prior radiology, with significant strictures in 3. PC retained in 11 (23%) with no resulting complications. Four had no prior radiology: 1, subsequent BFT showed jejunal adhesions; 2, BFT showed Crohn’s stricture; 3, false+ PC (actually a calcified fibroid); 4, lost to follow-up. Five had prior normal radiology: 1, subsequent BFT normal, repeat PC retained; CT showed active Crohn’s; 2, PC in cecum ie false-; 3, subsequent BFT normal, awaiting repeat PC; 4, awaiting BFT; 5, lost to follow-up. Two had prior minor abnormalities at radiology: tight strictures found at DBE in 1; tight Crohn’s stricture at BFT in other.

Conclusion: (1) Patients without high-risk indicators for CR do not require a PC prior to CE. (2) The reliability of BFT for determining PC passage through the small bowel is poor. (3) In our experience, the PC can be used safely as a 1st line investigation in patients with high-risk indicators for CR without a prior BFT. (4) Retention of the PC is highly suggestive of significant underlying pathology. PC use helps to avoid the inappropriate and potentially dangerous application of CE in these patients. (5) Interpretation of PC location on AXR can be difficult, and false positives or false negatives may result.


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Aims & Methods: We aimed to assess the optimal method of bowel preparation for the capsule endoscopy test. We prospectively randomised patients to four groups: standard preparation as above (S); standard preparation plus 10 mg metoclopramide 15 mins before the test (M); Senna tablets with 2 l of Citramag the day before (CS); Citramag and Senna as above plus metoclopramide before the test (CSM). The studies were reviewed by a single investigator, blinded to the preparation used. The gastric (GTT) and small bowel transit times (SBTT), completion rate (CR), and significant findings were recorded. The view quality (VQ) was assessed on a scale from 0 to 4 (poor to good) and the luminal view obscured (0–20%, 20–40%, 40–60%). The score was applied to 5 minute segments assessed every 10% of the SBTT (max score = 4). Patient acceptance of the preparation was assessed using a visual analogue scale questionnaire. The study was powered for 150 patients.

Results: An interim analysis of 76 patients recruited to date was performed (18 in S, 17 M, 24 CS and 17 CSM). No significant difference in age, inpatient status or diabetes prevalence was noted between groups, but significantly fewer men were found in group S and M. The GTT and SBTT were significantly reduced in the CSM group compared with S (GTI 591 s vs 1012 s, p = 0.03, SBTT 184 min vs 258 min p = 0.01), but this was not the case in groups M or CS. No significant difference in CR was noted between groups (range 82–94%). VQ was significantly improved in the CSM group (overall score 41 v 36 p = 0.04) but no difference was seen in the CS or M groups. No association was noted between VQ and number of findings or rate of positive diagnosis in any of the groups. Patients found the CSM group significantly less comfortable (52% v 93% comfort p = 0.04). There was a trend towards CS being less comfortable and both CS and CSM being less convenient; 90% of patients would agree to the same preparation again and would forego more comfortable preparation for a more accurate test.

Conclusion: Citramag and Senna with Metoclopramide pre-procedure results in significantly reduced transit times and better small bowel visualisation than standard preparation. Although it is less comfortable and convenient, patients may overlook this for a more accurate diagnosis.


308 COMMON BILE DUCT WIDTH, AS MEASURED BY ENDOSCOPIC ULTRASOUND, INCREASES WITH AGE AND POST-CHOLECYSTECTOMY

S. L. Preston1, V. Kwan2, I. D. Norton3, D. B. Jones2. 1Gastroenterology, Concord Hospital; 2Gastroenterology, Concord hospital; 3Gastroenterology, Royal North Shore Hospital, Sydney, Australia

Introduction: The diameter of the common bile duct (CBD) frequently triggers further, often more invasive, imaging of the biliary tree. At what width is the CBD significantly dilated? Are there any variables that need to be taken into account when considering this measurement? Existing literature on the subject of CBD calibre has used both transabdominal ultrasound and cholangiography. Endoscopic ultrasound (EUS) enables a more accurate method of measuring CBD diameter, as it can image the entire CBD in a single real-time image.

Aims & Methods: This series set out to define the relationship between age and CBD diameter as measured by EUS. The influence of previous cholecystectomy and gender was also assessed. Prospective data were collected from consecutive patients undergoing EUS for non-biliary indications between March 2003 and May 2006. Exclusion criteria were: biliary or head of pancreas abnormalities; previous sphincterotomy; and abnormal liver function tests. At the time of EUS the CBD was identified at its ampullary distal origin and its proximal course mapped. The point of maximum diameter was recorded. This was correlated with age, gender and cholecystectomy status using the SPSS statistical package.

Results: 143 subjects were evaluated (90 females, 53 males). Their mean (SD) age was 62 (14) years, 35 were post-cholecystectomy. Overall the mean CBD diameter was 5.7 (2.4) mm. The Pearson correlation coefficient between age and CBD diameter was 0.285 (p = 0.01). Mean CBD diameters for males and females were 5.2 (1.6) mm and 5.9 (2.8) mm respectively (p = 0.10). On multivariate analysis, cholecystectomy (p = 0.001) and age (p = 0.037), but not gender (p = 0.296), were found to be predictors of CBD diameter.

Conclusion: In agreement with the existing literature, CBD diameter as measured at EUS is increased post-cholecystectomy. However, the correlation with age is not as strong, and a dilated CBD in an elderly patient should therefore not be solely attributed to age.

309 THE ADDITIONAL VALUE OF CUSUM CHARTS FOR COLONOSCOPY TRAINING

G. Bowler1, G. Waddup2, S. Masson3, M. D. Rutter4. 1Endoscopy; 2Gastroenterology, University Hospital of North Tees, Stockton-on-Tees, UK

Introduction: The Cusum (cumulative sum) chart gives a graphical representation of colonoscopy success rates. The graph line rises if trainee fall short of 90% coecal hit rate (CHR), and falls if CHR consistently exceeds 90%. Their use is promoted in JAG colonoscopy courses but few trainees or trainers use them. Here we share our unit’s experience of Cusum charts, and describe their value in highlighting potential problem areas for colonoscopy trainees and trainers.

Aims & Methods: All colonoscopy trainees in our hospital maintain a Cusum chart of CHR. These charts are reviewed quarterly as part of broader one-to-one endoscopy trainee meetings. Over the past 18 months, several interesting findings have been highlighted by the Cusum charts that would otherwise have been overlooked.

Results: Case A. Completed one-to-one training after 200 cases with clear evidence of >90% CHR. Performance dropped for first 40 procedures performed without trainer in room, only recognised on reviewing Cusum at next quarterly review. Action proposed: Phased withdrawal from room following sign-off trainee. Trainer to review initial progress more regularly.

Case B. Trainee practising without one-to-one supervision demonstrating >90% CHR. However following 3 week period of absence from colonoscopy practice, CHR dropped to <90% for next 30 cases. Action proposed: Highlight potential issue to future trainees/trainers. Consider list size reduction or brief period one-to-one supervision on return.

Conclusion: The value of Cusum charts extends beyond simply tracking CHR. In our experience their use has highlighted potential training/ performance issues in colonoscopy and has refined the unit’s training practice. We encourage all trainees and all units who train colonoscopists to adopt them.

310 DIAGNOSTIC YIELD OF INVESTIGATIONS IN PATIENTS WITH HEPATIC METASTASIS

S. S. Salunke1, A. Badar2, N. Jamieson1, A. Cahill1. 1Gastroenterology; 2Medicine, Stobhill Hospital, Glasgow, UK

Introduction: Patients with hepatic metastasis from unknown primary have a short-term prognosis. The dilemma is how to obtain information identifying a primary site with minimal inconvenience and delay.

Aims & Methods: To evaluate the diagnostic yield of investigations, looking for a primary, in patients with proven hepatic metastasis of unknown origin. Retrospective case notes review of patients with hepatic metastasis proven by liver biopsy attending Stobhill Hospital, Glasgow, between 2001 and 2006. Information was collected regarding liver biopsy, CT scan and investigations of the gastrointestinal (GI) tract.

Results: We found 52 cases, of which 47 were eligible for the study. The group had 22 (47%) women. The mean age was 65 (range 26–86) years. The mean survival after liver biopsy was 15 weeks. Liver biopsy of these 47 patients showed adenocarcinoma in 47%, non-small cell and large cell carcinoma in 6%, poorly differentiated carcinoma in 4% and 2% each of squamous cell carcinoma, carcinoid, pancreatic/neoendocrine...
Aims & Methods: practice. An audit of our practice was undertaken before and after a change in clinical percutaneous endoscopic gastrostomy (PEG) insertions, a retrospective and specialist review of patients prior to PEG insertion resulted in improved patient status (including the American Society of Anaesthesiology grading) and any complicating factors that might make the procedure high risk, such as comorbidities or patient frailty. Of these, 6/30 (20%) patients died in 30 days or less. These results were presented to the general internal medicine staff and a dedicated referral form was created that focussed on the indication for PEG, current infection. In addition, all referrals were assessed either by a specialist gastrointestinal nurse or gastroenterology registrar. Re-audit occurred from September 2004 to December 2006. We aimed to show a decrease in mortality through improved patient selection.

Conclusion: Mean survival in liver biopsy-proven patients with hepatic metastasis is extremely poor. Non-invasive investigation using CT scan appears to be more productive in diagnosing a possible primary site than invasive GI investigations.

311 PERCUTANEOUS ENDOSCOPIC GASTROSTOMY: IMPROVED PATIENT SELECTION AND 30-DAY MORTALITY RATES AFTER A CHANGE IN CLINICAL PRACTICE

M. Shariff, A. Milestone, L. McEvoy, C. Collins, I. Beveridge, K. Sundaram, S. Kane. Gastroenterology, West Middlesex University Hospital, London, UK

Introduction: Following the National Confidential Enquiry into Patient Outcome and Death (NCEPOD)1 of perioperative mortality following percutaneous endoscopic gastrostomy (PEG) insertions, a retrospective audit of our practice was undertaken before and after a change in clinical practice.

Aims & Methods: Case notes, endoscopy records and endoscribe computer database searches were reviewed of PEG insertions from January to September 2004. Re-audit occurred from January to September 2006. We aimed to show a decrease in mortality through improved patient selection.

Results: Case notes, endoscopy records and endoscope computer database searches were reviewed of PEG insertions from January to September 2004. 43 cases were identified. The 30-day mortality rate, indication for PEG and use of prophylactic antibiotic were recorded for each. Of these, 6/30 (20%) patients died in 30 days or less. These results were presented to the general internal medicine staff and a dedicated referral form was created that focussed on the indication for PEG, current patient status (including the American Society of Anaesthesiology grading) and any complicating factors that might make the procedure high risk, such as recent abdominal surgery, MRSA colonisation and clostridium difficile infection. In addition, all referrals were assessed either by a specialist gastrointestinal nurse or gastroenterology registrar. Re-audit occurred from January to September 2006 and showed a decrease in total number of procedures (27) and 30 day mortality rate (2/27 or 7.4%). The indications for PEG insertion were similar in both groups.

Conclusion: In conclusion, clinician education, a dedicated referral form and specialist review of patients prior to PEG insertion resulted in improved patient selection, fewer procedures and a reduced mortality rate.


312 SINGLE-CENTRE, SINGLE-OPERATOR ERCP EXPERIENCE IN A DISTRICT GENERAL HOSPITAL

R. G. Shidrawi, N. C. Z. Chua. Academic Department of Medical and Surgical Gastroenterology, Hamerton University Hospital, London, UK

Introduction: Multicentre series carried out by multiple operators may have confounding factors in determining the risks and benefits of endoscopic retrograde cholangio-pancreatography (ERCP). Data from single-centre, single-operator series can provide a useful estimate of the average risk of complications and failure, and can be used in obtaining informed consent in patients undergoing this procedure.

Aims & Methods: The ERCP experience of a single operator (RS) carrying out over 97% of these procedures in a district general hospital is reported. Preliminary imaging always included transabdominal ultrasonography and may have included computerised tomography, but magnetic resonance cholangio-pancreatography was not routinely available. A total of 638 procedures were carried out for the period December 2000-October 2006. Patient characteristics, indications, procedures, complications and failure rates is reviewed.

Results: Patient demographics: 261 males, 377 females; mean age 59.9 years, range 20-94. Indications (%): gallstone disease, 434 (68.0), carcinoma of the pancreas 27 (5.8), chronic pancreatitis 56 (8.8), pancreatic pseudocyst 30 (4.7), postoperative biliary injury 28 (4.4), cholangiocarcinoma 25 (3.9), ampullary neoplasia 15 (2.4), miscellaneous 13 (2.0). Therapeutic procedures: 577 (90.4). Endoscopic sphincterotomy: 412 (64.6). Needle knife papillotomy, 173 (27.1). Stone extraction, 281 (44.0). Endoscopic stenting: 149 (23.4). (Amsterdam 65, Pigtail 52, Metallic 32). Mechanical lithotripsy: 26 (4.1). Pancreatic endotherapy: 32 (5.0). Previous polya gastrectomy: 6 (0.9). Failed procedures: 9 (1.4).

Complications: 14 (2.2) (pancreatitis 5, perforation 4, haemorrhage 3, cholecystitis 1, cholangitis 1). The ERCP experience of a single operator (RS) carrying out over 97% of these procedures in a district general hospital is reported.

Conclusion: Patients referred appropriately for ERCP are likely to undergo a therapeutic procedure in over 90% of cases, overall have a 2.2% risk of serious complications requiring in-patient stay and a 1.4% risk of failure. All serious complications were associated with therapeutic intervention except post-ERCP pancreatitis.

313 FIBRED CONFOCAL ENDOMICROSCOPY: A FEASIBILITY STUDY TO ENHANCE ROUTINE ENDOSCOPY

A. Shonh2, R. Singh1, P. Kaye1, C. J. Hawkey1, K. Raunath1. 1Wolfson Digestive Diseases Centre, 2Histopathology, Queen's Medical Centre, Nottingham, UK

Introduction: The incorporation of magnification and confocal endomicroscopy has increased the ability of routine endoscopy to detect subtle abnormal lesions in the gastrointestinal tract. However, characterisation of these lesions is difficult even with the use of pit pattern description. The CellVizio GI F400 (developed by Mauna Kea Technologies, Paris, France) is a fibred confocal endomicroscopy device with the ability to characterise lesions in vivo by providing “virtual histology”.

Aims & Methods: The aim of this study was to assess the potential of fibred confocal endomicroscopy for prediction of histology during routine endoscopy. 62 patients underwent endoscopies using the Olympus Lucera video endoscopy system, (gastroscopy 22; colonoscopy 40) and confocal images were obtained using the CellVizio fibred confocal endomicroscopy system. Prior to obtaining confocal images the mucosa was washed with 10% N-acetyl cysteine to clear mucus. Either 10 ml of 0.8% fluorescein intravenously or 0.6% fluorescein topically was given as a fluorophore. Coloflex S and HD confocal miniprobes were used which have a lateral resolution of 5 &m and 2.5 &m respectively. The Laser Scanning Unit (LSU) functions at 488 nm. Confocal images were graded according to structural and cellular changes.

Results: Digital video images of confocal endomicroscopy were obtained at 12 f/second during the endoscopies from normal and abnormal mucosa. Corresponding biopsies were taken to allow histological comparison with endomicroscopy. The endomicroscopy images obtained resembled the histological appearance allowing in vivo diagnosis of Barrett’s oesophagus, intramucosal carcinoma of the oesophagus and stomach, tubular villous adenoma and ulcerative colitis in the colon. 0.8% intravenous gave the best images. No complications resulted from using this imaging system.

Conclusion: In vivo virtual histology can now be obtained using CellVizio GI confocal endomicroscopy system. This imaging modality may have potential uses in surveillance endoscopies for Barrett’s oesophagus and ulcerative colitis. It may also help distinguish hyperplastic from dysplastic adenomas. Further studies are needed in these areas to investigate the possibility of enhancing routine endoscopies.

314 THE SAFETY, EFFICACY AND CLINICAL OUTCOMES OF ENDOSCOPIC MUCOSAL RESECTION: EXPERIENCE FROM A TERTIARY REFERRAL CENTRE

R. Singh1, K. Yao2, A. Shonh1, P. Kaye2, K. Raunath1. 1Wolfson Digestive Diseases Centre, 2Department of Histopathology, Queens Medical Centre Campus, Nottingham University Hospitals Trusts, Nottingham, UK

Introduction: Endoscopic mucosal resection (EMR) has gained increasing acceptance as a minimally invasive approach to the management of superficial carcinomas or premalignant lesions in the gastrointestinal tract. Our aim was to assess the safety, efficacy and clinical outcomes of EMR in our institution.

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Aims & Methods: One hundred consecutive EMRs in 82 patients over a period of 35 months were prospectively analysed. Early (up to 24 h), and delayed (up to 4 weeks) complications were recorded. Completeness of resection (CR) was also assessed based on the histologic specimen and negative biopsy findings on follow-up endoscopic examination.

Results: A total of 51 males and 31 females with a mean (SD) age of 67 (14) (34–87) years underwent the procedure. The lesions were located in the oesophagus (10), stomach (8), duodenum (4), caecum (11), ascending colon (16), transverse colon (13), descending colon (4), sigmoid colon (14), recto-sigmoid (5) and rectum (13). Morphologically, 72 flat, sessile and 5 subpedunculated lesions measuring 16.6 (9.8) (3–50) mm were resected. Minor bleeding occurred in 12 patients (11 inapproproate referrals, 1 delayed) of which hemostasis was successfully achieved. Two patients developed perforations that required surgery and recovered. There were no procedure related mortality. Post-EMR histopathology was low-grade dysplasia (55), high-grade dysplasia (HGD) (23), carcinoma (3), carcinoma (3), serrated adenoma (3), metaplastic polypl (7) and unknown (6). Histology was upgraded to either adenocarcinoma or HGD in 13% of the lesions. CR was achieved in 63% as per intention-to-treat analysis and 80% as per protocol analysis.

Conclusion: EMR is a safe and effective technique for resection of superficial GI neoplasms with low complication rates. Long-term follow-up and outcome data are needed.

315 BENEFITS OF PRE-ASSESSMENT IN PEG PATIENTS

1Gastroenterology, Undergraduate Medical Student, Llandough Hospital; 2Gastroenterology, Llandough Hospital, Cardiff, UK

Introduction: A percutaneous endoscopic gastrostomy (PEG) assessment service was set up in our hospital in 2001 to assess all referrals for PEG placement. Prior to this they were performed on an “on-demand” basis when requested by a patient’s clinical team. Consequently patients were arriving in endoscopy ill prepared and for “inappropriate” reasons. The aim of the service was to reduce these inappropriate referrals, prioritise and ensure all patients were prepared for the procedure.

Aims & Methods: All patients referred between October 2001 and September 2006 were assessed by a Nutrition Nurse Specialist (NNS). Those felt to be unsuitable were discussed with the referring team. All patients receiving PEGs were given written information; a pre procedure label was entered into the notes to ensure consent, prophylactic antibiotic treatment, FBC, INR and IV access were all completed before the procedure. Post procedure the endoscopist placed a second label into the notes with detailed after care advice. Patients were followed-up with daily care records by ward staff and a weekly review by the NNS. A comparison was made of the number of PEG insertions before and after the introduction of pre assessment was made.

Results: In the year prior to pre-assessment 78 PEGs were inserted. The table shows the numbers inserted during the five-year period, the number of unsuitable patients referred for PEGs and the 30-day mortality rate. Reasons for which patients were declined included patients being unfit for the procedure, patient deterioration/death, improvement in patient condition, family decision and medical team decision. The main indications for the PEG procedures over the five year period were cerebrovascular accident (CVA) (43%), general deterioration (9%), MS/MND (8%), lung pathology (7%), head and neck malignancy (6%), dementia (5%) and Parkinson’s (4%). Other indications included oesophageal stricture and psychiatric causes. The highest mortality was in stroke patients (63%). All the patients had undergone pre-procedure checks.

Conclusion: Since introduction of a pre-assessment service of PEG patients the number of PEGs being carried out in the hospital has decreased. Also there has been a reduction in 30-day mortality suggesting a better preparation and selection of patients.

316 CHANGE IN BOWEL HABIT TO CONSTIPATION: IS FLEXIBLE SIGMOIDOSCOPY INDICATED?

M. J. Sproat, S. Kanagalingam, Z. H. Khan, J. Gatto. Gastroenterology, Yeovil District Hospital, Yeovil, UK

Introduction: Change in bowel habit is a common cause of referral to gastroenterology clinics. The prevalence of constipation is higher in women than men and increases with age. National guidelines have defined high risk groups who warrant endoscopic investigation to exclude colorectal carcinoma and include patients over 60 years with a persistent change in bowel habit to looser stools and/or more frequent stools without rectal bleeding. However, there is no consensus on the investigation of change in bowel habit to constipation. A previous study has shown that the yield of endoscopy for investigation of isolated constipation may be comparable with asymptomatic patients who undergo colon cancer screening.

Aims & Methods: We looked at constipation as an indication for flexible sigmoidoscopy, with or without other symptoms. A retrospective case series report was conducted for all flexible sigmoidoscopies between 3 February 1997 and 27 October 2006 performed for a change in bowel habit to constipation alone, or in association with other symptoms including bleeding, weight loss, anaemia and abdominal pain. Cases were found using Endoscribe database. A review of the patients’ medical notes and history was also performed.

Results: 327 patients had a flexible sigmoidoscopy for constipation. The median age was 73 years (range 26–96). The male to female ratio was 1:1.3. In 57.0% cases, isolated constipation was the only indication for endoscopy, and of the remainder, 18.6% were associated with pain, 16.2% overt rectal bleeding, 4.0% weight loss, 1.2% anaemia, and 6.1% other symptoms. Seven cases of colorectal carcinoma were seen (2.1%). However, in all of these cases there was another independent indication for endoscopy: constipation + overt rectal bleeding, 5 cases; constipation + colonic obstruction, 1 case; constipation + weight loss, 1 case. Overall, sigmoidoscopy was normal in 72.0% cases. Other diagnoses included diverticular disease (14.6%), polyps (9.8%) and colitis (1.5%). A review of histology and further imaging is also presented.

Conclusion: Our results confirm that the incidence of colorectal cancer in patients referred with constipation is low. Flexible sigmoidoscopy should only therefore be performed at patients presenting with constipation if other high-risk features are present.


317 GASTROINTESTINAL BLEEDING AND COAGULOPATHY: WORTH GETTING OUT OF BED FOR?


Introduction: Upper gastrointestinal bleeding (UGIB) in the setting of coagulopathy is most often a consequence of liver disease and portal hypertension. The role of immediate, therapeutic endoscopy in this population is paramount. However, UGIB also occurs in a fifth of patients with bleeding disorders or on long-term anticoagulation. Immediate endoscopy has been shown to have a lower yield in this group of patients.

Aims & Methods: The aim of this study was to establish the yield of upper gastrointestinal endoscopy for UGIB in the presence of coagulopathy at a
Introduction:
The literature suggests that black oesophagus or acute oesophageal necrosis (AEN) is a rare condition. It was our impression that it is a more common phenomenon, particularly in inpatients.

Aims & Methods:
We prospectively collected cases of “black oesophagus” identified during endoscopy at the Royal Berkshire Hospital (RBH) January 2005–July 2006. The RBH is a district general hospital serving a population of over 500,000; the unit performs >3000 GID's annually. Endoscopic images and histology were obtained where possible.

Results:
Nine cases (6 men) were identified, median age 85 (52–93), see table. In six patients (1 in table) the oesophagus was biopsied and all comprised predominantly acutely inflamed ulcer slough. In four cases (2, 3, 8, 9) there was also acutely inflamed oesophageal squamous mucosa; in two cases (4, 7) there was no epithelium. There was no evidence of Barrett’s oesophagus or malignancy. Special stains for iron, melanin, and bile were all negative. Three cases (4, 8, 9) contained hyphae and spores compatible with fungal infection.

Conclusion:
True AEN is confirmed by diffuse oesophageal necrosis and is reportedly rare. The appearance of a black oesophagus however appears more common and the underlying pathogenesis may be difficult to ascertain. The histology from all these cases confirmed ulceration. Microscopic presence of abundant extracellular yellow/brown pigment in these cases is significant but the special stains were inconclusive and do not discount extrathoracic bile or exogenous pigment. There was insufficient non-ulcerated tissue to reliably assess for ischaemia. One final consideration is that the black appearance is not due to pigment but rather reflects the state of ischaemia within the tissue, in a manner analogous to gangrenous necrosis. Black oesophagus may represent a spectrum of pathologies but also may represent true AEN more commonly than previously thought. This may be due to poor recognition, underreporting or difficulty in obtaining diagnostic histology. Although the natural history is poorly understood and some cases heal completely, black oesophagus and AEN appear to be generally associated with significant comorbidity which may dictate outcome. Histology should be obtained to help clarify the diagnosis.

Abstract 318

**ACUTE OESOPHAGEAL NECROSIS OR JUST ANOTHER BLACK OESOPHAGUS?**

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**Introduction:** The literature suggests that black oesophagus or acute oesophageal necrosis (AEN) is a rare condition. It was our impression that it is a more common phenomenon, particularly in inpatients.

**Aims & Methods:** We prospectively collected cases of “black oesophagus” identified during endoscopy at the Royal Berkshire Hospital (RBH) January 2005–July 2006. The RBH is a district general hospital serving a population of over 500,000; the unit performs >3000 OGDs annually. Endoscopic images and histology were obtained where possible.

**Results:** Nine cases (6 men) were identified, median age 85 (52–93), see table. In six patients (1 in table) the oesophagus was biopsied and all comprised predominantly acutely inflamed ulcer slough. In four cases (2, 3, 8, 9) there was also acutely inflamed oesophageal squamous mucosa; in two cases (4, 7) there was no epithelium. There was no evidence of Barrett’s oesophagus or malignancy. Special stains for iron, melanin, and bile were all negative. Three cases (4, 8, 9) contained hyphae and spores compatible with fungal infection.

**Conclusion:** True AEN is confirmed by diffuse oesophageal necrosis and is reportedly rare. The appearance of a black oesophagus however appears more common and the underlying pathogenesis may be difficult to ascertain. The histology from all these cases confirmed ulceration. Microscopic presence of abundant extracellular yellow/brown pigment in these cases is significant but the special stains were inconclusive and do not discount extrathoracic bile or exogenous pigment. There was insufficient non-ulcerated tissue to reliably assess for ischaemia. One final consideration is that the black appearance is not due to pigment but rather reflects the state of ischaemia within the tissue, in a manner analogous to gangrenous necrosis. Black oesophagus may represent a spectrum of pathologies but also may represent true AEN more commonly than previously thought. This may be due to poor recognition, underreporting or difficulty in obtaining diagnostic histology. Although the natural history is poorly understood and some cases heal completely, black oesophagus and AEN appear to be generally associated with significant comorbidity which may dictate outcome. Histology should be obtained to help clarify the diagnosis.
Conclusion: This is the first study to establish the key components of hands-on training for colonoscopy. The components identified included novel considerations as well as those present in expert endoscopy opinion and the sport and motor skills literature. In general the study supports the notion that critical components of skills training outside medicine may be applicable to endoscopy. Knowledge and awareness of the components identified has implications for colonoscopy training and perhaps more broadly in other medical skills training.

320 TRAINEE COLONOSCOPY AUDIT: NORTH EAST THAMES
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Introduction: Highly competent colonoscopists will be required to deliver the national colorectal cancer screening programme. A recent national audit demonstrated caecal intubation rates significantly below the 90% target set out by JAG. A study of North West Thames trainees concluded that a combination of improved training and self-directed learning was required to increase competence.

Aims & Methods: Our aim was to assess North East Thames (NET) trainees' level of expertise in colonoscopy and the nature of their training. NET trainees were assessed retrospectively using a 21 point questionnaire designed to assess trainees overall endoscopy experience, record keeping, self-assessment of performance (using the “cursum” method and the nature of their supervision, training and assessment. It was sent by email on three occasions (July–Sept 2006) and completed electronically.

Results: 29/61 (47.5%) trainees responded. The median year of training was 3.5 (range 0.33–7.17). 28/29 respondents were training in colonoscopy with 20/28 trainees performing colonoscopy independently. 10/20 (50%) had performed fewer than 100 procedures before being left unsupervised. The level of supervision for trainees first 100 colonoscopies was assessed by reviewing 66 trainee-trainer experiences. The trainer was in the room, in the department, in the hospital or unavailable in 31 (47%), 30 (45%), 5 (8%), and 0 experiences respectively. The quality of training for trainees first 100 colonoscopies was assessed by reviewing 61 trainee-trainer experiences: the trainer explaining and telling the trainee through overcoming the problem in 39/61 (60%), taking the scope and overcoming the problem prior to explaining in 17/61 (27%), taking the scope but not explaining in 3/61 (5%) or taking the scope and completing the procedure in 5/61 (8%). 18/28 trainees had attended a colonoscopy course and 4/28 were using the “cursum” method. All 20 independent trainees had been confirmed as competent in intubation technique. 6/20 and 3/20 had not been assessed as competent in polypectomy and extubation technique respectively. 18/28 trainees kept a record of their complication, caecal and ileal intubation rates. For independent trainees the average caecal and ileal intubation rates were 90.2% and 63.4% respectively.

Conclusion: Trainees are not performing enough fully supervised colonoscopies prior to independent practice. Trainees are taking the scope in 40% of experiences when a problem is encountered suggesting there is no potential to improve training. Record keeping, course attendance and use of the “cursum” method are under utilised. Assessment of competency is not yet being undertaken in all aspects of colonoscopy. However, the recommended caecal and ileal intubation rates are being met by independent trainees. Thus, although there is still some way to go, an overall improvement in colonoscopy training is evident.

321 A RANDOMISED, SINGLE-BLIND COMPARISON BETWEEN A LOW VOLUME POLYETHYLENE GLYCOL AND ASCORBIC ACID BOWEL PREPARATION (MOVIPREP) AND PICOLAX IN GUT CLEANSING PRIOR TO COLONOSCOPY

Introduction: Colonoscopy is an important tool for the diagnosis and evaluation of diseases of the colon. For a successful colonoscopy, it is essential that complete cleansing of the colon is achieved prior to the procedure with minimum inconvenience to the patient. If all the mucosa cannot be seen then the colonoscopy may need to be repeated as pathological findings might have been missed. Currently available bowel preparations are unsatisfactory.

Aims & Methods: This was a single-blind, parallel-group study comparing Moviprep (polyethylene glycol 3350 solution plus ascorbic acid and electrolytes) with Picolax (sodium picosulfate + magnesium citrate) in 65 adult male and female patients undergoing elective colonoscopy. Patients were randomised to treatment allocation in a 1:1 ratio. The physicians who performed the colonoscopy and rated the cleansing were unaware of the treatment allocation. The degree of cleansing was scored for each colonic segment, and the overall success of treatment for each patient was based on these individual scores. The treatment was defined as an overall success (100% colonic mucosa visualised) if all segments had Grade A or Grade B, indicating a good cleansing. Preparation was defined as a failure if one or more segments had bad cleansing (Grade C or Grade D).

Results: The percentage of patients who had an overall successful preparation was comparable for Moviprep (27/32 patients; 84.4%) and Picolax (24/33 patients; 72.7%) (p = 0.367). The Fisher’s exact test: treatment difference +1.16, 95% CI). However, the quality of colon cleansing was significantly better following Moviprep (Wilcoxon signed rank test: p = 0.018): 46.9% of patients who received Moviprep received a grading of “A” compared with 15.2% of patients who received Picolax. Furthermore, analysis of the individual colon segments showed a significant difference in the quality of cleansing for the ascending colon (Wilcoxon signed rank test: p = 0.024), cecum (p = 0.003) in favour of Moviprep. Patient acceptability ratings tended to favour Picolax, but the patients were not blind to treatment allocation and different dietary regimens were adopted for the two compounds. The safety and tolerability profile of the two treatments was similar, with headache, nausea and oral discomfort, being the most frequent adverse events (Moviprep 9, 7 and 2 patients and Picolax 12, 5 and 4 patients respectively). One patient in the Picolax group who was hyponatraemic prior to the bowel preparation, experienced worsening of hyponatraemia. This was classed by the investigator as being the most severe event and was found to be related to treatment with Picolax.

Conclusion: Moviprep provides gut cleansing that is at least as good as Picolax. Moviprep offers superior cleansing in the proximal colon, which offers important advantages in the clinical setting.

Gastrointestinal physiology posters

322 JNK MAPK AND CPLA2 REGULATE CHLORIDE SECRETION IN T84 COLONIC EPITHelial CELLS
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Introduction: Inflammation of the intestine is typically associated with increased fluid secretion, manifesting clinically as diarrhoea. Chloride (Cl-) secretion is the predominant driving force behind fluid secretion. Activation of Gq Protein Coupled Receptors (GqPCRs) by neuroimmune mediators induces transient Cl- secretory responses in intestinal epithelial cells. These responses are limited by an antisercreatory pathway mediated by epidermal growth factor (EGFR) and mitogen activated protein kinases (MAPKs) including ERK1/2 and p38. Jun N-terminal kinase (JNK) is also a member of the MAPK family while cytosolic phospholipase A2 (cPLA2) is a common downstream effector of EGFR and MAPK signalling in other systems. Their roles in regulating epithelial secretion are unknown.

Aims & Methods: The aim of this study was to determine if JNK and cPLA2 regulate GqPCR-induced Cl- secretion in intestinal epithelial. Both compounds were performed on monolayers of T84 colon cell lines grown on permeable supports. Protein phosphorylation was analysed by Western blotting. Cl- secretion was measured as changes in short-circuit current (Isc) across voltage-clamped T84 cells mounted in Ussing chambers.

Results: Western blot analysis revealed that the prototypical GqPCR agonist carbachol (CCh; 100 μM) induced phosphorylation of both 46 kDa and 54 kDa isoform of JNK (n = 5; p < 0.01) and of cPLA2 (n = 3; p < 0.05). Furthermore, pretreatment of voltage-clamped T84 cells with SP600125 (2 μM), a specific JNK inhibitor, and with AAOCCF3 (100 μM), a specific cPLA2 inhibitor, significantly potentiated Isc responses to CCh. The maximal response to CCh in SP600125-pretreated cells was 54.1 (5.8) μA/cm² compared with 34.0 (3.5) μA/cm² in control cells (n = 6;p = 0.01) while maximal responses to CCh in AAOCCF3-pretreated cells increased by 45.2 (7.8%) compared to those in control cells (n = 5; p < 0.05).

Conclusion: Both JNK and cPLA2 are components of a signalling pathway that limits the extent of GqPCR-induced Cl- secretory responses in intestinal epithelial cells. Pharmacological manipulation of MAPKs and/or cPLA2 may prove useful in the treatment of transport disorders associated with diarrhoea.
323 DIAGNOSTIC VALUE OF OESOPHAGEAL PHYSIOLOGY STUDIES: AN EIGHT-YEAR PROSPECTIVE STUDY

S. Mehta, R. Lawndes, M. Rhodes. Upper Gastrointestinal Surgery, Norfolk and Norwich University Hospital, Norwich, UK

Introduction: Physiology studies are an aid in the diagnosis and management of patients who suffer from gastro-oesophageal symptoms. The purpose of this study was to evaluate the diagnostic value of oesophageal pH and manometry at a university hospital physiology unit over an eight-year period.

Aims & Methods: Between July 1996 and October 2004 there were 1116 referrals for 24 h oesophageal pH/ manometry to investigate four cardinal symptoms. These were symptomatic gastro-oesophageal reflux (n = 802), atypical chest pain (n = 137), dysphagia (n = 153), and achalasia (n = 74).

Results: Studies were successfully completed in 92.4%. Reasons for failure were patient intolerance (3.3%) and recording malfunction (4.3%). Results are shown in the table.

Conclusion: Symptoms alone are a poor predictor of abnormal oesophageal function. 24 h pH and manometry studies are valuable in defining the physiological abnormality in order to allow appropriate treatment.

<table>
<thead>
<tr>
<th>Symptom subtype</th>
<th>% with spasm</th>
<th>% with disorder of peristalsis</th>
<th>% with abnormal LOSP</th>
<th>% with abnormal reflex</th>
<th>% with normal findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reflux</td>
<td>18.3</td>
<td>50.7</td>
<td>37.3</td>
<td>51.1</td>
<td>11.9</td>
</tr>
<tr>
<td>Atypical chest pain</td>
<td>33.9</td>
<td>32.2</td>
<td>19.0</td>
<td>23.9</td>
<td>37.2</td>
</tr>
<tr>
<td>Dysphagia</td>
<td>47.0</td>
<td>57.6</td>
<td>12.9</td>
<td>30.0</td>
<td>7.6</td>
</tr>
<tr>
<td>Achalasia</td>
<td>40.4</td>
<td>82.5</td>
<td>66.7</td>
<td>No pH studies</td>
<td>1.8</td>
</tr>
</tbody>
</table>

324 ASSESSMENT OF RECTAL SENSORY AND MOTOR FUNCTION USING TWO DIFFERENT BAROSTAT SYSTEMS

S. P. Vasudevan, N. Zarate, P. J. Lunniss, S. M. Scott. Centre for Academic Surgery and the GI Physiology Unit, Bart’s and the London, Queen Mary, University of London, London, UK

Introduction: Barostat studies have been used extensively to study visceral sensori-motor function in man. Currently, two devices are commonly used: the dual stage rigid cylinder type (capacity 100 ml; Synectics) and the single stage matched reservoir type (capacity 1200 ml; G&J). The former has the theoretical disadvantage of error due to non pre-pressurising of that cylinder excluded from the circuit. Comparing the two systems in vivo is important to determine the validity of comparisons of data, especially contemporary versus historical, within retrospective comparisons, multi-centre studies, and meta-analysis of literature.

Aims & Methods: The aim of the study was to determine the reproducibility of assessment of rectal sensory and motor function using the two systems in healthy volunteers. Four rectal barostat studies were performed on 7 healthy volunteers (3F, 4M; median age 46 years), using the 2 barostat systems (dual stage (system A) and single stage matched reservoir (system B)) randomly twice (on two consecutive days, repeated two weeks apart). After conditioning distension, and determination of the operating pressure (minimum distending pressure +2 mm Hg), an ascending method of limits phasic distension protocol was used, with 4 mm Hg increments up to maximum tolerated pressure. Between phasic distensions, baseline pressures were maintained at operating pressure, and volumes (residual volume) recorded. Pressures and volumes at different sensory thresholds (first sensation, defaecatory desire, maximum toleration) as well as residual volumes, were compared between the two systems within individuals. Compliance curves were also assessed.

Results: Operating pressures (A: 6.4 ± 0.2 mm Hg, p = 0.84) and compliance (A: 7.7 (0.6) ml/mm Hg, B: 7.9 (0.6) ml/mm Hg, p = 0.42) within subjects were equivalent (paired t test); Bland-Altman statistic showed a mean difference in compliance of –0.2 ml/mm Hg (95% limit of agreement –2.3 to 1.9). Similarly, pressures and volumes at sensory thresholds were similar within subjects using the two barostat systems (p > 0.05). Residual volumes at operating pressures were also similar: A: 109 (14) ml, B: 120 (13) ml (p > 0.05).

Conclusion: In vivo assessment of rectal biomechanical properties was equivalent when determined by the two most commonly used barostat systems. At least with regard to the ascending method of limits, studies performed using these different systems are comparable.

Inflammatory bowel disease posters

325 MTHFR POLYMORPHISMS ARE OF PHARMACOGENETIC VALUE IN AZATHIOPRINE TREATMENT IN INFLAMMATORY BOWEL DISEASE

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Introduction: Polymorphism in the methylenetetrahydrofolate reductase (MTHFR) gene has clinical implications in vascular disease (through hyperhomocysteinaemia) and immunosuppression (primarily methotrexate). Importantly, the two common polymorphisms, MTHFR 677C>T and 1298A>C are predicted to have different metabolic consequences. The MTHFR 677T encodes a thermolabile variant and has been associated with hyperhomocysteinaemia and toxicity to methotrexate, and decreased red cell TPMT activity. The MTHFR 1298CC variant genotype has been associated with methotrexate toxicity but not hyperhomocysteinaemia. This raises the possibility that MTHFR 677C>T impacts on both red cell and nucleated cell activities while the MTHFR 1298A>C may be more relevant in nucleated cells. We have investigated the influence of MTHFR polymorphism on tolerance and clinical response to azathioprine treatment for inflammatory bowel disease (IBD).

Aims & Methods: 216 patients were entered into a prospective study of 2 mg/kg azathioprine in IBD. All patients were genotyped for the MTHFR 677C>T and 1298A>C polymorphisms and haplotypes correlated with strictly defined clinical response and risk of withdrawal due to adverse effects.

Results: A protective effect of the MTHFR 677C>T polymorphism against adverse effects was noted (15.7% v 5.3%, p = 0.032 for homozygous, p = 0.007 for heterozygous), not present for MTHFR 1298A>C. Conversely, there was a strong relationship between MTHFR 1298A>C and improved clinical response (64% v 39%, p = 0.002, OR 3.35). No relationship was observed for MTHFR 677C>T and clinical response.

Conclusion: Contrary to a recently published study, our results suggest that genetic variation in folate metabolism influences clinical response to azathioprine therapy. The MTHFR 677C>T polymorphism offers some protection from adverse effects on azathioprine, perhaps by restricting red cell 5-adenosylhomocysteine (SAM) pools, which in turn may decrease TPMT activity and the production of toxic methylated thiopurine metabolites. The MTHFR 1298A>C polymorphism, on the other hand, appears to confer improved clinical response to azathioprine, possibly by reducing thioupinurea methylation and inactivation in nucleated cells, and may be an important pharmacogenetic marker in addition to TPMT.

326 GENOMIC DNA HYPERMETHYLATION IN COLRECTAL MUCOSA OF PATIENTS WITH ULCERATIVE COLITIS (THE BORICC STUDY)

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Introduction: Alterations in DNA methylation patterns are seen commonly in tumours and may be affected by folate status. Folate deficiency can result

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Abstract 326

<table>
<thead>
<tr>
<th>Subject group</th>
<th>Age (SD)</th>
<th>Genomic DNA methylation (DPM \times 10^7/\mu g DNA)</th>
<th>RCF concentrations (ng/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ulcerative colitis (n = 24)</td>
<td>17 male: 7 female</td>
<td>58 (12)</td>
<td>4.1* (2.6–6.3)</td>
</tr>
<tr>
<td>Control (n = 220)</td>
<td>118 male: 102 female</td>
<td>51 (13)</td>
<td>14.5 (13–15.8)</td>
</tr>
</tbody>
</table>

*Statistically significant. Figures in brackets indicate 95% confidence interval.

in both genomic DNA hypomethylation as well as aberrant methylation of specific genes. Global DNA hypomethylation has previously been reported in rectal mucosa of patients with active and quiescent ulcerative colitis (UC) but folate status was unknown.1 In UC, folate status may be adversely affected by chronic inflammation, malabsorption and certain drugs.

Aims & Methods: To assess the genomic DNA methylation status in the macroscopically normal mucosa and folate status in a cohort of UC patients. 244 subjects were recruited (24 UC patients and 220 normal controls). Colorectal mucosal biopsies were obtained and DNA extracted. Genomic DNA methylation was measured using the tritium-labeled cytosine extension assay (3[H] dCTP) as described by Pogribny et al.2 In this assay, the extent of 3[H] dCTP incorporation into DNA is inversely proportional to the global DNA methylation status.

Results: Mean duration of UC was 9 years with an average 1 flare-up/year and mean Harvey–Bradshaw score was 2. Genomic DNA methylation (as measured by 3[H] dCTP incorporation) was higher in UC patients than in control subjects (p < 0.001). Folate status was lower in UC patients (p < 0.001) compared with controls.

Conclusion: Low folate status and genomic hypomethylation have both been shown to be associated with colorectal cancer3 although recent data have challenged this concept, suggesting a protective effect of low folate status on risk of colon cancer.4 We have shown a higher methylation status in UC patients, with a corresponding lower folate status compared to control subjects. Our findings are in contrast with a previous report,1 but our study size was significantly larger, involved quiescent UC and used a more reproducible assay. Further investigation is required to determine the precise effects of folate status on genomic methylation and its association with colorectal cancer.

This study is funded by the Food Standards Agency (N12015).


327 USE AND SAFETY OF INFlixIMAB FOR INFLAMMATORY BOWEL DISEASE IN SOUTH EAST ENGLAND (2): PREDICTORS OF RESPONSE, SAFETY AND USE OF IMMUNOSUPPRESSION IN CLINICAL PRACTICE

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Introduction: Infliximab (IFX) is now well established as treatment for moderate to severe IBD in the UK. However, use in practice varies considerably particularly as optimal usage based on clinical trials is at variance with NICE guidance upon which local protocols are often based.

Aims & Methods: To assess the impact of local variations in treatment regimes for IFX on broad clinical outcome and to identify clinical characteristics that may predict the likelihood of remission. A retrospective multicentre audit of clinical notes was performed.

Results: 122 (55%) were females. 200 (90%) had Crohn’s disease and 22 ulcerative colitis. 152 (69%) patients responded to IFX (assessed by HBI/CDAI/arbiter physician assessment). 40 (18%) patients had a primary non-response and 20/152 responders (13%) suffered a secondary loss of response to therapy. A comparison of episodic and scheduled infusions for both induction and maintenance of a response showed no difference between the two approaches (p = 0.4 for response induction and p = 1.00 for response maintenance). Concurrent immunosuppression did not affect success of induction (immunomodulators v none p = 1.00), however, concurrent prednisolone prevented a loss of response when compared with no immunomodulation (p = 0.001). No significance was noted for the other immunomodulators. Early Infliximab use and current smoking status did not influence response. Patients with isolated ileal disease (12/19 patients) had a lower chance of response than patients with isolated colonic disease (40/45 patients) (p = 0.03, RR 0.3, CI 0.19 to 0.7). 57 episodes of side effects were noted (0.6%). Side effects led to treatment withdrawal in 8 patients. Concurrent Azathioprine increased the risk of minor infectious complications when compared with Infliximab monotherapy (25/39 v 11/34, p = 0.0098, RR = 1.98, CI 1.1 to 3.4). Methotrexate appears to protect against minor infections when compared in a similar fashion (1/20 v 11/34, p = 0.0215, RR = 0.15, CI 0.2 to 1.1). Regular scheduled infusion protocols did not reduce risk of hypersensitivity reactions when compared with infusions on relapse (p = 0.9). Regular scheduled infusions appeared to increase the risk of infectious complications (p = 0.0003, RR = 0.16, 95% CI 0.05798 to 0.4806).

Conclusion: This suggests interesting possibilities for optimising infliximab use in IBD. Isolated colonic disease increases chances of a response and concurrent Azathioprine use helps maintain that response with a higher response (45%). Polymorphisms in enzymes involved in folate metabolism and transport have been shown to predict clinical outcome. In this retrospective study, clinical outcome and tolerance to MTX were correlated to genetic variation in MTHFR, ATIC (purine synthesis), and TS (pyrimidine synthesis).

Aims & Methods: Data were available on 171 patients with inflammatory bowel disease treated with methotrexate for more than 12 weeks. Response was defined as a withdrawal of steroids with a Harvey–Bradshaw index <4. Hepatotoxicity (ALT>3 times the upper limit of normal); neutropenia and other less frequent side effects were recorded. Patients were genotyped for the MTHFR 677C>G, ATIC 347C>G, T3ER2*3 and TYMS 3’UTR 6 bp in/del genotypes. Genotypes were tested for association with clinical outcomes and side effects using recessive and dominant models.

Results: Forty five patients suffered side effects. Five patients experienced leukopenia and 12 developed abnormal liver function tests during therapy. 101/171 (60%) of patients responded to therapy. The ATIC 347C>G mutation correlated with response to therapy as a recessive trait. 39/54 (72%) of homozgyous mutants responded to treatment compared with 8/18 wild types (p = 0.04, RR = 1.6, CI 1.925 to 9.407). The MTHFR 677C>T SNP correlated with a lack of response. 41/65 (65%) of wild types responded compared with 10/26 (38%) of homozgyous mutants (p = 0.03, RR = 1.340, CI 1.005 to 1.785). No other associations were found in recessive or dominant models with either response or occurrence of side effects.

Conclusion: These findings suggest that genetic variation in folate metabolism does influence response and tolerance to MTX. Further studies may define those loci which are of true clinical importance or which might have an additive effect as part of a pharmacogenetic index as proposed for MTX use in rheumatoid arthritis.

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**329** HLA-G 14Bp insertion-deletion polymorphism influences response to methotrexate in inflammatory bowel disease

B. Baburajan, N. Prescott, K. Herrlinger, F. Cummins, M. Arenas, M. Smith, M. Tremelling, A. Ansari, M. Parkes, D. Jewell, C. Mathew, A. Marini, J. Sanderson. 1. Department of Gastroenterology, Guy’s and St Thomas’ NHS Foundation Trust Hospitals; 2. Department of Medical and Molecular Genetics, Guy’s King’s and St Thomas’ School of Medicine, London; 3. Gastroenterology Unit, Radcliffe Infirmary, Oxford; 4. Purine Research Laboratory, Guy’s and St Thomas’ NHS Foundation Trust Hospitals, London; 5. Department of Gastroenterology, Addenbrooke’s Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

**Introduction:** HLA-G antigens have a recognised role in chronic inflammation and auto-immune diseases. Membrane bound and soluble HLA-G has been shown to correlate with increased IL-10 levels. A 14-bp deletion polymorphism in exon 8 at the 3’ UTR of the HLA-G gene has been associated with the development of auto immune disease. It has also been associated with efficacy of Methotrexate (MTX) therapy in rheumatoid arthritis possibly via increased IL-10 levels. MTX is well established as a standard second line immunosuppressant in the treatment of inflammatory bowel disease (IBD).

**Aims & Methods:** The aim of this study was to determine the influence of the HLA-G 14 bp ins-del polymorphism on clinical response to MTX in patients with IBD and compare this to any effect amongst those receiving azathioprine (AZA). 171 patients with IBD treated with Methotrexate and 96 treated with Azathioprine were included. Clinical response was defined as complete steroid withdrawal for at least 3 months with a duration of immunomodulatory therapy of at least 3 months. Genotyping was performed by fluorescent PCR and size-based allelic discrimination by capillary based liquid polyacrylamide gel electrophoresis. The two-sided Fisher’s exact test was used to calculate significance. Odds ratios are reported.

**Results:** The polymorphism correlated significantly with response to therapy in the MTX treated group. No correlation was found in the AZA treated group (p = 0.05238, RR = 0.8373, 95% CI 0.6596 to 1.23). Conclusion: The hypothesis that the 14 bp ins/del mutation influences clinical response to MTX therapy is confirmed and suggests that upregulation of IL-10 expression plays an important role in the mechanism of action of MTX in IBD. The lack of a correlation with response to AZA, which has a differing mode of action, is in keeping with this. The SNP will require further validation in a larger cohort to confirm its role as a clinically useful pharmacogenomic marker of MTX efficacy.

<table>
<thead>
<tr>
<th>Genotype</th>
<th>Responders</th>
<th>Failed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 bp del/del</td>
<td>41 (38%)</td>
<td>22 (20%)</td>
<td>63 (58%)</td>
</tr>
<tr>
<td>14 bp ins/ins</td>
<td>17 (16%)</td>
<td>28 (26%)</td>
<td>45 (42%)</td>
</tr>
<tr>
<td>Total</td>
<td>58 (54%)</td>
<td>50 (46%)</td>
<td>108 (100%)</td>
</tr>
</tbody>
</table>

p value = 0.0063, RR = 1.723, CI 0.136 to 2.613

**330** USE AND SAFETY OF INFliximAB FOR INFLAMMATORY BOWEL DISEASE IN SOUTH EAST ENGLAND [1]: ADHERENCE TO RECOMMENDED GUIDELINES

B. Baburajan, G. Bird, J. Hunt, A. McNair, A. Ireland, I. Bjarnson, M. Parkes, J. Sanderson. 1. Department of Gastroenterology, Guy’s and St Thomas’ NHS Foundation Trust Hospitals, London; 2. Department of Gastroenterology, Princess Royal University Hospital, London; 3. Department of Gastroenterology, Queen Elizabeth Hospital, Woolwich; 4. Department of Gastroenterology and Colorectal Surgery, University of Oxford, Oxford, UK

**Introduction:** Few data exist reporting the use in practice of infliximab in the UK with data analysis placed on registry data reported from the US. Here we report the preliminary results of a regional audit.

**Aims & Methods:** The aim of this study was to undertake a regional audit of infliximab usage in South East England assessing adherence to NICE guidelines and recommended protocols for safe and effective use.

<table>
<thead>
<tr>
<th>Genotype</th>
<th>Responders</th>
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<td>58 (54%)</td>
<td>50 (46%)</td>
<td>108 (100%)</td>
</tr>
</tbody>
</table>

p value = 0.0063, RR = 1.723, CI 0.136 to 2.613

**Results:** 222 patients (122 females) were included from 7 centres. 200 (90%) had Crohn’s disease and 22 ulcerative colitis. 129 (58%) were less than 40 years of age, 986 infusions were recorded. Adherence to NICE guidance was variable. Objective pre-treatment scoring systems (HBI/CDAI) were used in 112/222 patients (51%) with a recorded pre-treatment HBI in 8 in 61/112 (55%) patients. Failure/intolerance of immunosuppression was documented in 201/222 (91%) and unsuitability/unwillingness for surgery in 66 patients (30%). Pre-treatment tuberculosis screening was performed in only 108/220 patients (49%). Active IBD in 165 patients (75%) and restricting disease in 39 patients (18%) were the chief indications. 62 (28%) patients were on concurrent steroids at induction, of whom 9 (14%) remained steroid dependent. Azathioprine was the predominant immunomodulator (101 patients – 46%) used for antibody suppression. Methotrexate (19/220 patients) and 6-Mercaptopurine (21/220 patients) were less frequently used. 22 (10%) were not on immunomodulators. Induction was performed as per NICE guidelines in 89 (40%) patients and on a regular schedule in 52 (24%) patients. The remainder (40 patients) received a single infusion. Of the 152 responders, 31 (33%) were maintained on a variety of regimen. Pre-treatment with IV hydrocortisone was used in 21 patients (12 at local hospital policy, 7 after a prolonged interval between infusions and 2 after an infusion reaction). 152 patients (69%) responded to Infliximab (assessed by HBI/CDAI/ arbitrary physician assessment).

**Conclusion:** Considerable variation exists between centres in the use of infliximab for IBD. Adherence to NICE Guidance is variable and pre-treatment screening for tuberculosis is often lax. The take up of maintenance infusions has been poor in the past but is now increasingly seen. There is an underrepresentation of fistulising disease among the indications for therapy.

**331** POLYMORPHISMS IN THE PEROXISOME PROLIFERATOR-ACTIVATED RECEPTOR GAMMA GENE ARE ASSOCIATED WITH ILEAL CROWN’S DISEASE


**Introduction:** Peroxisome proliferator-activated receptor (PPAR) gamma is a nuclear receptor with inhibitory effects on NFκB, c-Jun and Fos signalling. It is expressed in the colon and ileum but is impaired in inflammatory bowel disease. 1 – 2 It is activated through bacterial TLR4 signalling as well as directly by bacterial products and components of food. 3 Linkage to a region incorporating the PPAR-gamma gene has been demonstrated in a mouse model of ileitis 2 and is syntenic to the 3p21–26 IBD susceptibility locus in humans. A small case-control study has shown significant association between polymorphisms in this gene and CD. 2

**Aims & Methods:** Our aim was to study PPAR gamma polymorphisms in cohorts of well characterised CD and ulcerative colitis (UC) patients. Homologous tagging single nucleotide polymorphisms (SNPs) were genotyped in 608 CD patients, 670 UC patients and 1131 controls using the MALDI-TOF iPLEX platform. All patients and controls were unrelated, white, non-Jewish and from Oxfordshire. Five intronic SNPs were identified from the two major haplotype blocks in the PPAR-gamma gene (block 1 and 2 in block 2). The genotyping rate was >96% and the genotypes were all in Hardy-Weinberg equilibrium.

**Results:** No association with individual SNPs was seen overall although a weak association with a common 2 SNP haplotype in block 2 was seen in CD (p = 0.05). For block 1, subphenotype analysis, showed a protective effect of the minor allele of each SNP (the SNPs being in tight linkage disequilibrium, r 2 0.95) for ileal CD (p = 0.005, OR = 0.59, CI 0.4 to 0.86), strictureing behaviour (p = 0.006, OR = 0.57, CI 0.37 to 0.87) and the need for ileal resection (p = 0.008, OR = 0.46, CI 0.25 to 0.84) although these trend was not independently associated with each other. Stratification of the cohort by known variants demonstrated that the ileal association was seen in those carrying the IBD5 risk haplotype and was strongest for the block 1 SNPs (p = 0.001, OR = 0.51, CI 0.32 to 0.78). There was a trend for a protective effect of the block 1 SNPs in patients negative for the common NOD2 variants (p = 0.02, OR 0.60, CI 0.37 to 0.95).

**Conclusion:** SNPs in a single haplotype block of the PPAR-gamma gene are independently associated with ileal CD, strictureing behaviour and ileal resection and there is epistasis with the IBD5 risk haplotype. These disease associations are unlikely to have functional effects on the PPAR-gamma gene themselves but may be in LD with functional SNPs either within the gene or in neighbouring genes. Direct sequencing and further fine mapping in CD is required.


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Conclusions: Both infliximab and adalimumab cause significantly greater apoptosis than etanercept. There is a corresponding G1/G0 cell cycle arrest (p = 0.007) when compared to etanercept. With adalimumab and human IgG1 control antibody, mean percentage of cells (± 1SD) in each cell cycle phase (n = 4) for each of the conditions. The increase in lymphocyte apoptosis was measured (n = 7 healthy subjects) and expressed as a percentage of background apoptosis rate of stimulated cells with medium alone, added. The increase in apoptosis compared to baseline was ~2% for human IgG1 control antibody, ~7% for etanercept, +110% for adalimumab and +132% for infliximab.

Conclusion: Both infliximab and adalimumab cause significantly greater G1/G0 cell cycle arrest (p = 0.007) when compared to etanercept. With adalimumab and infliximab but not etanercept there is a corresponding decrease in the percentage of cells in the S phase (p = 0.05). Infliximab and adalimumab cause greater apoptosis than etanercept. The induction of apoptosis may be related to the degree to which the anti-TNF agent induces cell cycle arrest. The variable effects of different anti-TNF agents on lymphocyte cell cycle may contribute to the differential efficacy of anti-TNF agents in Crohn’s disease.

Introduction: Crohn’s disease is characterised by an excess of lamina propria lymphocytes. Anti-TNF agents have had variable clinical efficacy in the treatment of Crohn’s disease but not in rheumatoid arthritis. Considerable work to explain the differential efficacy of these agents has focused on the induction of lymphocyte apoptosis. We investigate the differential effects of three anti-TNF agents (infliximab, adalimumab and etanercept) on stimulated lymphocyte cell cycling.

Aims & Methods: Peripheral blood mononuclear cells were isolated from four healthy individuals using lymphoprep separation. CD4 lymphocytes were then isolated by positive selection using beads. T-lymphocytes were focused on the induction of lymphocyte apoptosis. We investigate the differential effects of three anti-TNF agents (infliximab, adalimumab and etanercept) on stimulated lymphocyte cell cycling.

Results: Cell cycle results are shown in the table and are expressed as the mean percentage of cells (+/− standard deviation (SD)) in each cell cycle phase (n = 4) for each of the conditions. The increase in lymphocyte apoptosis was measured (n = 7 healthy subjects) and expressed as a percentage of background apoptosis rate of stimulated cells with medium alone added. The increase in apoptosis compared to baseline was ~2% for human IgG1 control antibody, +76% for etanercept, +110% for adalimumab and +132% for infliximab.

Conclusion: Both infliximab and adalimumab cause significantly greater G1/G0 cell cycle arrest (p = 0.007) when compared to etanercept. With adalimumab and infliximab but not etanercept there is a corresponding decrease in the percentage of cells in the S phase (p = 0.05). Infliximab and adalimumab cause greater apoptosis than etanercept. The induction of apoptosis may be related to the degree to which the anti-TNF agent induces cell cycle arrest. The variable effects of different anti-TNF agents on lymphocyte cell cycle may contribute to the differential efficacy of anti-TNF agents in Crohn’s disease.

Abstract 332 Cell cycle percentages at 72 h after drug exposure

<table>
<thead>
<tr>
<th></th>
<th>% cells in G1/0 phase (SD)</th>
<th>% cells in G0/1 phase (SD)</th>
<th>% cells in G2/M phase (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unstimulated cells alone</td>
<td>90.6 (6.3)</td>
<td>8.6 (6.3)</td>
<td>0.7 (0.6)</td>
</tr>
<tr>
<td>Stimulated plus medium</td>
<td>46.6 (12.8)</td>
<td>45.6 (10.1)</td>
<td>7.6 (4.3)</td>
</tr>
<tr>
<td>Stimulated plus IgG1</td>
<td>52.6 (17.9)</td>
<td>39.2 (12.7)</td>
<td>8.1 (7.7)</td>
</tr>
<tr>
<td>Stimulated plus infliximab</td>
<td>75.0 (7.8)</td>
<td>21.3 (7.2)</td>
<td>3.7 (1.4)</td>
</tr>
<tr>
<td>Stimulated plus etanercept</td>
<td>73.7 (11.4)</td>
<td>22.9 (10.1)</td>
<td>3.4 (2.5)</td>
</tr>
<tr>
<td>Adalimumab</td>
<td>58.0 (5.5)</td>
<td>33.8 (8.4)</td>
<td>8.2 (8.9)</td>
</tr>
</tbody>
</table>

Abstract 333 Table 1

<table>
<thead>
<tr>
<th>CD duration (years)</th>
<th>Placebo (n)</th>
<th>Placebo response rate* (%)</th>
<th>Certolizumab pegol (n)</th>
<th>Certolizumab pegol response rate* (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
<td>210</td>
<td>36.2</td>
<td>215</td>
<td>62.8†</td>
</tr>
<tr>
<td>&lt;1</td>
<td>35</td>
<td>37.1</td>
<td>19</td>
<td>89.5†</td>
</tr>
<tr>
<td>1–2</td>
<td>22</td>
<td>50.0</td>
<td>20</td>
<td>75.0</td>
</tr>
<tr>
<td>2–4</td>
<td>55</td>
<td>39.4</td>
<td>45</td>
<td>66.9†</td>
</tr>
<tr>
<td>&gt;5</td>
<td>98</td>
<td>33.7</td>
<td>131</td>
<td>57.0††</td>
</tr>
</tbody>
</table>

*Wk26 overall ITT population; †p<0.001; ††p<0.05 v placebo.

Abstract 333 Table 2

<table>
<thead>
<tr>
<th>CD duration (years)</th>
<th>n</th>
<th>Remission rate* (%)</th>
<th>Remission rate* (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
<td>210</td>
<td>28.6</td>
<td>47.9†</td>
</tr>
<tr>
<td>&lt;1</td>
<td>35</td>
<td>37.1</td>
<td>68.4</td>
</tr>
<tr>
<td>1–2</td>
<td>22</td>
<td>36.4</td>
<td>55.0</td>
</tr>
<tr>
<td>2–4</td>
<td>55</td>
<td>29.1</td>
<td>46.7</td>
</tr>
<tr>
<td>&gt;5</td>
<td>98</td>
<td>23.3</td>
<td>44.3†</td>
</tr>
</tbody>
</table>

*Wk26 overall ITT population; †p<0.001; ††p<0.05 v placebo.
pegel 400 mg for the long-term maintenance of response and remission in patients with active CD.

**334 CERTOLIZUMAB PEGOL ADMINISTERED SUBCUTANEOUSLY IS EFFECTIVE IN ANTI-TNF NAIVE PATIENTS AND IN PATIENTS PREVIOUSLY TREATED WITH INFlixIMAB**

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Introduction: Certolizumab pegol, a PEGylated Fab' fragment of a humanised anti-TNFa monoclonal antibody, is currently being developed for the treatment of Crohn's disease (CD) and other autoimmune diseases. The PRECISE 2 maintenance trial assessed the efficacy and safety of certolizumab pegol 400 mg given subcutaneously (sc) every 4 weeks (wks) (after a 4-wk open-label induction phase) in patients with active CD (CD Activity Index (CDAI) score of 220-450 points, inclusive) compared with placebo (PBO). Patients who had previously received infliximab (IFX) entered the study provided that a response to treatment was observed after the first dose and there was no severe hypersensitivity or anaphylactic reaction.

**Aims & Methods:** We aimed to assess the efficacy of certolizumab pegol in the PRECISE 2 study in IFX-naïve patients and in patients previously treated with IFX. Patients received open-label certolizumab pegol 400 mg sc Wks 0, 2, 4, CDAI responders (decrease from baseline in CDAI score at least 100 points) at Wk 6 were randomised to receive double-blind certolizumab pegol 400 mg or PBO every 4 wks, Wks 8-24.

**Results:** Overall, 474/668 patients were IFX-naïve and 193/668 had a history of prior IFX use at baseline (data for 1 patient unavailable). Of those, 324 (68.4%) IFX-naïve patients and 104 patients (53.9%) with prior IFX use responded at Wk 6. The percentages of patients maintaining response at Wk 26 and achieving remission (CDAI score at least 150 points) were significantly greater with certolizumab pegol than with PBO irrespective of prior IFX use. Similar results were observed with the IBD Questionnaire (BDQ) for response (increase from baseline of at least 16 points) at Wk 26 (table). The proportion of patients experiencing adverse events (AEs) was similar in the certolizumab pegol and PBO groups in IFX-naïve (61.6% vs 65.6%, respectively) and prior IFX (75.0% vs 73.1%, respectively) cohorts. Serious AEs were observed in 4.3% (certolizumab pegol) and 5.6% (PBO) of IFX-naïve patients and in 9.6% in both groups for prior IFX patients.

**Conclusion:** Certolizumab pegol is a safe and effective sc administered anti-TNF treatment for patients with CD, irrespective of whether they are IFX-naïve or have received previous treatment with IFX.

**335 RAPID INDUCTION OF REMISSION AND CLINICAL RESPONSE WITH ADALIMUMAB IN PATIENTS WITH MODERATE TO SEvere CROHN’S DISEASE AND SECONDARY FAILURE TO INFlixIMAB THERAPY: RESULTS OF THE GAIN STUDY**

J. Colombel, P. Rutgeerts, W. J. Sandborn, R. Enns, S. B. Hanauer, J. D. Kent, P. F. Follack. 1Hepato-Gastroenterology, Centre Hospitalier Universitaire de Liege, Liege, Belgium; 2Gastroenterology, Mayo Clinic, United States; 3St Paul's Hospital, Vancouver, Canada; 4University of Chicago; 5Immunology Development, Abbott Laboratories, USA

Introduction: Hypersensitivity and loss of response are associated with antibodies to infliximab (IFX) in the treatment of patients with Crohn's disease (CD). Adalimumab (ADA), a self-injectable, fully human anti-TNF monoclonal antibody, is approved for treating rheumatoid arthritis (RA), psoriatic arthritis, and ankylosing spondylitis in the EU, US, and elsewhere. This study assessed the impact of secondary failure to IFX therapy on the induction of remission and clinical response in patients with active CD.

**Aims & Methods:** Patients with moderate to severe CD (CDAI 220–450) and secondary failure to IFX therapy (intolerance and/or loss of response) were enrolled in GAIN, a Phase III, double-blind, placebo-controlled study, and were randomised to receive ADA 160 mg sc at Wk 0 (BL) and 80 mg sc at Wk 2, or placebo (PBO) at both time points. Primary endpoint was remission (CR) defined as a decrease from BL CDAI of >70 or 100 (CR70/CR100) at Wk 4. Secondary endpoints were clinical response (CR) at Wk 4. Safety was assessed throughout the study.

**Results:** Patients received ADA (n = 159) or PBO (n = 166). Baseline characteristics were similar between treatment arms: mean age, 38 years; female, 65%; mean CDAI, 313; median CRP, 0.8 mg/dl; immunosuppressant use, 48%. Clinical remission and response rates observed in the ADA arm were significant versus PBO. Serious adverse events were observed in 4.8% of ADA patients (abcess, 3; sepsis, 1; CD flare, 2; abdominal pain, 2) and in 1.3% of ADA patients (dehydration, 2). No delayed-hypersensitivity (serum sickness) reactions or deaths occurred. The overall safety profile of ADA was consistent with prior CD trials and the existing RA database.

**Conclusion:** Adalimumab rapidly and significantly induced clinical remission and response in patients with moderate to severe CD who had secondary failure to infliximab. Adalimumab was well-tolerated.


**Abstract 335 Remission and clinical response in GAIN, n (%)**

<table>
<thead>
<tr>
<th>Week</th>
<th>PBO, n = 166</th>
<th>ADA, n = 159</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDAI≤150</td>
<td>4</td>
<td>12 (7%)</td>
</tr>
<tr>
<td>CR-70</td>
<td>2</td>
<td>30 (18%)</td>
</tr>
<tr>
<td>CR-70</td>
<td>4</td>
<td>41 (25%)</td>
</tr>
<tr>
<td>Remission</td>
<td>2</td>
<td>25 (15%)</td>
</tr>
<tr>
<td>BDQ response</td>
<td>4</td>
<td>56 (34%)</td>
</tr>
</tbody>
</table>

*p < 0.001; **p < 0.001; both vs PBO.

**336 LEUKOCYTAPHERESIS FOR ULCERATIVE COLITIS: CORRELATION OF CLINICAL RESPONSE WITH IMMUNE REGULATION**

F. Cummings, B. S. Singh, S. Aryasingha, P. Trzankowski, S. P. L. Travis, F. Powrie, D. P. Jewell. 1Gastroenterology Unit, Radcliffe Infirmary; 2Nuffield Department of Surgery; 3Gastroenterology Unit, John Radcliffe Hospital; 4Sir William Dunn School of Pathology, University of Oxford, Oxford, UK

Introduction: Leukocytapheresis (LCA) has been shown to be a safe and effective treatment for ulcerative colitis (UC). The mechanisms of action are unknown. A cellular pathway which may be affected by LCA involves regulatory T cells (Treg). FOXP3+ T cells have been shown to be potent suppressors of immune responses.

**Aims & Methods:** The aim of this study was to assess the effect of leukocytapheresis on Treg cells and correlate the changes with clinical response. Patients who had not achieved remission (Colitis Activity Index (CAI) >4) after at least 4 weeks of >20 mg of oral prednisolone or who had relapsed when the prednisolone dose was reduced to <10 mg per day were eligible for the study. Inclusion criteria included a CAI of 5–12 and disease extent >15 cm. Twelve patients underwent 1 treatment session a week for 5 weeks. Response to treatment was assessed by CAI, ESR and CRP. Colonoscopy and biopsy were performed at the beginning and end of the study and the endoscopic index (EI) was calculated.

Outcome measures were compared using a paired t-test. Results are given as mean (SEM). The frequency of CD4, CD8 and regulatory FOXP3+ T cells were determined by flow cytometry.

**Abstract 336 Patients (%) (ITT population) for certolizumab pegol (CZP) or PBO**

<table>
<thead>
<tr>
<th>Wk 26 endpoint</th>
<th>IFX-naïve CZP (n = 163)</th>
<th>IFX-naïve PBO (n = 159)</th>
<th>Prior IFX CZP (n = 52)</th>
<th>Prior IFX PBO (n = 51)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical response</td>
<td>68.7%</td>
<td>39.6</td>
<td>44.2%</td>
<td>25.5</td>
</tr>
<tr>
<td>Remission</td>
<td>52.8%</td>
<td>33.3</td>
<td>32.7%</td>
<td>13.7</td>
</tr>
<tr>
<td>BDQ response</td>
<td>64.9%</td>
<td>47.8</td>
<td>46.2%</td>
<td>27.5</td>
</tr>
</tbody>
</table>

p Values vs PBO: *<0.001; †<0.002; ‡<0.018; ‡<0.008; ¶<0.014.

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from PBMC was determined by flow cytometry on samples collected before and after the initial (week one) and final (week five) LCAP sessions. **Results:** Two patients were withdrawn from the study due to worsening of their condition and underwent surgery. 11/12 patients were on immunomodulator therapy. The total activity scores (CAI-ES) improved on per protocol analysis (17.3 (1.1) v 13.4 (1.3), p = 0.01). LCAP was associated with a decrease in the absolute number of CD3+ T cells without a change in the ratio of CD4:CD8 T cells. There was a reduction in the proportion of CD19+ cells. Over the 5 week period of treatment there was an increased proportion of naïve T cells (CD4+CD45RA+) 27.2% v 29.9% p = 0.3 and a reduction in the proportion of memory cells (CD4+CD45RO+) 46.1% v 41.6% p = 0.07. Successful outcome correlated with the proportion of FOXP3+CD4+CD28- Treg cells (r = 0.66 p = 0.018) and was inversely correlated with the proportion of a subset of memory cells (CD69+CD4+CD45RO+). **Conclusion:** This pilot study provides evidence for the use of LCAP in refractory UC and suggests that response to therapy may be regulated through Treg cells.

### Abstract 337

**DEVELOPMENT, VALIDATION AND TESTING OF A NEW SOCIAL QUALITY OF LIFE MEASURE FOR PATIENTS WITH INFLAMMATORY BOWEL DISEASE**

P. Das1, S. Gabe2, J. J. Smith3, P. P. Tekkis4, R. J. Nicholls1. 1. Coloproctology; 2. Gastroenterology, St Mark's Hospital, Harrow; 3. Department of Surgery, West Middlesex University Hospital, Isleworth; 4. Department of Surgical Oncology and Technology, St Mary's Hospital, London, UK

**Introduction:** Present quality of life (QOL) instruments for inflammatory bowel disease (IBD) fail to evaluate aspects of patients' life such as education, job/earning, personal relationships, finance and independence. We have developed a new QOL instrument to assess the impact of IBD on these domains.

**Aims & Methods:** A 14-item questionnaire was extended to include 33 items after a pilot assessment by surgeons and gastroenterologists on 39 patients. This was then completed by 148 IBD patients (median age 54 (24–78) years: 83 males) who had never had surgery. Median duration of disease was 24 (5–56) years. Patients also completed a SF-36 v2 and IBDQ.

**Results:** There was high level of inter-item correlation with the severity of colitis to: education (p = 0.421–0.916), job/earning (p = 0.003–0.838), human relationship (p = 0.004–0.832), finance (p = 0.120–0.727) and independence (p = 0.003–0.613). The items correlated well with the eight domains of SF-36 v2 and also with IBDQ. The questionnaire had a high level of reliability (Cronbach’s α = 0.731).

**Conclusion:** The items correlated with the clinical status of patients with IBD and the SF-36v2. The questionnaire may have a role in identifying IBD patients whose medical treatment is no longer effective in maintaining satisfactory life goals.
BSG abstracts

Aims & Methods: To report the incidence of CD in Cardiff City for 1996–2005. Using the same methods as in past studies, cases were identified from weekly pathology meetings, computerised pathology and discharge diagnosis records, IBD database, clinic letters, paediatric IBD database and a questionnaire sent to all Cardiff GPs. New cases resident in the City, fulfilling Lennard-Jones CD criteria, and diagnosed 1996–2005 were identified. Cases were reviewed where necessary by pathologist and radiologist and cases excluded if features were indeterminate. Information was collected on clinical features. Incidence figures were corrected to the age and sex distribution for England and Wales population 2001.

Results: 1739 case notes were reviewed, and 212 cases identified. Corrected incidence for 1996–2005 was 66/100,000/year (95% CI 57 to 76), compared to corrected incidences of 58.8, 70.9, and 44.0 for the previous 3 decades. Female:Male ratio was 1.6:1, as previously with the excess females mainly in young adults. The incidence in children <16 is rising: 27/100/year (95% CI 14 to 40), compared to 15.6 (1.9 to 29) and 16.4 (2.0 to 31) for 1991–5 and 1986–90 respectively. More striking is the increasing spread in age range at diagnosis (ages from 7 to 86 for 1996–2005, compared to age 3–83, 10–77, 9–71, 12–59 and 13–44 for 2000, compared to corrected incidences of 58.8, 70.9, and 44.0 for the previous 3 decades. Female:Male ratio was 1.6:1, as previously with the excess females mainly in young adults. The incidence in children <16 is rising: 27/100/year (95% CI 14 to 40), compared to 15.6 (1.9 to 29) and 16.4 (2.0 to 31) for 1991–5 and 1986–90 respectively.

Conclusion: CD incidence in Cardiff continues to rise. CD is more commonly diagnosed in elderly and the young and colonic location continues to rise and terminal ileal fall in frequency, particularly in older patients.


### 340 STANDARD AND ALTERNATIVE THERAPIES FOR INFLAMMATORY BOWEL DISEASE: THE PATIENT’S PERSPECTIVE

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Introduction: Patient experience and perception of drug treatments will have profound effects on compliance and may influence use of alternative therapies. In a postal survey of 567 patients with inflammatory bowel disease (IBD) we assessed experience/attitudes to traditional medical therapies and the use of alternative treatments.

Aims & Methods: All patients with IBD treated at the Royal Cornwall Hospital were invited to complete a questionnaire regarding their attitudes to and experiences of standard medical therapies and alternative therapies. Attitudes were assessed with a linear score (1–10). Extensive demographic details were recorded. All responses were anonymised.

Results: 329 patients responded (58%), 44% had Crohn’s disease (CD), 55% had ulcerative colitis (UC). 52% felt their treatment was very effective and 8% perceived little benefit. Response to steroid and 5 Aminosalicylate (SASA) therapy reflected published data (62% and 48% respectively reporting a “very good” effect). However, 77% were concerned about potential side effects from steroids and 24% reported these. SASAs were felt to be less effective than steroids (48% “works very well” vs 67%), but better tolerated (11% “side effects” vs 24%) and safer (33% showing concern vs 77%). 47% of patients had exposure to immunosuppressants. 66% of patients worried about side effects and 41% reported severe problems. A positive clinical effect was reported by 54% of those on Azathioprine, compared to 35% on 6-Mercaptopurine. No significant difference was reported in efficacy between CD and UC. 19% of patients took alternative therapies. These therapies were perceived to be “very effective” in 27% and included aloe vera, hemp, kombucha and tumeric. Aloe vera was the most commonly used and 30% reported an improvement in colitis. Only 6% reported poor tolerability. Acupuncture and reiki were used by 11% of patients of whom 57% improved. Probiotics were used by 32% and led to an improvement in 36%, although this was only “helped a lot” in 8%, 3% reported poor tolerability. 10% patients felt their doctors would support this treatment compared to 75% for the other alternative treatments. Although not in clinical practice, worm therapy was known to 24%. 47% felt they would take this therapy.

Conclusion: IBD patients are well informed regarding the safety profile of their medical treatment. Concurrent with clinical practice, patients feel it safer to take immunotherapy than repeated courses of steroids. 19% use alternative therapies and more than half perceive a worthwhile improvement with excellent tolerability. 75% of IBD patients felt they could approach their hospital team to try these treatments.

### 341 THE HUMAN ATP-BINDING CASSETTE TRANSPORTERS SUPERFAMILY AND XENOBIOTIC REGULATORS: ANALYSIS OF INTESTINAL EPITHELIAL GENE EXPRESSION IN INFLAMMATORY BOWEL DISEASE

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Introduction: The ATP-binding cassette (ABC) transporters regulate many important physiological processes, such as gut barrier defence, bile acid/substances for disease location and activity. In carcinogenesis, the transporter ABCB1/MDR1 and the transcriptional regulator, PXR have been implicated in IBD susceptibility. Functional studies have also demonstrated a role in transcriptional factors such as Fxr, in small intestinal defence.

Aims & Methods: The aim of this study was to characterise comprehensively the gene expression patterns of the entire ABC superfamily (48 genes) and their respective key transcriptional mediators (PXR, Fxr, Lxr and Car) in human IBD based on the Agilent whole human genome oligonucleotide microarray chip. Mucosal biopsy specimens (colon and terminal ileum) from 53 Crohn’s disease (CD) and 67 ulcerative colitis (UC) individuals were subjected to DNA microarray analysis. We performed comparative analyses with subanalyses for regional expression, inflammation status with healthy and non-IBD inflammatory controls (30 individuals).

Results: Overall, 15 (31%) ABC genes were differentially expressed in IBD. In non-inflammatory states, 7 ABC transporters (3 members of sub-family B, ABCB1/1, ABCB4,5) were significantly downregulated in UC and CD compared with healthy controls (p values 0.05–0.0001; ABCB1/MDR1 in UC, p = 0.003). In inflammatory states, a further 6 and 2 genes were significantly down- and upregulated in UC/CD respectively (p values 0.04–0.0001; CFTR in UC and CD, p = 0.008) compared with inflammatory controls. Three ABC transporters were significantly expressed differentially irrespective of inflammation status (ABCB1, ABCF1/2). Of interest, there were no differences in the expression of Fxr between IBD and controls (with the exception of inflammation status dependent expression of CFTR in UC and CD, p = 0.008) and the expression of PXR (p = 0.01) in IBD. Multiple logistic regression analyses revealed significant reduced contribution of inflammatory status to the expression of ABCB1/MDR1, ABCB2, ABCG2, ABCG8, ABCG4 and transcription factors PXR, Fxr, CAR and LXR irrespective of disease phenotype and control status (p = 0.02–0.005). In addition, ABCB1/MDR1, ABCB3, ABCB6 and ABCG1 genes display differential expression gradients independent of disease phenotype and control status (p = 0.01–p = 0.001). Of interest, ABCB1/MDR1 and ABCB3 demonstrated a similar expression pattern from proximal to distal colon (decreasing gradient respectively).

Conclusion: The current data show significant alterations in key ABC genes and xenobiotic transcriptional factors in IBD. Previously implicated genes such as ABCB1/MDR1 along with novel transporters emphasised the importance of this class of proteins/transporters in the pathogenesis of IBD.

### 342 THE ROLE OF DIET IN THE AETIOLOGY OF ULCERATIVE COLITIS: A EUROPEAN PROSPECTIVE COHORT STUDY

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Introduction: The causes of ulcerative colitis are unknown, although it is plausible that dietary factors are involved. Case-control studies of diet and ulcerative colitis have been subject to recall bias. Nutritional epidemiology is important as it is known that dietary factors can influence disease phenotype and control status (0.01

Aims & Methods: The aim of the study was to examine the prospective relationship between the dietary intake of food groups and nutrients and the development of ulcerative colitis. Dietary information was collected on 263 824 men and women aged 40–65 years, participating in a large prospective cohort study in Europe (Epic Study, European Prospective Investigation into Cancer and Nutrition). The participants were residents of the UK, Sweden, Denmark, Germany or Italy. Participants supplied information on diet at recruitment and were followed up for the development of ulcerative colitis. Each incident case was matched with four controls and dietary

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groups divided into quartiles. An analysis was performed using multi-
variate conditional logistic regression adjusting for total energy intake.

Results: 134 incident patients with ulcerative colitis (69 women, 65 men) were identified with a median age at diagnosis of 59.0 years (range 28.0–
80.8 years). No significant trends for food groups or nutrients were identified, apart from a significant positive association with an increasing
consumption of total polyunsaturated fatty acids (OR = 2.33, 95% CI 1.15
to 4.73, for highest v lowest quartile of intake).

Conclusion: Increased total polyunsaturated fatty acid intake was associated with an increased risk of developing ulcerative colitis. A possible biological mechanism exists in that polyunsaturated fatty acids are metabolised to proinflammatory mediators. The study is ongoing to identify
more study participants developing ulcerative colitis to increase the statistical power for further analyses.

343 INFLIXIMAB FOR THE TREATMENT OF ULCERATIVE COLITIS: OUTCOMES IN OXFORD OVER A SIX-YEAR PERIOD

Introduction: Infliximab (IFX) has been shown to be of benefit in the treatment of both moderate and severe ulcerative colitis, but long-term
coelectomy rates are not known. The aims of this study were to review the rate of coelectomy after infliximab and try to identify factors that might predict the need for coelectomy.

Aims & Methods: We conducted a retrospective cohort study of all patients with active ulcerative colitis who were treated with infliximab between 2000 and 2006. The primary outcome measure was coelectomy-free survival. Cases were identified from pharmacy records and checked against ward and surgical records. Disease duration, activity, extent, indication for IFX, previous therapy, number of doses of IFX and complications were documented. Coelectomy-free survival was analysed by a Kaplan–Meier curve; quantitative data were compared by a two-tailed Student t test; qualitative variables and differences were analysed by χ2 analysis.

Results: From 2000–6, 30 patients were treated with IFX for active ulcerative colitis refractory to steroids and immunomodulators. Sixteen (53%) came to coelectomy a median of 140 days after their first infusion (range 4–607), the most common indication being intractable symptoms (14/16 patients, 88%). Only 16.6% (5/30) maintained a steroid-free remission. All were non-smokers except one and all were white except 2 Jews, an Indian and an Iranian. 16/30 (47%) received IFX (5 mg/kg, single infusion) for severe colitis refractory to intravenous steroid therapy, after a mean 17 days from admission. 16/30 (53%) had their first IFX (5 mg/kg) for moderate, outpatient refractory disease. Disease distribution was distal in 10%, L-sided in 33%, or extensive in 57%. All were on
immunosuppressant therapy for maintenance of long-term symptomatic remission in inflammatory bowel disease. We aimed to validate its use in pouchitis.

Aims & Methods: 54 stool samples were obtained: 46 from ulcerative colitis (UC) patients and 8 from familial adenomatous polyposis (FAP) coli patients. These samples were processed and analysed using a qualitative type enzyme linked immunosorbant assay (“PhiCal ELISA New Method”, Eurospital, Italy). Pouchitis was defined as an objective pouchitis score (OPS) of >5/12 (endoscopic score of >3/6 and an acute histological score of >2/6) or a pouch disease activity index (PDAI) of >7/18. Statistical analysis was performed using Spearman Rank and Mann–Whitney.

Results: The faecal calprotectin concentrations were monitored well with the OPS (r = 0.68, p < 0.0001), endoscopic score (r = 0.6, p < 0.0001), acute histological score (r = 0.71, p < 0.0001) and neutrophil score (r = 0.68, p < 0.0001), but correlated poorly with patients’ clinical symptoms (r = 0.3, p = 0.03). Using the OPS, 6 patients were diagnosed with UC pouchitis (+ pre-pouch ileitis), 13 with UC pouchitis alone, 27 had a healthy UC pouch, 11 had FAP pouchitis (+ pre-pouch ileitis) and 7 had a healthy FAP pouch. Respectively, median faecal calprotectin values (mg/kg) for these groups were 865, 145, 305 and 9, with means (95% confidence intervals) of 1073 (188.5 to 1958), 888.8 (174.1 to 1603), 147 (71.8 to 222.2), 305 and 12.86 (5.1 to 20.6). Statistically significant differences were noted when comparing inflamed and non-inflamed pouches (p < 0.0001). The pre-pouch ileitis group had higher values than those with pouchitis alone but this proved non-significant (p = 0.2). Using the upper normal limit for calprotectin as 50 mg/kg, the receiver operating characteristic analysis revealed a sensitivity of 90%, a specificity of 53%. Using a higher threshold of 92.5 mg/kg a sensitivity of 90% was maintained with a specificity of 76.5% demonstrated. Similar results were obtained using the PDAI, albeit with a slightly lower specificity level.

Conclusion: The new “PhiCal” faecal calprotectin test is a useful non-
invasive diagnostic tool for differentiating between healthy and inflamed ileal pouches. In addition, the quantity of faecal calprotectin directly correlated to the objective markers of disease severity. This simple test could be used to rationalise the management of ileal pouch patients before exposing them to the potential risks of empirical antibiotic therapy and endoscopic investigations with biopsies.

345 AZATHIOPRINE INDUCED HEPATOTOXICITY IN INFLAMMATORY BOWEL DISEASE: IS IT AS RARE AS WE THINK?
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Introduction: Azathioprine is widely acknowledged as the benchmark therapy for maintenance of long-term symptomatic remission in inflammatory bowel disease (IBD). However, the concern for both the clinician and the patient are the well documented side effects. Hepatotoxicity is of concern but is said to be rare in adults with reported rates of 0.2–7.5%.

Aims & Methods: Blood monitoring was performed on 55 consecutive patients with IBD (24 UC; 31 Crohn’s disease) started on Azathioprine. All
Abstract 347

**Definition** | **Rate**
---|---
Complete resolution (score = 0) of SF, RB, Sig score, PGA and PFA | UCDAI < 1, RB and SF = 0, at least 1 point decrease in Sig Score | 22% from baseline
RB = 0 and SF = 0 or 1 | UCDAI < 1, RB and SF = 0, at least 1 point decrease in Sig Score | 49%
UCDAI < 2 or no individual subscore > 1 | UCDAI < 2 | 50%
UCDAI < 2 | 54%

**Results:** Forty two patients (76%) completed the eight-week induction period. All patients complied with blood testing and this was closely monitored and supported by a nurse specialist (HEJ). No patients developed myelosuppression. Six (11%) stopped treatment with Azathioprine for a number of reasons (flu-like symptoms, abdo pain, infection) with normal blood tests. Seven (13%) developed hepatotoxicity. In all patients LFTs returned to normal after stopping Azathioprine.

**Conclusion:** The results from this study demonstrate that hepatoxicity can occur in excess of 10% of IBD patients within eight weeks of starting Azathioprine. All patients were symptomatic with this. Although there were no long-term complications, the elevation in LFTs was often significant and concerning. These results challenge the belief that Azathioprine induced hepatotoxicity is rare.

**Abstract 348**

**THE ALPHA7-NACHR RECEPTOR MEDIATES INHIBITION OF TNF-α-INDUCED IL-8 PRODUCTION BY HT29 COLONIC EPITHELIAL CELLS**

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**Introduction:** Why smoking and nicotine patches are beneficial in ulcerative colitis, while smoking is deleterious in Crohn’s disease, is unknown. We previously reported (Khatab et al., Gut 2005;54:A97) that nicotine downregulates IL-8 production by epithelial cells with a colonic phenotype (HT29), but has no effect on those of small intestinal phenotype (Caco2). Nicotine exerts its effects via nicotinic acetyl choline receptors (nAChRs); these have 17 subunits but it is not clear which subunit mediates the effects of nicotine in the gut. In macrophages, α7-nAChR mediates cholinergic inhibition of proinflammatory cytokine synthesis. **Aims & Methods:** We aimed to explore the role of α7-nAChR in mediating the effects of nicotine in HT29 and Caco2 cell lines. HT29 and Caco2 cells were grown to confluence and stimulated with TNF-α (10 ng/ml) in the presence of nicotine (10−5–10−3 M). After 24 h, total RNA was isolated by Trizol, mRNA expression of α3, α4, α5, α7 and n2-nAChRs by HT29 and Caco2 were analysed using RT-PCR. Supernatants were assayed for IL-8 by ELISA.

**Results:** RT-PCR analysis showed that α7-nAChR was expressed by HT29 cells (fig 1A), but not Caco2 cells (fig 1B). α3, α4, α5, and n2-nAChRs were expressed by neither HT29 nor Caco2. ELISA showed that TNF-α dose-dependently stimulated IL-8 production by HT29 and Caco2 cells. In

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>IL-8 (pg/ml)</th>
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<tr>
<td>A</td>
<td>HT29</td>
<td>Unstim T NF</td>
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<td>B</td>
<td>Caco2</td>
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**Abstract 348.**

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Abstract 345

**MMX MESALAZINE IS WELL TOLERATED DURING 12 MONTHS’ MAINTENANCE TREATMENT OF MILD-TO-MODERATE ULCERATIVE COLITIS**


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**Introduction:** Current 5-aminosaliclylate formulations for the maintenance of remission of ulcerative colitis (UC) require multiple-daily dosing regimens. Patient compliance with these regimens is poor, resulting in reduced drug efficacy and an increased risk of disease flare. MMX mesalazine is a high strength (1.2 g/tablet) 5 ASA formulation designed for once-daily (QD) dosing. Two pivotal phase III studies (SPD476-301 (301) and SPD476-324 (302)) have shown MMX mesalazine to be efficacious and well tolerated for the induction of remission (clinical and endoscopic) of active, mild to moderate UC. Here we report a further study, SPD476-303, assessing the safety of MMX mesalazine for the maintenance of remission of UC.

**Aims & Methods:** Study 303 was a randomised, multicentre, open label, extension study. Patients not in remission after the two phase III studies (301 and 302) could enrol into the maintenance phase of study 303 and receive 12 months’ MMX mesalazine 2.4 g QD or 1.2 g BID. Patients in remission after the pivotal studies or the acute phase of study 303, could enter the maintenance phase of study 303 and were randomised to receive 12 months’ MMX mesalazine 2.4 g QD or 1.2 g BID. The primary objective was to assess safety and tolerability in the maintenance phase.

**Results:** 459 patients entered the maintenance phase (246 from studies 301/302; 213 via the acute phase of study 303). Treatment-emergent adverse events (TEAEs) were experienced by 88/226 (39.1%) and 86/234 (36.8%) patients taking MMX mesalazine 2.4 g QD or BID, respectively. The most commonly reported AE was UC flare (coded as AEs that led to withdrawal (11 patients and 10 patients in the QD and BID groups, respectively). Of these, 2 cases of aggravated UC, 1 abnormal liver function test and 1 case of arthralgia were assessed as probably or possibly related to treatment. 21 patients experienced 23 AEs that led to withdrawal (11 patients and 10 patients in the QD and BID groups, respectively). Of these, 2 cases of aggravated UC, 1 abnormal liver function test and 1 case of arthralgia were assessed as probably or possibly related to treatment.

**Conclusion:** Long-term therapy with MMX mesalazine 2.4 g given twice daily was well tolerated for the maintenance of remission of mild-to-moderate UC.

Research funded by Shire Pharmaceuticals Inc, Wayne, PA, USA.
HT29 cells, but not Caco2 cells, nicotine (in concentrations resembling those found in the serum) significantly inhibited IL-8 production.

Conclusion: Of the five receptors assessed, only α7-nAChR is expressed by HT29 colonic epithelial cells and is likely to mediate the inhibitory effect of nicotine on IL-8 production by this cell type. In contrast, epithelial cells with a small intestinal phenotype (Caco2) do not express any of the receptors sought, and did not respond to nicotine. These results suggest that the beneficial effects of nicotine in UC may be attributed in part to its inhibition, via the α7-nAChR receptor, of IL-8 production by colonic epithelial cells.

349 RANDOMISED PLACEBO-CONTROLLED TRIAL OF CLARITHROMYCIN IN ACTIVE CROHN’S DISEASE

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Introduction: Crohn’s disease (CD) is characterised by defective innate immune responses to intestinal bacteria. Clarithromycin is a broad-spectrum antibiotic that has particularly good penetration into macrophages and may therefore be effective at eradicating the organisms at the centre of the granulomatous reaction in Crohn’s disease. There is also evidence suggesting that macrolide antibiotics can stimulate macrophage proliferation, migration, chemotaxis, chemokinesis and cytotoxic activity.

Aims & Methods: Patients with active Crohn’s disease (Crohn’s disease activity index (CDAI) >200 and a CRP >10 mg/l) were allocated either clarithromycin 1 g od or identical placebo for three months in a single-centre randomised double blind controlled trial. Inclusion criteria included a stable dose of corticosteroid (<10 mg prednisolone or <3 mg budesonide) and a stable dose of other medication (azathioprine for at least 3 months and 5-ASA preparation for at least one month). Randomisation was by blinded pharmacist independent from the trial. Primary outcome measure was remission (CDAI=150) or response (fall in CDAI>40 from baseline level) at months 3, 6, 9 and 12.

Results: The trial was stopped after 41 patients had been randomised because of poor overall efficacy (initially assessed blinded to treatment allocation). Baseline characteristics were similar in the two groups except CRP at baseline was 28 mg/l (range 10–200) in the clarithromycin group and 37 mg/l (range 10–200) in the placebo group. Use of other medications (azathioprine) was similar. As with previous studies, luminal associated flora (LAF) were extracted from pouch effluent. Mucosal associated flora (MAF) were extracted from pouch biopsies and were cultured in anaerobic chambers and used as controls. There was no difference in response/remission at week 12: CRP at baseline was 28 mg/l (range 10–200) in the clarithromycin group and 35 (80) for clarithromycin and –2 (114) for placebo. There was a significant difference in response/remission after one month: 10/19 (complete preservation of sample anaerobia and use of wide range of media) patients were similar when compared with patients with healthy pouches (p=0.306, 0.735, 0.800 and 0.735 respectively). However, eight organisms (OTU 100 (Sulphate reducing bacteria), 137, 193 (Methylotrophic), 232, 376, 381, 414 and 465 (Microbacterium)) were seen exclusively in patients with pouchitis.

Conclusion: Using T-RFLP, bacterial diversity and counts of predominant organisms in patient with pouchitis was similar when compared with patients with healthy pouches. However, T-RFLP identified eight candidate organisms (of which five were novel) which may be responsible for pouchitis.

351 A RAPID, NON-INVASIVE TEST FOR THE QUALITATIVE DETECTION OF ELEVATED FAECAL LACTOFERRIN IN ILEAL POUCH PATIENTS WITH INFLAMMATION

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Introduction: Pouchitis is a common long term complication of ileal pouch surgery. Currently, diagnosis requires a triad of clinical symptoms, endoscopic appearance and histological confirmation of inflammation. Elevated lactoferrin occurs in inflammatory disease of the gut. A rapid test for faecal lactoferrin may be useful adjunct. The IBD EZ VUE test, an immunochromatographic assay, is non invasive, easy to perform and provides a result within 10 minutes. Visual interpretation of positive and negative results is simple because of the membrane cassette format of the test.

Aims & Methods: We studied the sensitivity and specificity of the IBD EZ VUE faecal lactoferrin kit (TechLab) in diagnosing pouchitis. Consecutive ileal pouch patients with change in pouch function were recruited from a colorectal outpatient department. A faecal sample was collected from each patient prior to examination and biopsy of the pouch. An IBD EZ VUE test was performed by a person blinded to the patient’s symptoms and pouch appearance. Pouch disease activity indices (PDAI) were calculated for each patient. Pouchitis was defined as a PDAI of 7 or greater. Results of the IBD EZ VUE test were correlated with the PDAI for each patient.

Results: There were 32 ileal pouch patients (11 with and 21 without pouchitis). Median PDAI was significantly higher in those with pouchitis compared with those with healthy pouches (8 (7–9) v 3 (2–4), p=0.001). Overall the IBD EZ VUE test had a sensitivity of 100% and a specificity of 86% for diagnosing pouchitis. The positive predictive value was 79%. The three elevated lactoferrin results in the non-inflamed pouch group occurred in (1) bleeding haemorrhoids, (2) a pouch pouch anastomosis stenosis and (3) a patient with clefts. All three causes were readily apparent on clinical examination.

Conclusion: IBD EZ VUE is a simple, non-invasive and rapid test for indicating pouchitis. It is a sensitive method for diagnosing pouch inflammation without the need for routine endoscopic pouch examination or biopsy. Antibiotic treatment can be commenced with greater confidence and is appropriate in more than three quarters of patients. Further investigations can be reserved for those patients who have a positive lactoferrin test that fail to respond to standard antibiotic treatment.

352 A COMPARATIVE STUDY OF LUMINAL AND MUCOSAL ASSOCIATED FLORA IN PATIENTS WITH ILEAL POUCHES

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Introduction: The luminal associated flora of patients with healthy and inflamed pouches has been previously studied. However, inflammation of the ileal pouch often involves the mucosa, and flora at the mucosal interface may be more important clinically. We therefore studied mucosal associated flora in ileal pouch patients.

Aims & Methods: Bacterial flora were studied in 20 consecutive ileal pouch patients. As with previous studies, luminal associated flora (LAF) were obtained from pouch effluent. Mucosal associated flora (MAF) were extracted from pouch biopsies using the vortex technique. Best culture methods (sensitivity preservation of small anaerobia and use of wide range of media) and genotypic confirmation of all phenotypically identified organisms was performed. Diversity indices and counts (log colony forming units per gram sample) of bacteria were compared between LAF and MAF. Wilcoxon’s statistical test was performed, a p value of <0.05 was statistically significant.

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Results: Total bacterial diversity indices and counts were all significantly lower in IAF when compared with LAF. When data were analysed according to individual organisms, there were significantly more enterococci (5.9 (IQR 0.0–6.8) vs 0.0 (IQR 0.00–0.0)) and bacteroides (IQR 6.9 (0.0–7.7) vs 0.0 (IQR 0.0–5.4)) in LAF when compared with IAF.

Conclusion: Using best culture techniques, bacterial diversity and counts are significantly lower in mucosal associated flora when compared with luminal associated flora. There are inherent differences in bacterial yield and populations between the lumen and the mucosa of ileal pouch patients. These differences may be important in the planning and comparison of future studies.

Aims & Methods: To investigate luminal expression of HD-5 in Crohn’s disease (CD). Ileostomy fluid samples from 51 CD patients and 20 controls (7 had ulcerative colitis) were collected with protease inhibitors. Concentration of HD-5 in ileostomy fluid samples was determined (blinded) by comparison of immunoblot density against a standard curve. Luminal HD-5 was characterised following purification using a cation-exchange matrix and reverse phase-high performance liquid chromatography (RP-HPLC). HD-5 immunoreactive fractions were analysed by acid urea-polyacrylamide gel electrophoresis (AU-PAGE) and SDS-PAGE. Western Blots were performed for amino acid sequencing and ES-QToF of mass spectrometry.

Results: Luminal HD-5 levels were lower in CD ileostomy fluid than control (median range: 7.9 (5.5–35.0) vs 10.5 (6.0–30.0) μg/mL; p = 0.055). This reduction was most marked in those with active CD (p = 0.01) and in NOD2 mutant homozygotes/compound heterozygotes (p = 0.03). In control group (n = 3), luminal HD-5 had characteristics of the mature form only. By contrast, luminal HD-5 from the CD group (n = 7) appeared to exist in multiple forms on AU-PAGE Western. This was confirmed by RP-HPLC, in which HD-5 eluted from the column at three acetonitrile concentrations: 35% (previously seen with pro-HD-5), 50% (mature HD-5), but the majority eluted at 59% acetonitrile. Further analysis of the latter fraction (from 3 CD patients) by ES-QToF showed sequences for chymotrypsin (confirmed by N-terminal sequencing) and also contained a mass consistent with mature HD-5 (3580.51 Da). In one representative 59% acetonitrile sample, AU-PAGE showed HD-5 and chymotrypsin-specific bands in a similar position. However, in SDS-PAGE (under denaturing/reducing conditions), the same sample showed distinct immunoreactive bands consistent with mature HD-5 and chymotrypsin. SDS-PAGE Westerns of ileostomy fluid cation-exchange concentrations (not applied to RP-HPLC) showed chymotrypsin immunoreactive bands in samples from CD and controls. Western blot analyses of control and CD Paneth cell extracts showed chymotrypsin immunoreactive bands.

Conclusion: (1) HD-5 levels in CD ileostomy fluid samples were lower than in controls (2) HD-5 in control ileostomy fluid, HD-5 exists in the free mature form (3) In CD ileostomy fluid, majority of the HD-5 was present in a complex with chymotrypsin (which may originate from Paneth cells) (4) Reduced total luminal HD-5 levels, and luminal HD-5-chymotrypsin complexes may result in reduced function of this antimicrobial peptide in CD.

Aims & Methods: The aim of this study was to compare certolizumab pegol (an antibody Fab’ fragment conjugated with polyethylene glycol) with other anti-TNF agents in terms of their effect on LPS-stimulated production of TNFα and IL-1β. Monocytic cells were pre-incubated for 1 h with certolizumab pegol, etanercept, adalimumab, and infliximab or with LPS (100 ng/ml) for 4 h at 37°C. Supernatants were collected for measurement of TNFα and IL-1β by enzyme-linked immunosorbent assay and a range of chemokines, cytokines and other proteins measured by Luminex.

Results: Pre-incubation of monocytic cells with certolizumab pegol, adalimumab or infliximab appeared to completely inhibit subsequent LPS-stimulated production of TNFα and IL-1β in a dose-dependent manner. In contrast, etanercept was much less efficient at mediating this activity, causing only partial inhibition of cytokine production. There were no differences in potency between infliximab and adalimumab, while certolizumab pegol was approximately 100-fold more potent than infliximab or adalimumab at inhibiting the release of TNFα and IL-1β by monocytic cells. The Luminex analysis of several cytokines and chemokines showed a range of effects, with inhibition of IL-10 and IL-12 being the most profound. Again, etanercept was not as potent as the other three anti-TNF agents at inhibiting these two cytokines.

Abstract 352

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354 ALTERNATIONS IN THE EXPRESSION OF HUMAN DEFENSIN-5 IN ILEOSTOMY FLUID OF PATIENTS WITH CROHN’S DISEASE

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Introduction: Human defensin-5 (HD-5) is a major antimicrobial peptide which is normally present in the lumen in its mature form but stored in small intestinal Paneth cells in its precursor form.

355 EFFECTS OF CERTOLIZUMAB PEGOL, ETANERCEPT, ADALIMMAB AND INFliximab ON LIPOPOLYSACCHARIDE-INDUCED CYTOKINE PRODUCTION BY HUMAN PERIPHERAL BLOOD MONOCYTES

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Introduction: Monocytes/macrophages secrete a variety of pro-inflammatory cytokines, such as tumour necrosis factor alpha (TNFα) and interleukin-1 beta (IL-1β), which are expressed in increased amounts in the blood and intestinal mucosa of patients with Crohn’s disease (CD). It has been suggested that anti-TNF agents induce signalling via membrane TNF alpha, which results in an inhibitory effect on lipopolysaccharide (LPS)-induced cytokine production.

Aims & Methods: The aim of this study was to compare certolizumab pegol (an antibody Fab’ fragment conjugated with polyethylene glycol) with other anti-TNF agents in terms of their effect on LPS-stimulated production of TNFα and IL-1β. Human monocytic cells were selected from peripheral blood mononuclear cells of healthy donors using CD14+ magnetic microbead-associated cell sorting (MACS). Purified monocytes were pre-incubated for 1 h with certolizumab pegol, etanercept, adalimumab, infliximab (at a range of concentrations from 100 μg/ml to 100 μg/ml) or a relevant control. After extensive washing, the monocytes were incubated, with or without LPS (100 ng/ml) for 4 h at 37°C. Supernatants were collected for measurement of TNFα and IL-1β by enzyme-linked immunosorbent assay and a range of chemokines, cytokines and other proteins measured by Luminex at one anti-TNF concentration.

Results: Pre-incubation of monocytic cells with certolizumab pegol, adalimumab or infliximab appeared to completely inhibit subsequent LPS-stimulated production of TNFα and IL-1β in a dose-dependent manner. In contrast, etanercept was much less efficient at mediating this activity, causing only partial inhibition of cytokine production. There were no clear differences in potency between infliximab and adalimumab, while certolizumab pegol was approximately 100-fold more potent than infliximab or adalimumab at inhibiting the release of TNFα and IL-1β by monocytic cells. The Luminex analysis of several cytokines and chemokines showed a range of effects, with inhibition of IL-10 and IL-12 being the most profound. Again, etanercept was not as potent as the other three anti-TNF agents at inhibiting these two cytokines.
Conclusion: Certolizumab pegol effectively inhibited cytokine production more potently than adalimumab or infliximab. Etanercept showed only partial inhibition of cytokine production even at high concentrations. Although these data were generated in an in vitro system, the comparative trends in the inhibition of cytokine production stimulated by bacterial products appear to reflect the clinical efficacy of these anti-TNF agents in CD. The potent inhibition by certolizumab pegol of cytokine production by monocytes may represent an important mechanism of action in CD.

356 ANTIBODIES TO INFlixIMAB IN PATIENTS WITH CROHN'S DISEASE DO NOT CROSS-REACT WITH CERTOLIZUMAB PEGOL

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Introduction: Anti-tumour necrosis factor-alpha (TNF-α) therapies have shown clinical benefit in a range of inflammatory diseases. Infliximab is a chimeric full IgG1 monoclonal anti-TNF antibody administered intravenously for the treatment of Crohn’s disease (CD). Its use may be limited by the induction of antibodies to infliximab, subsequent loss of efficacy and occurrence of infusion reactions.1 Certolizumab pegol is a PEGylated Fab fragment of a humanised anti-TNF antibody that is administered subcutaneously and is currently in development for the treatment of CD. If the antibody response to infliximab does not cross-react with certolizumab pegol, the patients who develop antibodies following treatment with infliximab may have an opportunity to switch to treatment with certolizumab pegol.

Aims & Methods: The aim of this study was to determine if the antibody response elicited in patients to infliximab cross-reacts with certolizumab pegol. Samples from 20 patients with an antibody response to infliximab were assayed using ELISA plates coated with certolizumab pegol and then blocked with 0.1% bovine serum albumin. Plasma from patients with antibodies to infliximab was then incubated on the plates. Following a wash step, biotinylated certolizumab pegol was added followed by streptavidin-horseradish peroxidase. Colour was developed using 3,3,5,5-tetramethylbenzidine (TMB) substrate and the absorbance read at 450 nm with reference at 630 nm.

Results: No cross-reactivity to certolizumab pegol was detected in any of the 20 infliximab antibody-positive samples tested.

Conclusion: The generation of an antibody response to one anti-TNF therapy may not preclude the use of another anti-TNF drug in patients with CD. Subcutaneous certolizumab pegol may provide an alternative therapy for patients who develop antibodies following intravenous treatment with infliximab.


357 ACCUMULATION OF PLASMACYTOID DENDRITIC CELLS IN THE INTESTINE OF ACUTE ULCERATIVE COLITIS

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Introduction: Breakdown of tolerance to commensal microflora is believed to be a key factor in the pathogenesis of inflammatory bowel disease (IBD). Dendritic cells (DCs) have been implicated in mediating this process in various rodent models, but data on human intestinal DC in IBD are limited.

Aims & Methods: We aimed to identify changes in intestinal DCs in patients with acute flare-up of ulcerative colitis (UC). Rectal biopsies were obtained from patients with active UC symptomatology for less than four weeks (n = 19; Ulcerative Colitis Disease Activity Index > 5; sigmoidoscopy score > 2) and controls (n = 7; macroscopically and histologically normal intestine of patients referred for rectal bleeding). DCs were identified in freshly isolated lamina propria mononuclear cells and four colour flow cytometric analysis was used to identify the proportion and number of CD11c+ (HLA-DR+/Lin-) myeloid DCs and CD123+ (PL-HLA-DR+/Lin-) plasmacytoid DCs. Surface expression of activation/maturation markers CD40, CD86, and toll-like receptors (TLR) TLR-2 and TLR-4 was assessed on each cell population.

Results: During acute flare-up, UC patients have a significantly higher number of intestinal DCs compared with controls (456 versus 108 per milligram tissue; p = 0.026). The majority of additional DCs present in inflamed tissue were CD11c+ cells. The number of these cells was significantly greater in tissues from UC patients than from controls (403 vs 51; p < 0.005). In contrast, the number of CD11c+ DC did not differ significantly between UC patients and controls. Unlike CD11c+ myeloid DCs, the CD11c- cells from UC patients did not express TLR-2 and TLR-4, and only a few expressed CD40 (22% CD11c-DC versus 60% CD11c+DC) and CD86 (11% CD11c-DC versus 48% CD11c+DC). Preliminary data also suggested that these CD11c- cells lack expression of the classic blood plasmacytoid DC markers (CD123, BDCA-2 and BDCA-4).

Conclusion: UC patients with acute flare-up have an increased number of intestinal DCs, the majority of which are CD11c- cells and the nature of which remains to be fully determined. The recruitment of this specific group of cells in the intestine probably contributes to gut inflammation and tissue damage. Further characterisation of these cells have therapeutic potential.

358 MANAGEMENT OF POSTOPERATIVE CROHN’S DISEASE IN A SPECIALIST UNIT: NEED FOR A DEFINED STRATEGY

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Introduction: Postoperative clinical and endoscopic recurrence is common in Crohn’s disease.

Aims & Methods: We aimed to assess postoperative Crohn’s management and recurrence in a cross-sectional patient cohort in our unit, and to define a treatment algorithm for the prophylaxis of Crohn’s recurrence after resection. We retrospectively reviewed all patients who had a primary ileocolonic resection for Crohn’s disease between 2003 and 2005 in a secondary and tertiary specialist centre.

Results: Ninety-nine patients (42 male; 57 female; mean age 37 years) with a median disease duration of 10 years, were reviewed. Indications for surgery were obstruction (n = 61), failed medical therapy (n = 31) and internal fistula (n = 7). 30 patients (30%) were active smokers. 51 patients (52%) had at least one previous Crohn’s resection. Clinical and surgical recurrence rates were 28% and 5% respectively, at one year. Median time to clinical recurrence was 10 months. Only 19% of patients had an ileocolonoscopy, and 60% had been reviewed by a gastroenterologist after surgery. Nine of the 28 patients (32%) who had clinical recurrence had not had postoperative medical therapy. We have subsequently devised a postoperative treatment strategy to stratify patients to receive no treatment, mesalazine or immunosuppressant based on clinical risk factors and endoscopic findings at 6 and 12 months after surgery.

Conclusion: The rate of postoperative recurrence of Crohn’s disease in our unit was high in the short term. Prospective treatment strategies are deficient. We have devised a postoperative treatment strategy which requires further evaluation.

359 ANALYSIS OF DISTINCT GENOME WIDE EXPRESSION PROFILES IN THE TERMINAL ILEUM OF PATIENTS WITH CROHN’S DISEASE

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Introduction: Gene expression technology using microarray allows a comprehensive picture of gene expression at the tissue and cellular level.

Aims & Methods: The aim of this study was to investigate differential gene expression in endoscopic terminal ileal (TI) biopsies of a well phenotyped cohort of Crohn’s disease (CD) patients and controls. Paired TI biopsies from 16 patients with CD: 6 non-infamed biopsies, 7 chronically inflamed biopsies and 3 acutely inflamed biopsies, and 6 healthy control TI biopsies were collected for RNA extraction and histology. Patients symptoms were scored at the time of endoscopy and phenotypic data were collected by patient questionnaire and case note review. Microarray studies were carried out using the Agilent whole human genome oligonucleotide chip. Results were confirmed by real time PCR.

Results: Using unsupervised hierarchical clustering, discrete separation between the female CD TI biopsies and female control TI biopsies was not observed. When the CD TI biopsies (16 biopsies) were compared to controls (6), 296 sequences were upregulated and 312 sequences were downregulated (fold change (FC) greater or less than 2, 0.01 < p < 0.005). To further investigate the acute inflammatory signal 10 inflamed CD TI biopsies were compared to 6 non-inflamed CD biopsies. 149 sequences were upregulated and 156 sequences were downregulated, (FC greater or less than 2, 0.0095 < p < 0.01 × 10–45). By removing the acute inflammatory signal to compare quiescent CD TI biopsies to controls (6), 87 sequences were upregulated and 83 sequences were downregulated (FC greater or less than 2, 0.01 > p > 1.68 × 10–44). To further investigate the acute inflammatory signal 10 inflamed CD TI biopsies were compared to 6 non-inflamed CD biopsies. 149 sequences were upregulated and 156 sequences were downregulated, (FC greater or less than 2, 0.0095 < p < 0.01 × 10–45). Gene
ontology revealed a preponderance of these differentially regulated sequences were associated with endoplasmic reticulum stress when gene pathways were considered and lipid metabolism when biological function was considered. Interestingly, and contrary to previous data, no change in alpha, 6 expression, 5 survival between the CD T1 biopsies and controls. This was confirmed by real-time PCR.

Conclusion: Genome wide microarray analysis of CD T1 biopsies has allowed us to characterise distinct expression signatures and to identify candidate genes involved in disease pathogenesis that could be considered novel therapeutic targets.


360 SERUM AND SALIVARY IGA RESPONSES TO A 200 KD SACCHAROMYCETES CEREVIAE ANTIGEN IN OROFACIAL GRANULOMATOSIS AND CROHN’S DISEASE

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Introduction: Orofacial granulomatosis (OFG) is a rare chronic inflammatory disease of unknown aetiology and has been linked to Crohn’s disease (CD). Whether OFG represents a true manifestation of CD or exists as a separate entity is uncertain. Serological markers such as anti-Saccharomyces cerevisiae antibodies (ASCA) have proven useful in defining indeterminate cases of inflammatory bowel disease. Early identification of patients with gut CD presenting as OFG is likely to be beneficial.

Aims & Methods: To investigate whether the immunological response to a specific Saccharomyces cerevisiae 200 kDa glycoprotein antigen in serum and saliva can predict the presence of gut CD in patients with OFG. Serum and salivary antibodies to a 200 kDa S cerevisiae antigen were measured by ELISA in 4 distinct groups of patients: OFG alone (n = 10), gut CD alone (n = 10), both oral and gut CD (n = 7) and healthy controls (n = 30). Response to control antigens from SAP2 protein (from Candida albicans) and whole cells of Escherichia coli (E.coli) were also determined.

Results: Serum IgA antibodies to S cerevisiae 200 kDa were raised markedly in the two groups with gut disease compared to controls (OFG + CD, p<0.005 and CD, p<0.001). Whole saliva IgA antibodies to S cerevisiae were raised in the groups with oral involvement but also in CD (p<0.005). Specific salivary IgA to SAP2 from Candida albicans were also raised in the groups with oral involvement (p<0.005) and in CD (p<0.001). Serum IgG to SAP2 was raised in the groups with oral involvement whilst serum IgA to SAP2 did not show any difference between the four groups. Specific serum IgG to E coli was elevated in all three groups (p<0.005) but no difference between the groups was seen with salivary IgA to E.coli.

Conclusion: These findings suggest that raised serum IgA antibodies to S cerevisiae 200 kDa may reflect gut inflammation while raised salivary IgA antibodies to S cerevisiae 200 kDa reflect both oral and/ or gut disease. High titres of serum IgA to S cerevisiae 200 kDa antigen might be of predictor of gut involvement in OFG, identifying a subgroup of patients that may benefit from early gastrointestinal investigations and possibly treatment.

361 THE DIETARY MANAGEMENT OF OROFACIAL GRANULOMATOSIS

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Introduction: Orofacial granulomatosis (OFG) is a rare chronic inflammatory disease of unknown aetiology that typically presents with lip swelling in young adulthood. Management of OFG remains a challenge but recent evidence implicates dietary antigens, in particular cinnamon and benzoate, as a possible trigger of the chronic inflammatory process. At our institution dietary manipulation, in the form of a cinnamon and benzoate free diet (CB-free), is used as a standard first line treatment. Failing a CB-free diet, a more formal dietary approach with liquid enteral diet as a sole source of nutrition is offered. In this study we review the impact of a dietary approach to OFG.

Aims & Methods: A retrospective case note review to determine the utilisation and efficacy of dietary manipulation in patients with OFG. Patients attending a combined Oral Medicine/Gastroenterology clinic with a diagnosis of OFG confirmed by typical clinical and histological features were advised on a CB-free diet (n=57) for 12 weeks. Following treatment with a CB-free diet those patients who required further symptomatic control were assessed for suitability of liquid enteral diet (elemental E028 or Modulen IBD) as a sole source of nutrition for 6-12 weeks followed by a low fat, fibre limited, exclusion (LOFFLEX) reintroduction regimen. A standardised oral disease chart was used to objectively assess the oral features pre- and post all dietary treatments.

Results: Data were available on 57 patients who followed a CB-free diet. The median age was 22 years and 29 patients were male. Improvement in oral activity scores was seen in 39/57 (68.4%) patients following a CB-free diet after 12 weeks. Of the 57 patients, 15 patients with an incomplete or absent response to the CB-free diet were assessed for liquid enteral nutrition. Data were available for 12 of the patients. Three patients could not tolerate the diet within the first week and were therefore not followed up further. In Modulen IBD this was achieved by reducing oral intake and providing elemental diet. Improvements in oral disease activity scores, two were taking Modulen IBD and 6 were taking elemental E028.

Conclusion: A dietary approach as management for patients with OFG is an effective form of treatment and supports the view that the disease is driven by a dietary antigen(s). The disease typically affects teenagers and young adults making dietary therapy particularly appropriate. In a majority, this avoids the need to consider corticosteroids and immunosuppression.

362 B-CELL INFILTRATES IN OROFACIAL GRANULOMATOSIS

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Introduction: Orofacial granulomatosis (OFG) is a rare chronic inflammatory disease of unknown cause and which overlaps with Crohn’s disease. Recent data suggest a possible dietary link with benzoate. Histologically OFG is characterised by a chronic inflammatory cell infiltrate, non-caseating epithelioid granulomas, lymphoepithelium of the oropharynx and dilated lymphatics. We have recently observed B-cells with dendritic morphology in the inflammatory infiltrates that have not been described previously.

Aims & Methods: To characterise the B-cell infiltrate in patients with OFG. Serial sections of paraffin embedded lip biopsies from patients with a confirmed diagnosis of OFG were stained for CD20, CD21 and IgD. A frozen lip biopsy sample was also stained for CD138 and CD19. Standard immunohistochemical techniques were applied.

Results: Lip biopsies in OFG contain an infiltrate of subepithelial large dendritic B-cells in all of 12 cases studied. They express the B cell marker CD20, but not markers of naive B-cells such as IgD or CD21. They are not associated with organised follicular lymphoid structures since B-cells expressing IgD and CD21+ follicular dendritic cells were absent in serial sections. The dendritic processes of the B-cells frequently associate with adjacent cells, confirmed to be T-cells in double stained preparations. They are unlikely to represent differentiation of B lineage towards plasma cells since the CD20- infiltrate is not consistently accompanied by a CD19+, CD20- B-cell subset or CD138+ cells that would signify local plasma cell differentiation.

Conclusion: B-cells with dendritic morphology that are independent of lymphoid follicular structure are present in the oral mucosa in OFG. These cells resemble large interfollicular B-cells in the T-cell zones of lymph nodes and follicle independent B-cells in the thymus that have been linked with antigen presentation. These B-cells may therefore provide a link between the specific recognition of dietary benzoate within this group of patients and the associated inflammatory response.

363 HIGH THROUGHPUT 16S RIBOSOMAL RNA SEQUENCE ANALYSIS OF THE INTESTINAL MICROBIOTA IN CROHN’S DISEASE

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Introduction: It is generally accepted that alterations in the bacterial microbiota associated with the human intestinal mucosa play a critical role...
in the pathogenesis of IBD. Previous studies on the composition of the bacterial flora in Crohn’s disease (CD) patients and healthy controls using fluorescent in situ hybridization (FISH) or culture suggest higher content of Bacteroides spp and Clostridia in patients with CD. The exact difference in the microbiota between inflamed and non-inflamed mucosal sites in CD patients has not been established.

**Aims & Methods:** The aim of this study was to undertake detailed molecular characterisation of the mucosal-associated microbiota in inflamed and non-inflamed mucosal sites in CD patients using high throughput bacterial 16S ribosomal RNA sequencing. Total DNA was extracted from paired biopsies of inflamed and non-inflamed mucosa from 6 patients with CD and from biopsies of healthy mucosa of 6 normal controls. Bacterial DNA was amplified using universal bacterial 16S ribosomal RNA gene primers and cloned into a plasmid vector to generate clone libraries.

**Results:** The clone libraries yielded 11,160 sequenced clones, with up to 101 OTUs per clone library, representing a large sample population. The findings of increased numbers of Firmicutes and Bacteroidetes in highly significant difference between inflamed and non-inflamed mucosa in analysis of the intestinal microbiota in CD undertaken to date and shows a previously unidentified bacterial phylotypes. Analysis on species level data identified phylotypes included Firmicutes, Fusobacteria, Actinobacteria, 101 OTUs per clone library, representing a large sample population. The finding of increased numbers of Firmicutes and Bacteroidetes in highly significant difference between inflamed and non-inflamed tissue in all of the CD patients. Higher numbers of Firmicutes, (including all Clostridia spp) were found in the inflamed mucosa of all of the CD patients. The most abundant species in all of the 6 CD patients were Firmicutes and Bacteroidetes.

**Conclusion:** This is the most extensive 16S ribosomal RNA sequence analysis of the intestinal microbiota in CD undertaken to date and shows a highly significant difference between inflamed and non-inflamed mucosa in CD. The findings of increased numbers of Firmicutes and Bacteroidetes in inflamed mucosa complement those obtained by FISH. Further detailed analysis of these species may reveal phenotypic properties important in the pathogenesis of CD.

### 365 THALIDOMIDE IN LUMINAL AND FISTULISING CROHN’S DISEASE RESISTANT TO STANDARD THERAPIES

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**Introduction:** Thalidomide has been shown to be an effective treatment in patients with Crohn’s disease (CD).

**Aims & Methods:** We retrospectively assessed the efficacy and tolerability of thalidomide in patients with refractory CD. 25 patients with CD (eight luminal, 11 fistulising, 4 luminal and fistulising, 2 perianal ulcerating disease) refractory to standard therapy, including infliximab, were treated over a period of 10 to 12 weeks. All patients had at least one luminal disease. Thalidomide was started at a dose of 50 or 100 mg at night and increased stepwise if tolerated. Retrospective “estimated” CDAIs were assessed at baseline and at end of follow-up. Clinical response was defined as a reduction in the “estimated” CDAI of >300 points for patients with luminal disease, >50% reduction in draining fistulas or >50% reduction in perianal ulcer size. Clinical remission was defined as an “estimated” CDAI <150 points (luminal disease), complete fistula closure (fistulising disease), and complete ulcer healing (perianal ulcerating disease).

**Results:** Six of 8 patients (75%) treated for luminal disease responded to thalidomide at a median follow-up of 12 months (3 clinical responses, 3 clinical remissions). The median “estimated” CDAI was 378 (range 251–600) at baseline and 151.5 (range 98–241; p=0.005) at the end of follow-up. Nine of 11 patients (81.8%) with active fistulising disease responded to thalidomide (6 responses; 3 remissions). All the patients treated for both luminal and fistulising disease had fistula response (3 clinical responses, 1 complete healing) and 3 of them had a response in luminal disease activity (2 remissions, 1 clinical response). One of 2 patients with perianal ulcerating disease responded. Three of 7 (43%) AASER-dependent patients discontinued steroids. 12 patients (48%) discontinued treatment because of adverse effects (sedation = 3; abdominal pain = 2; leucopenia = 1; neuropathy = 6).

**Conclusion:** Thalidomide is an effective and relatively safe treatment in selected patients with refractory luminal and fistulising CD. It has a potential role in the short to medium-term use for acute disease, bridging therapy, or fistulising disease. Its long-term use is limited by toxicity.

### 366 A NON-SYNONYMOUS SNP IN AN AUTOPHAGY-RELATED GENE IS ASSOCIATED WITH CROHN’S DISEASE


**Introduction:** A genome-wide association scan of non-synonymous single nucleotide polymorphisms (nsSNP) in Crohn’s disease (CD) patients from Germany detected a highly significant association in a gene from the autophagy-related gene network (ATG-related) gene.

**Aims & Methods:** We retrospectively assayed the efficacy and tolerability of thalidomide in patients with refractory CD. 25 patients with CD (eight luminal, 11 fistulising, 4 luminal and fistulising, 2 perianal ulcerating disease) refractory to standard therapy, including infliximab, were treated over a period of 10 to 12 weeks. All patients had at least one luminal disease. Thalidomide was started at a dose of 50 or 100 mg at night and increased stepwise if tolerated. Retrospective “estimated” CDAIs were assessed at baseline and at end of follow-up. Clinical response was defined as a reduction in the “estimated” CDAI of >300 points for patients with luminal disease, >50% reduction in draining fistulas or >50% reduction in perianal ulcer size. Clinical remission was defined as an “estimated” CDAI <150 points (luminal disease), complete fistula closure (fistulising disease), and complete ulcer healing (perianal ulcerating disease).

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**Conclusion:** Thalidomide is an effective and relatively safe treatment in selected patients with refractory luminal and fistulising CD. It has a potential role in the short to medium-term use for acute disease, bridging therapy, or fistulising disease. Its long-term use is limited by toxicity.

**Aims & Methods:** A genome-wide association scan of non-synonymous single nucleotide polymorphisms (nsSNP) in Crohn’s disease (CD) patients from Germany detected a highly significant association in a gene from the autophagy-related gene network (ATG-related) gene.
disease susceptibility variants in CARD15 and IBDS loci to test for association and interaction with these loci. In addition, genotype data were stratified by clinical phenotype in order to determine if the ATG-related risk variant is associated with a particular subtype of CD based on site of disease and disease behaviour.

Results: The frequency of the ATG nsSNP was 58.1% in CD cases and 51.3% in controls, demonstrating a highly significant association with CD (p = 2.4 x 10^-6). Genetic modelling revealed that this trait locus best fits a recessive model with a 1.65-fold increase in risk of disease in individuals homozygous for the risk allele (95% CI 1.32 to 2.07). This risk was increased to 2.6-fold for ileal disease (95% CI 1.59 to 4.31) p = 8.7 x 10^-6, and there was no increase in risk of CD for other disease sites. Analysis of the ATG locus with respect to interaction with the two other well-defined IBD loci, CARD15 and IBDS, indicated independent additive contributions for all three loci to the risk of CD.

Conclusion: These data, together with the recent report of an association of the IL23R locus with CD, strongly support the existence of at least 4 susceptibility genes for this disorder, and indicate a role for processing of intracellular bacteria in the pathogenesis of CD.

A GLYCOMIC APPROACH TO THE IDENTIFICATION OF DISEASE BIOMARKERS IN INFAMMATORY BOWEL DISEASE

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Introduction: Earlier research into IgG glycosylation changes associated with rheumatoid arthritis and other rheumatic diseases has indicated the presence of sugar biomarkers that may be associated with health and disease. Furthermore, a pilot study has demonstrated the possibility of using this technique to differentiate between Crohn’s disease, ulcerative colitis and healthy controls. Our aim was to extend these studies using serum to assess the direct diagnostic and prognostic potential for identifying other sugar biomarkers in a cohort of patients with inflammatory bowel disease.

Aims & Methods: High performance anion-exchange chromatography with pulsed amperometric detection (HPAEC-PAD) together with mass spectrometry (MS) was used to compare the overall glycosylation profile of patients with Crohn’s disease (CD) (n = 30), ulcerative colitis (UC) (n = 30), indeterminate colitis (IC) (n = 15) and healthy controls (n = 15). The oligosaccharides were enzymatically cleaved from total serum glycoproteins using PNGase-F.

Results: HPAEC-PAD analysis together with MS indicates marked and significant differences in the glycosylation profiles of CD and UC from each other, and from healthy controls. These include changes in the neutral as well as monosialylated and multi- (di-, tri- and tetra-sialyated structures) where the major changes occur. Additionally, in the cohort of patients with IC, the glycosylation profile was often similar to those associated with CD or UC.

Conclusion: We have demonstrated that HPAEC-PAD can be used to provide rapid complete sugar profiles of serum glycoproteins, and that there are marked and significant differences associated with inflammatory bowel disease. The results also suggest that indeterminate colitis may not be a separate entity in patients, and may eventually be diagnosed as either CD or UC after a latent period. We conclude that serum sugar profiles may be of use in the management of patients with inflammatory bowel disease, and further suggest that glycoproteins other than IgG may be undergoing disease-specific sugar variation.


ENDOSCOPICALLY MEASURED MUCOSAL HEALING CORRELATED WITH RESPONSE TO THERAPY IN MODERATELY ACTIVE ULCERATIVE COLITIS

D. T. Rubin1, B. Yacyshyn2, C. Yeh3, G. Lichtenstein4, 1Gastroenterology, Hepatology, and Nutrition, University of Chicago, Chicago; 2Clinical Development, Biostatistics, Procter and Gamble Pharmaceuticals, Ohio; 4Gastroenterology and Hepatology, Hospital of the University of Pennsylvania, Philadelphia, USA

Introduction: [Introduced by Dr S Travis] To examine the correlation between endoscopically measured mucosal healing and response to therapy with delayed-release oral mesalamine 4.8 g/day (investigational 800 mg tab) and 2.4 g/day (marketed 400 mg tab) in patients with moderately active ulcerative colitis (UC).

Aims & Methods: Data from 2 Phase III, multicentre, randomised, double-blind, 6-week, controlled studies of similar design (ASCEND I&II) were pooled and analysed. The primary endpoint was treatment success, predefined as improvement from baseline in the Physician’s Global Assessment (PGA) accompanied by improvement in at least one other clinical assessment (stool frequency, rectal bleeding, patient functional assessment (PFA), or endoscopy findings) and no worsening in any of the remaining clinical assessments. Mucosal healing was defined as an endoscopy score of 0 or 1. PFA was based on a 4-point scale, 0 (“generally well”) to 3 (“terrible”). Patients with moderately active UC (baseline PGA = 2) and baseline endoscopy subscore >2 were included in this analysis. The correlation between mucosal healing and treatment response and PFA was determined.

Results: 423 analyzable patients with moderate UC were randomised in the two studies, of which 391 patients met the criteria for these analyses. The two treatment groups were balanced at baseline with regard to demographic characteristics, disease history, and disease state characteristics. Overall at 6 weeks, 67% of moderate UC patients who achieved treatment success also had mucosal healing (κ = 0.6938). This finding was consistent regardless of dose (2.4 g/day or 4.8 g/day [κ = 0.7452 and 0.6046, respectively]). This finding was also consistently present at the 3-week time point (κ = 0.7173). An endoscopic score of 0 alone was poorly correlated with treatment success but did improve from 3 weeks to 6 weeks (κ = 0.1176 and 0.2252 respectively).

Conclusion: This analysis demonstrates that successful treatment of moderately active UC with mesalamine is associated with improved mucosal integrity as early as 3 and 6 weeks. The lack of association between endoscopic improvement and PFA may be due to the fact that UC patients’ general wellbeing involves more than mucosal healing.

DIABETIC CONTROL IS NOT DISTURBED BY AN ORAL CORTICOSTEROID (PREDNISOLONE METASULFOBENZOATE) DESIGNED TO TREAT COLITIS

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Introduction: Corticosteroids remain the mainstay of treatment of acute severe ulcerative colitis despite potential side effects, including unmasking latent diabetes or exacerbation of known diabetes. Orally administered Eudragit-L-coated prednisolone metasulfobenzoate (Predocol) has limited absorption but remains effective in treating colitis. The effect of oral Predocol on diabetic control has not been studied.

Aims & Methods: To compare the effects on blood glucose in stable diabetic volunteers following either oral Predocol 30 mg or oral

<table>
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<tr>
<th>Blood glucose (mmol/l)</th>
<th>Pre-Predocol (n = 22)</th>
<th>Post-Predocol (n = 22)</th>
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<td>24 hours: range</td>
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<td>48 hours: mean (SD)</td>
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<td>48 hours: range</td>
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<td>5.4–10.9</td>
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<td>6.3–13.0</td>
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</table>

Abstract 369 Glucose levels pre- and post-treatment in the 24- and 48-h post-dose periods

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prednisolone 30 mg in a randomised, double-blind, single dose, cross-over study.

Results: The greatest effect on blood glucose occurred in the first 24 h with an increase in mean blood glucose following prednisolone of 3.05 mmol/l with no change following Predoc (p = 0.001). In the 48-h post-treatment period mean blood glucose increased from 7.7 to 7.8 mmol/l following Predoc and from 7.7 to 9.2 mmol/l following prednisolone (treatment difference 1.44 mmol/l; p < 0.001).

Conclusion: A single oral dose of Predoc 30 mg has a minimal effect on blood glucose levels in controlled diabetics, in contrast to a significant increase seen following a single oral dose of prednisolone 30 mg. This is of importance to diabetic patients requiring steroid therapy for colitis. Predoc may be a preferred alternative to conventional prednisolone in the treatment of acute colitis in diabetic patients. Further work is needed to establish the role of Predoc in the treatment of diabetic control.


370 CYCLOSPORINE IN ACUTE ULCERATIVE COLITIS: A RETROSPECTIVE REVIEW OF A TEACHING HOSPITAL CASELOAD OVER AN EIGHT-YEAR PERIOD


Introduction: Cyclosporine (CsA) has been regarded as rescue therapy in patients with active colitis who would otherwise have surgery. CsA is currently under review since publication of the Jarnerot Study1 showing a benefit with infliximab as rescue therapy in moderate to severe ulcerative colitis.

Aims & Methods: Retrospective review from 1998–2006. By reviewing clinical records we assessed short and long-term efficacy of intravenous (IV) CsA.

Results: Twenty three patients received CsA, 11 female, 12 male. Mean age 44.5 years, mean time from initial diagnosis of ulcerative colitis to CsA treatment was 5.5 years, 7 patients (30%) received IV CsA on their presentation. Mean duration of symptoms prior to hospitalisation was 7 weeks. Two patients (9%) were already taking azathioprine. Mean CRP on admission was 133 mg/l. All patients received IV steroids. CsA was commenced on mean day 12, for a mean duration of 8 days. In 18 (78%) of the 23 cases 4 mg/kg dose was used, in the remaining 5 cases 22% 2 mg/kg was used. 15 of the 23 patients (65%) responded and did not require colectomy. Eight patients (35%) required colectomy on the same admission, one of whom died postoperatively from sepsis secondary to peritonitis (she had received the longest duration of IV CsA). 14 of the 15 patients discharged with an intact colon were on oral CsA at a mean dose of 6.3 mg/kg. Mean duration of use was 3.6 months. Of the 14 patients discharged on oral CsA, 12 (86%) were on triple immunosuppression (ie prednisolone, CsA and azathioprine). The other 2 patients were commenced on azathioprine on discontinuation of their CsA. 6 out of the 12 patients on triple immunosuppression were on pentoxyfylline prophylaxis with co-trimoxazole. We had an initial colectomy rate of 35%, 43% at 7 weeks. Two patients (9%) were already taking azathioprine. Mean CRP (ie prednisolone, CsA and azathioprine). The other 2 patients were commenced on azathioprine on discontinuation of their CsA. 6 out of the 12 patients on triple immunosuppression were on pentoxyfylline prophylaxis with co-trimoxazole. We had an initial colectomy rate of 35%, 43% at 1 year, 58% at 2 years, 65% at 3 years, 65% at 4 years and 73% at 5 years. With regards to treatment response to CsA in relation to site of the colitis, 1 patient had a proctitis (failed to respond to treatment), 5 patients had proctosigmoiditis (all responded to treatment), 6 had left sided colitis (5 responded) and 11 had pancolitis (only 5 responded).

Conclusion: Our data are consistent with previously reported outcomes. Our policy now is to use the 2 mg/kg dose to start treatment with CsA after day 3 of IV hydrocortisone therapy (if HS criteria are met) or no later than day 7 if the patient is refractory to IV steroids and for no longer than 7–10 days. By this means, colectomy is not delayed. Our review suggested that patients with a pancolitis were less likely to respond to CsA therapy than limited colitis. We routinely give triple immunosuppression (steroids, azathioprine and CsA) with co-trimoxazole prophylaxis and discontinuous CsA at 3–6 months in patients who have been discharged with an intact colon. Infliximab is likely to have a role to play in acute severe inflammatory colitis but despite favourable short-term data, long-term data are awaited.


371 MYELOTOXICITY IS A LATE EVENT IN AZATHIOPRINE TREATED TPMT HETEROZYGOTES

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Introduction: Heterozygous TPMT deficiency has been reported to be associated with side effects to azathioprine, particularly myelotoxicity. However, the extent and timing of toxicity when treated with azathioprine at standard dose is not clearly established and as a result take up of TPMT testing pre-treatment remains low.

Aims & Methods: We undertook a sub-group analysis of TPMT heterozygous patients identified in a prospective cohort of 216 inflammatory bowel disease (IBD) patients treated with 2 mg/kg azathioprine. Monitoring included FBC, renal and liver profile, ESR and CRP, (at weeks 2, 4, 6, 12, 18 and 24) and thioguanine nucleotide (TGN) levels and clinical assessment (at weeks 4, 12 and 24).

Results: 19 (9%) of the cohort were TPMT heterozygous (12 CD, 7 UC). All were prescribed azathioprine as a steroid sparing agent. There was 100% concordance between TPMT genotype and phenotype. By 36 weeks, 17/19 patients had withdrawn due to: myelotoxicity (6), gastrointestinal disturbance (6), nausea (4) and rash (1). Myelotoxicity occurred from 12 weeks (made 12 wks, range 12–36 wks) and all episodes occurred off withdrawal. In 4 patients myelotoxicity occurred within 4 weeks of steroid withdrawal. In those with normal TPMT, the incidence of myelotoxicity was 1%. The single patient who appeared to tolerate long-term azathioprine was non-compliant (multiple low TGN blood levels (75 pmol/8×108 RBC) and urinary 6-thiouric acid). The average TGN level in the remainder was high (566 pmol/8×108 RBC).

Conclusion: TPMT heterozygous patients do not tolerate full dose azathioprine and in the majority of cases treatment is withdrawn within 6 weeks due to gastrointestinal side effects. This early effect may protect this group from later occurring myelotoxicity. Steroids appear to have a protective effect. The implications for therapy are: (1) TPMT heterozygous patients will not tolerate standard dose azathioprine therapy; (2) conventional early intensive blood monitoring regimens will not detect myelotoxicity in this group; (3) use EBC monitoring when withdrawing concurrent steroids is important to detect late myelotoxicity.


372 SERUM PROTEIN SIGNATURES DETERMINED BY MASS SPECTROMETRY (SELDI-TOF) ACCURATELY DISTINGUISHES CROHN’S DISEASE FROM ULCERATIVE COLITIS

1Department of Gastroenterology, St George’s University of London, London, UK; 2Department of Computer Science, Rice University, Houston, USA; 3Cellular and Molecular Medicine, St George’s University of London, London, UK

Introduction: Accurate diagnosis of ulcerative colitis (UC) or Crohn’s disease (CD) is essential to guide patient management. Current tests are not invasive and carry significant risks. A recent meta-analysis suggests that serological diagnosis of CD by ASCA positivity and pANCA negativity has a sensitivity of 54.6% and pANCA positivity has a sensitivity of 55.3% in the diagnosis of UC.

Aims & Methods: In this preliminary study serum was collected prospectively from patients with histological proven UC (n=62) and CD
BSG abstracts

A121

(n = 63) and stored at −80 °C. Samples were applied to CM10 protein chip arrays and time-of-flight spectra were generated using a PBS-II mass spectrometer (Ciphergen, Fremont, CA, USA). To identify peaks, spectra were normalised to the total ion current in the m/z range over 2000–10 000 after baseline subtraction. Biomarker Wizard version 3.1 was used to identify corresponding peaks in each spectrum (peak clusters) within 0–3% of the molecular mass. Signal-to-noise ratio was set at 5 for the first pass and 2 for the second pass. Preliminary analysis was performed using p value determination of integrated peaks. Statistical analysis was performed using principal component and support vector machine (SVM) classifiers. Classifier performance was measured using 10-fold cross-validation.

Results: A linear kernel SVM classifier working on ten principal components of the original data obtained a sensitivity of 77% (7%), specificity of 79% (3%), accuracy of 79% (4%) and area under the receiver operating characteristic curve of 0.77 (0.04), on a 10-fold cross-validation study. The peaks selected by the SVM were also significantly discriminative when used in individual peak analysis.

Conclusion: Using protein signatures of patients with UC and CD we have demonstrated that an experienced gastroenterologist prescribes therapy in an episodic fashion. Results showed that using peak clusters working on ten principal components of the original data obtained a sensitivity of 77% (7%), specificity of 79% (3%), accuracy of 79% (4%) and area under the receiver operating characteristic curve of 0.77 (0.04), on a 10-fold cross-validation study. The peaks selected by the SVM were also significantly discriminative when used in individual peak analysis.

Aims & Methods: To audit the practice of Infliximab prescribing compared to NICE recommendations and to determine the therapeutic response. Data were extracted from the St Mark’s Hospital database for the period between December 2001 and June 2006. These were analysed for indications and response to therapy.

Results: A total of 65 patients were included in the database: 40 (62%) were female and 25 (38%) were male. Of those treated, 61/65 (94%) were between 20–59 years of age. An experienced gastroenterologist prescribed infliximab for all the patients and all cases were refractory or intolerant of other medical therapy. With respect to disease activity, therapy was commenced on the basis of symptoms rather than research evidence.

Conclusion: There is a need for ongoing audit of practice to determine compliance with NICE recommendations.

Aims & Methods: To investigate the mRNA gene expression in Paneth cells of lysozyme, sPLA2, human defensins 5 and 6 and TNF-α in Crohn’s disease. Results were analysed using Axiovision software.

Results: Ten in situ hybridization was performed on groups of sections with a standard section, control section, wild type Crohn’s disease, CARD15 heterozygotes and CARD15 homoyzogotes/compound heterozygote Crohn’s disease sections. There was a significant increase in TNF-α mRNA expression in Paneth cells as measured by densitometry in Crohn’s disease sections compared to controls (p < 0.001). There was a trend to increased TNF-α mRNA expression in CARD15 heterozygotes, with a further increase in density of staining in CARD15 heterozygotes/compound heterozygotes. No difference was seen between CARD15 genotypes and density of staining for lysozyme, sPLA2, human defensins 5 and 6 and TNF-α mRNA. No difference was seen between controls and Crohn’s disease sections and density of staining for lysozyme, sPLA2, human defensins 5 and 6 and TNF-α mRNA.

Conclusion: In contrast to previous work this study shows no difference in human defensin 5 and 6 mRNA expression in Paneth cells between CARD15 genotypes. TNF-α mRNA is found to be increased in the Paneth cell of Crohn’s disease sections. A trend to increased TNF-α mRNA expression was seen in Crohn’s disease sections homoyzogous/compound heterozygous for CARD15 mutations.

Aims & Methods: Our aim was to replicate the association between variants in TNFSF15 on chromosome 9q32 and Crohn’s disease (CD) was recently reported. In this study there was significant association (p = 1.7 × 10−11 OR 2.17) with single nucleotide polymorphisms (SNPs) and haplotypes in Japanese CD patients. Replication in an Oxford, UK population using TDT and case control panels confirmed an association although the effect was weaker (peak allele OR 1.32 p = 0.02) and a protective haplotype common to both UK and Japanese populations was identified (p = 0.02 in both Oxford, UK panels). The discrepancy in effect size is consistent with other studies demonstrating heterogeneity at confirmed CD susceptibility loci between western and Japanese populations. 2 TNFSF15 is a strong candidate IBD susceptibility gene encoding a novel TNF-like factor expressed by macrophages and lymphocytes.

Aims & Methods: Our aim was to replicate the association between variants in TNFSF15 and the CD in the UK population using a large independent East Anglia case control panel. 756 CD patients and 636 genetically matched controls were genotyped using Taqman for 3 SNPs defining the risk haplotype in TNFSF15. Results were analysed using rare variant analysis.


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logistic regression methods within STATA. Haplotypes were reconstructed using SNPHAP v1.3.

**Results:** Two SNPs (rs3810936 and rs7848647) showed significant association between CD and TNFSF15 overall (p = 0.048 and p = 0.033 respectively; table 1). There was significant LD between these loci (r² 0.80, p = 0.61). Construction of 3 locus haplotypes identified a risk haplotype, frequency 0.65 in cases and 0.62 in controls and one protective haplotype, frequency 0.25 in cases and 0.28 in controls. Although similar to the Oxford panel in the index study this is not statistically significant (p = 0.23).

**Conclusion:** Our results provide independent replication of association between SNPs in TNFSF15 and CD. We also confirm that TNFSF15 has a smaller effect on susceptibility to CD in UK than in Japanese populations and we were unable to identify a significant risk haplotype. Attempts should now be made to fine map the locus and identify the disease causing variants.


### 376 GERMLINE VARIATION OF NOD1/CARD4 DOES NOT DETERMINE SUSCEPTIBILITY TO INFLAMMATORY BOWEL DISEASE: RESULTS OF A DETAILED HAPLOTYPE-TAGGING INVESTIGATION

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**Introduction:** NOD2/CARD15 variation has a definite but weak effect on Crohn’s disease (CD) susceptibility in Northern Europe. NOD1/CARD4 and NOD2/CARD15 are intracellular pattern-recognition receptors involved in the anti-bacterial innate immune response. The NOD1/CARD4 gene lies within the putative Tp14.3 IBD locus. Data regarding the role of a complex insertion/deletion (−32656) variant of NOD1/CARD4 in IBD from groups in Germany, England and our own Scottish population data have shown no association in contrast to the index study from Oxford.

**Aims & Methods:** The aim of this study was to assess the influence of NOD1/CARD4 on IBD susceptibility and phenotype in the Scottish population using a gene wide association approach. 1693 subjects comprising of 1323 IBD patients (662 CD, 628 UC, 33 IC) and 370 population using a gene wide association approach. 1693 subjects comprised of 1323 IBD patients (662 CD, 628 UC, 33 IC) and 370 controls were genotyped for nine single nucleotide polymorphisms (SNPs) tagging the NOD1/CARD4 gene and the three common NOD2/CARD15 variants. Allelic, genotype and haplotype frequency comparisons between cases and controls using χ² and a log-likelihood analysis were used to assess association with IBD. Genotype-phenotype analyses (Montreal classification, need for surgery—including stratification for NOD2/CARD15 variant carriage) were also performed.

**Results:** After correction for multiple testing, no significant associations were observed between any of the NOD1/CARD4 SNPs studied and IBD, CD or UC (p > 0.10 for all). Haplotype case-control analysis was also negative (p > 0.20 in IBD, CD and UC). NOD2/CARD15 variant carriage did not influence the effect of NOD1/CARD4 haplotype on CD susceptibility. Using log-likelihood analysis (heterogeneity model—1000 permutations), set χ² statistics (degrees of freedom = 511) were reached 103, 39% and 35 times for IBD, CD and UC, respectively (corresponding uncorrected p values 0.10, 0.39 and 0.03). Genotype-phenotype analysis in both adult and childhood onset CD did not show any significant influence of NOD1/CARD4. We did not observe any significant effect of NOD2/CARD15 variant carriage on the influence of NOD1/CARD4 on any of the phenotypes studied.

**Conclusion:** This is the first study using a gene wide haplotype-tagging approach to assess the contribution of NOD1/CARD4 in IBD. In the Scottish IBD population, germline NOD1/CARD4 variation does not represent an important determinant of disease susceptibility.

### 377 AZATHIOPRINE TOLERANCE IN INFLAMMATORY BOWEL DISEASE: ASSESS TPMT STATUS BY PHENOTYPE OR GENOTYPE?

J. W. Winter1, D. Gaffney2, D. Shapiro3, G. Naismith1, S. Barclay1, M. Priest1, S. Dover1, R. J. Spooner2, P. R. Mills1

1Gastroenterology, Gartnavel General Hospital; 2Biochemistry, Glasgow Royal Infirmary; 3Clinical Biochemistry, Gartnavel General Hospital, Glasgow, UK

**Introduction:** Azathioprine is a commonly used drug in the management of refractory inflammatory bowel disease (IBD). Although generally regarded as effective, it is associated with a wide range of adverse events, the most serious being myelo-suppression, which can occasionally be fatal. The enzyme thiopurine methyltransferase (TPMT) holds an integral role in the metabolism of thiopurine drugs. Its activity can be measured directly or predicted by detection of genetic polymorphisms. 1/300 individuals are homozygous for mutant alleles and have little or absent enzyme activity, and 11% of the population are heterozygotes with more moderate reduction in activity. Reduced activity of TPMT has been associated with an increased risk of side effects, particularly marrow suppression, and it has been proposed that pretreatment assessment of TPMT status can reduce the incidence of side effects and therefore cost effective.

**Aims & Methods:** The aim of our study was to determine whether measurement of TPMT activity (phenotype) or TPMT gene polymorphisms (genotype) was more effective in predicting azathioprine intolerance in IBD. Sequential patients were identified and tolerance of azathioprine recorded. Patients had been commenced on therapy without knowledge of TPMT status. Blood was collected for measurement of TPMT activity and for DNA analysis for the commonest TPMT gene mutations (2, 3B, 3C).

**Results:** 129 patients were recruited. 86 (67%) remained on azathioprine after a median duration of 30 months. 44 patients (34%) experienced side effects, forcing 33 (26%) to discontinue treatment. The commonest side effect was gastro-intestinal upset, affecting 11% of patients. Four patients experienced severe leucopenia (WCC<2) with 3 requiring hospital management for the complications of myelotoxicity. There was no association between TPMT activity and all cause side effects. One of the 4 patients with severe myelosuppression was a heterozygote, but with a TPMT level much lower than could have been predicted from the genotype.

**Conclusion:** Prior knowledge of TPMT status would have avoided side effects in 1 of 129 patients. Moderate reduction of TPMT activity in heterozygotes did not correlate with risk of any adverse event. Very low TPMT activity accounted for one of our four cases of severe myelosuppression. This would have been predicted by measuring TPMT activity but not by genotyping. Very low TPMT activity in the presence of a heterozygous mutation has been previously reported and attributed to novel mutations acting in a compound heterozygous manner. Measurement of TPMT activity may be superior to genotype analysis in assessing risk due to the possibility of rarer gene mutations being missed.


**Abstract 375**

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Allele frequencies and genotypes are given for 756 Crohn’s disease patients and 636 controls.
Liver posters

378 RECOVERY OF LIVER FUNCTION FOLLOWING DECOMPENSATED ALCOHOLIC LIVER DISEASE: RELATION TO SUBSEQUENT DRINKING BEHAVIOUR

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Introduction: We have reported (McFarlane. Gut 2006;55:A36) that following hospital discharge in patients presenting with a first episode of decompensated ALD (defined as Childs grade B or C), 3-year survival was 88% in abstinent patients and was still substantial (44%) in patients who failed to reduce alcohol intake. How often liver function recovers in these patients is unclear.

Aims & Methods: To document the frequency and determinants of liver function recovery in this cohort following hospital discharge. Serum liver tests were extracted from hospital databases; at least one result was available in 195 patients. Recovery was defined as a serum bilirubin of <34 mmol/l and a serum albumin of >35 g/l. Three patients, with recovery prior to index hospital discharge were excluded.

Results: By life table analysis, recovery rates for patients who failed to reduce alcohol intake were (mean SEI) 28 (7%), 38 (9%) and 47 (9%) after 6, 12 and 24 months, lower (log rank p = 0.021) than corresponding pooled rates of 41 (4%), 60 (4%) and 68 (6%) for other drinking categories, between which, rates did not differ. Recovery rates were unaffected by either (a) excluding patients (n=54) whose initial presentation was associated with a GI bleed, or (b) considering only patients (n=75) with Childs grade C at presentation (6, 12 and 24 month rates in those failing to reduce alcohol intake (a): 23 (9%), 41 (10%) and 47 (9%) and (b): 27 (13%), 27 (13%) and 15 (19%) . By Cox multivariate analysis, recovery was negatively associated with heavy drinking (p=0.029) and older age (p=0.008) but not associated with Childs score on initial admission or serum bilirubin or albumin on discharge. Five-year survival was 76 (5%) in patients who recovered and 5 (0%) in those who did not (p<0.001).

Conclusion: Over half of patients with a first episode of decompensated ALD show recovery of liver function over 2 years. Recovery is highly predictive of survival and is more likely in patients who either abstain or reduce their alcohol intake and in younger patients, but is unrelated to initial severity of liver dysfunction. Even in patients failing to reduce their drinking, recovery may still occur, suggesting that decompensated ALD is partly influenced by factors other than alcohol intake.

379 LACTATE ALONE IS NOT AN ACCURATE PREDICTOR OF OUTCOME OR PROGNOSIS IN PARACETAMOL-INDUCED FULMINANT LIVER FAILURE

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Introduction: The Kings College Hospital (KCH) criteria have been used since 1989 to determine need for transplantation in patients with fulminant hepatic failure. These criteria have recently been modified to include lactate in patients with paracetamol induced fulminant hepatic failure. A lactate >3.5 mmol/l 24 h post overdose or >3.0 mmol/l following fluid resuscitation fulfils a separate criterion for poor prognosis and the patient can be listed for super-urgent orthotopic liver transplant (OLT).

Aims & Methods: To assess the sensitivity and specificity of the lactate criteria applied to patients admitted to the Scottish Liver Transplant Unit (SLTU). A retrospective analysis of all admissions to SLTU from 1 September 2004 to 31 October 2006 with paracetamol overdose (POD). The initial lactate on admission and a second sample following fluid resuscitation were recorded. The sensitivity and specificity of lactate in relation to outcome compared with KCH criteria was analysed.

Results: Sixty eight patients were admitted with a diagnosis of POD. Three patients underwent super-urgent OLT and were excluded from further analysis. The admission lactate was available in 53 patients (med 4.1 mmol/l (range 1.1-19.53 mmol/l)). 30 patients had a lactate >3.5 mmol/l, 11 patients subsequently died (1 survived). 18 patients did not fulfil KCH criteria and 17 survived. The sensitivity of initial lactate for predicting death from FHF was 92%, but specificity was 55%. KCH criteria were 92% sensitive and 95% specific for predicting death. Two patients within the lactate<3.5 group subsequently fulfilled KCH criteria. 26 patients had a second lactate value following fluid resuscitation (med time 12.16 (6.4-26.98) h). Within this group 15 patients' lactate was >3.0, (medtime 12.2 h following initial lactate). Five of these patients survived (med lactate 3.4 (3.0-3.67) mmol/l) and 10 died (med lactate 7.07 (3.03-16.86) mmol/l). Of the 5 patients with lactate >3.0 mmol/l who survived, 4 did not fulfill KCH criteria. Of the 10 patients with lactate >3.0 mmol/l who died, 9 fulfilled KCH criteria.

Conclusion: The incorporation of lactate into poor prognostic criteria may reduce the time to listing for OLT however, in our experience this test lacks the specificity to be the sole criterion for listing for liver transplantation in paracetamol overdose. KCH criteria remain sensitive and specific in predicting poor prognosis in patients with paracetamol overdose.

380 13C-METHACETIN BREATH TEST COMPARED TO ALSO NON-INVASIVE, BIOCHEMICAL BLOOD TESTS IN PREDICTING HEPATIC FIBROSIS AND CIRRHOSIS

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Introduction: The 13C-methacetin breath test and several also noninvasive blood tests comprising routine laboratory parameters have been proposed to predict fibrosis and cirrhosis in chronic hepatitis C.

Aims & Methods: The aim of the study was to compare the diagnostic accuracy between these tests. 96 patients with chronic hepatitis C virus infection, but without clinical evidence of cirrhosis underwent percutaneous liver biopsy in Menghini technique and the 13C-methacetin breath test. The AST to platelet ratio index (APRI), and the AST to APT ratio (AAR) were used as parameters for the staging of fibrosis. The main endpoint was the area under the characteristic curves for the diagnosis of advanced fibrosis (F3-F4) and cirrhosis (F4) according to the Batts Ludvig criteria.

Results: Operating characteristcs analysis revealed a cut-off >14.6% best with 84.1% sensitivity and 92.6% specificity for the 13C-methacetin breath test in predicting liver cirrhosis. For the APRI >1.0 66.7% sensitivity and 75.4 specificity, and for the AST to APT ratio >1.0 65.4% sensitivity and 59.4% specificity were obtained in predicting liver cirrhosis. The areas under the curve for the breath test, APRI and the AST to APT ratio were 0.957, 0.799, and 0.688, respectively, when predicting cirrhosis. For identifying patients with advanced fibrosis, the areas under the curve were 0.827, 0.779, and 0.561, respectively. Discrepancies between APRI (79%) or AAR (37.6%) and liver biopsy were significantly more frequent than between 13C-breath test (11.6%) and liver biopsy (p<0.005).

Conclusion: The 13C-methacetin breath test is more reliable in predicting advanced fibrosis and cirrhosis than simple biochemical parameters (APRI, AAR).

381 HAEMOCROMATOSIS: RISING HOSPITAL ADMISSION RATES BUT STABLE MORTALITY 1989/90 TO 2002/03

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Introduction: Awareness of haemochromatosis has increased in recent years. Treatment of the consequences of iron overload and venesection to prevent progression of disease represent significant healthcare burdens.

Aims & Methods: To investigate time trends for hospital admission and mortality rates for haemochromatosis in England. Hospital admission data for haemochromatosis (ICD-9: 2750, ICD-10:EB31) were obtained from the Hospital Episodes Statistics service. Both day-case and inpatient admissions were analysed. Mortality rates for haemochromatosis in England and Wales were also studied.

Results: Hospital admission rates for haemochromatosis substantially increased during the period (3.6% to 6.1%) for both inpatient admissions and day-cases, and for both sexes. Most admissions occurred in patients aged over 24. Directly age-standardised mortality rates from haemochromatosis remained fairly stable from 1979 to 2000, being 0.07 per 100 000 population for men in 2000 and 0.02 for women.

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Conclusion: Hospital inpatient and day-case admissions for haemochromatosis increased markedly over the study period while mortality rates remained stable. Both admission and mortality rates were higher in men than women. The huge increase in the admission rate is likely to reflect improved recognition and diagnosis of iron overload disorders following identification of the HFE gene in 1996, rather than the underlying prevalence of disease or the effect of treatment.

Aims & Methods: To study the HEV IgG seroprevalence in a group of blood donors (n = 500), patients with stable established chronic liver disease (CLD, n = 126), and asymptomatic individuals >60 years (n = 336). All had sera tested for HEV IgG (WanTai, China), and the >60 years cohort had a dietary history to establish if they were vegetarian or not.

Results: 85/500 (17%) of the blood donor group were HEV IgG positive compared to 86/336 (25.5%) in the >60 years group (p = 0.002). In the >60 years group males had a significantly higher HEV IgG seroprevalence (48/157, 30.5%) compared to females (38/179, 21.2%). 17/126 (13.4%) of the CLD group were HEV IgG positive. This is not significantly different from the blood donor group. 5/336 were vegetarian, 1/3 tested positive for HEV IgG.

Conclusion: These data indicate that subclinical and/or unrecognised infection with HEV is common in the UK. HEV IgG positivity seems to be particularly common in individuals >60 years and males. The reason for this observation is not clear, but we (and others) have shown that this group of individuals seems particularly prone to clinically recognisable locally acquired HEV infection. Over 85% of patients with CLD are HEV IgG negative. These patients can be considered an "at risk" population, as HEV superinfection in patients with CLD carries a poor prognosis. 2

A. N. De Silva 1, A. Muddu 1, E. Pelosi 2, N. Sheron 1, J. Iredale 3, S. Khakoo 1.

References:

Indigenous Hepatitis E: The Southampton Experience

Introduction: Hepatitis E virus (HEV) is an enterically transmitted RNA virus traditionally associated with disease in endemic areas such as Africa and Asia. HEV infection in developed countries, where the seroprevalence is much lower, is thought to arise in those who have visited endemic areas or had contact with individuals from these areas. As HEV infection is considered rare in the UK, single centre experience of HEV has hitherto been thought to be too low to represent a clinically significant problem. We present data from a single centre covering a population of 220 000, which suggests that HEV has a greater clinical impact than would be implied from centrally reported statistics.

Aims & Methods: Patients diagnosed with HEV in Southampton University Hospital Trust between May 2005–June 2006 were identified from computer records. Their case notes were reviewed and additional information was obtained from HPA questionnaires.

Results: Fifteen patients with HEV were found in this 13 month period. Diagnoses were confirmed by a positive HEV IgM with rising IgG levels on later specimens. 13 of these 15 patients reported no travel to endemic areas or history of contact with affected individuals. Of these, 8 cases had PCR confirmation of HEV RNA; and all 8 were genotype 3. Of the 13 patients with no travel exposure, the median age was 71.4 years (47–83) and 9 were male. All patients were British of white European ethnicity. 11 were retired; 1 was a refuse collector, 1 worked in a depot and another worked in a residential home. Clinical presentations were similar in all cases. Typical features were a 2–3 week prodrome of malaise, jaundice and anorexia. Initial bloods typically showed a transaminits with ALTs varying between 600–6000 iu/l. Symptoms resolved over 2 weeks. One patient died of an unrelated cause within 3 months of HEV diagnosis. In this same period, only 4 cases of acute hepatitis B and 2 cases of acute hepatitis A were identified.

Conclusion: HEV was the most common cause of acute viral hepatitis in Southampton within this 13 month period. We believe we have identified the largest cohort of non-travel associated HEV infected individuals in a single centre within the UK. This finding has partly been achieved by implementation of a new testing algorithm. Systematic testing for hepatitis E IgM and IgG was carried out in patients with an ALT >300 (norm 5–42) who had no serological markers of acute hepatitis A, B, C, CMV or EBV. We suggest all patients with an acute hepatitis should be tested for HEV if initial investigations are negative.

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Introduction: Hepatitis E (HEV) has previously been thought to be rare in the UK, single centre experience of HEV has hitherto been thought to be too low to represent a clinically significant problem. We present data from a single centre covering a population of 220 000, which suggests that HEV has a greater clinical impact than would be implied from centrally reported statistics.

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Gastroenterology, Royal Liverpool University Hospital, Liverpool, UK

Introduction: Percutaneous liver biopsy is associated with a morbidity rate >5%. Death is rare. At our centre the outpatient liver biopsy service is provided by doctors from gastroenterology, infectious diseases and radiology. Over the 6-year period there were 640 biopsies on 608 patients. Good attendance is necessary for compliance with procedure indication, pathology and radiology results, possible complications and death were collected. If a possible complication was identified the notes were obtained for further analysis.

Results: Over the 6-year period there were 640 biopsies on 608 patients. No patient had died within 30 days. We found 33 complications (5.2%). 18 patients were admitted within 30 days (2.8%) including 4 pre-planned. Of the 378 unguided biopsies there were 25 complications: 1 transfusion-dependent haemorrhage, 1 pneumothorax, 1 haemorrhage, 6 samples contained necrosis, 10 patients had pain (6 requiring admission) and a further 6 patients attended hospital within 30 days, some for unrelated reasons. Of the 262 US guided biopsies there were 8 complications: 2 patients had pain and a further 6 patients attended hospital within 30 days, some for unrelated reasons. 43 attempts were recorded as having failed. 37 of these were to be undertaken blindly: 4 procedures were felt to be unsafe and were abandoned. 7 failed to obtain an adequate specimen, 10 samples contained inadequate liver tissue for histological diagnosis and 16 samples did not contain any liver tissue. The remaining 6 were performed with US guidance: 5 were not adequate for diagnosis and 1 sample was lost.

Conclusion: Day-case liver biopsy appears to be a safe procedure at our centre. The higher risk US guided biopsies are less likely to fail (2.7% v 9.5%) and less likely to be complicated (3.1% v 6.6%) and this supports the argument for US-guided biopsy.

Gastroenterology Department, Wycombe Hospital, High Wycombe, UK

Introduction: Several studies report poor attendance of hepatitis C (HCV) patients in outpatient clinics. Good attendance is necessary for compliance with treatment and its monitoring.

385 Hepatitis C patients: the myth about poor DNA rates

Gastroenterology Department, Wycombe Hospital, High Wycombe, UK

Introduction: Several studies report poor attendance of hepatitis C (HCV) patients in outpatient clinics. Good attendance is necessary for compliance with treatment and its monitoring.
Aims & Methods: This study aimed to compare DNA (did not attend) rates in a HCV clinic with DNA rates in a general gastroenterology clinic, and identify risk factors for poor attendance. Attendance records at the HCV clinic in a district hospital over a period of 17 months were scrutinised. The HCV clinic is run simultaneously alongside a general gastroenterology clinic with an identical appointments system. Patients attending both clinics were divided into new, follow-up and total categories. Characteristics of HCV patients with a DNA record (failed to attend one or more appointments) were contrasted with those of HCV patients attending all appointments.

Results: There were 245 HCV patient and 1741 general gastroenterology patient appointments. Although the DNA rate of 19% for new HCV patients was greater than the DNA rate of 3% for new non-HCV patients (p<0.01), the DNA rate of 9.4% for follow-up HCV patients was not different to the DNA rate of 10.5% for follow-up non-HCV patients. Similarly the total (new and follow-up) DNA rates for HCV (10.6%) and non-HCV patients (10.5%) were not different. When comparing the characteristics of HCV patients who missed one or more appointments with HCV patients who kept all appointments, those with a DNA record were more likely to be male (p=0.01), younger (median age 43 ± 48 years, p<0.05), and living alone (p<0.05). Previous intravenous drug use was found equally in HCV patients with and without a DNA record, but those with a DNA record were more likely to have used intravenous drugs or methadone in the past 12 months (p<0.001). Rates of excess alcohol consumption, psychiatric history and previous criminal behaviour were similar in those with and without a DNA record. Racial origin did not influence DNA rates (35% of this HCV clinic population is Pakistani), and attendance records were better in non-English speakers.

Conclusion: HCV patients in general do not have a higher DNA rate than other gastroenterology clinic patients. However HCV patients who are male, live alone or have recently used intravenous drugs or methadone, are more likely to miss clinic appointments.

Abstract 386 Long-term outcome of a cohort with autoimmune hepatitis at a single centre

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Introduction: Data on long-term follow-up of patients with autoimmune hepatitis (AIH) are limited. We describe the long-term outcome of a large cohort of patients with AIH from a single centre.

Aims & Methods: Patients: between 1971 and 2005, 216 patients with AIH, defined by the revised criteria of the International AIH Group (IG), have been followed-up. 32 patients were male, 204 white. Median age at diagnosis: 56.63 years (range 2.5–87 years). The median length of follow-up: 9.23 years (0.17–30.01 years), total length of FU was 2178.08 years.

Results: Presentation: 27 patients had signs of advanced liver disease (Ascites, HE, GI bleed) at diagnosis. 43 patients were completely healthy at the time of diagnosis and 2 presented with decompensation. Rates for death (all-cause) were 10.6% for new and 10.5% for follow-up HCV patients who kept all appointments.

Conclusion: This study aimed to compare DNA (did not attend) rates in a HCV clinic with DNA rates in a general gastroenterology clinic, and identify risk factors for poor attendance. Attendance records at the HCV clinic in a district hospital over a period of 17 months were scrutinised. The HCV clinic is run simultaneously alongside a general gastroenterology clinic with an identical appointments system. Patients attending both clinics were divided into new, follow-up and total categories. Characteristics of HCV patients with a DNA record (failed to attend one or more appointments) were contrasted with those of HCV patients attending all appointments.

Results: There were 245 HCV patient and 1741 general gastroenterology patient appointments. Although the DNA rate of 19% for new HCV patients was greater than the DNA rate of 3% for new non-HCV patients (p<0.01), the DNA rate of 9.4% for follow-up HCV patients was not different to the DNA rate of 10.5% for follow-up non-HCV patients. Similarly the total (new and follow-up) DNA rates for HCV (10.6%) and non-HCV patients (10.5%) were not different. When comparing the characteristics of HCV patients who missed one or more appointments with HCV patients who kept all appointments, those with a DNA record were more likely to be male (p=0.01), younger (median age 43 ± 48 years, p<0.05), and living alone (p<0.05). Previous intravenous drug use was found equally in HCV patients with and without a DNA record, but those with a DNA record were more likely to have used intravenous drugs or methadone in the past 12 months (p<0.001). Rates of excess alcohol consumption, psychiatric history and previous criminal behaviour were similar in those with and without a DNA record. Racial origin did not influence DNA rates (35% of this HCV clinic population is Pakistani), and attendance records were better in non-English speakers.

Conclusion: HCV patients in general do not have a higher DNA rate than other gastroenterology clinic patients. However HCV patients who are male, live alone or have recently used intravenous drugs or methadone, are more likely to miss clinic appointments.

Abstract 387 Mortality, malignancy and myocardial infarction (MI) in the primary biliary cirrhosis (PBC) cohort compared with matched controls

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Introduction: There is debate over the mortality risk in people with primary biliary cirrhosis (PBC) and whether this risk is reduced by use of ursodeoxycholic acid. We have performed a cohort study using the General Practice Research Database to quantify the excess mortality, malignancy and myocardial infarction (MI) risk in people with PBC.

Aims & Methods: We identified 930 people with PBC and 9202 age and sex matched control subjects. We used Cox regression to estimate the hazard ratios for our outcomes in the PBC cohort compared with the general population. We categorised ursodeoxycholic acid as treatment ≥6 prescriptions and no treatment <6.

Results: There was a 2.7-fold increased mortality for the PBC cohort compared with the general population (adjusted hazard ratio (HR) 2.69 (95% CI 2.35 to 3.09)) but no increased risk of extrahepatic malignancy or MI (HRs 1.06, 95% CI 0.77 to 1.45, 1.15 95% CI 1.01 to 1.87 respectively). In those treated with ursodeoxycholic acid (43%) the mortality increase was 2-fold (HR 1.90 95% CI 1.47 to 2.46) compared to a threefold increase for those not exposed (HR 3.19 95% CI 2.71 to 3.76). Overall, we found an eightfold increased risk of primary liver cancer (HR 8.56, 95% CI 3.18 to 23.06) which in those not treated with ursodeoxycholic acid was 19.91 (95% CI 4.74 to 83.63).

Conclusion: People with PBC had a threefold mortality increase compared with the general population which was not explained by an excess risk of malignancy or MI. Treatment with ursodeoxycholic acid was associated with reduced mortality and, perhaps, a lower incidence of primary liver cancer.

Abstract 387 Mortality, malignancy and myocardial infarction (MI) in the primary biliary cirrhosis (PBC) cohort compared with matched controls

<table>
<thead>
<tr>
<th></th>
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<td>Mortality PBC cohort</td>
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Analysis restricted according to UDCA treatment.
388 THE RISK OF HEPATOCELLULAR CARCINOMA AND DECOMPENSATION FOLLOWING HEPATITIS C TREATMENT WITH INTERFERON-BASED THERAPY

K. M. Jamil1, W. Cheng1, L. Tarquinio1, L. Adams2, L. Mollison3, G. Macquillan4, J. Flexman5, B. Deboer6, N. Kontorinis7. 1Gastroenterology and Hepatology, Royal Perth Hospital; 2Gastroenterology and Hepatology, Sir Charles Gairdner Hospital; 3Gastroenterology and Hepatology, Fremantle Hospital; 4Microbiology, Royal Perth Hospital; 5Pathology, Sir Charles Gairdner Hospital, Perth, Australia

Introduction: Patients with advanced hepatic fibrosis due to hepatitis C virus (HCV) are at high risk of hepatocellular carcinoma (HCC) and hepatic decompensation (HD).1–3 We evaluate their incidence following interferon therapy in patients with F3/4 fibrosis, and study the effect of SVR.

Aims & Methods: A cohort of patients with F3-4 fibrosis (METAVIR) treated with IFN therapy from 1995 to 2006 was identified from the HCV databases at three centres in WA. All patients had compensated (Child’s A) liver disease. The incidences of HD, diagnosis of HCC and mortality were recorded. Frequency of HCC screening with U/S and AFP were assessed.

Results: 129 patients had HCC screening of which 71% was sporadic, 27% associated with development of HCC (p = 0.0054). Incidence of HCC was 41%/year associated with previous psychiatric history and younger age, but not with sex or treatment duration. Dose reductions and major SEs (suicide attempt or psychiatric admission) were more common with a prior psychiatric history. There was a trend for lower SVR in patients with a prior history of depression compared with those with no history (40% vs 50%). However this was not significant. There was no difference in SVR between patients who developed DSEs and those that did not.

Conclusion: Patients with a preceding history of depression comprise a high risk, “difficult to treat” group with possible reduced SVR. Pre-emptive SSRI use in this group may be beneficial. Otherwise, development of de novo depression responds well to SSRI therapy and does not affect SVR.


389 MANAGEMENT OF DEPRESSION IN PATIENTS TREATED WITHPEGYLATED INTERFERON AND RIBAVIRIN FOR HEPATITIS C

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Introduction: Depression is a common side effect of PEG-IFN/RBV therapy for hepatitis C. It is a major cause of treating interruptions, reducing the chances of achieving viral eradication.1 This study investigates the incidence, risk factors and outcome of patients with PEG-IFN associated depression.

Aims & Methods: Data were collected prospectively using a standardised data sheet on all patients treated with PEG IFN and RBV for hepatitis C. Patients with a history of depression before antiviral therapy were identified. Depressive side effects (DSEs, defined as symptoms necessitating IFN dose reduction, psychiatric consultation, initiation or change of antidepressant medication) were recorded. Predictors of DSEs, IFN dose reductions, psychiatric intervention and rate of sustained virological response (SVR) were recorded. Logistic regression models were used to examine predictors of SVR and DSEs.

Results: DSEs occurred in 30/160 patients (19%), and were independently associated with previous psychiatric history and younger age, but not with sex or treatment duration. Dose reductions and major SEs (suicide attempt or psychiatric admission) were more common with a prior psychiatric history. There was a trend for lower SVR in patients with a prior history of depression compared with those with no history (40% vs 50%). However this was not significant. There was no difference in SVR between patients who developed DSEs and those that did not.

Conclusion: Patients with a preceding history of depression comprise a high risk, “difficult to treat” group with possible reduced SVR. Pre-emptive SSRI use in this group may be beneficial. Otherwise, development of de novo depression responds well to SSRI therapy and does not affect SVR.


390 INTERFERON INDUCED THYROID DYSFUNCTION IN CHRONIC HEPATITIS C

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Introduction: Treatment of chronic hepatitis C with interferon is known to be associated with thyroid dysfunction in 5–14% of patients. We studied the incidence, types, outcome and risk factors predictive of thyroid dysfunction.

Aims & Methods: A retrospective analysis was performed on all patients treated with interferon alpha (IFN) or pegylated interferon alpha (PEG-IFN) + ribavirin (RBV), who developed abnormal thyroid function tests (TFTs). These cases were compared with treatment-matched controls to identify factors predictive of thyroid dysfunction. Statistical methods consisted of χ² test, Fischer’s exact test, Welch’s t test, and multivariate analysis.

Results: From a total of 511 patients, 45 cases with thyroid dysfunction were identified (8.8%). PEG-IFN was associated with significantly higher rates of abnormal TFT than IFN (14.1% vs 6.0%, p=0.0029). Female sex, Asian ethnicity and previous history of thyroid abnormality were predictors of developing TFT abnormality, with sex and ethnicity being independent predictors (table). There was no association with age, weight, autoantibodies, diabetes or SVR. Mean time to development of abnormal TFT was
21.4 weeks. Cytology was obtained in 13 patients: benign follicular pattern (8); thyroiditis (3); and normal (2). 24 patients had mild transient TFT changes, while 21 required treatment. Earlier onset of dysfunction was significantly associated with need for treatment (p = 0.03). 18 patients had persistent thyroid dysfunction by the end of follow-up.

**Conclusion:** 1 (PEG-IFN) is associated with a higher rate of thyroid dysfunction than IFN. (2) TFTs should be monitored during and after IFN-based therapy. (3) Females and Asians are the most susceptible. (4) The most common cytological finding is a benign follicular pattern.

**Abstract 390 Predictors of thyroid dysfunction**

<table>
<thead>
<tr>
<th></th>
<th>n (%)</th>
<th>Controls, n (%)</th>
<th>Univariate p value</th>
<th>Multivariate p value</th>
<th>Odds ratio (95% CI)</th>
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<tr>
<td>Total</td>
<td>45 (100)</td>
<td>45 (100)</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Females</td>
<td>21 (47)</td>
<td>11 (24)</td>
<td>0.047</td>
<td>0.035</td>
<td>5.6 (1.1–7)</td>
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<tr>
<td>Asian</td>
<td>13 (29)</td>
<td>3 (7)</td>
<td>0.021</td>
<td>0.014</td>
<td>2.7 (1.4–22)</td>
</tr>
<tr>
<td>History of thyroid disease</td>
<td>6 (13)</td>
<td>0 (0)</td>
<td>0.026</td>
<td>NS</td>
<td>—</td>
</tr>
</tbody>
</table>

Asian: of East Asian origin.

**Introduction:** A significant proportion of patients fail to achieve a sustained virological response (SVR) for treatment for hepatitis C. Re-treatment with PEG-IFN/RBV in patients that failed standard IFN may prove beneficial.

**Aims & Methods:** Patients treated with PEG-IFN/RBV who had failed previous IFN-based therapy were classified according to previous response. Relapsers were considered to have a pattern of relapse and non-responders to have a pattern of failure. Patients were then subgrouped for genotype 1 (see chart). There was no difference in SVR between RLs and treatment naive patients in all genotypes or in SVR rates according to type of previous failed treatment: 38% for IFN monotherapy, 27% for IFN/RBV therapy.

**Conclusion:** Success of re-treatment for hepatitis C with PEG-IFN/RBV depends on response to previous therapy. In relapsers, the chance of success is equal to naive patients, while non-responders have very low rates of SVR, particularly for genotype 1 infection. These points should be taken into account when counselling patients prior to re-treatment.

**Abstract 392 Treatment according to fibrosis stage**

<table>
<thead>
<tr>
<th>Fibrosis stage</th>
<th>F 0, 1, 2</th>
<th>F3, 4</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number</td>
<td>96</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>66 (71%)</td>
<td>29 (71%)</td>
<td>NS</td>
</tr>
<tr>
<td>Age, mean (SD)</td>
<td>43 (10)</td>
<td>49 (8)</td>
<td>0.0041</td>
</tr>
<tr>
<td>SVR overall</td>
<td>42 (44%)</td>
<td>20 (49%)</td>
<td>NS</td>
</tr>
<tr>
<td>Genotype 1</td>
<td>18 (36%)</td>
<td>9 (47%)</td>
<td>NS</td>
</tr>
<tr>
<td>Non-genotype 1</td>
<td>24 (52%)</td>
<td>11 (50%)</td>
<td>NS</td>
</tr>
<tr>
<td>IFN dose reduction</td>
<td>32 (33%)</td>
<td>15 (36%)</td>
<td>NS</td>
</tr>
<tr>
<td>RBV dose reduction</td>
<td>28 (29%)</td>
<td>15 (36%)</td>
<td>NS</td>
</tr>
<tr>
<td>Neutropenia</td>
<td>16 (17%)</td>
<td>8 (20%)</td>
<td>NS</td>
</tr>
<tr>
<td>Anaemia</td>
<td>8 (8%)</td>
<td>5 (12%)</td>
<td>NS</td>
</tr>
<tr>
<td>Optimal adherence</td>
<td>81%</td>
<td>66%</td>
<td>NS</td>
</tr>
</tbody>
</table>

Neutropenia: WBC < 0.8 × 10⁹/l; anaemia: Hb < 100 g/l.

**Abstract 393 Sustained virological response by genotype and treatment history**

**Introduction:** Chronic liver disease (CLD) is a major cause of morbidity and mortality in the UK. Up to 75% of people with type 2 diabetes have a degree of non-alcoholic fatty liver disease (NAFLD) at diagnosis. Recent studies have shown that the risk of CLD and hepatocellular carcinoma is significantly increased in patients with diabetes. Diabetics are at risk of other disorders associated with abnormal liver function tests (LFTs). Currently the diabetes annual review does not involve assessing liver disease risk.

**Aims & Methods:** This study aimed to determine the prevalence of abnormal LFTs in the population attending diabetic clinic in the secondary care setting of a large rural university hospital. Demographics, LFTs, HbA1C, lipid levels and body mass index (BMI) were recorded for all patients attending the hospital diabetic clinic between 1/9/05 and 31/12/05. Data were collected retrospectively from hospital records.

**Results:** During the study period 910 diabetics attended the clinic. 49% had type 1 and 51% had type 2 diabetes. In 55 (6%) patients both ALT and GGT were raised above the normal range. In 181 (19.9%) patients ALT, GGT or both were elevated (Group 1). This group was compared to patients with normal ALT and GGT (Group 2). Group 1 patients had significantly higher BMI and a more adverse lipid profile. The proportion of type II diabetics...


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### 394 TIPSS IN TREATMENT OF BLEEDING GASTRIC VARICES: A LARGE SINGLE CENTRE EXPERIENCE

N. Koch1, D. Tripathi1, H. Ireland2, D. N. Redhead1, P. C. Hayes1

**Introduction:** Transjugular intrahepatic portosystemic stent shunt (TIPSS) is an established management option for bleeding from gastric varices (GV). We have previously reported a better survival in patients with TIPSS for GV of oesophageal varices (OV).1 We report here a much larger, single centre series of patients who had TIPSS for management of bleeding GV.

**Aims & Methods:** A retrospective study of patients who had TIPSS inserted for GV. Patients identified from a dedicated database.

**Results:** Over 14 years, 768 TIPSS have been inserted, of whom 81 (10.5%) were for bleeding gastric varices (males 43; mean age 51.6 (12.4) years). Underlying aetiologies were ALD (69%), viral (4%), and others (13%). Mean Child-Pugh (CP) score was 9.1 (2.5). TIPSS was done as an emergency procedure in 49 (6.0%) patients. Cardiac arrest occurred in 26% patients. Mean PPG pre-TIPSS was 16.7 (6.9) and post-TIPSS was 6.0 (2.96) mmHg. TIPSS successfully achieved haemostasis in all but one patient. Ten (12.3%) patients had variceal rebleeding at a median of 7 days (4 days to 142 months). This was related to shunt modification in one and shunt dysfunction in 8 patients, which responded to shunt interventions. 61 deaths (40, liver related) and 5 transplants have occurred at a median duration of 21 months (1 day to 160 months). When compared with an age, sex and alcoholic aetiology matched group of 135 controls, patients who received TIPSS had a reduced CP score (p = 0.001) and better survival (survival at 6, 12 and 24 months was 68, 61 and 51% respectively, p < 0.05).

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### 395 CHRONIC RENAL FAILURE POST LIVER TRANSPLANT: PREVALENCE AND RATE OF DECLINE

J. A. Leifhead, J. W. Ferguson, P. C. Hayes.

**Introduction:** Chronic renal dysfunction is a recognised cause of morbidity and mortality after liver transplantation. However, the definition of chronic renal dysfunction varies widely and its true prevalence and clinical significance is underestimated.

**Aims & Methods:** Our aim was to assess the prevalence of chronic kidney disease at 5 years post elective liver transplantation, and to determine the rate of decline in renal function. A single-centre retrospective study of 135 consecutive patients who received 146 liver transplants between January 1996 and 31 December 2000. 106 patients survived for the 5-year follow-up period. Estimated glomerular filtration rate (GFR) was calculated using the MDRD6 equation. As per the National Kidney Foundation a GFR of > 90, 60–89, < 60 and < 15 was used to define normal renal function, mildly reduced GFR, chronic kidney disease (CKD) and kidney failure respectively. Values were expressed as mean and standard deviation, and median and interquartile range as appropriate.

**Results:** The mean age at time of transplantation was 50.1 (10.9) years (M:F = 1:1.1). 97% were of European ethnic origin. Indications for liver transplantation were primary cirrhosis (35%), alcoholic liver disease (22%), hepatitis C (10%) and others (35%). Pre-transplantation 38% had a reduced GFR and 7% met the criteria for CKD. Postoperatively, 60%, 74%, 81% and 80% had some degree of renal impairment and 15%, 27%, 26% and 28% had CKD at 1, 6, 12 and 60 months respectively. The mean GFR at 5 years was 64 (12) in those with Child-Pugh B1 (11) in those without. Noteably, the median serum creatinine at 5 years in the former was only marginally elevated at 135 (125-157). Two patients (2%) developed kidney failure and required dialysis during the follow-up period. Mean GFR at 5 years was 31 ml/min/1.73 m2 less than the preoperative level. The fastest rate of decline was observed during the peri-operative period. Thereafter, GFR stabilised. Although there was no significant difference in the mean GFR at 1 and 5 years of the group as a whole (p = 0.46), 46% demonstrated a deterioration in renal function at a rate greater than that expected with age. Of this cohort 86% had a reduced GFR, 37% had CKD and 2% had kidney failure at 5 years. The mean rate of decline of GFR was 4.5±2.7 ml/min/1.73 m2/yr. Therefore, the predicted prevalence of kidney failure (or dialysis) at 10 and 15 years post-transplantation is 5% and 18% respectively.

**Conclusion:** Chronic renal dysfunction is an important complication after liver transplantation. More than a quarter of patients at 5 years fulfil the criteria for CKD. In those who demonstrate progressive impairment, the mean rate of decline is comparable with the rate observed in non-transplant patients with CKD. Further research is required to identify modifiable risk factors for both prevalence and rate of decline.

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### 396 MINIMAL HEPATIC ENCEPHALOPATHY AFTER TIPS INSERTION IS ASSOCIATED WITH A REDUCED QUALITY OF LIFE

S. Masson1, H. A. Mardini1, J. D. Rose2, C. O. Record1

**Introduction:** One of the main drawbacks of TIPS is the development of hepatic encephalopathy (HE). The diagnosis of HE is typically clinical yet this is insensitive; the development of psychometric testing has allowed the detection of subtler degrees of neuropsychiatric impairment—subclinical or "minimal" HE. However, the morbidity associated with minimal HE and the extent to which this affects quality of life (QOL) is unclear.

**Aims & Methods:** We aimed to determine the incidence of minimal HE after TIPS insertion and the impact this had on perceived health status and QOL. From our database of patients in whom TIPS has been inserted in the last decade (n = 197), those still attending (n = 59) were invited to attend for psychometric testing. A test battery for the detection of minimal HE, the psychometric hepatic encephalopathy score (PHES), was derived from six paper and pencil tests. Computed psychometry (CDQ) was also undertaken within one week of the paper and pencil tests by the same operator (HM). Blood was collected at the time of testing for Child-Pugh and MELD score and whole blood ammonia. These patients were asked to complete 2 health profile questionnaires—the Short Form 36 (SF-36) and the chronic liver disease questionnaire (CLDQ).

**Results:** PHES were available in 35/59 (59%) patients. Testing was undertaken at a mean length of 81 months (range 3–123) after TIPS insertion. PHES was abnormal (score ≤ 18) in 17 patients (49%); some (n = 6) had no clinically evident HE during FU. PHES was normal (≥ 20 to 2) in 18 patients. The CDR score was significantly lower in those with abnormal PHES scores (p < 0.001) and was in the normal range (mean 20 to 5) in a control group.
only 14 of the 36 tests performed (39%). QOL questionnaires were completed by 19/35 (54%) of those who underwent psychometric testing. In both the SF-36 and CLDQ questionnaires, the total scores for patients with abnormal psychometric test results were significantly lower than that for patients with normal psychometric test results (p=0.05). This difference was significant in the domains covering physical health in the SF-36 questionnaire and in the domains of fatigue, systemic symptoms and activity in the CLDQ.

Conclusion: Abnormal PHE scores are seen in around half of all patients after TIPS insertion. This subclinical abnormality represents psychomotor slowing along with impairment of visual perception and attention, that is, minimal HE. Additionally, this results in a globally diminished functional activity in the CLDQ.

**Contribution:** The presence of abnormal psychometric test results is significantly associated with abnormal QOL in cirrhotic patients, with abnormal psychometric test results were significantly lower than that for patients with normal psychometric test results (p=0.05). This difference was significant in the domains covering physical health in the SF-36 questionnaire and in the domains of fatigue, systemic symptoms and activity in the CLDQ.

**397 CORRELATION OF CORONARY ARTERY CALCIFICATION SCORES WITH FEATURES OF THE METABOLIC SYNDROME IN PATIENTS UNDERGOING ASSESSMENT FOR ORTHOTOPIC LIVER TRANSPLANTATION**

N. C. McNulty, P. C. Hayes, G. McKillop. Department of Hepatology, Royal Infirmary of Edinburgh, Edinburgh, UK

**Introduction:** An increased incidence of cardiovascular events is seen in patients with end stage liver disease; with the underlying mechanisms currently not fully understood. As non-alcoholic fatty liver disease (NAFLD) is increasing in prevalence, with more of these patients progressing to end stage liver disease, we aimed to assess the relationship between the presence of features of the metabolic syndrome (MS) and coronary artery calcification (CAC) score, a well-validated, non-invasive assessment tool used in the detection of subclinical coronary artery disease. We also examined if any relationship exists between insulin resistance (as assessed by HOMA-IR index), features of the MS and CAC scores in an unselected cohort of patients being assessed for liver transplantation.

**Aims & Methods:** Single centre prospective observational study. We recruited patients who were undergoing assessment for orthotopic liver transplantation (OLT) from April 2005–May 2006. All patients underwent CT scanning of the thorax to allow CAC scores to be generated and correlated this with the number of features of metabolic syndrome as classified by ATP III criteria and the HOMA-IR index, calculated by obtaining simultaneous fasting glucose and insulin, to assess insulin resistance (IR).

**Results:** Fifty two patients underwent cardiac CT scanning (38 males: 14 females) with a median age of 54 years (range 24–69). The median CAC score was 102 (range 0–3533). Features of the MS were common in this unselected cohort of OLT candidates. Further evaluation of these risk factors for cardiovascular disease is important and should be addressed in prospective studies. The significance of the high prevalence and severity of insulin resistance in patients with advanced liver disease is worthy of further study in view of our current understanding of the pathogenesis of NAFLD.

**398 LIVER DISEASE AND KHT CHEWING IN YOUNG SOMALIAN MEN**

C. A. McCune, M. Mooring, F. H. Gordon, P. L. Collins. Department of Hepatology, Histopathology, Bristol Royal Infirmary, Bristol, UK

**Introduction:** Historically, port workers from Somalia have settled in Bristol since the last century. Following conflict in East Africa the local population has increased to around 700–1000. Cryptogenic liver disease within the Somali population has been recognised by liver units around the UK, but cases are rare. An unusual form of autoimmune hepatitis in young Somalian men has recently been described. Khat chewing is highly prevalent within the male Somali culture; in contrast women rarely partake. The leaves of the Khat shrub (Catha edulis) contain an active amphetamine-like stimulant cathinone. Animals fed Khat leaves develop an acute hepatitis and long-term feeding is associated with fibrotic liver disease.

**Aims & Methods:** To determine the prevalence of liver disease in Somalis presenting to a teaching hospital in Bristol, UK between 1999 and 2006. All cases were identified using departmental and histopathology databases. In all but one an accurate record of khat ingestion was documented in the notes.

**Results:** Seven Somalian men (no women) were identified (median age 33, range 28–41 years). All presented with a predominant hepatic derangement in LFTs. In 6 there was a clear history of regular khat chewing and a collateral history of a possible habit in the remaining 1. All subjects denied ever drinking alcohol. No other aetiological factors for liver disease were identified (ie neg viral serology, copper studies, etc). Six patients had liver biopsies with features consistent with a chronic hepatitis. Two also had established cirrhosis. Three patients were seropositive with raised SMA titres (table). In 2 of these immunosuppression therapy failed. In 4 patients (patients 1, 5, 6, 7) the liver disease recovered or stabilised following cessation of khat and immunosuppression has not been required.

**Conclusion:** There appears to be a high prevalence of ‘cryptogenic’ liver disease in Somalian men; a population known to frequently ingest a potential hepatotoxin in khat. Khat-induced liver disease appears to mimic autoimmune hepatitis and this may explain the poor response to immunosuppression previously described. Supporting this supposition is the lack of liver disease in women. The precise hepatotoxin(s) in Khat (or contaminants during transportation) remains unclear and warrants further study.


**399 THE LONG-TERM PROGNOSIS OF BLEEDING OESOPHAGEAL VARICES: A 14-YEAR FOLLOW-UP STUDY**


**Introduction:** Variceal bleeding has long been identified as a significant cause of morbidity and mortality among cirrhotic patients. Although there have been several reports on short-term prognosis following variceal bleeding less is known about the long-term survival. Knowing more about the natural history of variceal bleeding allows us to make informed decisions regarding future management of these patients. The long-term study of bleeding varices might help in improving the management of patients.

**Aim:** To determine the long-term prognosis and risk factors for recurrent bleeding of oesophageal varices.

**Methods:** A total of 143 patients were followed up for a maximum period of 14 years. The study cohort included 94 males and 49 females with a mean age of 47 years (range 20–74 years) at enrollment. The patients were followed up for mean period of 12 years (range 1–14 years).

**Results:** The overall rebleeding rate was 53% (78/143). The median time to the first rebleeding was 2.5 years (range 0–14 years). The 5-year and 10-year cumulative rebleeding rates were 25% and 50%, respectively. The 5-year and 10-year cumulative mortality rates were 22% and 42%, respectively. The 5-year and 10-year cumulative survival rates were 55% and 38%, respectively. The independent risk factors for recurrent bleeding were Child-Pugh class (p < 0.001), number of varices (p = 0.04), and presence of MCV (p = 0.02).

**Conclusion:** The long-term prognosis of variceal bleeding is significantly influenced by the severity of liver disease, the number of varices, and the presence of MCV. These findings highlight the importance of early intervention to prevent rebleeding and improve the long-term survival of patients with variceal bleeding.

**Abstract 398**

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age</th>
<th>Khat</th>
<th>Onset</th>
<th>AI</th>
<th>H.A.I / 18</th>
<th>Fibrosis/6</th>
<th>Outcome</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>41</td>
<td>+</td>
<td>Acute</td>
<td></td>
<td></td>
<td>5</td>
<td>Biopsy</td>
<td>Resolved</td>
</tr>
<tr>
<td>2</td>
<td>41</td>
<td>+</td>
<td>Acute</td>
<td>Neg</td>
<td>Declined</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>33</td>
<td>+</td>
<td>Subacute</td>
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<td></td>
<td>9</td>
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</tr>
<tr>
<td>4</td>
<td>28</td>
<td>+</td>
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<td></td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>33</td>
<td>+</td>
<td>Chronic</td>
<td></td>
<td></td>
<td>6</td>
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<td></td>
</tr>
<tr>
<td>6</td>
<td>39</td>
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<td>+</td>
<td>Chronic</td>
<td></td>
<td></td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Failed immunosuppression.

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decisions about subsequent management including secondary variceal prophylaxis and hepatoma screening.

**Aims & Methods:** Details of all patients admitted to our Gastrointestinal Bleeding Unit over the past 14 years were recorded in a database. Patients who were primary cause of bleeding was esophageal varices were identified and survival was evaluated at 30 days, 6 months and 5 years. Overall survival was assessed using Kaplan Meier survival curves. Only the first admission to our unit was analysed in survival data. Survival was evaluated dependent on year of admission, gender, age, alcohol intake and rebleeding during admission.

**Results:** There were 288 patients admitted with variceal bleeding on a total of 434 bleeding related admissions. Males accounted for 66.7% and mean age was 55.2 years. The mean duration of stay in the HDU per admission was 8.1 days and the mean transfusion requirement was 3.9 units of blood. Median follow-up was 1.1 months (range 0–165). Overall mortality was 23 at 30 days, 34% at 6 months and 67.7% at 5 years. There was no statistically significant difference in survival time dependent on gender or weekly alcohol consumption. Age significantly affected survival (p<0.01) with a 2.5% increase in risk of death per year of age. Patients who had rebleeding from varices during their admission had a significant reduction in survival, median 14 months versus 66 months if no rebleeding (p<0.01).

**Conclusion:** We have demonstrated that increasing age and rebleeding have an adverse influence on survival. Although we have previously shown that median survival had an adverse effect on long-term mortality, we did not find a significant influence on long-term survival. There is a 34% mortality at six months, however a significant number of patients who survive the acute bleeding episode live for many years and therefore when discussing therapeutic strategies during the acute presentation this should be taken into consideration. Given the large numbers surviving we need to make provision for secondary prophylaxis against variceal haemorrhage and hepatoma screening in those where it is indicated.

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**NON-TRANSPLANT SURGERY FOR DOMINANT STRICTURE IN PRIMARY SCLEROSING CHOLANGITIS: REVISITED**

M. K. Nayar 1, M. Hudson 2, D. Manas 3.

**Gastroenterology, 2Hepatology, 3Hepatobiliary and Transplant Surgery, Freeman Hospital, Newcastle upon Tyne, UK**

**Introduction:** Primary sclerosing cholangitis (PSC) is a chronic cholestatic liver disorder characterised by strictures and dilatations of the biliary tree. A dominant stricture in common bile duct and/or right hepatic duct or left hepatic duct has been reported in up to 45% patients. 1 It is complicated by cholangiocarcinoma (CC) in 10% to 20% of cases, and is more common in large duct disease. Treatment options include repeated stenting of strictures, surgical excision and liver transplantation.

**Aims & Methods:** The aim of this study was to assess the outcome of patients with histologically proven non-cirrhotic PSC, who under went surgical excision of extrahepatic dominant strictures (EHDS). A retrospective cohort of 130 patients with PSC presenting to the Freeman Hospital Liver unit between April 2000 and March 2005 identified 13 patients as having EHDS due to PSC. 11 patients underwent surgery. Pre-op presentation, pre and post-op liver function (LFT), post-op complications and follow-up to date were evaluated.

**Results:** Of the 11 patients, six underwent segment 4B resection and a Hepp-Couinaud hepaticojejunostomy (HU) with total excision of the EHBD. Four patients underwent left hepatectomy, total excision of the EHBD and right duct HJ for disease involving the confluence and one patient underwent a pylorus preserving whipping resection plus total excision of the EHBD. Mean age was 65 years (range = 33–70). All patients had life threatening recurrent cholangitis prior to surgery. In nine patients we LFT stabilised post operatively. No perioperative mortality occurred. Median follow-up was 42.45 months (range 5–78). Two patients had CC on follow-up was 1.1 months (range 0–165). Overall mortality was 23% at 30 days, 34% at 6 months and 67.7% at 5 years. There was no statistically significant difference in survival time dependent on gender or weekly alcohol consumption. Age significantly affected survival (p<0.01) with a 2.5% increase in risk of death per year of age. Patients who had rebleeding from varices during their admission had a significant reduction in survival, median 14 months versus 66 months if no rebleeding (p<0.01).

**Conclusion:** We have demonstrated that increasing age and rebleeding have an adverse influence on survival. Although we have previously shown that median survival had an adverse effect on long-term mortality, we did not find a significant influence on long-term survival. There is a 34% mortality at six months, however a significant number of patients who survive the acute bleeding episode live for many years and therefore when discussing therapeutic strategies during the acute presentation this should be taken into consideration. Given the large numbers surviving we need to make provision for secondary prophylaxis against variceal haemorrhage and hepatoma screening in those where it is indicated.

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**PORTAL BILIOPATHY: A MULTIDISCIPLINARY APPROACH TO MANAGEMENT**

Y. H. Oo, S. Olliff, G. Haydon, D. Thorburn. Liver and Hepatobiliary Unit, Queen Elizabeth Hospital, Birmingham, UK

**Introduction:** Portal vein thrombosis frequently results in the formation of a portal cavernoma, when bridging collateral veins dilate to bypass the obstruction and shunt portal blood to the inferior vena cava. Portal cavernoma is a consequence of portal cavernoma, portal biliopathy, develops when the thin walled epi- and para-choledochal venous plexuses dilate and compress the bile duct and gallbladder. Although biliary changes can be identified on imaging in the majority of cases of portal cavernoma, portal biliopathy is an uncommon cause of symptomatic biliary disease in the Western world.

**Aims & Methods:** We reviewed all patients presenting to the Liver Unit in Birmingham with symptomatic portal biliopathy between 1992 and 2005 and report the presentation, investigation, management and outcome of these complex patients.

**Results:** Thirteen patients (median age at presentation 34 (range 23–61 years)) with median follow-up of 2 years (range 1–18 years) were identified. Jaundice, associated with typical biliary pain in 5 cases, was the presenting feature in all cases. Intrahepatic biliary dilatation with multiple intrahepatic and extrahepatic strictures were present in all cases. In addition gallbladder stones (n=11) and bile duct stones or sludge (n=10) were commonly present. Biliary symptoms were successfully treated by biliary decompression in six cases (metallic stent 3, plastic stent 1, combined procedure 1, sphincterotomy 1) and portal decompression in three cases (TIPS 2, Meso-caval shunt 1). Biliary obstruction could not be relieved endoscopically or by portal decompression in one case who was accepted for combined liver and small bowel transplantation. Three patients had spontaneous resolution of symptoms without recurrence over the follow-up period. All patients had endoscopic evidence of esophageal varices and 10 (77%) experienced a total of 18 episodes of gastrointestinal bleeding. There were two deaths over the follow-up period, each resulting from complications following variceal haemorrhage.

**Conclusion:** Portal biliopathy is an uncommon cause of biliary obstruction. Endoscopic management (sphincterotomy and stone extraction or stent insertion) is effective initial therapy for patients whose symptoms do not resolve spontaneously. In the case of persistent biliary obstruction porto-systemic shunting (TIPS or surgical) should be considered however the extent of vascular thrombosis precludes this in most cases. Liver or multivisceral transplantation should be considered for patients who are unsuitable or are resistant to these therapies.

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**LINEAR ENDOSCOPIC ULTRASOUND (EUS) ASSESSMENT AND EUS-FINE NEEDLE ASPIRATION OF HIILAR LESIONS**

M. Nayar 1, D. Manas 1, V. Wadhera 2, K. N. Oppong 1.

**1Hepatopancreatic Biliary Unit, Freeman Hospital, 2Department of Cytopathology, Royal Victoria Infirmary, Newcastle upon Tyne, UK**

**Introduction:** Optimal management of hilar cholangiocarcinoma requires good imaging of the tumour mass, its relationship to vascular structures and a tissue diagnosis. Endoscopic ultrasound (EUS) and EUS-FNA offer the potential of gaining staging information and a tissue diagnosis in the same sitting. Previous studies 1-3 have reported sensitivities of 25-83%. We report our experience of EUS assessment and EUS-FNA of hilar lesions.

**Aims & Methods:** All patients who underwent Linear EUS assessment followed by EUS- FNA for hilar lesions between April 2004 to April 2006 were identified. All these patients had a provisional diagnosis of a hilar cholangiocarcinoma on prior cross-sectional imaging. The final diagnosis was determined by surgical pathology, cytology or follow-up.

**Results:** Fifteen patients underwent 17 procedures for hilar lesions during the study period. There were 7 males and 8 females with a mean age of 69.9 years (range 40–79). All but one patient (who had a hilar node) had a suspected hilar stricture. All patients had prior radiological imaging (CT and or MRI). Two patients had repeat procedures. Good images were obtained in all cases. The lesion was able to be identified and an assessment of operability made. Positioning for EUS-FNA was often awkward and restricted the number of passes made mean 2.06 (range 1–3). There were no complications. An inadequate specimen was obtained in 9 procedures. The pathological diagnosis was adenocarcinoma (4) and...
benign [3]. Six patients had definite diagnosis of adenocarcinoma on biliary brushings [3] and surgical pathology [3]. The sensitivity, specificity, positive predictive value, negative predictive value and accuracy of EUS-FNA were 33%, 100%, 100%, 38.5%, 53% respectively.

Conclusion: EUS assessment provided useful staging information of hilar lesions. However the performance of EUS-FNA was technically difficult and the sensitivity poor. This was predominantly due to the high proportion of inadequate specimens.


Introduction: Invasive measurement of graft function by indocyanine green clearance (ICG Cl) has been shown to predict outcome after liver transplantation. Non-invasive measurement is now possible with the LiMON device. We report our experience of ICG Cl determination in this way, assessing its potential for early prediction of adverse post operative events making comparison with other parameters in a cohort of patients undergoing liver transplantation (LT).

Aims & Methods: ICG PDR was measured by LiMON in 93 patients at a median of 1 day (interquartile range 0-1) after LT. Clinical and laboratory markers of graft and extra-hepatic organ function were recorded at the time of ICG measurement. Primary outcome measures were 28 day (28DS), 90 day graft survival (90DS) and postoperative complications (renal failure (RF) and need for haemofiltration (Hf)). Predictive accuracy was assessed by area under receiver operator characteristic curves (AUC).

Results: Sixty eight patients underwent elective LT for chronic liver disease (CLD) and 25 emergency LT for acute liver failure (ALF). Significant differences were present in relation to 28DS in both lactate and ICG Cl (lactate: 1.8 mmol/l (1.3-3.7) survivors v 4.45 mmol/l (1.8-16) in non survivors (p=0.01); ICG PDR:17% (11.7-24.2) v 10.8 (5.8-18.5), p=0.04). Similar findings were present in relation to 90DS: AST, Bilirubin and INR showed no significant differences. AUC for the prediction of 28DS and 90DS were 0.72 for lactate and 0.68 for ICG Cl. In ALF patients ICG Cl predicted 28DS more accurately than lactate. In CLD patients, ICG Cl did not predict 28DS but performed as well as lactate when predicting 90DS. Significant differences were present in relation to development of RF in ICG Cl, creatinine (Cr) and urine output (U/O) (ICG Cl 13.5% (8.9-19.5) with RF v 21.5% without (15-30.1), p<0.001; Cr 138 mmol/l (99-203) v 88 (76-110), p<0.001, U/O 200 ml/day (0-1023) v 1180 (210-2120), p<0.001). Overall, AUCs for Cr were 0.8, U/O 0.8 and ICG Cl 0.78 for prediction of RF. In ALF patients, Cr, U/O, ICG Cl and bilirubin predicted the need for RF at day 7, but only ICG Cl and U/O accurately predicted need for RF in the CLD group.

Conclusion: Early ICG Cl measured non-invasively predicted graft survival in patients undergoing emergency and elective LT. However, it did not appear to be superior to existing conventional measures. In those transplanted for CLD, a low ICG Cl was associated with a subsequent need for Hf suggesting an association of graft dysfunction with renal failure.

Abstract 405 Mean polymorphonuclear (PMN) count for each Combur9 result

<table>
<thead>
<tr>
<th>Combur9 result</th>
<th>0 (n =128)</th>
<th>1 (n =22)</th>
<th>2 (n =10)</th>
<th>3 (n =2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMN/mm³</td>
<td>17.9 (&lt;1–200)</td>
<td>47.5 (&lt;1–698)</td>
<td>1546 (&lt;1–14400)</td>
<td>3450 (2100–4800)</td>
</tr>
</tbody>
</table>

404 PRELIMINARY DATA OF THE ROLE OF CHEMOEMBOLISATION FOLLOWED BY RADIOFREQUENCY ABLATION IN THE TREATMENT OF MULTIPLE OR LARGE HEPATOCELLULAR CARCINOMA

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Introduction: Hepatocellular carcinoma (HCC) is the 4th commonest cause of cancer in the world with increasing UK incidence due Hepatitis C and alcohol/non-alcoholic steatohepatitis related cirrhosis. Although surgery or radio-frequency ablation (RFA) can be effective for small tumours, once the size is >3 cm effective therapies are limited. Chemoembolisation is often used as palliative therapy for larger or multiple tumours, but there are very limited data on combined chemoembolisation and RFA as therapy for this patient group.

Aims & Methods: The aim of our audit was to assess the impact and outcome of combined chemoembolisation and RFA in our centre in the management of patients with HCC >3 cm or multiple tumours. A retrospective case note analysis performed of patients diagnosed with HCC over a 6-year time period (January 2000-6). Patients treated with chemoembolisation followed by RFA (combined therapy) were identified and outcome assessed.

Results: Fifty-two patients were diagnosed with HCC over the study period. Aetiology was alcoholic liver disease (ALD) in 46% and 73% patients had Childs C disease. 33% had a single HCC (mean diameter 5.89 (2.57) cm). The overall one-year survival was 35%. 12 patients were treated with chemoembolisation followed by RFA (11 male; mean age 59.2 (10.6) years). Aetiology included: ALD in 6 patients, haemochromatosis in 2, cryptogenic cirrhosis in 2, hepatitis C in 1 and primary biliary cirrhosis in 1. The Child-Pugh grades were: 8 grade A and 4 grade B with 42% having a raised AFP at diagnosis. 50% patients had a single HCC (median diameter 6 cm, range 3.5–20 cm). None had extra-hepatic metastasis on CT (+/-) MR imaging. 50% were Barcelona Clinic Liver Cancer (BCLC) stage A, 17% stage B and 33% stage C. The median no of chemoembolisation sessions was 2 (range 1–5), followed by a median no of 2 (range 1–6) RFA sessions. The only complication encountered was a pyrexia with abnormal LFTs post-procedure in one patient which settled after antibiotic therapy.

Conclusion: Chemoembolisation followed by RFA therapy results in good radiological tumour resolution in patients with >3 cm or multiple HCC without metastatic disease. However recurrence and new HCC occurs frequently on follow-up. This combination therapy requires further study to clarify its exact role in the management of HCC.
the 4-grade colorimetric scale of the Combur9 urine dipstick (read at 120s: grade 0, 1, 2 and 3). Results were compared with standard cell count and culture of AF in blood culture bottles. SBP and bacterascites were defined according to the International Ascites Club criteria. Results: 183 AF samples were obtained in 59 patients. 21 samples were excluded: 13 were not received by the laboratory, 3 were clotted and the dipstick could not be read in 5 patients due to hyperbilirubinaemia. 24% of tests were performed in elective admissions. Mean patient age was 56 years, 60% male. Cirrhosis was most frequently due to alcohol (76%), mean MELD 16, SBP was diagnosed in 3 cases; bacterascites in 10 cases. When we considered a positive reagent strip result of 3, sensitivity was 33% (2 of 6), specificity 100% (156 of 156), positive predictive value (PPV) 100% and negative predictive value (NPV) 98%. When we considered positive a reagent strip result of 2 or more, sensitivity was 83% (5 of 6), specificity was 96% (150 of 156), PPV 42% and NPV 99%. Conclusion: Leucocyte esterase reagent strips are a reliable bedside test for the exclusion of SBP. A negative result (0 or 1) may be useful as a cheap alternative screening test to exclude SBP and result in significant cost savings for the NHS by preventing the need for further microbial analysis. A result of 2 or more should be an indication for empirical antibiotics and confirmation of the result with standard cell count and asctic fluid culture. 1. Moore KP, et al. Hepatology 2003;38: 258–66.

**406 ACUTE RENAL FAILURE IN CIRRHOSIS: IS IT AS BAD AS WE THINK?**

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Introduction: Acute renal failure (ARF) is associated with a mortality of 50–60% in critically ill patients admitted to the intensive care unit (ICU). Prerenal causes and acute tubular necrosis (ATN) account for more than 85% of cases and are potentially reversible. ARF frequently complicates cirrhosis, is often attributed to hepatorenal syndrome (HRS), which may preclude aggressive treatment with its mortality up to 90%.

Aims & Methods: The aim of this study was to identify factors that may predispose to or precipitate ARF in cirrhosis, and determine outcome and mortality. A retrospective review of cirrhotic patients admitted with or developing renal impairment (defined as serum creatinine >130 μmol/l or oliguria <500 ml/24 h) from October 1999–April 2004. Patients with bleeding gastro-oesophageal varices were excluded. Demographic details, cause of ARF, potential early warning features, management and outcome were recorded.

Results: Eighty patients, median age 52 years (25–84), 46 male, median MELD 26 (7–43). Alcohol was causal in 88.8%. ARF occurred in 41/80 (51.3%) on admission, or a median of 6 days after admission (1–54). Median serum creatinine at onset of renal impairment 172μmol/l (60–589). An identifiable precipitant was found in 62/80 (77.5%) and were concurrent in 61.2%. HRS patients had higher MELD scores than non-HRS patients (30 (9–68) vs 15 (10–35); p<0.05). 28-day mortality was significantly associated with readmission Maddrey, MELD and Glasgow prognostic scores are similar to those following initial admission. As, following initial admission, gender, age and presence of bleeding or infection did not predict mortality in multivariate analysis. Mortality was significantly associated with readmission Maddrey, MELD and Glasgow scores, and for 28-day mortality only) Child score. The table shows (after excluding 35 patients given corticosteroids) areas under ROC curves (AUROC) and % accuracy of admission scores for prediction of 28-day mortality. Values for Child score were lower (p<0.05) for admission 2 than for admission 1; other differences were not significant.

Conclusion: The major determinant of hospital readmission with decompenased ALD is continued heavy drinking. The early outcome and prognostic value of the Maddrey, MELD and Glasgow scores are similar to those following initial admission.

**407 HOSPITAL READMISSION WITH DECOMPAENSED ALCOHOLIC LIVER DISEASE: DETERMINANTS, EARLY OUTCOME AND ACCURACY OF PROGNOSTIC SCORES**

P. Sackellariou1, K. L. Bagguley2, R. Ferguson3, J. Kerss3, E. McFarlane4, D. Gleeson1. 1Gastroenterology, Royal Hallamshire Hospital, 2Liver Unit, Royal Hallamshire Hospital, 3Liver Unit, Royal Hallamshire Hospital, Sheffield, UK

Introduction: We have previously reported (McFarlane. Gut 2006;55:A2; Kerss, Gut 2006:AA2) an early outcome and an accuracy of Maddrey, MELD, Child and Glasgow prognostic scores in patients presenting with first episode of decompenased alcoholic liver disease (ALD) (defined as Childs grade B or C). There are limited data regarding subsequent hospital admissions in such patients.

Aims & Methods: To evaluate determinants and early outcome of readmission in patients with decompenased ALD and to assess reliability of prognostic scores. Of 249 patients admitted to the Royal Hallamshire Hospital (RHH) with first episode of decompenased ALD, 37 died and 212 were discharged. We reviewed records of these 212 patients. We documented first readmissions with decompenassed ALD to either RHH or Northern General Hospital (the other Sheffield acute hospital) for RHH readmissions, we reviewed case notes and calculated prognostic scores on readmission. We also evaluated drinking behaviour following initial discharge (graded as 1: abstinent, to 4: no reduction of intake).

Results: Ninety nine patients were initially readmitted with decompenased ALD to RHH and 19 initially to NGH (of whom 7 were subsequently admitted to RHH). We excluded 4 other patients with coincidental advanced malignancy (2 hepatoma, 1 pancreas, 1 lung). Readmission rates with decompenased ALD after 6, 12 and 24 months were (mean (SE)) 39 (3), 48 (5) and 59 (6)% respectively. By multivariate analysis, readmission was associated with drinking behaviour after initial discharge (p<0.01) but not with gender, age or severity of liver dysfunction during initial admission. Following readmission to RHH, 28- and 84-day mortality rates were 7 (2)% and 20 (4)% respectively, similar to those following initial admission. As, following initial admission, gender, age, and presence of bleeding or infection did not predict mortality in multivariate analysis. Mortality was significantly associated with readmission Maddrey, MELD and Glasgow scores, and for 84 day mortality only) Child score. The table shows (after excluding 35 patients given corticosteroids) areas under ROC curves (AUROC) and % accuracy of admission scores for prediction of 28-day mortality. Values for Child score were lower (p<0.05) for admission 2 than for admission 1; other differences were not significant.

Conclusion: The major determinant of hospital readmission with decompenased ALD is continued heavy drinking. The early outcome and prognostic value of the Maddrey, MELD and Glasgow scores are similar to those following initial admission.

**408 AN AUDIT OF THE MANAGEMENT OF OSTEOPOROSIS ASSOCIATED WITH CHRONIC LIVER DISEASE**

D. A. Sheridan, C. E. MacDonald. Gastroenterology, Cumberland Infirmary, Carlisle, UK

Introduction: Chronic liver disease and alcohol consumption are important risk factors for the development of osteoporosis. Moreover heavy alcohol users are at increased risk of osteoporosis irrespective of the presence of cirrhosis. All patients with cirrhosis or severe cholestasis (bilirubin >3x normal for >6 months) should be assessed and treated for osteoporosis (Collier JD, et al. BSG Guidelines. Gut 2002;50(Suppl I):1-19).

Aims & Methods: We audited outpatients with a clinical or histological diagnosis of cirrhosis and compared the assessment of three subgroups according to aetiology: alcoholic cirrhosis (ALD), primary biliary cirrhosis (PBC) and autoimmune hepatitis (AIH) to see if they were being assessed for with ARF. Development of ARF in a cirrhotic patient should not preclude aggressive treatment.

### Abstract 407

<table>
<thead>
<tr>
<th>SCORE</th>
<th>Admission 1</th>
<th>Admission 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(cut-off point)</td>
<td>AUROC</td>
<td>accuracy (%)</td>
</tr>
<tr>
<td>MELD (17)</td>
<td>0.79±0.05</td>
<td>84</td>
</tr>
<tr>
<td>Maddrey (40)</td>
<td>0.81±0.05</td>
<td>79</td>
</tr>
<tr>
<td>Glasgow (9)</td>
<td>0.80±0.04</td>
<td>87</td>
</tr>
<tr>
<td>Child (12)</td>
<td>0.78±0.05</td>
<td>81</td>
</tr>
</tbody>
</table>

*p<0.05 compared with values on admission 1.*
osteoporosis according to BSG guidelines. An electronic search of clinic letters for the word “cirrhosis” was performed, then notes used to identify those with a clinical and/or histological diagnosis of liver cirrhosis and the likely aetiology.

**Results:** The demographics, risk factors, DEXA scan results and prescription of calcium/vitamin D3 and bisphosphonates are presented in the table.

**Conclusion:** Patients with chronic liver disease from all causes are at risk of developing reduced bone mineral density and osteoporosis. There is also a significant pre-existing vertebral fracture rate within this population. Bone mineral density did not correlate with severity of liver disease as measured by Child-Pugh score. Assessment of bone mineral density by DEXA scanning leads to a change in management by initiating a bisphosphate in those with a high risk of fracture; however despite a baseline 91.6% of patients with ALD being assessed according to the BSG guidelines, only a small proportion of those with ALD were being assessed. This audit highlights that those with alcoholic cirrhosis should be a target group for improved assessment of bone health.

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### 409 HAEMATOLOGICAL MALIGNANCIES PRESENTING WITH ACUTE LIVER FAILURE: A SINGLE CENTRE EXPERIENCE

S. Shetty, A. Holt, W. Syn, B. Gunson, G. Haydon. Liver Unit, Queen Elizabeth Hospital, Birmingham, UK

**Introduction:** Acute liver failure (ALF) is a condition with a high mortality rate. Early recognition and identification of the underlying cause is crucial in instituting medical treatment and assessing the need for liver transplantation. Previous experience of the management of ALF secondary to haematological malignancy is limited, with one published UK case series.

**Aims & Methods:** Review our experience of ALF secondary to haematological malignancies. All patients admitted to the liver unit with ALF secondary to a haematological malignancy between 1996 and 2006 were identified. A retrospective review was made of case notes and database.

**Results:** 572 cases of ALF, 6 were associated with haematological malignancy. The underlying malignancies were NK-cell leukaemia (1), adult T lymphocytic leukaemia (1) and lymphoma (4). Median age was 45 (range 18–66). One patient was previously diagnosed with Hodgkin’s disease and was subsequently transplanted for sero-negative hepatitis.

**Discussion:** Features common to all patients were a prodromal illness (median duration of 3 weeks; range 2–6) and jaundice (median bilirubin 208 μmol/l; range 112–238). 5/6 had palpable hepatomegaly, but only 2/6 had evidence of peripheral lymphadenopathy. Transjugular liver biopsy was performed in two patients and confirmed the diagnosis in both cases. In the remaining cases the diagnosis was made following lymph node biopsy (1), bone marrow examination (2) or postmortem (1). Encephalopathy developed in 4 patients following admission. Median time from jaundice to encephalopathy was 12 days, range 1–22. Four patients were managed on ITU and required haemofiltration. One patient was transfused but died soon after the procedure, one patient underwent a course of chemotherapy and one patient was commenced on steroids and immunoglobulins. All six patients died soon after admission with a median survival of 8 days (range 3–26).

**Conclusion:** ALF secondary to a haematological malignancy is rare (<1% of referrals) but should be considered in all ALF patients presenting with a prodromal illness, jaundice, early lactic acidosis and hepatomegaly. Liver biopsy should be considered in these cases but the benefit of chemotherapy/transplantation in this setting is unclear. 1. Rowbotham D, Wendon J, Williams R. Acute liver failure secondary to hepatic infiltration: a single centre experience of 18 cases. Gut 1998;42:576–80.
EXTRACTION OF RNA FROM FORMALIN-FIXED, PARAFFIN-EMBEDDED ARCHIVAL HEPATOCELLULAR CARCINOMA

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Introduction: Most archival tissue is formalin fixed and paraffin embedded (FFPE) prior to histological examination. This process preserves the architecture of the tissues to allow accurate pathological diagnosis, but also degrades nucleic acids within these tissues. We have modified a pre-existing phenol-chloroform extraction method, and applied it to various FFPE samples of hepatocellular carcinoma (HCC) to assess the efficiency and reproducibility of this method.

Aims & Methods: Ninety nine cases of HCC were identified from our archive over an 18 year time period. Expert histopathological review then defined for each case an example of HCC and non-HCC. 10 ±5 μm section were then taken for each sample and extracted using a modified phenol-chloroform technique. The quality of the RNA was assessed objectively using a Nanodrop ND-1000 spectrophotometer, subjectively with an Agilent 2100 bioanalyzer, and functionally using both real-time polymerase chain reactions (RT-PCR) and Agilent whole human genome gene array chips.

Results: All 99 cases (198 specimens) yielded significant amounts of RNA. The mean extracted RNA for all 198 cases was 1349 ng/ul. No statistically significant difference was noted when samples were stratified for age, aetiology or presence of tumour. When the nucleic acids were assessed using the Agilent chip, 34% of samples had good quality RNA with little or no degraded RNA present, 30% yielded RNA of good quality with a significant amount of degraded RNA present, and 36% of samples were composed of mainly degraded RNA. Functional analysis using RT-PCR showed that the majority of samples could be used in PCR experiments. Over 1/3 of the samples were of sufficient quality to be used in gene array experiments.

Conclusion: Our nucleic acid extraction technique can reproducibly extract RNA from FFPE specimens up to 18 years old, with little variability in quality of RNA. The aetiology of the liver disease does not affect the extractions, and the RNA can be used in a variety of molecular pathology applications.

ALCOHOL AWARENESS IN MEDICAL UNDERGRADUATES

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Introduction: It has been shown that university students in general are poor at distinguishing the alcohol content in alcoholic beverages. However no data exist in relation to medical students specifically to determine the extent to which they, as future doctors, understand the alcohol content in alcoholic beverages.

Aims & Methods: To determine the awareness of alcohol consumption and the extent of teaching medical students consider they have received to see if this correlates with their confidence in taking a full alcohol history. To see if there is a clear correlation between the years and the knowledge of the definition of a unit of alcohol. Less than 20% identified the correct number of alcohol units in Strongbow, Kronenburg and Wine.

Conclusion: Alcohol-related knowledge needs improving amongst medical students, especially when converting drinks to units as this is imperative if alcohol knowledge can be applied to real life situations and patients. It is important for the medical schools to design their own policies regarding ways to increase alcohol awareness.

MINIMALLY-ELEVATED LIVER FUNCTION TESTS: ARE WE SEEING OR DOING ENOUGH?

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Introduction: A rising burden of liver disease and increased deaths from cirrhosis are well documented in the UK. Asymptomatic mildly deranged liver function tests (LFTs) have been associated with significant liver disease.

Aims & Methods: We set out to identify what proportion of patients with an alanine aminotransaminase (ALT) in the range 40–90 IU/l were referred to either a gastroenterologist or hepatologist in Newcastle, from 1 January to 31 December 2003. We wanted to determine how fully investigated the patients were in primary care before referral and the outcome after being seen in secondary care. All LFTs in Newcastle are analysed in the Freeman biochemistry department. The pathology computer was interrogated to identify all patients with an ALT in the selected range and matched with the consultant gastroenterologists and hepatologists in the city. A retrospective case note review was undertaken.

Results: After correction for repeated sampling 5489 patients had an ALT between 40–90. Of these only 331 (6%) were referred to secondary care. 309 (93%) case notes were available for review. 190 (62%) were males, median age of the whole group was 52 (range 17–92) years. Of these patients 184 (60%) were referred from primary care for investigation of the abnormal LFTs, 19 (6%) had pre-existing liver disease, 17 (6%) were referred from within secondary care, 72 (23%) referred for other GI symptoms but LFTs not investigated, 17 (6%) for other GI symptoms but had their LFTs investigated. Of these 4 had coeliac disease. In primary care only 58% of patients had LFTs repeated before referral—median time between tests 8.5 weeks. Only 40% of patients had viral hepatitis serology, 23% autobody studies and 23% an ultrasound scan before referral. All patients had a “liver screen” at initial outpatient appointment. At clinic 27% had normal ALT <40. 28% underwent liver biopsy at a median 24 weeks from initial clinic appointment. This did influence management, patients with NASH were reviewed more frequently than those with NAFD (5.5 v 3). However, only 25% of patients with simple steatosis were discharged. Overall significant liver disease was found in 58% patients—29% NAFD, 7% cirrhosis, 5.5% NASH, 5% alcoholic liver disease, 4% viral hepatitis.

Conclusion: Only a minority (6%) of patients with minimally abnormal ALT were referred to secondary care. The majority that were had little investigative work up prior to referral. Within those referred there was a significant incidence of cirrhosis and liver fibrosis. Clearer guidelines for referral within primary care, streamlining of referral pathways and sensitive screening tests for assessing fibrosis in fatty liver disease would greatly ease the assessment process.

SINGLE NUCLEOTIDE POLYMORPHISM OF THE SRB1 GENE AND SUSCEPTIBILITY TO HCV INFECTION


Introduction: We have recently described a population of injection drug users who remain uninfected by hepatitis C virus (HCV) despite their long history of drug use and repeated sharing of injecting equipment. These individuals test negative for both HCV antibody and HCV RNA and we have termed them exposed but uninfected (EU). The absence of infection despite exposure raises the possibility that they have an innate resistance to infection. Alterations in receptors mediating viral entry can confer resistance as described with CCR5 mutations in HIV infection. The scavenger receptor class B1 (SRB1) molecule is a lipid receptor recently shown to be an important HCV receptor. We aimed to examine if a functional polymorphism of the SRB1 receptor, which alters lipid metabolism, could have an impact on susceptibility to HCV infection.
### Abstract 414 Results of SRB1 genotype

<table>
<thead>
<tr>
<th>Patient groups</th>
<th>Homozygous (GG)</th>
<th>Heterozygous (GA)</th>
<th>Homozygous (AA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposed uninfected</td>
<td>28 (80%)</td>
<td>6 (17%)</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Chronic HCV</td>
<td>46 (79%)</td>
<td>11 (19%)</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Resolved HCV</td>
<td>34 (79%)</td>
<td>9 (21%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

#### Aims & Methods:
Genomic DNA was extracted from whole blood by salt precipitation. We studied three cohorts of subjects: (1) resolved HCV infection (HCV Ab -ve but HCV RNA -ve, n = 43), (2) chronic HCV infection (HCV Ab +ve and HCV RNA -ve, n = 58) and (3) exposed uninfecteds (HCV Ab and HCV RNA -ve, n = 35). Genotyping was done commercially (K Biosciences) to detect a G/A polymorphism at the 4th nucleotide position on exon 1 of the SRB1 gene (chromosome 12q24.32) which results in a change in amino acid from glycine to serine.

#### Results:
The overall frequency of GG, GA, AA alleles was 79%, 19% and 1.5% respectively. There were no significant differences between groups.

#### Conclusion:
Our data show no difference in the frequency of this single nucleotide polymorphism among individuals exhibiting resistance to HCV.

### Abstract 415 Size of biopsy related to number of portal tracts and adequacy

#### Aims & Methods:
Percutaneous liver biopsy is associated with morbidity >5% and mortality of 0.01–0.1%. The number of passes taken increases the incidence of complications. There is a general consensus among pathologists that a sample should contain a minimum of 6 portal tracts with a greater number needed for staging of hepatitis C. However, the operator taking the biopsy cannot use this criterion as a guide for adequacy of the sample.

#### Results:
There were 640 biopsies (using needle gauge 14, 16 and occasionally 18) on 608 patients (238 females:370 males), median age at biopsy 47 (range 17–84). 255 biopsies were performed for viral hepatitis grading. Number of portal tracts were recorded in 310 reports.

#### Conclusion:
As cores of over 10 mm in length give a 80% chance of making a definitive diagnosis, >90% likelihood of the pathologist being happy with the sample sent and a >85% likelihood of there being 6 or more portal tracts within the sample, we would suggest, with the exclusion of hepatitis C staging, if the sample obtained is over 10 mm there is no need for a further pass. This avoids the increased risks of morbidity and mortality to the patient of a second or subsequent pass. If the sample obtained is less than 5 mm, a second pass is likely to be required for diagnosis to be made.

### Abstract 416 Treatment of Autoimmune Hepatitis with Mycophenolate Mofetil

#### Introduction:
Mycophenolate mofetil (MMF) use in autoimmune hepatitis (AIH) has been associated with a reduction in steroid requirements and improvement in liver histology but data are limited.

#### Aims & Methods:
Retrospective review of 20 patients with AIH treated with MMF after either failure to respond to, or intolerance of azathioprine (AZA).

#### Results:
Seventeen patients were female; age at AIH diagnosis was (mean range) 44 (13–73) years. AIH score by International Group Criteria at diagnosis was 15 (10–19). 10 patients were switched to MMF (starting at 500 mg bd) because of failure to achieve histological remission after a mean of 125 months on AZA. 10 were switched to MMF after a mean of 26 months on AZA because of intolerance (5 NSV, 5 neutropenia). Two patients had to discontinue MMF after 3 months: 1 had severe deterioration of LFTs, the other was found to have a malignancy. No patients stopped MMF due to side effects or haematological problems. In the 10 patients given MMF because of failure to respond to AZA, the steroid dose (to maintain normal transaminases) fell in 9, but only 1 patient was able to discontinue steroids. 6 out of the 10 had repeated biochemical relapses; relapse frequency was similar on MMF and on AZA. The mean serum AST fell after 3 months of MMF (67 ± 53) and after 2 years was 29. 3 patients were biopsied after 2 years, 2 showed improvement in necro-inflammatory and fibrosis scores whilst one showed no change. Of the 10 patients on MMF because of AZA intolerance, steroid dose fell in 9 and were stopped in 5. The mean dose fell from 19 mg, 3 months before MMF, to 9.5 mg and 5 mg at 3 and 12 months respectively. 2 patients had 1 relapse each over 4 years on MMF, these were easily controlled with steroids. The average AST fell from 142 to 39, 3 months before and after MMF. The average AST at 2 years was 29. Of the 3 patients biopsied on MMF after 2 years, 2 showed histological improvement, the third had worsening inflammation.

#### Conclusion:
These data support the use of MMF as a second-line agent for treatment of AIH. In patients who are intolerant of AZA, MMF is well tolerated and is associated with reduced steroid requirements and a low relapse rate. In patients who fail to respond to AZA, MMF had no clear effect on relapse rate but did lower serum transaminases and allow a mean steroid dose to fall in 50% of patients. These results are in keeping with recent studies, although do suggest that patients who fail to respond to AZA may not respond to MMF and are often steroid dependent.


Nutrition posters

417 ACID-BASE PROBLEMS DURING HOME PARENTERAL NUTRITION
P. Chopra, J. Groning, B. J. M. Jones. Gastroenterology, Russells Hall Hospital, West Midlands, UK

Introduction: The home parenteral nutrition (HPN) literature relates to D-lactic acidosis in patients with intestinal failure and large bowel in continuation. Hypokalaemic alkalosis is also recognised. There are few reports of other causes of acid-base disturbance (ABD) in adults. We wish to report our experience of severe hyperchloraemic metabolic acidosis and hypochloraemic metabolic alkalosis during HPN.

Aims & Methods: All 39 HPN patients from 1989–2006 were retrospectively audited for underlying condition, bowel anatomy, use of proton pump inhibitors, renal failure, bicarbonate and chloride levels, D lactate and anion gap Na – (Cl +HCO3).

Results: Five patients had severe ABD and 5 others subclinical ABD. The latter 5 patients were chronically acidotic with high chloride and borderline bicarbonate levels and had normal renal function. In those who had severe ABD, 3 patients had evidence of severe hyperchloraemic acidosis with a normal anion gap excluding lactic acidosis. D-lactic acid levels were normal. Patient 1 (radiation enteritis, colon in line) developed a severe metabolic acidosis with pH 6.87, base excess – 25.7, HCO3 of 4 and pCO2 2.8, lactate 0.7, Cl - 126 and required haemofiltration. Patient 2 (Crohn’s disease, jejunostomy) developed metabolic acidosis with gram negative sepsis, pH 6.91, base excess –22.9, HCO3 5.4, Cl 109, Mg 0.25. Both patients had renal impairment and required intensive care with large amounts of bicarbonate supplementation. Only 4 acidotic patients were not on a proton pump inhibitor. Withdrawal of PPI improved acidosis. Two of our patients, 1 with an ileal conduit and colostomy, developed severe hypochloraemic alkalosis requiring intensive potassium and aggressive nutritional intervention of malnourished patients should be initiated.

Conclusion: Acid-base disturbance is an underreported complication of HPN. Intercurrent sepsis and dehydration, particularly with renal impairment predisposes to overwhelming acidosis to which proton pump inhibitors may contribute. We now routinely measure chloride and bicarbonate in the regular follow-up of our HPN patients.

418 CLINICAL OUTCOMES CAN BE IMPROVED BY INCREASING PATIENT KNOWLEDGE WITH AN INFORMATION BOOKLET
A. Culkin1, S. M. Gabe1, A. Madden2, Lennard-Jones Intestinal Failure Unit, St Mark’s Hospital, Harrow; 2School of Health and Emergency Professions, University of Hertfordshire, Hatfield, UK

Introduction: Chronic intestinal failure (CIF) occurs when the function of most of the small intestine is lost either though extensive resection or as a result of severe chronic conditions such as radiation enteritis. Patients are advised to adhere to appropriate dietary advice to avoid diarrhoea and unmanageable output from a stoma/histula, dehydration and oxalate kidney stones. By manipulating the diet patients can maintain or improve nutritional status thus avoiding or reducing dependency on home parenteral nutrition (HPN) fluids.1 This study aimed to assess the effectiveness of an information booklet on patients’ knowledge of the CIF regimen and clinical outcomes.

Aims & Methods: Outpatients completed a 3-day food and gastrointestinal output diary plus a questionnaire to assess their knowledge of the CIF regime. Height, weight, body mass index (BMI), triceps skinfold thickness and mid-arm muscle circumference were measured. The ED-5Q was used to assess quality of life which generates an index and a visual analogue scale (VAS). The volume and content of HPN was recorded. Patients were provided with the booklet and given individually tailored advice by a dietician and reassessed at their next appointment. Paired t tests were used to compare data.

Results: Forty eight patients completed (31 female, 17 male, mean age 56.1 (13.4) years). 25 had Crohn’s, 12 mesenteric infarct, 3 radiation enteritis, 5 surgical resections and 3 others. 33 received HPN, 4 intravenous fluids, 2 subcutaneous fluids and 4 oral nutritional supplements. There was a significant improvement in patients’ knowledge, oral energy and fat intake, BMI and a reduction in parental energy, volume and frequency. There was no increase in gastrointestinal output resulting from an increase in oral intake. In HPN patients there was an improvement in ED-5D index (p = 0.007) and VAS (p = 0.001).

Conclusion: The study shows positive effects of education in stable CIF patients resulting in clinical benefits including the reduction of HPN.

C. Somesundum, Z. Andreou, C. A. Sabin, K. Besherdas, N. Van Somerun, H. Rajakumaraswamy, J. Jocc, R. D. Souza. Department of Gastroenterology, Chase Farm Hospital, Enfield, UK

Introduction: Assessment of nutritional status should be integrated into clinical practice. We assess several biochemical and diagnostic tests for assessment of nutritional status. Malnutrition is frequently observed in hospitals and is often under-diagnosed. It is associated with a higher morbidity and economic burden.

Aims & Methods: In this study we assessed the nutrition of 200 patients (114 F: 86M) on emergency admission to hospital—72% were above the age of 65. Biochemical markers together with mid-upper arm circumference (MUAC), triceps skinfold thickness and BMI measurements were performed in all patients. Investigators had performed more than 200 measurements using the Herbendens callipers for triceps skinfold thickness before starting the study. Malnutrition universal screening test developed by BAPEN and quality of life data using the SF36 was also performed on admission.

Results: Biochemical markers were not good indicators of malnutrition until patients were severely malnourished. Triceps skinfold thickness, BMI (using hoist in immobile patients) and MUAC were available for all 200 patients. Data on MUST and SF36 were available for 95% of patients. 66% of patients were malnourished. Poor quality of life data assessed by the SF36 questionnaire, age (>75), comorbidity, a diagnosis of cancer, length of stay and patients unable to feed themselves independently were associated with severe malnutrition (p<0.01). BMI seemed to underestimate the presence of malnutrition and measurement of height and weight were difficult to measure in elderly immobile patients due to the need of a hoist and intensive nursing care. There was a close relation between BMI and MUAC. Triceps skinfold thickness and MUST were more sensitive markers of malnutrition and predicted quality of life and length of stay.

Conclusion: Malnutrition is prevalent in hospitalised medical and surgical patients. Nutritional assessment should be part of routine clinical practice and aggressive nutritional intervention of malnourished patients should be initiated.

Abstract 418

<table>
<thead>
<tr>
<th>Variable</th>
<th>Before (mean [SD])</th>
<th>After (mean [SD])</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge score</td>
<td>64.5 (27%)</td>
<td>80.7 (14.8%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Oral energy</td>
<td>2130 (895) kcal</td>
<td>2342 (983) kcal</td>
<td>0.04</td>
</tr>
<tr>
<td>Oral fat</td>
<td>93 (42) g</td>
<td>110 (52) g</td>
<td>0.003</td>
</tr>
<tr>
<td>BMI</td>
<td>22.3 (2.9)</td>
<td>22.8 (2.6)</td>
<td>0.02</td>
</tr>
<tr>
<td>Parenteral energy</td>
<td>881 (521) kcal</td>
<td>802 (546) kcal</td>
<td>0.02</td>
</tr>
<tr>
<td>Parenteral volume</td>
<td>2311 (880) ml</td>
<td>2198 (950) ml</td>
<td>0.02</td>
</tr>
<tr>
<td>Parenteral frequency</td>
<td>6.3 (1.3) days</td>
<td>5.9 (1.3) days</td>
<td>0.003</td>
</tr>
</tbody>
</table>
**420** THE NASAL BRIDLE — ITS PLACE WITHIN AN INTEGRATED NUTRITION SERVICE: A PROSPECTIVE AUDIT OF ONE YEAR’S DATA

E. Donaldson, T. Earley, P. L. Shields. Department of Gastroenterology, Royal Preston Hospital, Preston, UK

**Introduction:** The use of a nasal bridle to secure a nasogastric feeding tube was first described in 1980 and has subsequently been demonstrated to be safe and effective. The device was introduced as an integral part of the nutrition service on 1 August 2005 and this abstract presents one year of prospective data. We also compared our 30-day mortality data for PEG insertion after the introduction of nasal bridles to three previous audits.

**Aims & Methods:** Patient demographic data, indication for nutritional support, duration of feeding with a bridled NG tube and outcome was prospectively collected. We also collected prospective data on PEG placement including indication and 30-day mortality.

**Results:** Between 1 August 2005 and 31 August 2006 96 patients had a nasogastric tube secured with a nasal bridle. Indications included: CVA (34%), dementia (14%), sepsis (5%), post-op support (9%) and alcoholic liver disease (6%). Patients have had tubes secured for between 1 and 292 days (median time 16 days). 19% patients were discharged with the device in situ, 4% went on to have a PEG inserted when fit for the procedure and 30% died with secure NG tube feeding in place. The percentage of prescribed nosetubes given prior to the NG tube averaged 20%. This increased to 98% post bridle insertion. Since the use of nasal bridles, 30 day mortality for PEG insertion has decreased from 16% to 6%.

**Conclusion:** Nasal bridles are a safe and effective method of securing a nasogastric tube and can be maintained in both hospital and community settings. They provide an alternative to PEG feeding especially in patients with acute CVA. Patients can be guaranteed nutritional support whilst allowing a period for assessment, stabilisation and recovery prior to further intervention. An effective form of non-oral nutritional support allows PEG tubes to be placed in appropriate, stable patients with an associated reduction in 30 day mortality. The devices also assist the delivery of reliable enteral nutritional support in patients in whom PEG is not indicated (sepsis, postoperative, etc) and we are now able to support an increased number of malnourished patients appropriately.

**421** PEXACT DIRECT-PUNCTURE PEG PLACEMENT: OUR FIRST 12 MONTHS’ EXPERIENCE

H. Gupta1, R. Manikandan1, A. Byrne2, R. Nicholson1, P. A. O’Toole1. 1Gastroenterology Department, 2Audit Department, University Hospital Aintree, Liverpool, UK

**Introduction:** Endoscopic gastrostomy placement is usually performed using a “pull-through” technique. In patients with oro-pharyngeal carcinoma, pulling the PEG bumper past the tumour may risk seeding of the PEG site infections was noted, particularly in those already colonised prior to insertion.

**Aims & Methods:** A prospective study of 50 patients referred for PEG placement was carried out to assess prevalence of MRSA in patients referred for PEG tube placement; incidence and potential route of MRSA colonisation at PEG sites post procedure; relation of clinical evidence of infection to presence of MRSA; relation of gastrostomy site infections was noted, particularly in those already colonised prior to insertion.

**Results:** 30/50 (60%) patients were male. Median age 74 years (range 23–94 years). 46 (92%) had an MRSA screen sent prior to PEG insertion. 15 (32%) were MRSA positive in one or more sites prior to insertion. Information was available for 34 patients at 24 h and 31 patients at 7 days. 8/34 (24%) patients had MRSA identified in the PEG site within 24 h of which had also been positive at initial screening. 9/31 (29%) patients had MRSA identified in the PEG site within 7 days, 4 of which had also been positive on initial screening. 4/34 (12%) patients had PEG site infection at 24 h, 3 of which were colonised with MRSA (p<0.05). 3/4 (75%) of these reported moderate or severe pain, compared with 4/30 (13%) of those with no infection, 12/30 (40%) of patients had a PEG site infection at 7 days, 5 of which were colonised with MRSA. 6 (50%) of these reported moderate or severe pain compared with 0 with no infection (p<0.005).

**Conclusion:** Patients colonised with MRSA are likely to develop MRSA within their PEG site. Although the numbers are small, it is interesting that 3/10 patients who developed MRSA within their PEG site at 24 h only had positive swabs from their nose or sputum at the initial screening, thus raising the possibility that initial spread may occur via the gastroscope. This study has not been able to demonstrate that MRSA alone is responsible for PEG site infections, raising the possibility of other potential pathogens being transmitted via the PEG from the oropharynx. However, it should also be noted that 6/15 patients with evidence of MRSA within 7 days had not been previously positive, a serious concern relating to infection control.
### 423 VITAMIN D LEVELS IN PATIENTS PRESENTING TO A GASTROENTEROLOGY CLINIC

B. Høeørd1, A. Ali1, M. Shrivastava1, P. Basumani1, P. Willemsen1, R. Ellis2, K. Bardhan3. 1Gastroenterology, 2Biochemistry, Rotherham General Hospital, Rotherham, UK

**Introduction:** Vitamin D deficiency is associated with non-specific symptoms, carries long-term risk to bone health, and certain groups are at higher risk (alcohol excess, old age, Asians). The prevalence among patients attending gastroenterology clinics is unclear; this prompted our pilot study.

**Aims & Methods:** Patients (n = 150); n = 29 randomly chosen: alcoholic liver disease (ALD) (23), inflammatory bowel disease (IBD) (33), irritable bowel syndrome (IBS) (32), other liver disease (13), other diagnosis (20); n = 29 with exocrine pancreatic insufficiency (EPI). Use of OTC supplements was checked and those on vitamin preparations excluded. Measurements: Vitamin D [1,25-(OH)2 Vitamin D3], calcium profile, magnesium, ferritin, B12, folate. Demography: 75 females; 10 Asian. Median age 54 (18–86) years. 75 patients were female, 10 Asian, median age 54.34 years (17.88 to 85.72 years).

**Results:** (1) Only 40% had normal levels. (2) Severe deficiency was most frequent in ALD (48%), EPI (38%), other liver disease (31%) and IBD (18%) (26% overall). Mild–moderate deficiency occurred in similar frequency ALD (26%), EPI (35%), other liver disease (46%) and IBD (42%) but in IBOIS (46%). (3) Severe/moderate deficiency occurred significantly more often in males (p = 0.0266), Asians (p = 0.0358) but was unrelated to age (p = 0.6047) [Fisher’s exact test]. (4) 12%, 14% & 14% of 121 tested were females (p = 0.0266), Asians (p = 0.0358) but was unrelated to age (p = 0.6047) [Fisher’s exact test]. (5) No patient had toxic vitamin D levels.

**Conclusion:** (1) Vitamin D deficiency is common in patients attending gastroenterology clinics, is almost always subclinical and its long-term significance is unknown. (2) Increasing awareness has allowed us to recognise the condition more often.

### 424 REFERRAL FOR INTESTINAL TRANSPLANTATION: AN AUDIT OF INTESTINAL FAILURE PATIENTS

D. Lloyd1, A. Zabron1, S. Ralphs1, J. Woodward2, N. Jamieson3, S. Middleton2, S. Gabe1, 1Lennard-Jones Intestinal Failure Unit, St Mark’s Hospital, Harrow; 2Department of Gastroenterology, 3Department of Transplant Surgery, Addenbrooke’s Hospital, Cambridge, UK

**Introduction:** Survival after intestinal transplantation is improving. It is considered an alternative to home parenteral nutrition (HPN) in patients with intestinal failure (IF) who have complications associated with HPN. US guidelines for referral for intestinal transplantation have been published.

**Aims & Methods:** The aims of this study were to review numbers of HPN patients at a single UK tertiary referral centre eligible for consideration of intestinal transplantation, to assess the proportion of eligible patients who had been referred, and to compare details with patients who had undergone intestinal transplantation. Case records of patients receiving HPN on 31/12/2005 were reviewed. Patients were considered eligible for referral if they fulfilled 1 or more of the following criteria: advanced PN-associated liver disease (PNALD); thrombosis of 2 or more major veins; frequent CVC related sepsis; frequent severe dehydration; patient request. Case records of patients with intestinal failure who had undergone intestinal transplantation at a single UK transplant centre were reviewed.

**Results:** Records of 123 patients receiving HPN were reviewed (median age 51 years (range 19–80)); 33 patients (27%) fulfilled 1 or more criteria for referral (median age 47 years (range 24–76)). Of these only 7 (21%) had been referred (median age 39 (range 24–50)). Number of patients fulfilling each criterion and % referred was: advanced PNALD 2 (100%); multiple venous thrombosis 16 (19%); CVC sepsis 16 (12%); frequent dehydration 1 (100%); patient request 1 (100%). Of those not referred, referral was precluded by perceived comorbidity in 23% and psychosocial/compliance issues in 19%; alternate management strategies were employed in 23% and referral was not considered warranted in 31%. Other reasons were recorded in 4%. Records of 4 patients who had undergone intestinal transplantation were available for review (median age 30 (range 22–44)). Indications for transplantation were: multiple venous thrombosis and frequent CVC sepsis; advanced PNALD and recurrent CVC sepsis; frequent CVC sepsis; advanced desmoid disease.

**Conclusion:** Over a quarter of HPN patients fulfill criteria for consideration of intestinal transplantation. At present adult patients are only referred once complications are life threatening. Patients with CVC sepsis are rarely considered for transplantation. Similarly, patients with venous thromboses are only referred once access is very limited. Earlier referral may improve transplantation outcomes in this group but this must be balanced against favourable survival in patients receiving HPN. Close liaison with transplant centres is essential to ensure appropriate and optimally timed referral.

### Abstract 423 Vitamin D levels (number of patients + deficiency category)

<table>
<thead>
<tr>
<th>Condition</th>
<th>n</th>
<th>Median Vit D level (nmol/l)</th>
<th>Severe &lt; 25</th>
<th>Mild–moderate 25–50</th>
<th>Sufficient &gt; 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>150</td>
<td>41</td>
<td>39</td>
<td>51</td>
<td>60</td>
</tr>
<tr>
<td>ALD</td>
<td>23</td>
<td>25</td>
<td>11</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Liver other</td>
<td>13</td>
<td>30</td>
<td>4</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>IBS</td>
<td>32</td>
<td>58</td>
<td>4</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>BD</td>
<td>33</td>
<td>43</td>
<td>6</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Other</td>
<td>20</td>
<td>63</td>
<td>3</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>EPI</td>
<td>29</td>
<td>33</td>
<td>11</td>
<td>10</td>
<td>8</td>
</tr>
</tbody>
</table>

Vitamin D level by disease groups.
**426**

**A ONE-YEAR RETROSPECTIVE AUDIT OF NASO-JEJUNAL TUBE PLACEMENT COMPARING ENDOSCOPICALLY-PLACED VERSUS RADIOLOGICALLY-PLACED TUBES: DO THOSE PLACED WITH IMAGING AT THE TIME OF INSERTION LAST LONGER?**

M. McCarthy1, A. Ansari1, A. De Jabrun2, M. Small1, R. Salter3, T. Sabharwal2, J. Sanderson1.

**Gastroenterology, Guy’s and St Thomas’ NHS Foundation Trust, London, UK**

**Introduction:** Naso-jejunal (NJ) tubes are currently being placed at our unit for patients requiring post-pyloric feeding. Tubes are placed either using an endoscopic technique with a follow-up abdominal x-ray (AXR) prior to feeding versus radiological insertion using imaging to guide the tube into the jejunum.

**Aims & Methods:** We aimed to assess the safety and efficacy of our practice in NJ tube placement and to see if radiologically inserted tubes last longer.

**Results:** Over a 12-month period there were 75 NJ tubes placed, endoscopically (E), n = 45, and radiologically (R), n = 30. In the E group (27 M, 18 F), in the R group (13 M, 17 F). In the E group, mean age was 64 years, in R group, mean age was 65 years. In the E group, most patients were from intensive care (ITU, 80%) with majority of R group from wards (73%). Main indications in each group were: E group, acute pancreatitis, n = 20; gastroperesis, n = 16; compared to R group, failed nasogastric feeding with persistent vomiting, n = 8; gastric outlet obstruction, n = 5. The position of the tip of the NJ tube was judged at either AXR in E group or at time of imaging in R group. In E group, the tip was found to be in the jejunum in 40% and 2nd or 3rd part of duodenum in 60%, in R group tip was in jejunum in 100%. The mean duration of each tube was E group n = 5.2 days and in R group n = 6.5 days. 21/45 (47%) in E group lasted <3 days with 10/30 (33%) in R group lasting <3 days. Minor complications were found in both groups and included E group overall 80%, dislodgement, n = 19; blockage, n = 11; and GI dysfunction, n = 6 and in R group overall 70%, dislodgement, n = 17; blockage, n = 4; and GI dysfunction, n = 6. In E group, 53% required more than one NJ tube to be placed for feeding whereas in R group only 23% required more than one tube. Of those who failed NJ feeding and required parenteral nutrition (PN), E group n = 26% and R group n = 13%. The number of patients who regained oral intake at end of feeding was 67% in E group versus 87% in R group. Overall mortality whilst in hospital was 35% in E group versus 13% in R group.

**Conclusion:** Radiologically-inserted NJ tubes are more effective at getting into the jejunum (100% vs 40%) but do not appear to last significantly longer than endoscopically placed tubes 6.5 days vs 5.2 days. There is a trend towards less complications in radiological tubes and less need for multiple tubes being placed. Our unit is going to assess the effect of using radiological screening at the time of endoscopic placement to see if we can improve the duration of these tubes. We will also improve our current technique to secure tubes, improve flushing techniques to prevent blockage and improve education of staff in care of these tubes.

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**427**

**PEG ASSESSMENT TEAM IMPROVES CONTINUITY OF CARE FOR PATIENTS REQUIRING ENTERAL NUTRITION IN A DISTRICT GENERAL HOSPITAL**

K. McKeown, V. E. Saye, A. F. Muller. Department of Gastroenterology, Kent and Canterbury Hospital, Canterbury, UK

**Introduction:** Percutaneous endoscopic gastrostomy (PEG) has been the procedure of choice for patients requiring long-term enteral nutritional support for over 25 years. However the 2004 National Confidential Enquiry into Patient Outcome and Death (NCEPOD) “Scoping our practice” identified concerns regarding the appropriateness of referrals and highlighted a 6% 30-day mortality associated with PEG placement. In response to NCEPOD, a PEG assessment team was formed in 2005 comprising a consultant gastroenterologist, specialist nurse, nutrition team dietician and the speech and language therapy team.

**Aims & Methods:** A comparison was made of patients referred for PEG in the 14 month period before and after the introduction of the PEG team. The results were compared for indications, appropriateness and outcome as well as satisfaction of patients, relatives and ward staff.

**Results:** See table. There was no significant difference between the groups as regard to age, sex and indications. Pre-PEG team 41 patients; age range 17–90; mean 64 years; male, 22; female, 19. Post-PEG team 70 patients; age range 27–90; mean 65.8 years; male, 38; female, 32 (paired t test NS). The introduction of the PEG team has led to very positive feedback from patients, relatives and ward staff. Referrals have increased but the proportion of procedures has decreased due to more patients being deemed inappropriate (adequate nutritional intake, unfit for procedure, etc) More patients were referred directly for RIG insertion (usually patients with previous abdominal surgery).

**Conclusion:** The introduction of a dedicated PEG team has improved the assessment of patients, improved identification of those deemed inappropriate for PEG and has resulted in a reduction in PEG-associated mortality. The PEG team now arranges appropriate nutritional support for all referrals (including RIGs). We recommend the formation of similar PEG teams in every hospital.

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**428**

**EXPERIENCE FROM THE NUTRITIONAL SUPPORT TEAM AT BELFAST CITY HOSPITAL**

G. P. Rafferty1, S. Lowry2, K. Robinson3, D. Kean4, C. Loughrey5.

**Gastroenterology, Nutrition, Dietetics, Pharmacy, Clinical Pathology, Belfast City Hospital, Belfast, UK**

**Introduction:** The Belfast City Hospital (BCH) nutrition team started in June 2001. Its members consist of a consultant chemical pathologist, clinical pharmacist, dietician, and a nutrition nurse. Since its emergence the team has involved in managing parenteral nutrition (PN) in 497 patients.

**Aims & Methods:** Retrospective information was obtained from records of 497 patients. Data included numbers of patients per year, department usage, duration, and central venous catheter (CVC) infection rates.

**Results:** Statistics are available from May 2001 to June 2006 (table 1). In this period 497 patients received PN. The initial year had results for 7 months therefore modified figures were calculated to estimate 12 month results. This is also relevant to 2006 in which only 6 month results were available. Modified results were also calculated for this final year (table 2).

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**Abstract 427**

<table>
<thead>
<tr>
<th></th>
<th>Pre-team</th>
<th>Post-team</th>
</tr>
</thead>
<tbody>
<tr>
<td>Referrals</td>
<td>41</td>
<td>70</td>
</tr>
<tr>
<td>PEGs placed</td>
<td>27 (46%)</td>
<td>36 (51%)</td>
</tr>
<tr>
<td>30-day mortality post PEG</td>
<td>3 (11%)</td>
<td>1 (2.8%)</td>
</tr>
<tr>
<td>PEGs declined</td>
<td>14 (34%)</td>
<td>34 (39%)</td>
</tr>
<tr>
<td>Untilted*</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Refer for RIG/surgery</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Adequate nutrition</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Declined by patient†</td>
<td>0</td>
<td>5</td>
</tr>
</tbody>
</table>

*Full: severe end stage dementia or poor prognosis. RIG: radiologically inserted gastrostomy. **Declined by patients after full discussion with the PEG team.

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**Table 1 Frequency of usage of parenteral nutrition**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>HDU/CU</td>
<td>22</td>
<td>40</td>
<td>41</td>
<td>30</td>
<td>35</td>
</tr>
<tr>
<td>Haematology</td>
<td>14</td>
<td>13</td>
<td>12</td>
<td>23</td>
<td>8</td>
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<tr>
<td>Renal</td>
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<td>1</td>
<td>1</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Surgical</td>
<td>23</td>
<td>40</td>
<td>40</td>
<td>46</td>
<td>23</td>
</tr>
<tr>
<td>Medicine</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Oncology</td>
<td>2</td>
<td>9</td>
<td>8</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>63</td>
<td>108</td>
<td>104</td>
<td>113</td>
<td>77</td>
</tr>
</tbody>
</table>

www.gutjnl.com
The modified results show a decrease in the usage of PN over this 6-year period (chart 1). The departmental results also show a decline in the usage of PN in the intensive care unit (ICU) and the haematology department (chart 2). The percentage of patients receiving PN for duration greater than 5 days has remained consistent except for the final year of analysis in which it increased to 71% (table 3). CVC infection rates were accurately recorded over a 12-month period from September 2005 to August 2006 (table 4). 79 patients received PN during this period. 37% of these patients had positive organism growth on CVC tips. However only 11% of the total patients appeared to be symptomatic, that is pyrexia, positive peripheral blood culture, positive central blood culture and positive organism growth on CVC tip.

Conclusion: The role of the BCH nutrition team cannot be underestimated given the large numbers of patients receiving PN. Overall these data suggest that patient selection is improving as fewer patients are receiving PN and if they do receive PN it is for a longer duration. The CVC sepsis rates are below other institutes figures.

### Abstract 428 Table 2 Frequency of usage of parenteral nutrition (modified)

<table>
<thead>
<tr>
<th>Year</th>
<th>HDU/ICU</th>
<th>Haematology</th>
<th>Renal</th>
<th>Surgical</th>
<th>Medicine</th>
<th>Oncology</th>
<th>Total</th>
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</thead>
<tbody>
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<td>24</td>
<td>2</td>
<td>39</td>
<td>2</td>
<td>3</td>
<td>107</td>
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<tr>
<td>2002</td>
<td>40</td>
<td>13</td>
<td>4</td>
<td>40</td>
<td>2</td>
<td>9</td>
<td>108</td>
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<tr>
<td>2003</td>
<td>41</td>
<td>12</td>
<td>2</td>
<td>46</td>
<td>1</td>
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<tr>
<td>2004</td>
<td>30</td>
<td>23</td>
<td>4</td>
<td>23</td>
<td>2</td>
<td>6</td>
<td>113</td>
</tr>
<tr>
<td>2005</td>
<td>35</td>
<td>8</td>
<td>2</td>
<td>23</td>
<td>3</td>
<td>5</td>
<td>77</td>
</tr>
<tr>
<td>2006</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>46</td>
<td>3</td>
<td>12</td>
<td>77</td>
</tr>
<tr>
<td>Total</td>
<td>586</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### Abstract 428 Table 3 Percentage of patients receiving parenteral nutrition >5 days

<table>
<thead>
<tr>
<th>Year</th>
<th>% pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>56</td>
</tr>
<tr>
<td>2002</td>
<td>59</td>
</tr>
<tr>
<td>2003</td>
<td>59</td>
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<td>2004</td>
<td>58</td>
</tr>
<tr>
<td>2005</td>
<td>52</td>
</tr>
<tr>
<td>2006</td>
<td>71</td>
</tr>
</tbody>
</table>

### Abstract 428 Table 4 Frequency of CVC sepsis between September 2005–August 2006

<table>
<thead>
<tr>
<th>Number</th>
<th>% pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>79</td>
</tr>
<tr>
<td>Positive tip</td>
<td>29</td>
</tr>
<tr>
<td>Positive tip and BC</td>
<td>9</td>
</tr>
</tbody>
</table>

The modified results show a decrease in the usage of PN over this 6-year period (chart 1). The departmental results also show a decline in the usage of PN in the intensive care unit (ICU) and the haematology department (chart 2). The percentage of patients receiving PN for duration greater than 5 days has remained consistent except for the final year of analysis in which it increased to 71% (table 3). CVC infection rates were accurately recorded over a 12-month period from September 2005 to August 2006 (table 4). 79 patients received PN during this period. 37% of these patients had positive organism growth on CVC tips. However only 11% of the total patients appeared to be symptomatic, that is pyrexia, positive peripheral blood culture, positive central blood culture and positive organism growth on CVC tip.

Conclusion: The role of the BCH nutrition team cannot be underestimated given the large numbers of patients receiving PN. Overall these data suggest that patient selection is improving as fewer patients are receiving PN and if they do receive PN it is for a longer duration. The CVC sepsis rates are below other institutes figures.

### Abstract 429 GASTROSTOMIES IN PATIENTS WITH DEMENTIA: KILL OR CURE?

J. Tharakan, S. Kaushik. Medicine, Princess Alexandra Hospital, Harlow, UK

Introduction: Feeding gastrostomies (also abbreviated as PEG) is an established method of maintaining long term enteral nutrition in patients with swallowing difficulties arising mainly from strokes or cognitive impairment. Not many studies have been done to look at the short and particularly the long-term outlook of these patients with dementia after PEG insertion.

Aims & Methods: To review outcomes of patients with dementia who had a PEG inserted in a 600 bed district general hospital. METHODS: Records of such patients who had a PEG inserted between July 2000 and June 2003 were reviewed for 7 day, 1 month and 1 year mortality at our hospital. Nursing homes and carers were contacted to provide details where case notes could not be found.

Results: Sixty nine patients (48 males, 21 females) had a PEG inserted. The causes of the dementia were senile or vascular in aetiology. There were no procedure related deaths. Minor complications included wound related infection (2 patients), tube leak (1 patient) and tube dislodgement (1 patient) which were corrected. Nine patients died by day 7 (13%), a total of 20 were dead by 1 month (29%), 31 had succumbed by 3 months (45%) and 8 patients were alive at one year giving a 12 month mortality of 89%. All the deaths could be attributed to progression of the dementia and/or aspiration pneumonias and subsequent worsening of their condition. On a positive note, 3 of the 8 patients who were alive at 12 months had their PEG tube removed as their swallowing had returned.

Conclusion: Early and particularly late mortality are high as shown from this study. PEG tubes do not appear to improve mortality or quality of life in patients with dementia. Less invasive methods of feeding (nasogastric, thickened oral feeds or subcutaneous fluids) should be considered instead.

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for these patients. Importantly, valuable endoscopy slots, resources and time could be used for more productive causes.

**Small bowel posters**

**430** SPECIALIST FOLLOW-UP FOR PEOPLE WITH COELIAC DISEASE: A QUESTIONNAIRE STUDY

E. K. Bridcut. Nutrition and Dietetics, Wirral Hospital NHS Trust, Wirral, UK

**Introduction:** Regular follow-up is recommended for all patients with coeliac disease. Studies have found regular follow-up is associated with better adherence to gluten free diet. A significant proportion of patients fail to attend their appointments. A dedicated coeliac clinic where a specialist doctor and dietitian would be available was selected as a useful service by over 70% of attenders and non-attenders.

**Aims & Methods:** This study aimed to explore why people do or do not attend clinic appointments and how this links with dietary adherence. Findings from a previous qualitative study were used to inform the design of a questionnaire which was sent by post to 304 patients diagnosed with coeliac disease. The questionnaire was piloted face to face with patients with coeliac disease in the waiting area of a gastroenterology clinic. The questionnaire was sent to two occasions to improve response rate. Questionnaires were sent to attenders and non-attenders on different coloured paper. Non-attenders were defined as those who had not attended a follow-up appointment during the preceding year and/or had failed to attend an appointment on 5 or more occasions.

**Results:** 185 responses were received from attenders (78%) and 29 from non-attenders (43%). 52% of attenders compared with 17% of non-attenders reported they got all the information they needed about coeliac disease at their appointments. 62% of attenders and 24% of non-attenders reported they got all the practical help and advice about living with a gluten-free diet they needed. A dedicated coeliac clinic where a specialist doctor and dietitian may be available is selected as a useful service by over 70% of attenders and non-attenders.

**Conclusion:** This study represents an attempt to study the needs of people with coeliac disease who fail to attend follow-up. The results are limited by small sample size but suggest that some non-attenders may not be having their needs for information and practical advice met in a way that enables them to adhere to gluten free diet. Further research is required to find how these needs can best be met to facilitate dietary adherence. A dedicated coeliac clinic is an approach to follow up which is preferred by many patients.


**431** ADAPTING TO LIFE WITHOUT GLUTEN

E. K. Bridcut. Nutrition and Dietetics, Wirral Hospital NHS Trust, Wirral, UK

**Introduction:** The only treatment for coeliac disease is a gluten free diet. Strict adherence to a gluten-free diet is difficult to maintain and has been associated with reduced quality of life. This study explored how people with coeliac disease manage, or fail to manage, a gluten-free diet and the role played by health professionals in this.

**Aims & Methods:** The aim of the study was to understand in greater depth how people with coeliac disease manage a gluten-free diet and how health professionals can improve dietary adherence. This was a qualitative study using grounded theory. Data collection and analysis were carried out concurrently. Initial analysis informed further data collection in an iterative fashion until an adequate degree of saturation was reached. Data comprised transcripts of semistructured interviews carried out on respondants' homes.

**Results:** Factors which helped or hindered adoption of a strict gluten-free diet were identified. These included experience of symptoms, beliefs about complications, social support, practical skills, information and attitude to gluten free diet. A key strategy employed in adapting to life without gluten was normalisation. In the context of coeliac disease normalisation means minimising the social consequences of gluten free diet in order to lead a normal life.

**Conclusion:** This study suggests that the goal of adaptation to a gluten-free diet in our patient population is the reconstruction of normal life, gluten-free. This echoes the findings of another recent qualitative study. The factors identified as promoting successful adaptation could be used to plan interventions by health professionals aimed at improving dietary adherence.


**432** RESPONSE OF REDUCED BONE MINERAL DENSITY IN COELIAC DISEASE TO TREATMENT

D. Comer, W. Dickey. Department of Gastroenterology, Altnagelvin Hospital, Londonderry, UK

**Introduction:** Current BSG guidelines recommend DEXA scanning for all newly diagnosed patients with coeliac disease (CD), though the need for this has been questioned. It is not clear how best to manage reduced bone mineral density (BMD) in CD.

**Aims & Methods:** Our approach has been to treat osteopenia (T score -2.5 SD) by adequate calcium/vitamin D supplementation within a gluten free (GF) diet, adding weekly bisphosphonate (alendronate or risedronate) if osteoporosis (T score -2.5 SD) is present. We report the effect of this approach on BMD as assessed by follow-up (2 year) DEXA scan. We studied 158 patients with biopsy-proven villous atrophy and lymphocytosis (CD). BMD was recorded by DEXA at the L2-4 lumbar spine (LS) and neck of femur (NOF) at diagnosis (t0) and repeated after two years (t2) if osteopenia or osteoporosis was present.

**Results:** At diagnosis, 70 patients (44%) had normal BMD, 56 (35%) osteopenia at either site, and 32 (21%) osteoporosis. After two years’ treatment (t2), there was significant improvement in BMD in patients with osteopenia and osteoporosis at both sites (p<0.002 for all). No patient with osteopenia developed osteoporosis.

**Conclusion:** GF diet with adequate calcium/vitamin D, plus bisphosphonate for osteoporosis, results in significant improvement in BMD. Follow-up DEXA does not appear to be needed. As only one fifth of CD patients have osteoporosis at diagnosis, risk factors should be identified to allow patient selection for initial DEXA.

**433 IDENTIFICATION OF PATIENTS WITH IDIOPATHIC BILE ACID MALABSORPTION PRESENTING WITH CHRONIC DIARRHEA**

Department of Gastroenterology, County Hospital, Hereford, UK

**Introduction:** Bile acid malabsorption (BAM) is an important cause of chronic diarrhea and is present in many patients without evidence of ileal disease. Previous studies have been unable to distinguish patients with BAM based on their clinical presentation and investigations other than 75SeHCAT retention.

**Aims & Methods:** The aim of our study was to examine demographic, clinical and pathological variables in a cohort of patients with chronic diarrhea who underwent 75SeHCAT scanning, in order to diagnose BAM at an earlier stage obviating unnecessary investigations. Sixty-three patients underwent a 75SeHCAT test between January 2002 and September 2006. They were divided based on their 7 day 75SeHCAT retention; 40 patients were positive (<15% retention) and 23 were negative (>15%). A diagnosis of primary BAM was considered when bile acid retention was <15% after exclusion of secondary causes (Group A). This group was compared with cases with a diagnosis of functional diarrhea and normal 75SeHCAT retention (Group B). The two groups were similarly investigated with blood tests, stool culture and endoscopy to exclude other causes of diarrhea.

**Results:** Of the 40/63 cases with 75SeHCAT result <15%, 18 had secondary BAM (9 terminal ileal resection, 3 cholecystectomy, 2 small bowel resection, 2 collagenous colitis, 1 post-infective enteritis and 1 prior radiotherapy). The remaining 22 patients were defined as having idiopathic BAM-Group A (median 75SeHCAT retention 9%). Of the 23/63 cases with a negative result, 3 patients had other causes of diarrhea (2 Crohn’s disease, 1 bacterial overgrowth) and the remaining 20 patients were diagnosed with functional diarrhoea. Group B (median 75SeHCAT retention 18.9%). The female to male ratio in groups A and B was similar (2.5:1 v 2.3:1). Primary BAM patients presented at a later age (60 ± 44 years, p < 0.05) and had a longer duration of diarrhea at presentation (24 ± 15 months, p < 0.05). No significant difference was noted in bowel frequency, stool type, weight change, white cell count, platelet count and C-reactive protein between the two groups.

**Conclusion:** Our study indicates that patients with primary BAM were older and had diarrhea for longer duration than patients with functional diarrhea. Biochemical and haematological results could not distinguish between these groups. Our study demonstrates higher detection rate of primary BAM (22/63, 34.9%) by 75SeHCAT scanning as compared to a previous study (6%). This may be attributed to differences in patient selection and preliminary workup prior to 75SeHCAT scanning.


**434 NUTRIENT SUPPLEMENTS PREVENT DOWNREGULATION OF INTESTINAL DEFENSIN EXPRESSION DURING DIARRHOEA DISEASE**

P. Kelly1, M. Khanam1, S. Shawa1, I. Zuli2, A. Tomkins3, C. Bevins4, W. Dhaliiwal1.
1. Gastroenterology, Barts and the London School of Medicine, London, UK; 2. Tropical Gastroenterology and Nutrition, University of Zambia School of Medicine, Lusaka, Zambia; 3. Centre for International Child Health, Institute of Child Health, London, UK; 4. Medical Microbiology and Immunology, University of California, Davis, USA

**Introduction:** We have previously demonstrated that alpha-defensin expression in small intestine is reduced in a tropical population compared to a European population. This counterintuitive difference between two populations could be due to genetic or environmental factors. Intestinal infection is common in urban Africa, and other groups have shown that intestinal pathogens can downregulate defensin expression.

**Aims & Methods:** We studied expression of HD5 and HD6 during and one month after episodes of diarrhoea, in Zambian adults participating in a randomised controlled trial of a micronutrient supplement. In this trial, 500 adults were randomised to a multiple micronutrient supplement or placebo and followed up for 3.5 years. HD5 and HD6 mRNA were measured by real time quantitative RT-PCR in 53 pairs of biopsies obtained by endoscopy during and after diarrhoea.

**Results:** The full results are not yet known as the randomisation code will not be broken until December 2006, but interim analysis is available. In placebo recipients, HD5 mRNA was lower by 0.87 transcripts/microgram total RNA during diarrhoea, but in micronutrient recipients this reduction was abolished (p = 0.02). Full results after breaking the code will be available by February 2007, and these data will also include analysis of asymptomatic infections.

**Conclusion:** These preliminary data suggest that diarrhoea-causing pathogens cause a downregulation of intestinal alpha-defensin expression, which may partly explain the lower defensin expression referred to above. The data also suggest that a multiple micronutrient intervention can protect against this effect.


**435 THE CHANGING PRESENTATION OF COELIAC DISEASE IN THE NORTH EAST OF ENGLAND: AN EPIDEMIOLOGICAL ANALYSIS OF FOUR YEARS**

V. Verma1, C. Blockham2, A. Dhar1.
1. Gastroenterology, 2.Pathology, Bishop Auckland General Hospital, County Durham and Darlington NHS trust, Bishop Auckland, UK

**Introduction:** The clinical presentation of coeliac disease (CD) is reported to be changing with an increase in extraintestinal and atypical presentations in comparison to the traditional malabsorptive presentation. (NIH Consensus Meeting 2004, USA). The data on this phenomenon from the UK are limited, although larger centres have reported on this phenomenon.

**Aims & Methods:** (1) To determine whether the clinical epidemiology of CD has changed in a closed population of the North East of England. (2) To study the positivity of anti-endomysial antibody (EmA) in these “atypical” presentations of CD compared to the “classical” presentation. A retrospective case notes review of all cases coded histologically as coeliac disease or subtotal/total villous atrophy over a 4-year period from January 2001–December 2004 in the South of Durham (population equivalent 200 000) was carried out. The clinical symptoms, EmA positivity and Marsh grading of the histology were compared.

**Results:** Ninety-two patients were coded to have histology compatible with CD over the 4-year period giving a population prevalence of approx 1:2000. 76 cases were noted as available for review, and 6 paediatric cases were excluded from final analysis. 50 patients had total villous atrophy and 20 had various grades of partial villous atrophy on histology. Mean age at presentation was 53 years, and M: F ratio was 1:3. 27% patients had extraintestinal presentation (dermatitis herpetiformis 22%, puritus 15%, faecal loss in 15% and osteoporosis 15%); 27% had neuropsychiatric presentations with anxiety being the commonest (56%). The classical manifestations of CD were present in only 46% patients with diarrhoea in 19% and abdominal pain in 25%. 51% of CD patients had anaemia according to the WHO definition, but it did not discriminate between the groups. Overall EmA positivity was 74%. 3 patients were diagnosed as CD on the basis of a HLA DQ2/DQ8 association despite equivocal EmA and histology.

**Conclusion:** The clinical epidemiology of CD in the North East of England is changing similar to that reported from the US. Atypical presentations are commoner than the classical presentation and there is a need to recognise the importance of coeliac screening in patients with osteoporosis and neuropsychiatric symptoms.


**436 “HIDDEN” LACTOSE IN DRUGS MAY CONTRIBUTE TO SYMPTOMS IN PATIENTS WITH GASTROINTESTINAL CONDITIONS AND COEXISTING LACTOSE SENSITIVITY**

1. Department of Gastroenterology, 2. Department of Medical Biochemistry, London Hospital; 3. Department of Medical Biochemistry and Immunology, Cardiff University Heath Park Campus, Cardiff, UK

**Introduction:** Lactose sensitivity is a common problem affecting up to 9% of the UK population. Primary adult hypolactasia (lactase non-persistence) has been shown to occur in 14.5% of patients with inflammatory bowel disease. Hypolactasia can also present with symptoms that mimic IBS. Lactose consumption above a patient’s natural threshold may result in...
abdominal and systemic symptoms. Lactose is used as filler in a wide range of drugs including those used to treat GI disorders.

**Aims & Methods:** The aim of this study was to identify and quantify "hidden" lactose in drugs used for the treatment of a wide range of GI disorders, to assess whether this "hidden" lactose contributes significantly to symptoms in patients with coexisting lactose sensitivity and also to identify alternative "lactose free" preparations. Drugs used for the treatment of a wide range of GI disorders were identified via the British National Formulary and by reference to the Electronic Compendium of Medicine. Data were also obtained from Medicines Information, Great Ormond Street Hospital. A selection of drugs was analysed for lactose content by high performance liquid chromatography (HPLC).

**Results:** Drugs were identified that contained lactose. Some of these are Asacol HR, Colofoac, Herbolity, Deltacortril, Immodium, Codeine, Dulcolax and others. Those that were lactose free were Pentasa, Pantoprazole, Colpermin, Entocort CR and others. The range of lactose added to drugs used in the treatment of a wide range of GI disorders ranged from 3 mg to over 2 g daily. We identified alternative, used in the treatment of a wide range of GI disorders ranged from 3 mg Colpermin, Entocort CR and others. The range of lactose added to drugs and others. Those that were lactose free were Pentasa, Pantoprazole, Colpermin, Entocort CR and others. The range of lactose added to drugs used in the treatment of a wide range of GI disorders ranged from 3 mg Ranitid (Ranitidine) 150 mg tablet – 600 mg in Budenofalk (Budesonide) 3 mg tablet. The quantity of "hidden" lactose consumed by recommended guidelines ranged from 3 mg to over 2 g daily. We identified alternative, lactose-free preparations for all indications.

**Conclusion:** Our results clearly demonstrate that lactose is present in drugs prescribed for a wide range of GI disorders. Furthermore patients may take over 2 g/day of "hidden" lactose (equivalent to 42 ml of milk). The quantity of lactose present in drugs is not often listed on the label or manufacturer’s leaflet. Many patients are on multiple drugs. It has been reported that most individuals tolerate 11.8 g of lactose per day (250 ml of milk). Our data show that a significant consumption of "hidden" lactose occurs in drug treatment. The identification of patient’s lactose non-persistence status and a dietary assessment of lactose consumed, including that from drug treatment, should now be undertaken. Lactose-free alternative drugs should be prescribed where appropriate.

**Abstract 437 MONOCLONAL ANTIBODIES RAISED AGAINST HIGH MOLECULAR WEIGHT GLUTENINS**


1Gastroenterology, Rayne Institute, King’s College London, London, UK; 2PRI, Plant Research International, Wageningen, Netherlands; 3German Institute, Food Research, Garching, Germany; 4Nanobiology, URV, Tarragona, Spain

**Introduction:** High molecular weight glutenin subunits (HMW-GS) are coeliac-toxic in vivo, but are not assessed by commercially available methods of gluten analysis. The gliadin standard is mostly composed of low molecular weight glutenins (LMW-GS), which have a formula of HMW-GS.

**Aims & Methods:** We wished to develop reagents for use in assays for measurement of these proteins. Ideally such assays would comprise a single cocktail of anti-gliadin and anti-glutenin antibodies with appropriate IgG concentrations. Recombinant 1Dx5 and 1Dy10, which are the principle dough forming HMW-GS, were isolated from transgenic yeast and maize and immobilised on ELISA plates. We prepared monoclonal antibodies against 1Dy10 and characterised by ELISA and SDS-PAGE.

**Results:** Monoclonals raised against 1Dy10 cross-reacted fully with 1Dx5 subunits. ELISA revealed considerable cross-reactivity of the antibodies with European Standard Gliadin. Gel electrophoresis of the latter, followed by immunoblotting demonstrated that the cross-reaction was due to the presence of HMW-GS in the gliadin standard, but there was no cross-reaction with gliadin bands.

**Conclusion:** A single HMW-GS monoclonal antibody is sufficient to measure both of the important dough forming subunits 1Dx10 and 1Dx5. Such antibodies could be used in a cocktail ELISA system with combined gliadin and glutenin standards for which appropriate reference material will be required.

**Abstract 438 TTG titres found in CD patients with different Marsh grade duodenal biopsies**

<table>
<thead>
<tr>
<th>Marsh grade severity</th>
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<th>3b</th>
<th>3c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
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<td>30</td>
<td>18</td>
</tr>
<tr>
<td>TTG value average (range) U/ml</td>
<td>176 (0–300)</td>
<td>151 (5–300)</td>
<td>264 (55–300)</td>
</tr>
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<td>Sensitivity of TTG (positive) U/ml</td>
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<td>90% (27/30)</td>
<td>100% (18/18)</td>
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<tr>
<td>Number of EMA positive patients</td>
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<td>26</td>
<td>18</td>
</tr>
<tr>
<td>Sensitivity of EMA</td>
<td>79%</td>
<td>87%</td>
<td>100%</td>
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</tbody>
</table>

**Abstract 439 MALIGNANCY AND MORTALITY IN PEOPLE WITH DERMATITIS HERPETIFORMIS: A POPULATION-BASED COHORT STUDY**

N. R. Lewis, R. F. A. Logan, J. West. Division of Epidemiology and Public Health, Queen’s Medical Centre, Nottingham University Hospital, Nottingham, UK

**Introduction:** Dermatitis herpetiformis forms part of the same spectrum of gluten-sensitive disease as coeliac disease. People with coeliac disease have modest increases in overall risk of mortality and malignancy though precise estimates of the mortality and malignancy risk experienced by people with dermatitis herpetiformis in comparison to the general population is not known. We performed a population-based cohort study by using the General Practice Research database to quantify the risks of mortality and malignancy in people with dermatitis herpetiformis compared with the general population.

**Aims & Methods:** We identified 641 people with dermatitis herpetiformis and 3205 age- and sex-matched control subjects. We used Cox regression to estimate the hazard ratios for malignancy and mortality in the dermatitis herpetiformis cohort compared with the general population.

**Results:** The mean age at diagnosis was 47 years and 533 were women. The overall hazard ratio for any malignancy was 1.19 (95% CI 0.85 to 1.68)
1.67); for mortality was 0.98 (0.71 to 1.34); for gastrointestinal cancer was 1.72 (0.68 to 4.34); for breast cancer was 0.64 (0.23 to 1.82); for lung cancer was 0.97 (0.28 to 3.21); and for lymphoproliferative disease 1.03 (0.23 to 4.69).

Conclusion: There is no excess risk of mortality nor malignancy experienced by people with dermatitis herpetiformis.

440 FRACTURE RISK IN PEOPLE WITH DERMATITIS HERPETIFORMIS: A POPULATION-BASED COHORT STUDY

N. R. Lewis, R. F. A. Logan, J. West. Division of Epidemiology and Public Health, Queen’s Medical Centre, Nottingham University Hospital, Nottingham, UK

Introduction: Dermatitis herpetiformis forms part of the same spectrum of gluten-sensitive disease as coeliac disease. People with coeliac disease are a modest increased risk of fracture though precise estimates of the fracture risk experienced by people with dermatitis herpetiformis in comparison to the general population and to people with coeliac disease is not known. We performed a population-based cohort study by using the General Practice Research database to quantify the fracture risk in people with dermatitis herpetiformis compared with the general population.

Aims & Methods: We identified 641 people with dermatitis herpetiformis and 3,305 matched sex-matched control subjects. We used Cox regression to estimate the hazard ratios for any fracture, hip fracture, and ulna or radius fracture in the dermatitis herpetiformis cohort compared with the general population.

Results: The mean age at diagnosis was 47 years and 535 were women. The overall hazard ratio for any fracture was 1.10 (95% CI 0.80 to 1.50) for hip fracture was 1.35 (95% CI 0.55 to 3.31); and for ulna or radius fracture was 1.79 (95% CI 0.84 to 3.81).

Conclusion: There is no excess fracture risk experienced by people with dermatitis herpetiformis. Screening and surveillance of people with dermatitis herpetiformis for decreased bone mineral density is not warranted.

441 CAPSULE ENDOSCOPY FOR OBSCURE GASTROINTESTINAL BLEEDING: ANALYSIS OF FACTORS FOR A POSITIVE YIELD

R. Sidhu1, D. S. Sanders1, K. Kapur2, D. P. Hurlstone1, J. S. Leeks1, M. E. McAlindon2. 1Department of Gastroenterology, Royal Hallamshire Hospital, Sheffield, 2Department of Gastroenterology, Barnsley Hospital NHS Foundation Trust, Barnsley, UK

Introduction: Capsule endoscopy (CE) is now an established investigation in patients with obscure gastrointestinal bleeding (OGB). In carefully selected patients (who have had negative standard tests) the diagnostic yield has been reported to range from 45-80%. However, there is uncertainty as to which clinical factors predict the ability of CE to detect pathology.

Aims & Methods: We evaluated which clinical factors were predictive of a higher diagnostic yield in patients with undiagnosed CE for OGB. Of 441 patients referred for CE in routine practice over 52 months were studied (n=159). Case notes were reviewed for type of OGB (occult/overt), age, sex, comorbidity, use of anticoagulants, non-steroidal anti-inflammatory drugs (NSAIDs), transfusion dependence, subsequent CE diagnosis and follow-up data.

Results: There were 88 females, mean age 42 years. The average follow-up was 17 months. The overall positive yield was 53%. The diagnostic yield was notably higher in overt bleeders: 66% when compared to the occult group (46%) (p<0.025). The commonest finding in both groups was angiodyplasia [AD, n=35]. Other diagnosis obtained included gastric antral vascular ectasia (GAVE) (6), GAVE & AD (6), tumour (9), polyps (2), Crohn’s disease (3), NSAIDs ulceration (3), peptic ulcer disease (3), varices (2), small bowel ulcers (4), dieulafoy (1) and miscellaneous (11). Significant independent factors predictive of a positive yield by univariate analysis included age >55 (p=0.001, OR 3.3, 95% CI 1.7 to 6.4), type of OGB (p=0.025, OR 2.2, 95% CI 1.1 to 4.3), presence of comorbidity (cardiac/cirrhosis/haematological/cancer) (p=0.001, OR 18.7, 95% CI 4.3 to 81.2) and requirement for regular blood transfusions (p=0.025). On multivariate analysis transfusion dependence (p=0.005) and comorbidity (p=0.001) remained significant. Management was altered in 42% and 23% in the overt bleeders and anaemia group respectively (p<0.025). This was in the form of endoscopic treatment of angioectasia: heater probe (16), variceal glueing (1), polypectomy (n=1), surgery (12) and drug therapy (11): helicobacter eradication/proton pump inhibitors (2), thalidomide (n=3), beta blockers (1), ozaathioprine (1)/withdrawal of NSAIDs (4) and initiation of a gluten-free diet (1).

Conclusion: For patients with OGB who undergo CE, transfusion dependence and co-morbidity are significant predictors of a positive diagnostic yield. Further CE studies are required to validate these criteria, ensuring efficient use of the CE service.

442 ANAEMIA AND OSTEOPOROSIS IN ADULT COELIAC DISEASE

I. J. Tanswell, R. Desai, H. Griffiths, E. Hone, M. Hall, R. Ransford. Gastroenterology, Hereford County Hospital, Hereford, UK

Introduction: Anaemia is now the commonest presenting feature of coeliac disease in primary care1 but wide variation is reported in the prevalence of osteoporosis associated with coeliac disease in primary and secondary care studies. 47% of adults, with coeliac disease in secondary care were found to have osteoporosis2 compared to 12% of those in a community based study of endomysial antibody positive subjects.3 The aims of this study were to compare the prevalence of osteoporosis in coeliac disease with anaemic status and with symptoms at diagnosis in a large secondary care cohort of patients.

Aims & Methods: 146 adult cases of biopsy proven coeliac disease were assessed according to symptoms at presentation, age at diagnosis, red cell indices and iron studies, Marsh grade of small bowel histology and bone densitometry results. Anaemia was diagnosed in males Hb <13 g/dl and females Hb <11 g/dl; serum ferritin levels <15 ug/l were considered compatible with iron deficiency. Bone density was analysed according to internationally accepted Z scores with osteopenia diagnosed with Z score to 2.5 and osteoporosis <2.5 below age-matched controls.

Results: Seventy eight patients were anaemic at diagnosis (54%) and 66 non-anaemic (46%) cases. Peak age of presentation was 60-69 years with 42% of new cases of coeliac disease diagnosed older than 60 years. Frequencies of principle presenting features were: diarrhoea (36%), anaemia (33%), irritable bowel syndrome (8%) and weight loss (6%). Osteopenia was present in 38% and osteoporosis in 47% of patients with only 15% showing normal bone densitometry. Abnormal bone densitometry was found in 96% of patients older than 50 years but also in 43% of patients younger than 50 years (p<0.005). No significant difference in bone densitometry was found between anaemic and non-anaemic groups but patients presenting with diarrhoea or steatorrhoea showed a significantly higher prevalence of osteopenia and osteoporosis compared to other patient groups (p<0.05).

Conclusion: Diarrhoea and anaemia are the commonest presenting feature of coeliac disease in secondary care but patients presenting with diarrhoea (classical cases) have a significantly higher prevalence of osteopenia and osteoporosis compared to cases presenting with iron deficiency anaemia (subclinical cases). Varying length of small bowel involvement is recognised in coeliac disease and patients presenting with diarrhoea may have a longer length of small bowel involvement with greater intestinal calcium malabsorption. Abnormal bone densitometry is present in the majority of older coeliac patients in secondary care but should be considered in patients of any age presenting with diarrhoea.


443 PERSISTENT DIARRHOEA DUE TO BACTERIAL OVERGROWTH IN PATIENTS WITH MIDGUT CARCINOID TUMOURS

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Introduction: Midgut carcinoid tumours may present clinically either with “carcinoid syndrome” or with symptoms related to peritumoral mesenteric fibrosis. The latter may predispose to small intestinal bacterial overgrowth, which results in increased diarrhoea and malabsorption.

Aims & Methods: To evaluate whether persistent and non-responding to treatment diarrhoea, in a series of patients with midgut carcinoid tumours was associated with bacterial overgrowth. 15 with metastatic midgut carcinoid tumours and mesenteric fibrosis (mean age 61.1 years, range 23-78 years) were included in our study. All had persistent diarrhoea (more than 6 times per day) despite treatment with high doses of long-acting somatostatin analogues, antimotility agents, or pancreatic enzymes supplements. They underwent the non-invasive, non-radioactive “Hydrogen Breath Test”. None of them had any antibiotics for at least one month prior to the test.

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Results: In five out of 15 patients (33%), the test was positive. Four out of 5 had had small bowel resection to remove the primary lesion, while 2 out of 5 had several episodes of subacute bowel obstruction, treated conservatively. Three of these patients had reported weight loss (despite no tumour progression) and had low serum albumin levels, while in one of them serum B12 levels were also low. Four out of 10 of those with negative breath test had had small bowel surgery, 1 had episodes of subacute bowel obstruction, while none of them reported weight loss, or biochemical evidence of malabsorption. All patients with positive test received oral ciprofloxacin 500 mg bd for 7 days every month since the date of test, resulting in significant control of their symptoms (decrease of diarrhea, cessation of malabsorption). No antibiotic-related adverse effects were reported. Mean follow-up of these patients is 6.9 months (range 3–9.5 months).

Conclusion: (1) Small intestinal bacterial overgrowth may be a cause of diarrhoea resistant to treatment in patients with midgut carcinoid tumours and mesenteric fibrosis. (2) Hydrogen breath test is non-invasive and helpful test for its diagnosis. (3) Short course of oral ciprofloxacin seems effective treatment for this situation.
Is ileocaecal Crohn’s disease L1 or L3 according to the Montreal classification?

In a recent issue of the journal, Satsangi et al. reviewed the key issues that have emerged from discussions of the Montreal Working Party (Gut 2005;55:749–53). One problem that I have encountered in my clinical practice is to define ileocaecal Crohn’s disease according to the Montreal classification. In both articles on the Montreal classification, terminal ileum involvement is L1, colonic disease is L2, and ileocolonic involvement is L3.1 Should we consider ileocaecal Crohn’s disease as L1 or L3 according to the Montreal classification?

I decided to interview 27 French and international experts in the field of inflammatory bowel disease via email asking them “What is ileocaecal Crohn’s disease according to the Montreal classification?” Fifteen out of 27 (55.6%) colleagues classified ileocaecal Crohn’s disease as L1, while the 12 remaining experts (44.4%) responded L3. What can explain such discrepancy between the experts? Most experts who answered L1 argued that the caecum is the end of the small intestine and that caecal involvement is not sufficient to be considered as colonic disease, while those who classified ileocaecal Crohn’s disease as L3 explained that the caecum is an integral part of the colon.

I think we forget that the Montreal classification is based on the same definitions as the original Vienna classification, as it is a revised version of the Vienna classification.1,2 Indeed, it is clearly stated in the original paper on the Vienna classification that the term “terminal ileum” covers disease limited to the lower third of the small bowel with or without spill-over into the caecum.2 In this regard, the term “terminal ileum” used in both articles on the Montreal classification may be misleading.3

Recently, Offerbauer-Ernst et al. confirmed that discrepancies in the Vienna classification existed mainly for L1 and L3, and concluded that the presence of coexisting colonic lesions may lead to disagreement between observers.2 The authors proposed an alternative, segment-wise description of Crohn’s disease as ileal, right colonic, transverse colonic, left colonic or rectal disease.4 This might result in an improvement of L1 and L3 interobserver agreement to 85%.5

In conclusion, because it is well established that diagnostic misclassification reduces the ability to detect linkage in inflammatory bowel disease genetic studies,6 we should keep in mind that, similarly to the Vienna classification, L1 corresponds to pure ileal or ileocaecal Crohn’s disease according to the Montreal classification.

REFERENCES


CORRECTIONS


It has come to the editor’s notice that the wording of this abstract closely resembles that of an article published in the BMJ (Lane J A, Murray L J, Noble S, et al. Impact of Helicobacter pylori eradication on dyspepsia, health resource use, and quality of life in the Bristol Helicobacter pylori randomised controlled trial. BMJ 2006;332:199–204). We therefore wish to withdraw the abstract by Osornay et al.

We also wish to withdraw the following abstracts, which closely resemble previously published articles by other authors.

Osornay C, Osornay K, Swain P. Investigating the link between mast cell density and severity of Helicobacter pylori gastritis in the corpus and antrum. Gut 2005;54(Suppl II):A85. This abstract withdrawn at the request of Professor Swain.

P Abdulhannan, J W L Puntis. Iron deficiency anaemia and perianastomotic ulceration as a late complication of ileal resection in infancy. *Gut* 2007;56:1478–9. The first author’s name for this letter was published incorrectly and should be Peshang Abdulhannan. Furthermore, the letter should have read “We were interested…” not “I was interested …”.

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Committee on Publication Ethics (COPE) – Seminar 2008

9.30am–4.30pm Friday 4 April 2008, Woburn House, London, UK

This year’s seminar will focus on three key topics: (1) How does patient privacy legislation affect an editor’s ability to publish? (2) What is publication? — the changing definitions of publication. (3) COPE’s new Best Practice Guidelines. There will also be a short demonstration of an anti-plagiarism system as it is working in a publishing house.

Invited speakers will discuss legislation on privacy and data protection that editors need to be aware of; how editors should respond to more and more data being available online prior to formal peer-reviewed publication; and what happens to a publication after it appears in print.

The newly designed COPE website will be demonstrated, and there will be interactive workshops on common ethical and editorial dilemmas.

Editors, authors and all those interested in improving the standard of publication ethics are welcome.

The seminar will include invited talks:
- A Pandora’s box of tissues—legislation in relation to tissues and cells
- The promise and perils of patient privacy
- Pre-publication or duplicate publication? How to decide
- What really happens to a publication after it appears in print
- Screening for plagiarism: the CrossCheck initiative

In addition:
- Discussion of COPE’s new Best Practice Guidelines with experiences from journals who have piloted the audit
- COPE’s new website unveiled
- Interactive workshops on the key topics of the seminar.
- Opportunities to network with other editors and share your experiences and challenges

The seminar is free for COPE members and £50.00 for non-members. Numbers are limited and early booking is advisable. For registration or more information please contact the COPE Administrator at cope@bmjgroup.com or call 020-7383-6602.

For more information on COPE visit www.publicationethics.org.uk/