We read with interest the article by Eckardt et al regarding the long term results of pneumatic dilation in achalasia. A different approach was chosen—that is, treatment consisted of one or more pneumatic dilations under conscious sedation in order to achieve stable clinical remission, defined as persisting one year after the last dilatation. To this end, closer follow up was performed in the first year after dilatation (scheduled assessments at three and 12 months). Thereafter, clinical and manometric assessments were performed yearly for six years. The clinical score was according to Eckardt et al. Five patients needed one (30 mm diameter Rigiflex dilator) and six needed two (30 and 35 mm diameter) dilatations. No complications occurred. All patients remained in clinical remission and their lower oesophageal sphincter pressure decreased to <10 mm Hg and remained unchanged over time.

There are similarities in the results of the two studies. (1) The outcome of our 11 patients was comparable with that of the eight patients of Eckardt et al with a lower oesophageal sphincter pressure of <10 mm Hg who had a remission rate of 75% at six years; and (2) the observation that the six patients in our series who needed a second dilation all relapsed within one year of the first dilation agrees with the data by Eckardt et al, showing that most relapses occur in the first 12 months. However, our dilatations were more successful and, importantly, a second dilation led to a sustained remission in all patients. We do not know the reasons for this difference but believe it may be at least partly related to our use of the non-compliant Rigiflex dilator, which is currently considered the best choice, although there are no adequately powered comparisons with the Browne-McHardy dilator in the literature. Similarly to our result, a recent paper has shown very good efficacy of a second dilation with the Rigiflex dilator in patients who had relapsed. Another possible reason is the use of conscious sedation during the procedure which allowed us to complete all dilatations; Eckardt et al, who used topical anaesthesia only, had to prematurely terminate 17% of the procedures.

In conclusion, our published experience and our current clinical practice, involving treatment and follow up of 10–15 new achalasia patients each year, suggest that performance of one or two dilatations until stable clinical results or improvement are reached is a valuable strategy, and that pneumatic dilation under conscious sedation with the Rigiflex dilator is an effective long term treatment in most patients with achalasia.

References


Authors’ reply

Penagini and Cantù should be congratulated for the remarkable results they were able to obtain in 11 patients with achalasia treated by pneumatic dilation. To my knowledge, not a single study has so far produced similar results. A review of prospective studies in patients undergoing pneumatic dilation with the Rigiflex dilator indicated that approximately 80% will have a good or excellent short term response. However, if such patients are observed for prolonged periods, the results obtained do not differ significantly from those observed following treatment with the older balloons. In a recent study, in which 56 patients were treated with the Rigiflex dilator and observed for more than 10 years, the long term success rate was 55%. Thus it is my impression that differences in treatment results are not so much related to differences in technique and operator experience but rather to the number of patients investigated, duration of follow up, and finally the quality of the study design. It is hoped that carefully designed randomised studies, which are now in progress, will tell us whether we should continue to offer pneumatic dilation to the great majority of patients with achalasia or whether we should advise them to undergo surgery instead.

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 Conflict of interest: None declared.

Probiotics in IBD: mucosal and systemic routes of administration may promote similar effects

We read with considerable interest the paper by Sheil et al (Gut 2004;53:694–700) who reported the successful application of the subcutaneous route for probiotic attenuation of colitis.

We agree with the corresponding commentary of Ghosh et al (Gut 2004;53:620–2) regarding the need to study mechanisms underlying probiotic interactions. Recently, we further standardised a method to compare the anti-inflammatory potential of orally administered lactic acid bacteria (LAB) in a murine model of acute 2,4,6-trinitrobenzene sulphonic acid (TNBS) induced colitis. This model allowed us to discriminate “protective” strains, showing between 30% and 70% reduction of inflammatory score, from strains which did not significantly attenuate experimental colitis. We could select highly performing strains of Lactobacillus salivarius and Lactobacillus rhamnosus that consistently lowered colitis. In comparison, our model allowed us to discriminate strains of Lactobacillus acidophilus, Lactococcus lactis, and Streptococcus gordoni never showing any improvement. For all five strains, we investigated the protective effect of a single intrapertioneal injection of $10^7$ live microorganisms, 24 hours prior to induction of colitis. Surprisingly, protection by the LAB strains via this systemic route closely matched the efficiency of the oral route (Fig 1).

When evaluating both routes simultaneously, the anti-inflammatory effect was of comparable magnitude. Moreover, the prophylactic impact of the intrapertioneal Lactobacillus salivarius strain was established up to two hours before TNBS administration. It is noteworthy that two delayed injections could lead to protection but caused marked weight loss (25% (p<0.05) in 1% (p=0.005) of control animals) and an acceleration of the target tissue, suggesting a relationship between the type of LAB (or LAB components) and peritoneal immunocompetent cells. Pereyra and colleagues’ reported transient dose dependent induction of interferon alpha in serum of intrapertioneal injected Lactobacillus bulgaricus while Streptococcus thermophilus did not. Recent
injected live LAB was 5 that the maximal non-lethal quantity of therapeutic molecules. immune cells, showing effects comparable anti-inflammatory components of probiotics hypothesised that toxicity may also differ trinitrobenzene sulphonic acid (TNBS): the impact of the oral or intraperitoneal route of LAB immune system is integrating all of them. ''bad'' signals are given out by LAB, and the symptoms of DSS colitis but caused inflam-Th1 response and was able to alleviate some subcutaneous CpG DNA that promoted a obvious. A first example is the case of subsequent have an impact on local immu-balance between Th1 and Th2 immunity, and probable that systemic delivery of specific live repres-represents an independent experiment of control (n = 10) and LAB treated mice (n = 10).***:620–2), approaches involving observations showed that heat treatment of oral administered probiotic cocktail abolished the colitis protection in a DSS model, while irradiation improved it. Consequently, cellular integrity appears to be necessary to explain at least some part of the effect, although cell walls and peptido-glycans of killed bacteria cannot be consid-ered as passive. Possibly both “good” and “bad” signals are given out by LAB, and the immune system is integrating all of them. Those “mixed” signals will no doubt be specific for each strain as well as dose dependent. Differences in physicochemical status could explain the mortality seen by Shell et al., especially when using heat treated bacteria. Pereyra and colleagues5 established that the maximal non-lethal quantity of injected live LAB was 5×10⁷ but it can be hypothesised that toxicity may also differ with strain and viability status. Both pro- and anti-inflammatory components of probiotics have been reported to interact with systemic immucells, showing effects comparable with other well known anti-inflammatory or therapeutic molecules.3 It is therefore most probable that systemic delivery of specific live or killed probiotics may influence the delicate balance between Th1 and Th2 immunity, and subsequently have an impact on local immu-nity. Clear relationships, however, are not obvious. A first example is the case of subcutaneous CpG DNA that promoted a Th1 response and was able to alleviate some symptoms of DSS colitis but caused inflamm-ation when administered after the onset of colitis.5 Secondly, different experimental models of colitis support a potential benefit of probiotic DNA, although it seems very premature to restrict this probiotic effect to nucleic acids only.5

As emphasised by Gosh and colleagues (Gut 2004;53:620–2), approaches involving fractional studies are essential tools to complete the knowledge obtained from in vitro and ex vivo models and assist in understanding the interactions between LAB and the immune system. These studies may reveal common mechanisms active in inflamm-tion, tolerance, and allergy models. Even if this study confirms the importance of the systemic route for certain probiotic activity, we cannot neglect the possible influence of local and innate immunity, the general response of the gut flora, and the role of epithelial cells in the cross talk between both.

Acknowledgements
We are indebted to Danisco France for financial support.

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Conflict of interest: None declared.

References

Mutations in anionic trypsinogen gene are not associated with tropical calcific pancreatitis
Pancreatitis is considered to be an autodigestive disease due to premature activation of trypsinogen inside the pancreas. Its genetic basis has recently been established with the identification of causal mutations in cationic trypsinogen gene (PRSS1) in patients with hereditary1 and non-hereditary pancreatitis.2 Mutations in other genes such as SPINK1 (encoding pancreatic secretory trypsin inhibitor)3 and cystic fibrosis transmembrane conductance regulator (CFTR)4,5 genes have also been associated with the disease. Tropical calcific pancreatitis is a type of idiopathic pancreatitis, reported particularly in the tropics. Recently, we and others demonstrated absence of PRSS1 mutations but significant prevalence of the N34S mutation in the SPINK1 gene in these patients.6,7 However, our study raised two important questions: firstly, the exact role of SPINK1 mutations in disease causation as cationic trypsinogen is normal with an intact auto-lysis site; and secondly, the cause of the disease in the remaining patients negative for both PRSS1 and SPINK1 mutations.

Of the nine members of the human trypsinogen gene family, only PRSS1, PRSS2, and PRSS3 are functional genes coding for cationic, anionic, and meso-trypsinogen isoforms, respectively. The functional form accounts for about one third of the total trypsins in pancreatic juice. We investigated whether mutations in the anionic trypsinogen gene may contribute to the pathogenesis of tropical calcific pancreatitis. Of the 20 mutations reported to date in the PRSS1 gene, 17 are clustered in exons 2 and 3 only. The remaining three are in the promoter region but reported in isolated patients. Hence we initially screened exons 2 and 3 of the anionic trypsinogen gene in 68 well characterised Indian patients with tropical calcific pancreatitis.8 Subsequently, we also sequenced the promoter, complete coding region, and the flanking region in an attempt to look for any novel mutation.

Owing to the extremely high sequence homology between PRSS1 and PRSS2, a nested polymerase chain reaction (PCR) was used to ensure specificity. The primers were selected from the published study of Chen and colleagues9 and all of the exons of PRSS2 were PCR amplified, purified, and sequenced with both alleles using inverse primers and the Big Dye terminator cycle sequencing approach. However, we did not find any of the reported or any novel mutations in the coding region or in the splice site junctions, except for a synonymous polymorphism A90A (GCA>GCG) in exon 3 of the anionic trypsinogen gene. This variation was observed in both the heterozygous
and homozygous states with a mutant allele frequency of 0.58 (9 AA, 20 GG, and 39 AG) and was comparable with 0.61 in 50 controls (7 AA, 18 GG and 25 AG) analysed. Our results thus exclude any association of mutations in the anionic trypsinogen gene in tropical calcific pancreatitis and suggest a role for other genetic or non-genetic factors in the pathogenesis of the disease. Screening of genes such as CFTR may explain the disease in the remaining patients. It also affirms the importance of the N345 mutation in SPINK1 as the major genetic factor for this type of pancreatitis.

Elevated plasma protein C levels correlate with the presence of fatty liver (NASH and NAFLD)

The clinical implications of non-alcoholic fatty liver disease (NAFLD) are derived mostly from its common occurrence in the general population and the potential of the condition to progress to fibrosis and cirrhosis. Markers that help in making an early diagnosis and treatment are warranted. Protein C is a vitamin K dependent glycoprotein that functions as a circulating anticoagulant through proteolytic cleavage and inactivation of the coagulation factors Va and VIII. Whether or not protein C levels increase in patients with NAFLDs has not been assessed.

We measured protein C levels in 44 patients (28 men and 16 women; mean ages 45 (11) and 49 (12) years, respectively); 15 patients with fatty liver (FL), 15 with non-alcoholic steatohepatitis (NASH), and 14 with chronic viral hepatitis B+C (CH). All were diagnosed by histology and liver test scans or ultrasound. Ten healthy subjects were used as controls. Obesity, hyperlipidaemia, and diabetes were present in 60%, 73%, and 23% of cases, respectively; 64% of patients had elevated liver enzyme tests (alanine aminotransferase 45 (21) IU/l in FL and 43 (18) IU/l in NASH). Mean protein C levels were significantly increased in patients with NAFLD (n = 30) compared with those with chronic viral hepatitis (140 (36) v 101 (24); p < 0.0009) and healthy individuals (140 (36) v 120 (12); p < 0.04). No significant difference in protein C levels was noted between simple fatty liver and NASH (149 (34%) and 130 (37%); respectively; p = 0.97). A significant correlation was found between protein C and extent of fatty infiltration (r = 0.63; p < 0.001) (fig 1), insulin resistance index (r = 0.3; p < 0.03), and triglyceride levels (r = 0.45; p < 0.001). Protein C could discriminate correctly between NAFLDs and chronic viral hepatitis in 82% of cases. No significant association was found between protein C and aminotransferase levels.

In conclusion, protein C was elevated in patients with NAFLD. The underlying mechanism remains unknown. Agevall et al suggested an increase in hepatic synthesis of protein C due to increased hepatic insulin resistance. Increased levels have been reported in patients with diabetes, hypertriglyceridaemia, and nephrotic syndrome, with the use of anabolic steroids, oral contraceptives, and alcohol, and with increasing age. Diabetes and hypertriglyceridaemia are predisposing conditions to fatty liver and were present in 23% and 73% of cases, respectively. The remaining conditions were excluded by clinical and biochemical findings. Although more studies are needed, these preliminary findings suggest that elevated protein C levels together with elevated liver enzymes may be used as markers for NAFLD and may obviate the need for liver biopsy.

References


Coexistent chronic idiopathic intestinal pseudo obstruction and inflammatory bowel disease

Chronic idiopathic intestinal pseudo obstruc‐
tion (CIP) is a severe condition presenting with abdominal pain and dysmotility. Inflammatory or degenerative changes of the autonomic nervous system or of the muscles of the bowel have been observed in CIP. As patients with inflammatory bowel disease (IBD) may show clinical and histological signs of autonomic neuropathy and dysmotility, the aim of this study was to examine whether there is an association between CIP and IBD.

Six patients at our hospital presenting with signs and symptoms of intestinal dysmotility were diagnosed with CIP based on clinical features, antroduodenojejunal manometry, and full thickness biopsies (table 1). Patient No 1 had an acute erosive colitis some years previously with bloody diarrhoea and an enhanced sedimentation rate, which was treated with steroids, and patient No 2 had relapsing proctitis treated with 5-amino‐salicylic acid (5-ASA). Patient No 3 was treated with corticosteroids for a flare of symptoms. No 4 had episodic abdominal pain which responded to a lowidue diet and metoclopramide. No 5 was treated with a low residue diet and had pelvic pain which disappeared with the addition of metoclopramide and ranitidine. No 6 presented with intermittent abdominal pain and had an episode of acute cholecystitis that responded to medical treatment. All patients presented with features suggestive of a spinal cord or autonomic neuropathy. Six patients were available for follow up, so the results for these are presented.

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totally and patient No 4 partially colectomised because of slow transit constipation. Patient No 6 was protocolectomised due to refractory colitis. The patients were further investigated with magnetic resonance (MR) enterography and video capsule enteroscopy to establish whether there were any signs of IBD. If these examinations showed any pathology, push enteroscopy and ileocolonoscopy were also performed. All biopsies collected over the years were re-evaluated.

MR enterography did not reveal any pathological changes in any of the subjects. In three patients (Nos 1, 3, and 4), video capsule enteroscopy revealed Crohn-like ulcerations/erosions in the stomach and small intestine. Further examination of patient No 1 by push enteroscopy confirmed the erosions in the stomach and one third of the proximal small intestine. In patient No 3, capsule enteroscopy showed aphthous ulcers typical of Crohn's disease throughout the distal jejunum and ileum (Fig 1A). Ileocolonoscopy showed the same picture in the ileum and ileorectal anastomosis.

Histopathological examination of the full thickness biopsies from patient Nos 1 and 2 showed visceral degenerative neuropathy, combined with vacuolisation of the muscularis propria. In patient Nos 3 and 6, lymphocytic ganglioneuropathy was found in both neural plexa of the resected colon and ileum (Fig 1B), with signs of neurodegeneration, and 30% and 80% reduction of ICCs in the perimyenteric ICC-plexus and deep muscular plexus of the circular muscle layer, respectively. Patient No 4 had a normal biopsy, and patient No 5 was not biopsied. Examination of mucosal biopsies from patient No 1 revealed focal active inflammation in the duodenum and caecum, and chronic inflammation in the rectum; patient No 5 had multifocal mild antral cryptitis, and both patients were diagnosed with suspected Crohn's disease. Colon biopsies from patient No 6 revealed epithelioid cell granulomas and multinucleated giant cells, as well as multifocal transmural lymphoid hyperplasia consistent with Crohn's disease.

In three patients (Nos 1, 3, and 4), dysmotility preceded the mucosal changes. In patient Nos 2 and 5, these two entities occurred simultaneously, while in patient No 6, dysmotility developed after proctocolectomy. Ganglionitis in patient No 3 could have been caused by Crohn's disease before other symptoms of the disease developed. Treatment with 5-ASA has reduced her abdominal pain. The normal histology of the sigmoidum in patient No 4 does not exclude the possibility of ganglionitis in other parts of the bowel due to the known patchy involvement of the gut in Crohn's disease.

The present observations indicate that apart from inflammation, even purely degenerative neuronal and ICC changes seen in CIP can occur in patients who also have IBD/IBD-like condition. At present, it is not known whether the observed abnormalities are part of IBD or independent of each other. This small patient sample prevents us from drawing any definite conclusion regarding this question. Further observations are needed to establish whether or not this connection is causal.

### Table 1: Summary of the findings in our patients

<table>
<thead>
<tr>
<th>Patient No</th>
<th>Debut age/CIIP diagnosis age (y)</th>
<th>Main symptoms</th>
<th>Clinical diagnosis</th>
<th>Endoscopic pathology</th>
<th>Histopathology</th>
<th>Antroduodenal manometry</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16/22</td>
<td>Pain, bloody diarrhoea</td>
<td>Crohn's disease, CIIP</td>
<td>Small and large bowel</td>
<td>Degenerative neuropathy</td>
<td>Normal</td>
</tr>
<tr>
<td>2</td>
<td>15/25</td>
<td>Pain, vomiting</td>
<td>Proctitis, CIIP</td>
<td>Rectum</td>
<td>Degenerative neuropathy</td>
<td>Abnormal</td>
</tr>
<tr>
<td>3</td>
<td>Constipation, dyspepsia</td>
<td>Crohn's disease, CIIP</td>
<td>Small and large bowel</td>
<td>Normal</td>
<td>Ganglionitis, Normal</td>
<td>Abnormal</td>
</tr>
<tr>
<td>4</td>
<td>Constipation, pain</td>
<td>Crohn's disease, CIIP</td>
<td>Small bowel</td>
<td>Normal</td>
<td>Ganglionitis, Crohn's disease</td>
<td>Abnormal</td>
</tr>
<tr>
<td>5</td>
<td>GORD, later pain and diarrhoea</td>
<td>Suspected Crohn's disease, CIIP</td>
<td>Normal</td>
<td>Normal</td>
<td>Ganglionitis, Crohn's disease</td>
<td>Abnormal</td>
</tr>
<tr>
<td>6</td>
<td>Pain, weight loss</td>
<td>Crohn's disease, CIIP</td>
<td>Large bowel</td>
<td>Normal</td>
<td>Ganglionitis, Crohn's disease</td>
<td>Abnormal</td>
</tr>
</tbody>
</table>

CIIP, Chronic idiopathic intestinal pseudo-obstruction; GORD, gastro-oesophageal reflux disease.

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**References**

Cannabinoid hyperemesis: not just a problem in Adelaide Hills

We read the article by Allen and colleagues (Gut 2004;53:1566–70) with interest and would like to report a case of probable cannabinoid hyperemesis seen in a district general hospital in the UK.

A 21 year old chef was admitted to our hospital on seven occasions over a two year period (April 2001 to December 2002) with profuse vomiting. Apart from a history of migraine as a child, he was fit and well. He smoked cannabis. Physical examination was unremarkable. The observation that the patient wanted to take regular baths because he had found that bathing eased the sickness was documented in the nursing notes but its significance was not appreciated. Investigations during attacks disclosed neutrophilia but blood urea, electrolytes, liver biochemistry, and serum amylase were normal. Abdominal x-ray was also normal. Upper gastrointestinal endoscopy showed grade I oesophagitis and gastritis. Gastric biopsies were histologically normal. An abdominal ultrasound scan and small bowel barium follow through examination were normal. Additional normal or negative investigations included: autoantibodies and immunoglobulins, C reactive protein, and urinary porphyrin screen. Computed tomography scan of the brain was also normal.

During his last admission, the patient’s girlfriend showed us an article published in an Australian newsletter which she had obtained via the internet, in which Dr JH Allen had raised the possibility of a link between recurrent vomiting and cannabis abuse. With the aid of the internet we traced and contacted Dr Allen who shared his experience of this condition with us.

Reviewing the patient’s history, he freely admitted to smoking cannabis and experiencing the compulsive desire to bathe during bouts of vomiting. Following his last admission in December 2002, our patient stopped smoking cannabis and has remained free of symptoms. Review of clinical presentation was almost identical to the cases described by Allen et al, together with the response to cessation of smoking cannabis, supports the view that our patient was suffering from cannabinoid hyperemesis and that this condition is international.

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Conflict of interest: None declared.

Inflammatory bowel disease stimulates formation of carcinogenic N-nitroso compounds

In patients with inflammatory bowel disease (IBD), intragastric volatile N-nitrosamines, nitrite, and nitrous oxide concentrations are formed as a consequence of the inflammatory process. As this exposure may influence the endogenous formation of NOC and colon cancer risk found in epidemiological studies, we hypothesised that as a result of chronic inflammatory conditions in the large intestine, increased colonic iNOS activity may produce an excess of NO, nitrogen oxides, and nitrite, which in turn react with NOCP present in the colon to produce relatively high levels of NOC. Increased formation of NOC in IBD patients may thus contribute to the relatively high incidence of colorectal cancer associated with this disease.

A recent population based case control study showed that in cases with a history of IBD, increased exposure to drinking water nitrate was associated with an increased risk of colon cancer whereas no such association was found in the overall population. We clearly indicate that the risk of colon cancer in IBD patients is not only determined by the disease itself but dietary factors known to influence the endogenous formation of NOC are also associated with an increased risk in these patients. Although both the increased formation of NOC found in mice with chemically induced colitis and increased levels of NO and nitrite found in the colonic lumen of patients with ulcerative colitis support this hypothesis, the relatively small amounts of NOC levels have never been investigated in IBD patients.

Therefore, we collected faecal samples from 17 patients diagnosed with ulcerative colitis and 17 healthy controls, and determined levels of N-nitrosodimethylamine (NDMA), a predominant carcinogenic NOC, using gas chromatography-mass spectrometry, as previously described. The study was approved by the medical ethics committee of the Maasland Hospital, Sittard, the Netherlands, and all patients gave their consent. In 41% of patients, we found levels of NDMA above the detection limit of 1 ng/g faeces, compared with 35% of controls. Comparison of concentrations in NDMA positive and NDMA negative cases showed that the average concentration in patients was significantly higher than that in the control group (table 1). When IBD patients were subdivided into hospitalised and non-hospitalised cases, the difference between the non-hospitalised group and controls was even more pronounced, whereas NDMA concentrations in hospitalised patients and controls were similar. All hospitalised patients received only liquid nutrition (Nutrison; Nutricia, UK) without additional intake of NOCP rich dietary foods, whereas high dietary NOCP intake and inflammation may present a risk factor.

Most research on endogenous NOC exposure has focused predominantly on the intragastric formation of these compounds in relation to the gastric cancer risk. However, we now report that faecal NDMA levels in IBD patients are considerably higher than those we reported previously in gastric juice (0.25 (0.3) ng/g), which indicates that NOC exposure may be even more relevant in colon carcinogenesis.

Based on these results, we conclude that the colon of IBD patients is exposed to relatively high concentrations of this carcinogenic compound, probably as a direct consequence of continuous NO production by the inflammatory process. As this exposure may strongly contribute to the increased colon cancer risk associated with IBD, dietary recommendations for IBD patients, avoiding high NOCP intake, seem warranted.

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doi: 10.1136/gut.2004.057471

Conflict of interest: None declared.

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Hepatocellular carcinoma occurring after successful treatment of childhood cancer with high dose chemotherapy and radiation

Hepatocellular carcinoma (HCC) is one of the world’s most common malignancies and accounts for more than 90% of all primary liver cancers. A number of different risk factors have been identified for the development of HCC. Hepatitis B carrier state, environmental toxins, chronic hepatitis C virus infection, hereditary haemochromatosis, and liver cirrhosis of almost any cause are well known risk factors for HCC. In addition, environmental toxins such as aflatoxins and contaminated drinking water may contribute to the pathogenesis of HCC, especially in Asia and underdeveloped countries. Finally, a number of HCC cases have occurred after the use of thiotretin for diagnostic procedures, and survivors of the atomic bomb of Hiroshima were also at higher risk for HCC development, indicating that radiation might also induce the development of HCC.

Herein we describe a rare case of HCC occurring in a patient 17 years after successful treatment of peripheral neuroectodermal tumour (PNET). A 32 year old female presented with pain in the right upper quadrant of her abdomen. Seventeen years prior to presentation in our hospital this patient was treated for a PNET with a combination of high dose chemotherapy (vincristine, Adriablastin, ifosfamide, and actinomycin D) and surgical removal of the 10x5 cm tumour from her right chest followed by combined radiotherapy (60 Gy) and chemotherapy. There were no signs of any recurrence of the tumour observed on her last check up 12 month earlier. Physical examination of the patient in our clinic showed typical signs of late radiation damage (erythema of the skin and an underdeveloped right breast) (Fig 1). A firm 3–5 cm mass was palpable at the lower edge of the liver. Laboratory tests showed elevated α-fetoprotein (41881 ng/l). Hepatitis serology was negative and there was no evidence of any other liver disease. Magnetic resonance imaging revealed multiple intrahepatic masses up to 6.5 cm. A biopsy from the hepatic surface revealed multiple intrahepatic masses with postobstructive pneumonia. Trans-rectal biopsies showed a diffuse large B cell lymphoma, and an oligoclonal B cell population. Based on these results, the diagnosis was ALK-positive for CD30 and negative for T and B cell lymphoma kinase (ALK) and Epstein-Barr virus (EBV) associated proteins. A multiplex polymerase chain reaction approach revealed a clonal T cell population in patients who received infliximab. Recent studies have shown that infliximab treatment is associated with an increased risk of lymphoproliferative disorders in patients who received infliximab.

Radiotherapy has been shown to be associated with an increased risk of solid tumours 10–15 years after treatment and later. There is one report in the literature of a radiation induced hepatoma in a patient with a non-malignant hepatic haemangiomata, which occurred 20 years after radiation of the liver with 28.5 Gy. To date, the molecular mechanism of hepatocarcinogenesis is not completely understood. The main causative agents—hepatitis B virus, hepatitis C virus, and aflatoxin B1—have been identified, which together are responsible for approximately 80% of all HCC in humans. This series of cases clearly supports the notion that secondary HCC can follow not only radiation therapy of children but also high dose chemotherapy, and may prompt careful follow up examinations of the liver in patients with a possible risk for the development of HCC.

Table 1

<table>
<thead>
<tr>
<th>First malignancy</th>
<th>Age (y)</th>
<th>Treatment</th>
<th>Age when HCC was diagnosed (y)</th>
<th>Time from first to second malignancy (y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL</td>
<td>4</td>
<td>CTX*</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>Osteosarcoma</td>
<td>15</td>
<td>CTX, RTx</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>ALL</td>
<td>4</td>
<td>na</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>PNET</td>
<td>15</td>
<td>CTX, RTx</td>
<td>33</td>
<td>18</td>
</tr>
<tr>
<td>Teratoma</td>
<td>2</td>
<td>na</td>
<td>19</td>
<td>16</td>
</tr>
<tr>
<td>ALL, acute lymphocytic leukaemia; PNET, peripheral neuroectodermal tumour; CTX, chemotherapy; RTx, radiation therapy.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This patient was hepatitis B surface antigen positive.

References


Biologics in inflammatory disease: infliximab associated risk of lymphoma development

In their excellent overview of currently available biologic compounds that are in use or under investigation for Crohn’s disease (CD), Sandborn and Faubion (Gut 2004;53:1366–73) reconfirm the unique standing of infliximab. They also note the ongoing discussion concerning the increased occurrence of lymphoproliferative disorders in patients who received infliximab.

Recently, we followed a 61 year old patient with a 31 year history of relapsing CD. Initial treatment was with steroids but after 10 years of ulcerations and multiple recto-rectal fistulas. Non-Hodgkin lymphoma was absent in the histologic material. Because of a poor response to conventional treatment, including azathioprine (100–200 mg/day), infliximab was added 22 months before the current admission. Total infliximab therapy included three doses of 400 mg (5 mg/kg) within two months and resulted in a marked reduction of CD activity (azathioprine was maintained). On admission 10 months after the last infliximab infusion, the patient relapsed again with ulcerations and multiple recto-rectal fistulas. Biopsies showed a polymorphous tumour infiltrate. Tumour cells were positive for CD30 and negative for T and B cell markers as well as the anaplastic large cell lymphoma kinase (ALK) and Epstein-Barr virus (EBV) associated proteins. Clinical stage was IAE. CHOP-chemotherapy resulted in complete clinical and histological remission, which was evidenced by computer tomography, positron emission tomography, and negative rectal histology. Polymerase chain reaction analysis of the rectal biopsies revealed no T cell receptor rearrangement.

Three months later, the patient presented with postobstructive pneumonia. Bronchial biopsies showed a diffuse large B cell lymphoma. In contrast with the preceding rectal biopsies, bronchial tumour cells were positive for CD20, EBER, EBNA2, and LMP-1, indicating EBV infection of latency type III, were detected in tumour cells.

Figure 1

Thorax and upper abdomen of the patient, 17 years after radiation with 60 Gy and removal of the peripheral neuroectodermal tumour.

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However, tumour cells were negative for CD30 and ALK protein. Molecular analysis demonstrated a monoclonal immunoglobulin heavy chain rearrangement in the absence of a T cell receptor rearrangement, confirming the diagnosis. The tumour was neither demonstrated a monoclonal immunoglobulin heavy chain rearrangement in the absence of non-Hodgkin’s lymphoma of 6.6/100 000 treated patients was estimated in 2002, which roughly 500 000 patients have been treated. Increased blood levels of homocysteine have been found to be associated with inflammatory bowel disease (IBD) in several studies. The main genetic determinant associated with elevated plasma levels of homocysteine (t-Hcy) is the MTHFR 677C>T gene polymorphism of methylenetetrahydrofolate reductase, a critical enzyme involved in the remethylation pathway of homocysteine. An association of the MTHFR 677T allele with IBD has been reported in Northern Europe but not in three other series from Italy and France. Double heterozygosity MTHFR 677CT+1298AC of methylenetetrahydrofolate reductase are associated with the severity of ulcerative colitis in central China. Increased blood levels of homocysteine have been found to be associated with inflammatory bowel disease (IBD) in several studies. The main genetic determinant associated with elevated plasma levels of homocysteine (t-Hcy) is the MTHFR 677C>T gene polymorphism of methylenetetrahydrofolate reductase, a critical enzyme involved in the remethylation pathway of homocysteine.

### Table 1 Patients with infliximab therapy and development of lymphoma

<table>
<thead>
<tr>
<th>Case</th>
<th>Age (y), sex, disease</th>
<th>Dose (mg/kg)</th>
<th>No of infusions</th>
<th>Lymphoma</th>
<th>EBV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>58, M, NR, CD</td>
<td>5</td>
<td>4</td>
<td>Burkitt lymphoma</td>
<td>NR</td>
</tr>
<tr>
<td>2</td>
<td>50, F, NR, CD</td>
<td>5</td>
<td>4</td>
<td>Hodgkin lymphoma</td>
<td>NR</td>
</tr>
<tr>
<td>3</td>
<td>52, M, NR, CD</td>
<td>5</td>
<td>4</td>
<td>Hodgkin lymphoma</td>
<td>NR</td>
</tr>
<tr>
<td>4</td>
<td>54, M, NR, CD</td>
<td>6</td>
<td>4</td>
<td>DLBCL</td>
<td>Positive</td>
</tr>
<tr>
<td>5</td>
<td>50, M, NR, CD</td>
<td>6</td>
<td>4</td>
<td>Hodgkin lymphoma</td>
<td>NR</td>
</tr>
<tr>
<td>6</td>
<td>50, M, NR, CD</td>
<td>6</td>
<td>4</td>
<td>Hodgkin lymphoma</td>
<td>NR</td>
</tr>
<tr>
<td>7</td>
<td>52, F, NR, CD</td>
<td>6</td>
<td>4</td>
<td>B cell NHL</td>
<td>NR</td>
</tr>
<tr>
<td>8</td>
<td>55, M, NR, CD</td>
<td>6</td>
<td>4</td>
<td>DLBCL</td>
<td>NR</td>
</tr>
<tr>
<td>9</td>
<td>57, M, NR, CD</td>
<td>6</td>
<td>4</td>
<td>Hodgkin lymphoma</td>
<td>NR</td>
</tr>
<tr>
<td>10</td>
<td>54, M, NR, CD</td>
<td>6</td>
<td>4</td>
<td>Hodgkin lymphoma</td>
<td>NR</td>
</tr>
<tr>
<td>11</td>
<td>56, M, NR, CD</td>
<td>6</td>
<td>4</td>
<td>Multiple myeloma</td>
<td>Negative</td>
</tr>
<tr>
<td>12</td>
<td>58, M, NR, CD</td>
<td>6</td>
<td>4</td>
<td>Hodgkin lymphoma</td>
<td>NR</td>
</tr>
<tr>
<td>13</td>
<td>60, M, NR, CD</td>
<td>6</td>
<td>4</td>
<td>Hodgkin lymphoma</td>
<td>NR</td>
</tr>
<tr>
<td>14</td>
<td>62, M, CD, HIV</td>
<td>6</td>
<td>4</td>
<td>B cell NHL</td>
<td>NR</td>
</tr>
<tr>
<td>15</td>
<td>62, M, CD, HIV</td>
<td>6</td>
<td>4</td>
<td>Intravascular B-NHL</td>
<td>Negative</td>
</tr>
<tr>
<td>16</td>
<td>62, F, DM, HIV</td>
<td>6</td>
<td>4</td>
<td>DLBCL</td>
<td>NR</td>
</tr>
<tr>
<td>17</td>
<td>62, M, CD, HIV</td>
<td>6</td>
<td>4</td>
<td>CD30+ T-cell lymphoma</td>
<td>Negative</td>
</tr>
</tbody>
</table>


### References

that differed significantly between patients and controls were determined by logistic regression analysis. A p value <0.05 was considered to indicate statistical significance.

The main clinical characteristics are summarised in table 1. Most of the cases were recently diagnosed. None had any thrombotic manifestations. TCN 776G allele frequency was approximately 1.5-fold higher compared with Caucasians, and we failed to find any association with the risk of UC or severity of disease. MTHFR 677TT allele frequency in our patient series (table 1). Secondly, these genotypes were associated with an increased risk of extensive UC (whole colon) (table 1), with an odds ratio of 4.92 (95% confidence interval 1.3–18.3; p = 0.017), after adjustment for age and sex.

In conclusion, our study showed that the genotypes of MTHFR associated with a decrease in enzyme activity, seemed to be more significantly associated with extension of disease than with the primary risk, at least in central China.

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Conflict of interest: None declared.

Table 1 Clinical characteristics and methylenetetrahydrofolate reductase (MTHFR) and transcobalamin (TCN) polymorphisms in 72 patients with ulcerative colitis (UC) and 111 controls from central China

<table>
<thead>
<tr>
<th>Genetic polymorphisms (n (%) [95% CI])</th>
<th>Ulcerative colitis (n (%))</th>
<th>Controls (n (%))</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTHFR 677TT allele</td>
<td>50 (34.7) [27.3–42.7]</td>
<td>91 [41.0] [34.7–47.5]</td>
<td>0.2286</td>
</tr>
<tr>
<td>MTHFR 677CT/677TT/1298AC</td>
<td>10 (13.9) [7.2–23.0]</td>
<td>21 [18.9] [12.4–26.8]</td>
<td>0.3707</td>
</tr>
<tr>
<td>MTHFR 1298 C</td>
<td>18 (24.1) [13.9–34.7]</td>
<td>41 [15.8] [13.3–21.9]</td>
<td>0.2889</td>
</tr>
<tr>
<td>MTHFR 677CT+1298AC</td>
<td>4 [6.2] [2.0–14.0]</td>
<td>17 [15.3] [9.5–22.7]</td>
<td>0.0755</td>
</tr>
<tr>
<td>MTHFR 677TT/CT+1298AC</td>
<td>14 [21.2] [12.6–32.0]</td>
<td>38 [34.2] [25.9–43.3]</td>
<td>0.0659</td>
</tr>
<tr>
<td>TCN 776CG</td>
<td>62 [63.3] [53.6–72.3]</td>
<td>138 [60.0] [53.6–66.2]</td>
<td>0.5709</td>
</tr>
<tr>
<td>TCN 776CG+GG</td>
<td>42 [85.7] [74.3–93.6]</td>
<td>89 [77.4] [69.8–84.3]</td>
<td>0.2236</td>
</tr>
<tr>
<td>Intestinal resections (n [%])</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steroids</td>
<td>15 (20.8)</td>
<td>15 (20.8)</td>
<td></td>
</tr>
<tr>
<td>Antibiotics</td>
<td>13 (18.1)</td>
<td>13 (18.1)</td>
<td></td>
</tr>
<tr>
<td>Total colon</td>
<td>7 (43.7) [22.6–66.6]</td>
<td>7 (41.4) [6.3–25.2]</td>
<td>0.0162</td>
</tr>
</tbody>
</table>

References


CORRECTION
doi: 10.1136/gut.2004.045294corr1

The original article by Cosnes et al (Impact of the increasing use of immunosuppressants in Crohn’s disease on the need for intestinal surgery. Gut 2005;54:237–41), published in the February 2005 issue was incomplete. Figure 2 was missing from the proof. A corrected version of the pdf can be viewed at http://gut.bmjournals.com/cgi/data/54/2/237/DC1/1, and the missing figure can be seen here.
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E Roche and P N Foster

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