A scientific meeting of the British Society of Gastroenterology was held at Imperial College, London, on 3 April 1970. The programme included a symposium on 'Microbiological aspects of gastroenterology'. The remainder of the meeting was devoted to papers on a variety of subjects of interest to members of the Society. Abstracts of most of these follow. The meeting concluded with an informal dinner.

STUDIES OF THE SUBEPITHELIAL REGION OF THE SMALL INTESTINAL MUCOSA

M. N. MARSH, A. C. BROWN, AND J. A. SWIFT (Dept. Medicine, Postgraduate Medical School, London, W.12., EM Unit, Dept. Anatomy, Royal College of Surgeons, Lincoln's Inn Fields, London, W.C.1, and EM Laboratory, Unilever Research Laboratory, Isleworth, Mx.), introduced by G. NEALE Basement membrane is a term which has been used by optical microscopists to describe the specialised layer which separates ectodermal derivatives, such as epidermis and other epithelia, from their underlying connective tissue structures. This layer may be stained a deep magenta colour by the histochemical periodic acid-Schiff (PAS) procedure. The ultrastructure of the subepithelial region of the small intestinal mucosa has not been explored extensively, and the particular lamina which gives the PAS reaction has not been defined.

Using the scanning electron microscope, discrete holes, approximately 2μ in diameter, were demonstrated in a subepithelial layer of the small intestinal mucosa which was revealed when the surface epithelium had been removed mechanically (Marsh, Brown, and Swift). Furthermore, in untreated coeliac disease, nearly three times the number of holes was observed.

In order to extend these findings, areas in which cells appeared to be passing through these perforations were cut from the scanning EM blocks and re-examined using transmission electron microscopy. This procedure was used to confirm the presence of cells within these holes, and secondly to determine which layer of the basement membrane had been exposed. Other experiments were performed in which various enzymes were used to detach the epithelium from the mucosa; the structures remaining after incubation were examined both by transmission and scanning electron microscopy.

The results of these studies provide further information about the organisation of the subepithelial region, and indicate that the holes or perforations observed are caused by the movement of cells, ie, lymphocytes and eosinophils, between the epithelium and the lamina propria.

REFERENCE


THE TRANSPORT OF FOLIC ACID (PTEROYL-L-MONOGlutamic ACID) ACROSS THE SMALL INTESTINE OF THE RAT

M. E. SMITH, A. J. MATTY, AND J. A. BLAIR (Departments of Biological Sciences and Chemistry, University of Aston in Birmingham, Gosta Green, Birmingham). Folic acid transport across the rat intestine has been studied using tritiated folic acid and the everted sac technique. Identification by thin-layer chromatography of the radioactive species found in the serosal solution when the mucosal solution only show folic acid to be the sole species present. Therefore folic acid is transported unchanged. Balance studies with folic acid in both serosal and mucosal solutions at 10⁻⁸M, 10⁻⁷M, and 10⁻⁶M show no significant difference from the equilibrium calculated for a dianion. The transport system is therefore an equilibrating one.

Analysis of the effects of varying (a) the time of incubation, (b) the concentration of folic acid in the mucosal solution, (c) the glucose concentration of the bathing solutions, (d) the pH of bathing solutions, and (e) the temperature establish that folic acid is transported across the intestine wall by a rate-limiting passive process diffusing through the lipid membranes as the undissociated acid. The rate of transport of folic acid appears to be determined by its solubility and percentage dissociation in a narrow boundary layer at the mucosal surface (microclimate) which in these experiments has a pH of about 3 and by solvent drag with the water flow.

A specific concentration of folic acid within the tissues was abolished by fluoride and methotrexate and is probably due to the absorption of folic acid on to the enzyme dihydrofolic reductase present in the mucosa.

QUANTITATION OF SECRETORY IgA IN THE SERUM OF PATIENTS WITH GASTROINTESTINAL DISEASE

P. ASQUITH, R. A. THOMPSON, AND W. T. COOKE (The General Hospital, Birmingham and The Department of Experimental Pathology, University of Birmingham). It has been suggested that secretory IgA has an important protective role in the gastrointestinal tract. It can be distinguished from serum IgA by the presence of an additional peptide fragment called the secretory piece; this 'piece' may be essential in its protective properties.

Using a specific antiserum to the secretory piece, secretory IgA has been previously demonstrated in
serum, and it has now been successfully quantitated using a haemagglutination inhibition reaction.

We have studied 70 patients with adult coeliac disease (37 on a normal diet and 33 on a gluten-free diet), 29 with regional enteritis, and 13 with ulcerative colitis and compared the results with those obtained on sera from 94 healthy controls. Significant increases in secretory IgA were found in these three diseases but there was no correlation between the amount and the level of the serum IgA. From a study of individuals with raised levels it would appear that in some circumstances specific dietary factors are associated with the elevation.

REFERENCES


THE LATE RESULTS OF MEDICAL AND SURGICAL TREATMENT FOR BLEEDING DUODENAL ULCER

R. F. HARVEY AND M. J. S. LANGMAN (Department of Gastroenterology, Central Middlesex Hospital, M.R.C. Statistical & Gastroenterological Research Units and University of Nottingham) Though operative treatment will control acute haemorrhage due to duodenal ulceration it has been claimed that the risk in subsequent years of recurrent bleeding is substantial and may be little less than in those individuals who receive medical treatment only. 1, 2 We have, therefore, determined the recurrent ulcer complication rate five to 10 years later in 278 duodenal ulcer patients admitted to the Central Middlesex Hospital with haematomesis or melaena. By the use of life tables it was found that the cumulative relapse rate was markedly greater in medically than in surgically treated patients. The risk of recurrent haemorrhage in medically treated patients fell with the passage of time, and it was slightly less in women than in men, and in those who had a single ulcer haemorrhage than in those who had had two or more episodes, but did not appear to change with age. The evidence obtained also suggested that the natural history of duodenal ulcer found in one country may differ considerably from that found elsewhere.

REFERENCES


RECURRENT DUODENAL ULCERATION AND THE INSULIN TEST

D. F. L. WATKIN (Department of Surgery, The Royal Infirmary, Sheffield) The proportion of patients with a positive insulin test increases during the months after vagotomy, but studies relating recurrent duodenal ulceration to a positive test ignore this time interval. This paper explores the relationship between the acid responses in immediate (within two weeks) and delayed (after six months) insulin tests and recurrent ulceration. Recurrence was assessed at interview at least two years after vagotomy and pyloroplasty, without reference to the test results. Forty 'non-recurrence' and 15 'recurrence' patients had both immediate and delayed tests. In the immediate tests, the two groups were indistinguishable. Delayed tests gave significant differences between the groups for mean peak acid concentration (54 mEq./litre ± 6.0 and 105 mEq./litre ± 7.4 respectively) rise in acid concentration (30 mEq./litre ± 4.0 and 72.5 mEq./litre ± 7.7), and, less clearly, acid output.

The distributions of acid concentrations in delayed tests were studied in 80 'non-recurrence' and 55 'recurrence' patients. 65% of 'non-recurrences' and 7% of 'recurrences' had a peak below 40 mEq./litre or a rise of less than 20 mEq./litre. A peak above 70 mEq./litre or a rise greater than 40 mEq./litre occurred in 17% of 'non-recurrences' and 70% of recurrences. About 20% of each group of patients gave result in an intermediate range. Thus, identification of patients especially liable to recurrence is possible with the delayed insulin test.

REFERENCES


VIRUS ANTIGEN, IMMUNOGLOBULINS AND AUTOANTIBODIES IN ACUTE HEPATITIS

J. G. WALKER, D. DONIACH, M. WILLETTE, C. H. CAMERON, AND D. S. DANE (The Middlesex & Central Middlesex Hospitals, London) Serial studies, carried out over a period of months and covering Australia antigen, serum immunoglobulins and tissue autoantibodies are reported in 45 patients admitted to hospital with virus hepatitis. Australia antigen was detected in 10 patients, 8 of whom were tested within 3 weeks of onset, 30 cases were consistently negative and 5 others proved to have infectious mononucleosis. Of the Au-positive cases (5 females/5 males; aged 15-26 yrs.), 6 had repeated syringe exposure or contact with jaundice, and the duration of illness was 4-15 weeks. Serum IgM elevation lasting up to 8 weeks was seen in 7 of these cases (maximum 550 mg%). Smooth muscle antibodies in titres not exceeding 1/40 were found in 7 patients and complement-fixing tissue antibodies in 4. Of the 30 Au-negative patients (mean age 24 yrs.), 3 had syringe exposure and 1 other had contact with jaundice. Duration of illness was 3-19 weeks. A rise in IgM values was present in two-thirds of the cases (maximum 760 mg%). Low titre smooth muscle and complement-fixing antibodies were again detected. While all 11 females had at least one positive autoantibody reaction, 63% of the 19 males were negative by all tests. Both Australia-positive and negative reactors showed normal serum IgG and IgA levels while none had significant antinuclear or mitochondrial antibodies. The serological abnormalities described all subsided after the illness and in no case was there evidence of a continuing autoimmunisation, including one patient in whom Au-antigen was repeatedly detected over a period of 3 months.

HEPATITIS-ASSOCIATED ANTIGEN AND ANTIBODY IN HEMODIALYSIS PATIENTS AND STAFF

R. A. FOX, S. P. NIAZI, SHEILA SHERLOCK, A. KNIGHT; AND J. F. MOORHEAD (Department of Medicine, Royal Free
Hospital, London, W.C.1) Epidemic hepatitis is a well recognised hazard to patients and staff of maintenance haemodialysis units. At present there are 84 patients and 50 staff attached to the haemodialysis unit of the Royal Free Hospital.

Since May, 1969, 8 staff members have developed hepatitis. Four of these were positive for H.A. antigen, and in 3 of these, the test was found to be positive before the onset of symptoms. Two further staff members were positive for H.A. antigen; neither had symptoms nor elevation of the serum transaminase levels. In these 2 individuals the antigen persisted in the blood for longer periods than in the 4 symptomatic individuals with antigenemia.

Three patients developed hepatitis and 2 of these were positive for H.A. Antigen. In addition, 5 patients have been found to be consistently positive for H.A. Antigen over the last 8 months. All 5 are symptom free although 4 have mild elevation of the serum aspartate transaminase. One has since died and at autopsy there was no evidence of acute or chronic hepatitis. Using fluorescein conjugated antibody to H.A. antigen, specific fluorescence was seen within the liver.

Routine screening has also revealed one staff member who is positive for the antibody to H.A. Antigen. This individual has never had hepatitis nor received blood transfusions.

Regular screening of the patients and staff of this haemodialysis unit has provided rapid and early detection of patients and staff members positive for H.A. antigen. This has allowed their early separation from the rest of the unit, which has helped in the early termination of the epidemic.

CONGENITAL CHLORIDORRHOEA: THE NATURE OF THE DEFECT

A. J. G. PEARSON, G. E. SLADEN, C. J. EDMONDS, M. R. WILLS, A. S. TAVILL, AND NEIL MCDONALD (Medical Unit, Royal Free Hospital, London, N.W.3) A 21-year-old male presented with watery diarrhoea from birth. Hypochloraeic alkalosis and hypokalaemia were present and chloride was not detectable in urine or sweat. Daily stool volumes varied between 400 and 3,000 ml; the stool chloride concentration was consistently in excess of the sum of the sodium and potassium ions and the stool was acid. A diagnosis of congenital chloridorrhea was made.

Stool chloride loss could be explained by excessive secretion of chloride or by a defect in absorption. Gastric hypersecretion was not demonstrated. Electrolyte movements in the intestine were studied using a triple lumen tube. In the jejunum absorption of sodium and chloride was normal with stimulation of saline uptake by glucose. In ileum and colon there was insignificant movement of sodium, potassium, chloride, bicarbonate, and water. However, some modification of luminal content probably occurred in the lower intestine as faecal electrolytes differed from those expected in normal jejunal effluent, and the transcolonic potential difference was high. This potential was diminished after intravenous saline loading and after spironolactone administration suggesting that increased mineralocorticoid activity was present. Renin and angiotensin II levels were extremely high, but the concentration of aldosterone was normal.

TEMPORARY RETENTION OF IRON BY THE INTESTINE

J. FLETCHER, AND B. M. JASANI (University College Hospital Medical School, London) Conrad and Crosby reported that a proportion of the iron absorbed from the lumen of the rat's small intestine is retained in mucosal cells and later lost when these cells are desquamated into the lumen.1 This temporary sequestration appears to occur in humans as an oral dose of radioactive iron continues to be excreted in the stools long after passage of a carmine red marker. A more sensitive way of measuring such sequestration is to compare the excretion of radioactive iron, $^{59}$Fe, with a radioactive but non-absorbed marker, $^{131}$BaSO$_4$.

Medical student volunteers were given $^{59}$Fe, either as a salt or incorporated into haemoglobin, together with $^{131}$BaSO$_4$. Stools were counted daily in a whole-body counter using an organic liquid scintillator.2 This counter was capable of discriminating the two radioisotopes and not affected by changes in their distribution in the body.

When excretion of $^{59}$Fe was compared with $^{131}$Ba there was no evidence of temporary retention of iron given as a salt. However, there was temporary retention of iron when given as haemoglobin. These results suggest that absorption of inorganic iron is controlled at the luminal surface of mucosal cells. Delayed loss of haem iron may be due to its digestion within the cells.3

REFERENCES


THE USE OF LIGNIN IN CONTROLLING DIARRHOEA DUE TO ILEAL DYSFUNCTION

M. A. EASTWOOD AND S. ERIKSSON (Gastrointestinal Unit, Department of Medicine, Western General Hospital, Edinburgh and Department of Medicine, Central Hospital, Vasteras, Sweden) The patient who loses ileal function may suffer from diarrhoea and steatorrhoea.1 The interruption of the enterohpatic circulation of bile acids results in an excess of bile acids passing to the colon, leading to diarrhoea. If the liver does not compensate for the reduction in bile acids delivered in the portal circulation, steatorrhoea may result from the reduced bile acid concentration in the small bowel. Malnutrition with electrolyte and water depletion may follow.

Different regimes have been advocated, including an easily absorbed medium chain triglyceride diet and the use of a bile salt sequestrating agent, cholestyramine. The former does not alleviate the diarrhoea and the latter may accentuate the steatorrhoea.

Lignin absorbs bile acids. The binding of conjugated bile acids involved in mixed micelles is weaker than for the unconjugated forms found in the colon. This report presents an experience in ten patients with loss of ileal function who have been treated with lignin.

In eight the diarrhoea was controlled and recommenced when lignin was discontinued. Steatorrhoea was unaffected. In two, treatment was unsuccessful.

REFERENCE

BACTERIAL COLONISATION AND MALABSORPTION IN PATIENTS FOLLOWING REPLACEMENT OF THE OESOPHAGUS WITH COLON OR JEJUNAL TRANSPLANTS

C. N. MALLINSON AND B. DRA SAR (Guy’s Hospital Medical School and St. Mary’s Hospital Medical School, London) The replacement of resected oesophagus by an autotransplant of colon or jejunum is an established surgical technique. The result is a segment of intrathoracic intestine which acts as a passive conduit to the stomach which in the nature of the procedure has usually been vagotomised.

After this operation one patient developed steatorrhoea which responded to antibiotic treatment. The colon transplant was heavily colonised with bacteria of a faecal type. The effect of successive courses of antibiotic treatment on the steatorrhoea was closely related to the reduction of this flora. Bacterial colonisation of such transplants has been investigated in thirteen other subjects between two days and five years after operation. All were significantly colonised regardless of time or courses of antibiotic treatment. Evidence of malabsorption was found in one other patient.

These results will be discussed in the light of current beliefs concerning the stagnant loop syndrome.

INTESTINAL MICROFLORA IN CROHN’S DISEASE

N. H. DYER, A. VINCE, F. W. O’GRADY, AND A. M. DAWSON (St. Bartholomew’s Hospital, London) Nutritional disturbances are common in Crohn’s disease and have many possible causes. One possible factor is the overgrowth of bacteria in the diseased small bowel lumen with the consequent occurrence of the stagnant loop syndrome. Samples were aspirated from various levels of the small bowel lumen and cultured both aerobically and anaerobically on a variety of media. Results from 13 patients with Crohn’s disease were compared with 20 control subjects. The tube reached the ileum in 10 patients and 12 controls.

Diphtheroids were significantly decreased in the gastrointestinal tract of patients with Crohn’s disease. Otherwise only 4 of the patients had a normal flora of the jejunum and mid small gut: it was difficult to define an abnormal flora for the terminal ileum, as when increasing numbers of control subjects were studied the upper end of the normal range became extremely high, while the presence or absence of the ileocaecal valve did not seem to influence the result. Correlation of luminal flora with vitamin B₁₂ absorption, luminal bile salt deconjugation and faecal fat excretion suggest that these organisms are not usually an important cause of malabsorption unless fistulas are present and that loss of bowel either by resection or inflammation is usually more important.

THE CLINICAL SIGNIFICANCE OF DUODENAL DIVERTICULOSIS

E. V. COX, D. M. HUMPHREYS, AND C. R. SANDERSON (Medical Assessment and Gastrointestinal Unit, Royal Berkshire Hospital Reading) The clinical significance of diverticula in the duodenum is difficult to assess because of the frequent association of other disorders. In 100 consecutive cases 30 had hiatus hernia, 15 jejunal diverticulosis, and at least 30 had gall bladder disease and 37 diverticular disease of the large bowel. In comparison with 50 consecutive patients requiring surgery for hiatus hernia and 50 consecutive patients for gall stones, patients with duodenal diverticulosis have an unusually high incidence of associated disorders.

Absorptive studies on 82 patients with duodenal diverticula who had no jejunal diverticula were compared with 34 patients who had jejunal diverticulosis, 11 of whom also had duodenal diverticula. Duodenal diverticula can interfere with absorption, though not as frequently as jejunal diverticulosis. Both are improved by antibiotic therapy.

Eight patients with duodenal diverticula had gastrointestinal bleeding for which no other explanation could be found.

One patient with an ampullary diverticulum, into which the pancreatic and bile ducts entered directly, presented with acute pancreatitis and at laparotomy had no evidence of disease in the biliary tract. Three patients without gall stones had recurrent bouts of cholangitis and all had ampullary diverticula.

Over 30% of patients studied had abnormalities which could be directly attributed to duodenal diverticulosis.

THE MECHANISM OF VITAMIN B₁₂ MALABSORPTION IN THE BLIND LOOP SYNDROME

H. SCHJONSBY, T. J. PETERS, A. V. HOFFBRAND, AND S. TABAQCHALI (M.R.C. Intestinal Malabsorption Group, Royal Postgraduate Medical School, London, W.12) The mechanism whereby bacteria cause malabsorption of intrinsic factor (IF)-bound B₁₂ in patients with the stagnant loop syndrome is uncertain. We, therefore, investigated possible mechanisms in vitro and in vivo.

We first studied the effects of bacteria on IF-bound B₁₂ in vitro. Human IF-bound ⁵⁷Co B₁₂ was incubated with individual bacterial strains subcultured from intestinal juices from blind loop patients. IF-binding completely inhibited B₁₂ uptake by all bacterial strains except for Bacteroides and Enterobacteria where inhibition was partial. Supernatants from the incubations of bacteria with ⁵⁷Co B₁₂-IF, and from ⁵⁷Co B₁₂-IF in sterile media were incubated with guinea pig ileal brush borders. The brush border uptake of radioactivity was similar in both groups.

We next studied rat IF-B₁₂ uptake by mid-intestinal brush borders from rats with surgically created proximal blind loops. Uptake by control brush borders (135 pg ⁵⁷Co B₁₂-IF ± 23) did not differ significantly from that in the experimental group (153 pg ± 24).

Finally B₁₂-IF uptake by bacteria was studied in blind loop patients. Following 1µg of human IF-bound ⁵⁷Co B₁₂ orally maximal radioactivity in centrifuged deposits of ileal aspirates was 43-72% in blind loop patients compared with 0-11% in controls.

In conclusion, bacteria neither destroy B₁₂-IF complex nor affect its brush border uptake, but in the blind loop syndrome, they may cause malabsorption by binding the B₁₂-IF complex.