British Society of Gastroenterology

A scientific meeting was held at The Royal College of Physicians, London, on 26 April 1968, the President, Professor Oliver Fitzgerald, in the chair. The programme included a symposium on 'The cell in gastroenterology' introduced by Professor M. A. Epstein. Other contributors to the symposium were Professor D. H. Smyth, Dr F. Schaffner (Mount Sinai Hospital, New York), and Dr A. E. M. McLean. Summaries of the other papers follow.

IRON DEFICIENCY AND AUTOIMMUNITY IN RELATION TO POST-CRICOID WEBs

RALPH WRIGHT, MORAG CHISHOLM, G. M. ARDRAN, AND S. T. E. CALLENDER (Oxford) In view of the recent doubt (Elwood, Jacobs, Pitman, and Entwistle, 1964) which has been cast on the relationship of iron deficiency to post-cricoid dysphagia, the problem has been re-examined. Fifty patients with post-cricoid webs detected radiographically or at oesophagoscopy over the past 15 years have been followed up and examined for evidence of iron deficiency and circulating autoantibodies.

In a prospective study over 300 patients with disorders which have been reported to be associated with post-cricoid webs (Wright, 1965) have been studied. These included patients with iron deficiency, pernicious anaemia, thyroid disease, and ulcerative colitis; a control group of apparently healthy volunteers has been studied in the same way. Investigations included cineradiography of swallowing, assessment of the haematological state, and immunological tests and tests of gastric function. During the prospective study post-cricoid webs were detected for the first time in 32 patients.

Of the 82 patients with post-cricoid webs all but six had evidence of iron deficiency, either at the time of diagnosis or in the past.

REFERENCES


DEGLYCRRRHIZINIZED LIQUORICE IN THE TREATMENT OF GASTRIC ULCER

A. G. G. TURPIE, J. RUNCIE, AND T. J. THOMSON (Gastrointestinal Unit, Stobhill General Hospital, Glasgow, and The Department of Materia Medica and Therapeutics, University of Glasgow) In 1962, Doll, Hill, Hutton, and Underwood found that a triterpenoid liquorice compound, carbenoxolone sodium, promoted healing of gastric ulcers. They found that 17% of the patients developed oedema. Other side effects, including hypertension, hypokalaemia, and muscle weakness, have since been reported.

Langman (1966) found that the simultaneous administration of spironolactone appeared to inhibit both the healing effect of the carbenoxolone sodium and the fluid retention. A double-blind trial of deglycyrrhizinated liquorice has been carried out in 33 patients with gastric ulcer. The criteria for acceptance to the trial and the objective assessment of rate of healing of gastric ulcer during a period of one month were those defined by Doll and his co-workers in 1962. All the patients were ambulant, took a varied diet, and many of them continued with their normal occupations during the trial. Sixteen patients received two capsules three times per day of the active material, in a dose of 380 mg in each capsule, for a period of one month; the placebo in identical capsules, containing coloured lactose, was given to 17 patients. The average reduction in size of the ulcer crater in those receiving the deglycyrrhizinated liquorice was 78%; the comparable figure in those receiving the placebo was 34% (p < 0.001).

No evidence of a mineralocorticoid effect has been found while prescribing the deglycyrrhizinated liquorice or Caved-S, a proprietary preparation containing this active principle.

Deglycyrrhizinated liquorice, given orally, appears to accelerate the healing rate of gastric ulcer without promoting fluid retention or hypokalaemia. This work suggests that there are at least two fractions in liquorice which can assist the healing of gastric ulcer.

REFERENCES


CARBOHYDRATE COMPOSITION OF HYDROLYSATES OF GASTRIC SECRETION OF NORMAL CONTROLS AND PATIENTS WITH DUODENAL ULCER

J. SCHRAGER (Royal Albert Edward Infirmary, Wigan) Previous work in this laboratory showed a constant quantitative relationship between the carbohydrate components of gastric secretion (Schrager, 1963, 1964; Schrager and Oates, 1968).

This communication reports the results of a comparative study of the carbohydrate composition of gastric secretion of 20 controls and of 20 patients with duodenal ulcer. The method of gas-liquid chromatography, sulphate and N-acetyl neuraminic acid estimation has already been described (Schrager and Oates, 1968).

All gastric aspirations contained the same sugar components. Galactose and glucosamine were always found in equimolar amounts. All secretions were divisible into distinctive groups with reference to the glucosamine/galactosamine ratio previously described (Schrager and...
Two levels counter. aspirin, patients with investigated previously gastrointestinal dietary labelled in the faeces previously successfully treated Wilson, 1959), precipitation Middlesex integrity The 1959). groups would smaller much bestowing resulting duodenal effect stabilizing Hydrophobic ions groups; bonding properties. lower sialic acid controls and that of Oates, 1968). Evidence has shown that the mucus integrity results in the pathogenesis of iron-deficiency anaemia after partial gastrectomy was discussed.

REFERENCES


RE-VAGOTOMY

H. L. DUTHIE, A. N. FAWCETT, AND D. JOHNSTON (Sheffield) Vagotomy and drainage has become a standard procedure in the surgical treatment of duodenal ulceration and enjoys a low mortality and morbidity, but after this operation there is a recurrence of the ulceration in a proportion of patients which depends on the incidence of incomplete vagal section for any given surgeon.

This paper presents a review of 70 patients who, over the past seven years have had a total of 72 re-vagotomies. Of these, 60 have been performed via the abdominal route and 12 via a transthoracic route.

The general clinical well being of the patients has been assessed and they have been graded according to the Visich classification, and the completeness of the re-vagotomy has been assessed by insulin testing.

Insulin testing has shown that about 75% of the re-vagotomies are complete. Clinical assessment has shown that only about 20% of patients have an unsatisfactory result from their re-vagotomy.

The relative merits of the abdominal and transthoracic routes were discussed.

METHOD FOR THE TISSUE CULTURE OF ANTRAL MUCOSAL CELLS

MIRANDA C. COOMBES, C. G. THOMPSON, AND W. SIRCUS (Edinburgh) Initially, an attempt was made to culture adult pig antral cells using enzymatic disaggregation techniques, since both human and pig foetal cells had been cultured from cells disrupted in this way. A number of different enzymes were used and although a cell suspension could be obtained using this method, the cells did not grow in culture. This was attributed to the large amounts of mucus produced by the hog antrum which prevented nutrients from reaching the cells. Mucolytics were used in an attempt to disperse the mucus, but these were found to be toxic to cells.

It was therefore decided to use sheep antral tissue, since this produces far less mucus and is also more friable than that of the pig. Cell suspensions were easily produced using trypsin-pancreatic mixtures, but again the cells did not grow satisfactorily.

Finally, a method for the culture of adult sheep antral mucosal cells was developed using the chopped tissue.
technique. The previously sterilized mucosa was chopped as finely as possible. The fragments plated out in petri dishes and covered with a nutrient medium. After incubation for four to five days, cells could be seen growing out of the fragments of tissue and adhering to the surface of the dish. Within two to three weeks, the dishes were confluent and ready for subculture.

Initially, the cells were all epithelial in type, but after four weeks in culture these began to be replaced by fibroblasts. These cells survived in culture for a period of six months and during this time they were subcultured 12 times.

**RATES OF ABSORPTION OF GLYCYNE AND ITS PEPTIDES**

D. M. Matthews, D. M. Geddes, I. L. Craft, I. J. Wise, and C. W. Hyde (Department of Chemical Pathology and Professorial Surgical Unit, Westminster Hospital, London) A recent investigation in man indicated that a given quantity of glycine was absorbed from the intestine most rapidly when given as the tripeptide (glycylglycylglycine), less rapidly as the dipeptide (glycylglycine) and least rapidly as the free amino acid (Craft, Geddes, Hyde, Wise, and Matthews, 1968). To explain this, it was postulated that glycine and the two peptides shared a rate-limiting step in transport which preceded intracellular hydrolysis, being handled, at this stage, in an almost identical way. Experiments were carried out in rats to explore this hypothesis. Absorption was studied in tied loops of jejunum. It was found that the relationships between initial lumen concentrations and rates of absorption, expressed on a molar basis, were curves which suggested saturation kinetics and which were rather similar for all these compounds, glycine, glycylglycine, and glycylglycylglycine. As in man, a given quantity of glycine could be absorbed more rapidly when presented as one of the peptides than as free glycine. Very little free glycine appeared in the intestinal lumen during absorption of the peptides. The results excluded the possibility that the peptides were hydrolysed in the bulk phase of fluid within the intestinal lumen, and supported the hypothesis that glycine and the peptides shared a step in transport preceding cellular hydrolysis. Glycine had a somewhat higher apparent affinity for this mechanism than diglycine or triglycine. The molar absorption rate of tetracycine was much slower than that of the first three compounds.

**REFERENCE**


**AN ISOPOE TECHNIQUE FOR ESTIMATING DISACCHARIDES**

P. R. Salmon, C. F. McCarty, and A. E. Read (Department of Medicine, Bristol Royal Infirmary, Bristol) Radio-carbon breath excretion studies have been used for several years to measure intermediary metabolism in man and experimental animals.

The use of complex equipment has hitherto made the application of such studies to clinical measurement impracticable.

A much simpler technique, based on the titration of expired CO2 with standard base, has been used by Abt and von Schuching to study fat absorption. This technique has been utilized and a simple apparatus constructed to estimate intestinal lactase levels in health and disease.

The apparatus and method are described in detail and the simplicity of the procedure is demonstrated.

The value of this procedure for measuring lactase was discussed and results using this method were compared with those of currently available tests for measuring disaccharide tolerance.

**INCORPORATION OF 14C LEUCINE INTO ENZYME FRACTIONS OF THE BRUSH BORDER MEMBRANE OF THE RAT SMALL INTESTINE**

R. Holmes and R. K. Crane (Department of Physiology, Rutgers Medical School, New Brunswick, New Jersey, USA) It has been proposed (Crane, 1966) that the brush border membrane of the intestinal epithelial cell forms a digestive-absorptive surface in which the elements responsible for digestion and absorption are thought to be arranged in an ordered proximity to one another, as in a mosaic. Certain digestive enzymes have been localized predominantly in the brush border membrane, from which, by the action of papaain, they have been separated as functional subunits having specific enzymatic properties (Eichholz and Crane, 1968).

Brush borders were prepared from rats six hours after 14C leucine injection, and membranes were obtained from these isolated brush borders by methods developed in this laboratory. Enzymatic fractions were split from the membranes by the action of a papaain complex under controlled conditions. The fractions separated on a Sephadex G-200 column into peaks of enzymatic activity with which the radioactive label was associated.

These results support the concept of the brush border membrane as a dynamic digestive surface and suggest that the functional subunits are formed, possibly continuously, throughout the life span of the epithelial cells as they move along the villi.

**REFERENCES**


**SOME STUDIES OF STARCH HYDROLYSIS: AN INTERPRETATION OF 'MEMBRANE DIGESTION’**

H. B. McMichael and A. Dahlovist (Department of Physiological Chemistry, University of Lund) Pancreatic amylase and mucosal disaccharidase activities have been extensively studied both biochemically and clinically but the relative importance of each in the digestion of starch has received little attention.

There appear to be six components of amylase activity found in human small intestinal mucosa in vitro. Five of these are probably mucosal in origin and the sixth is probably absorbed pancreatic enzyme.
Four of the five 'mucosal' components correspond by separation (ion exchange chromatography), heat inactivation, pH optimum, ion activation, and Km to the well described disaccharidase activities (Dahlqvist, 1962), and the fifth component, which is the smallest, also has maltase and isomaltase activities. Each enzyme hydrolyses the corresponding oligosaccharides.

Two particular differences were noted between the mucosal and 'pancreatic' amylases. First, the 'pancreatic' component is an α- (endo-) amylase, splitting starch into smaller oligosaccharides. The mucosal components are γ- (exo-) amylases, removing single glucose units from the ends of a starch molecule. Secondly, the Km of the 'pancreatic' component is about 1/30 that of the mucosal components, so that 'pancreatic' amylase hydrolyses large starch molecules efficiently at low molecular concentrations, whereas the efficiency of the mucosal components depends largely on the molecular concentration of the carbohydrate units available.

Thus, the production of more carbohydrate units by pancreatic amylase increases the efficiency of the mucosal amylases; therefore the total starch hydrolysis by the two systems working together must be greater than that of the sum of the two systems working independently. The results of Ugolev (1965) may therefore be explained without further reference to membrane factors in digestion.

REFERENCES


CLINICAL STUDY OF THE INFLUENCE OF NUTRITION ON HEALING OF INTESTINAL ANASTOMOSES

J. H. Goudie, S. Mantoudis, E. M. Thomas, and Alan G. Cox (Department of Surgery, Royal Postgraduate Medical School, London) A retrospective study has been carried out into the factors affecting healing of intestinal anastomoses and abdominal wounds in man. The records were reviewed of over 500 consecutive patients having had operations with intestinal anastomoses at the Hammersmith Hospital. Each case was reviewed to determine the incidence of defective anastomotic and wound healing. The relation of variables such as primary disease, age, sex, anaemia, hypoproteinaemia, and therapeutic agents to abnormal healing was subjected to statistical analysis. Our findings suggest that nutritional deficiencies play an important role in healing, and indicate that technical perfection alone will not ensure a satisfactory result of gastrointestinal surgery.

ASSOCIATION BETWEEN CARCINOMA OF THE PANCREAS AND DIABETES MELLITUS

J. Kyle and A. Karmody (Aberdeen) In the years 1955-67 there were 265 proven carcinomas of the exocrine pancreas in the Aberdeen region. Of these, 51 patients had a fasting blood sugar above 130 mg % and glycosuria greater than 0.25 mg %. The age and sex distribution were similar for those with and those without disturbed carbohydrate metabolism. In only six patients was the interval between the detection of diabetes and the diagnosis of pancreatic carcinoma greater than two years, while in 25 patients it was less than three months. The former group are believed to represent true diabetes mellitus, in whom the incidence of pancreatic carcinoma is shown to be three to four times greater than normal. When the interval between the two diagnoses is short the disturbed carbohydrate metabolism is probably caused by the presence of the carcinoma, even though jaundice may not have developed. Biliary short circuit to relieve the obstruction improved the carbohydrate abnormality in four patients, suggesting that disordered liver function may play a part. However, in nearly 80% of jaundiced patients with pancreatic carcinoma there is no hyperglycaemia. An unstable type of diabetes developing in an elderly patient should suggest the possibility of pancreatic carcinoma; the prognosis is very poor.

ACCURATE DETERMINATION OF BODY STORAGE IRON IN HAEMOCHROMATOSIS USING DTPA

Michael Barry, G. C. Cartel, and Sheila Sherlock (Department of Medicine, The Royal Free Hospital, London) The increased urinary iron excretion produced by the chelating agent diethylenetriamine penta-acetic acid (DTPA) is believed to be closely related to body storage iron content, and has been used in the past as a semi-quantitative test for iron overload. By recognizing that only a variable fraction of the total iron chelated in the body is excreted in the urine, and by using 55Fe-labelled DTPA to measure this fraction, a technique has been developed that gives a standardized index of DTPA-chelatable body iron. Serial results obtained during the treatment of patients with haemochromatosis, and cirrhosis with siderosis, have fallen in almost exact inverse relationship with iron removal by venesection, indicating that the method estimates body storage iron with an accuracy of ± 0.5 g. It has proved valuable in the diagnosis and management of haemochromatosis and in the assessment of siderosis in liver disease. It is the best method for detecting affected relatives of patients with primary haemochromatosis.