Gastroenterological Society of Australia

The 7th Annual General Meeting of the Gastroenterological Society of Australia was held at the University of Adelaide on 16 May 1966, with Dr. W. Irwin in the chair.

After the business meeting a scientific session was held. Summaries of the papers presented follow.

INITIAL EXPERIENCE WITH THE LOPRESTI FIBEROPTIC OESOPHAGOSCOPE

A. KERR GRANT, T. M. ALDOR, E. CURTIN, W. K. NOLAN The Lopresti fiberoptic oesophagoscope was described. The advantages of the instrument were its relative comfort to the patient, the ease of passage, the excellent magnified image of the oesophagus, and the avoidance of a general anaesthetic. Early experience and diagnosis had proved successful in the demonstration of oesophagitis, carcinoma, stricture, and oesophageal reflux. The instrument had also been of use in examination of the stomach as far as the antral region and the cardio-oesophageal junction could also be well seen. A colour cine film was shown to demonstrate views obtained of the oesophagus.

THE GASTROSCOPE AND THE FIBROSCOPE: AN OBJECTIVE APPRAISAL OF PERFORMANCE

G. BERCI AND L. A. KONT Comparative studies with various gastroscopes (Schindler type, semi-flexible gastroscope with a lens system, Hirschowitz fibre-gastroscope and Eder fibre-gastro-duodenoscope) were performed under identical conditions in the laboratory. The following features were investigated: resolution, definition, contrast, virtual field, field of view, magnification, light transmission, and colour response.

The results achieved were demonstrated on graphs, diagrams, and 35 mm. films recorded through the eyepiece of the different gastroscopes.

The authors drew conclusions about the methods which should be attempted to modify the recent instruments so as to improve their performance in allowing access to the present 'blind' areas and especially to the visualization of the fundus and the duodenum.

CRYPTOPLASMIC VIRUS-LIKE INCLUSIONS IN A HUMAN HEPATOCARCINOMA

M. H. MA AND C. R. B. BLACKBURN A 36-year-old man who presented to his physician with an abdominal mass was shown to have primary hepatocarcinoma by histological examination of tumour nodules obtained at laparotomy. A subsequent percutaneous liver biopsy was studied by electron microscopy.

The tumour cell had many ultrastructural deviations, including prominent compact nucleoli, pallor and loss of matrix granules of the mitochondria, grossly depleted granular endoplasmic reticulum, and complete absence of microbodies and glycogen. Abundant cytoplasmic virus-like particles were observed in the majority of tumour cells but in none of the normal liver cells. The particles were round or ovoid and had an average diameter of 80 m.μ. They were composed of a central electron dense nucleoid, a single outer limiting membrane, and an intermediate electron lucid zone. An attempt to culture the virus from a second liver biopsy failed but there was no tumour tissue present in the material submitted for tissue culture.

AMPUTATION NEUROMA OF THE CYSTIC DUCT STUMP

R. A. JOSKE Amputation neuroma of the cystic duct stump is an unusual but well recognized cause of late symptoms after cholecystectomy. It is important because it is surgically remediable. Seven patients with this lesion were presented, illustrating the characteristic clinical and pathological features. All were females aged from 25 to 73 (mean 44) years. All had undergone cholecystectomy, followed by a period free of symptoms. Symptoms recurred from five months to eight years after operation, and consisted of paroxysms of pain resembling biliary colic. These progressed in frequency and severity. None had jaundice. Investigations were normal except for demonstration of a cystic duct remnant in five, with stones in one of these. Excision of the remnant and neuroma relieved symptoms in six, one patient dying in the post-operative period from bile peritonitis. Pathologically the lesions are regeneration nodules and not neoplastic. They frequently contain small calculi and unabsorbed suture material.

OBSERVATIONS ON THE DISTURBED PHYSIOLOGY OF THE GASTROINTESTINAL TRACT IN A PATIENT WITH MASSIVE RESECTION OF THE SMALL BOWEL

J. A. WALKER-SMITH The case history was presented of a 24-year-old woman in whom massive resection of the small intestine was performed for gangrene of the bowel secondary to superior mesenteric venous thrombosis. The second part of the duodenum was anastomosed to the mid-transverse colon. Fifteen months after the bowel resection a second laparotomy for partial intestinal obstruction was performed. At this time marked hypertrophy and lengthening of the large bowel with some dilatation and hypertrophy of the residual duodenum was demonstrated. She has now survived 21 months.

Her capacity to absorb fat, proteins, carbohydrates, and vitamins has been studied over this period. Despite the reduced digestive and absorptive area, a surprising degree of fat absorption could be demonstrated (50% absorption on 70–80 g. fat diet). On an intake of 120 g. protein per day 50% of the ingested nitrogen could be shown to be absorbed. Some absorption of folic acid
(H₂ T.H.F.) could be shown but as expected no absorption of vitamin B₁₂ occurred.

Although the patient has survived 21 months with multiple oral and parenteral supplementation of vitamins and minerals, her course has been punctuated by multiple acute episodes of severe electrolyte imbalance and acidosis. The problem of management in a patient with small bowel resection was discussed.

MODE OF ACTION OF GASTRONE INHIBITOR OF GASTRIC ACID SECRETION

Peter E. Baume Canine antral mucus contains an active inhibitor of gastric secretion called gastrone. Using the pyloric ligated rat, the mode of action of gastrone on acid secretion was studied by stimulating secretion at specific points of the gastric secretory process and measuring the effect of gastrone on such stimulated secretion. It was found that gastrone failed to increase the rate of hydrogen ions across the gastric mucosa, failed to inhibit secretion by parietal cell mucosa in vitro and failed to inhibit histamine-stimulated secretion. Gastrone did prevent secretion of acid by the vagal stimulant 2-deoxy-D-glucose. It was concluded from these results that gastrone acted either to prevent the elaboration of the hormone gastrin by the pyloric mucosa or to prevent the action of circulating gastrin. The implication of these results was discussed.

ISOENZYMES OF LACTATE DEHYDROGENASE IN HUMAN GASTRIC MUCOSA

Barbara H. Fenton, Peter E. Baume, Janet E. Builder, Louise G. Irving, and Douglas Piper Twenty-two human fundic and 18 human pyloric gastric mucosae and 14 gastric carcinomas were obtained, and the tissue type verified histologically. The tissues were homogenized and the LHD isoenzyme patterns of each was determined immediately by an electrophoretic technique on cellulose acetate. Fundic gastric mucosa consistently displayed a pattern with a predominance of LD₃, LD₄, and LD₅. Pyloric gastric mucosa and cancer tissue consistently had identical patterns with a predominance of LD₂, LD₃, and LD₅, differing significantly from the LDH isoenzyme pattern of fundic mucosa. The LDH isoenzyme pattern characteristic of fundic mucosa extended to the histological junction between body and pyloric gastric mucosa and was affected by the presence of mild gastritis in the stomach. These results serve to demonstrate yet another difference between mucosa from the acid-secreting and the pyloric areas of the human stomach.

AN AUGMENTED SECRETIN TEST

J. Hansky In an endeavour to determine whether maximal stimulation of the pancreas by secretin was feasible in man, five healthy volunteers were subjected to repeated duodenal intubation and the response to single intravenous injections of from 1 to 4 units per kilogram body weight Vitrum secretin was assessed.

A maximal peak bicarbonate concentration and fluid and bicarbonate output was reached with a dose of 3 units per kilogram secretin. The parameters of secretin showing the lowest coefficients of variation were the peak 15-minute fluid output, peak bicarbonate concentration, and total fluid and bicarbonate output for the hour of aspiration. These coefficients could be improved if the figures were related to the body weight.

Twenty patients had been given an augmented dose of 3 units per kg. secretin and the best index of pancreatic insufficiency was found to be the peak bicarbonate concentration. When both standard and augmented doses were used, the latter did not seem to give better separation of normals from abnormals.

USE OF 35S SELENOMETHIONINE AS A SCANNING AGENT IN THE DIAGNOSIS OF PANCREATIC DISORDERS

M. F. Quinlan The findings in 66 patients who had pancreatic scans performed following the intravenous injection of 35S Selenomethionine were presented. A Picker Magnascanner with a 3 in. × 2 in. crystal was used and two scans were done in each case, with the patient usually in the supine position. An overnight fast was the only preparation used.

Of the 66 patients, 39 were finally considered as having a normal pancreas. In the group the head of the pancreas was seen on the scan in 33 cases, the body in 27, and the tail in 32 cases. The major drawback in pancreas scanning is overlap by the liver which also takes up Selenomethionine. In some cases this was partly overcome by rotating the patient 15°–20° to the right in the supine position.

Lack of uptake was found in acute and chronic pancreatitis, cysts of the pancreas, and tumours of the pancreas. Provided there was no significant liver overlap the diagnostic accuracy in these various pancreatic disorders was high.

THE EFFECT OF ACUTE RENAL FAILURE UPON MITOTIC ACTIVITY OF THE OESOPHAGUS: AN AUTORADIOGRAPHIC STUDY IN THE MOUSE

J. Nayman and W. G. R. M. de Boer Fibroblast proliferation is inhibited in acute renal failure. This paper presented an evaluation of the effect of acute renal failure upon epithelial proliferation in the oesophagus of the mouse as assessed by autoradiography using tritiated thymidine; renal failure was induced by intraperitoneal uranium nitrate or by cystectomy. The results indicated depression of epithelial proliferation.

MUSCLE ABNORMALITY IN DIVERTICULOSIS: A STUDY OF 200 COLONS

L. E. Hughes and W. Burnett The current emphasis on abnormalities of colonic muscle in aetiology and symptoms of diverticular disease were investigated by means of a study of 200 consecutive colons removed at necropsy. The incidence of diverticular and muscle change was estimated macroscopically and histologically. Attempts were made to differentiate between spasm and hypertrophy by means of mucosal patterns and pathological study. The occurrence of diverticula was related
to other common pathological states, and evidence of diverticulitis was correlated with bowel symptoms during life.

THE COMPUTER IN CLINICAL MEDICINE

T. A. McPherson and I. R. Mackay The role of the computer in clinical medicine was discussed. The design of the system recently introduced into the Clinical Research Unit of the Royal Melbourne Hospital was described.

TREATMENT OF CHRONIC HEPATITIS WITH AZATHIOPRINE (IMURAN)

I. R. Mackay The Clinical Research Unit in 1962 began an assessment of azathioprine (imuran) as an immunosuppressive treatment of certain forms of chronic hepatitis on the premise that such diseases were perpetuated by an autoimmune reaction. Fifteen patients have been treated with azathioprine continuously for three months to three years, with an aggregate of 18 patient-years of treatment. The contrast series comprised 15 patients treated continuously with prednisolone for one to three years, with an aggregate of 32 patient-years of treatment.

The treatment, azathioprine or prednisolone, was considered effective if there was (a) initiation and maintenance of disease suppression as judged by serum transaminase estimations, (b) restitution of liver function, as judged by estimations of serum albumin and bromsulphthalein excretion, and (c) life survival. On these criteria azathioprine was effective in 11 patients and ineffective in four patients, two of whom died during treatment. Prednisolone was effective in 14 cases, and ineffective in one who died during treatment; however, relapse occurred on reduction of the maintenance dose of prednisolone in nine of the 15 cases.

Cumulative mortality data from the Unit for lupoid hepatitis were compared for the 1955–65 decade and the 1950–60 decade. There was a six to 12-month increase in life survival for the 1955–65 decade which could be attributed to the introduction of 'immunosuppressive' treatment, including prednisolone and azathioprine, but their respective contribution to this improved survival cannot yet be ascertained.

THE USE OF 6-MERCAPTOPURINE IN THE TREATMENT OF ACTIVE CHRONIC HEPATITIS: EXPERIENCE IN EIGHT SELECTED CASES

Wye Poh Fung and S. P. Mistilis The effect of 6-MP on the clinical course, biochemical tests of hepatic function, and aspiration liver biopsy material in eight selected cases of active chronic hepatitis was described.

The dose of 6-MP used varied from 50 to 125 mg. per day and was given for periods from two weeks to 27 months. In five cases, therapy was terminated between two and six weeks because of undesirable side effects. In three cases the drug was given for seven, nine, and 27 months.

The observed secondary effects of 6-MP included hepatic coma in four, jaundice in six, thrombocytopenia in three, leucopenia in five, and anaemia in three cases. It should be emphasized that in cases where hepatic coma and jaundice occurred, the patients were anicteric and in a compensated state before 6-MP therapy. The secondary effects occurred with doses below those known to produce toxicity. The hepatic coma and jaundice appeared after a short interval of only two to three weeks of drug therapy. Also in cases that survived, the recovery was slow (four to 12 weeks) following drug withdrawal. In the patients who developed hepatic coma with 6-MP therapy, the pre-treatment aspiration liver biopsy revealed extensive and severe liver disease. Submassive necrosis was found in five cases and extensive necrosis in a sixth, in addition to the changes of active chronic hepatitis.

Although 6-MP did not produce any serious side effects in three cases in this series, experience in the remaining five cases indicated a need for caution in the use of this drug in cases with active chronic hepatitis. It would appear that 6-MP is contraindicated in cases with severe underlying liver disease. In this regard, aspiration liver biopsy to assess severity is essential before therapy. In addition, where drug therapy is instituted, it was recommended that a small initial dose (25 mg. per day) be given, increasing later by small increments if no toxic effects occurred. Particular emphasis was placed on the development of hyperbilirubinaemia as an indication for withdrawal of 6-MP or reduction of dosage.

THE ROLE OF CHELATION IN THE GASTROINTESTINAL ABSORPTION OF IRON IN MAN

P. S. Davis and D. J. Deller The recent demonstration of the ability of fructose to form a powerful chelate complex with iron led the authors to investigate its effect on the intestinal absorption of iron in man. An experiment was carried out with a group of haematologically normal human volunteers using an oral test dose of 5 mg. Fe labelled with 2 μC Fe59. Iron absorption was measured using a whole body monitor to determine the loss of radioactivity after 14 days. Each subject served as his own control. When fructose was administered in a 50:1 molar excess with respect to the iron, iron absorption was markedly enhanced.

A further iron absorption experiment was carried out on another group of human volunteers and the effect of a 50:1 molar excess of glucose on the absorption of a 5 mg. test dose of iron was measured. The glucose had no statistically significant effect on the extent of iron absorption. It was also shown in experiments in vitro that glucose lacked the ability of fructose to form a stable chelate complex with iron.

The results of these experiments support the hypothesis that the extent to which orally administered iron is absorbed depends largely on luminal factors which control the state of chemical combination of the iron, and show that the iron-fructose chelate complex is absorbed significantly better than inorganic iron. These observations may have clinical relevance in so far as certain common foods and wines have a high fructose content.
THE USE OF $^{51}$Cr Cl$_3$ IN THE DIAGNOSIS OF PROTEIN-LOSING ENTEROPATHY

S. P. MISTILIS, J. A. WALKER-SMITH, and A. P. SKYRING

Thirty-one patients were given $^{41}$Cr CI$_3$ intravenously and the distribution of the isotope in the body fluids, the half life, and the daily loss in the urine and faeces were measured.

The patients studied were divided into four groups: group I, nine control patients; group II, six patients with ulcerative disease of the bowel; group III, nine patients with malabsorption; group IV, seven patients with miscellaneous disorders known to be associated with enteric protein loss. Fourteen additional patients were studied with $^{131}$I PVP and five with in vitro labelled $^{51}$Cr albumin.

Following an intravenous injection of $^{51}$Cr CI$_3$ most of the radioactivity (85–92%) appeared in the plasma in the five-minute and four-day blood samples. The binding was tight and non-dialysable (approx. 90%). The radioactivity was precipitable with saturated and 50% saturated ammonium sulphate indicating a distribution to both albumin and globulin.

Less than 1% of the injected activity appeared in stools in the control patients. All patients with ulcerative disease and hypoalbuminaemia and eight of nine patients with adult coeliac disease had faecal radioactivity greater than 1-0%. All but two patients in group IV had increased stool activity greater than 1%.

There was a significant quantitative relationship in the 31 patients studied between the degree of hypoalbuminaemia and enteric loss of protein. The half life was 9-2 days and although much longer than $^{131}$I PVP and in vitro $^{51}$Cr albumin, it was still much shorter than that obtained with $^{131}$I albumin (18-22 days).

In vivo labelling of plasma proteins with $^{51}$Cr CI$_3$ is a simple, safe (less irradiation), and effective means of diagnosing enteric loss of plasma proteins (albumin and globulin). It would not appear to be of value in concurrent protein turnover studies. The relative advantages of this in vivo method as compared with $^{131}$I PVP and in vitro $^{51}$Cr albumin were discussed.

BILE ACID TRANSPORT BY RAT INTESTINE

M. PLAYOUST and S. M. PEARCE

Previous work with everted gut sacs has demonstrated, in the ileum, an active transport mechanism for bile salts. In the case of the conjugated bile salts, this mechanism is responsible for most of their enterohepatic circulation, since non-ionic diffusion, bulk flow and transport of the ionized moiety can account for only a small proportion of the total amount absorbed.

Further studies have been carried out to demonstrate the absolute requirement of sodium ions for the functioning of the active transport mechanism. Digitalis glycosides, which readily inhibit other Na+—dependent transport systems, have virtually no effect on bile salt transport. The complete substitution of chloride ions by sulphate does not decrease bile salt transport. In this preparation, it has not been possible to demonstrate jejunal transport by passive diffusion or by facilitated diffusion—even in the presence of a high concentration gradient.

Data were presented to show that each of cholate, taurocholate, glycocholate, taurodeoxycholate and deoxycholate is a competitive inhibitor of the transport of each of the others.

These results suggested that these compounds share the same transport mechanism.

FATTY ACID ABSORPTION BY ISOLATED LOOPS OF RAT INTESTINE

N. GALLAGHER and M. PLAYOUST

The absorption of palmitic acid-1-14C and of oleic acid-1-14C was studied in rats. A 12 cm. segment of upper jejunum or distal ileum was isolated surgically and an albumin suspension of 14C-fatty acid was injected into the lumen. After half, one and a half, or three hours the animal was killed and the luminal contents and the mucosa were assayed for total radioactivity. Lipid fractionation was performed by standard techniques. Similar absorption experiments were performed in several rats with lymph fistulae.

Both fatty acids were absorbed more rapidly by the jejunum than by the ileum; this difference was most marked in the half-hour experiment (e.g., 63% absorption of palmitate from jejunum, 24% from ileum) and barely detectable at three hours when absorption was nearly complete in all cases.

Palmitic acid was absorbed more rapidly than oleic acid in the half- and one and a half-hour experiments although the differences were small. The presence of bile salts did not affect oleic acid absorption, but preliminary work indicated that they increased jejunal palmitate absorption.

Fractionation of the intestinal mucosal lipids showed a surprisingly large proportion of the 14C label in phospholipid—up to 40%. Lecithin was the phospholipid with most radioactivity. Identical experiments performed in rats with lymph fistulae confirmed the high activity of mucosal phospholipids, although the lymph phospholipids contained very little of the radioactive label. We have confirmed earlier in vitro work with intestinal mucosal slices: when these are incubated with a 14C-fatty acid/albumin suspension, there is only minor incorporation of the label into tissue phospholipids.

The technique described is a useful method of studying lipid absorption in rats.

THE ROLE OF CLOSTRIDIUM WELCHII IN DIARRHOEAL DISEASES OF MAN

T. G. C. MURRELL

Recent data have produced evidence that closely related strains of Cl. perfringens (welchii) may be responsible for a number of distinct syndromes, separable both clinically and bacteriologically. Classification of these strains into six types (A–F) upon the basis of their toxin production has been of great epidemiological significance in enteric disease in both human and veterinary medicine.

Dr. Murrell described the recovery of strains of Cl. perfringens producing lethal beta-toxin from cases of pig-bel. This disease is an epidemic enteric gangrene which occurs in natives of the highlands of New Guinea following the custom of pig-feasting. These strains have
been formally classified as type C varieties and have previously not been recovered from man. The diagnostic features of pig-bel were discussed and compared with other enteric diseases in man attributed to differing strains of Cl. welchii.

**LONG-TERM COMPLICATIONS OF PARTIAL GASTRECTOMY: POST-GASTRECTOMY GASTRITIS**

A. J. WALL. The haematological, nutritional, and gastric secretory status were assessed in 109 unselected consecutive patients who had had partial gastrectomy performed three to 18 (mean 9·3) years previously. The incidence of anaemia, vitamin B₁₂, folic acid and iron deficiency, protein deficiency, and weight loss was in keeping with that of other published series. The frequency of these complications was lower after Billroth I operations than after Billroth II operations, and in patients suffering from duodenal ulcer than in those with gastric ulcer. A similar pattern was seen in the results of gastric acid output and gastric biopsy (100 patients).

Before operation atrophic gastritis was found in 2% of duodenal ulcer patients and 30% of gastric ulcer patients. After Billroth I (gastro-duodenal) anastomosis the incidence rose to 55% and 78% respectively, while after Billroth II (gastrojejunlal) anastomosis the incidence rose to 95% and 100%. Parietal cell and intrinsic factor antibodies were not found in these patients. Because of the high incidence of atrophic gastritis, an adequate statistical assessment of the potentially important role of atrophic gastritis in long-term haematological and nutritional status could not be made, and a larger group should be studied.

On the afternoon of 17 May a clinical meeting was held. Cases of portal hypertension, intestinal angina, and amoebiasis were presented and discussed.

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**The February 1967 Issue**

**THE FEBRUARY 1967 ISSUE CONTAINS THE FOLLOWING PAPERS**

**Bile salts and fat absorption** A. M. DAWSON

**Miliary Crohn's disease, K. W. HEATON, C. F. MCCARTHY, R. E. HORTON, J. S. CORNES, and A. E. READ**

**Eosinophilic granuloma of the gastro-intestinal tract** P. R. SALMON and J. W. PAULLEY

**Permeability of the rectosigmoid mucosa to tritiated water in normal subjects and in patients with mild idiopathic ulcerative colitis** RUVEN LEVITAN and SIMCHA BRUDNO

**Rectal reaction to injected ulcerative colitis leucocytes and plasma** SIDNEY FINK, WILLIAM J. DONNELLY, and VICTOR R. JABLOKOW

**Histamine content of rectal mucosa in ulcerative colitis** VIBEKE BINDER and EIGILL HVIDBERG

**Inhibitory action of cholecystokinin on acid secretion from Heidenhain pouches induced by endogenous gastrin** JOHN C. BROWN and D. F. MAGEE

**Effect of decreased levels of endogenous gastric tissue histamine on acid secretion and stress ulcer formation in the rat** WALLACE P. RITCHIE, JR., JOHN J. BREEN, DAVID I. GRIGG, and OWEN H. WANGENSTEEN

**Histamine- and insulin-stimulated gastric acid secretion after selective and truncal vagotomy** S. BANK, I. N. MARKS, and J. H. LOUW

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