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Introduction

This brief review aims at a selection of some highlights of general interest in the surgical publications of 1973 which have caught the eye—or the imagination—of the author. The topics chosen for review must naturally be limited by confines of space, but we have chosen the use of fiberoptics in gastroenterology, road traffic trauma, the surgical treatment of obesity, some interesting aspects of Crohn's disease, of breast cancer and of wound healing, and some penile emergencies. The references quoted are all but confined to this year's publications.

Advances in alimentary endoscopy

The last decade has seen a revolution in endoscopy with the introduction of flexible fiberoptic instruments. A fiberscope comprises a bundle of glass fibres which transmits light down the instrument from an external source. A second bundle of glass fibres with an attached lens system enables inspection of the illuminated alimentary mucosa. In addition, the tip of the instrument can be manipulated from the other end of the endoscope and further channels allow the passage of a biopsy forceps and for fluid or air to be injected down the instrument and sucked out. Other attachments enable photography to be carried out through the instrument and for a second viewer to observe and learn through a separate teaching device. Endoscopy can be performed with much greater safety than using the rigid oesophagoscope or gastroscope in upper alimentary endoscopy. In examination of the large bowel, the colonoscope has greatly extended the extent of bowel which can be examined and, indeed, the expert can reach the ileocaecal valve, or even beyond, in many cases.

Upper alimentary endoscopy

A wide range of problems can now be defined in which upper alimentary fiberoendoscopy is of established value. These include: the investigation of X-ray negative dyspepsias, the differentiation of benign from malignant gastric ulcers, acute diagnosis of the source of upper alimentary bleeding, the investigation of symptoms following gastric surgery, the con-

firmation of duodenal ulceration and the investigation of biliary and pancreatic disease by means of retrograde cholangiopancreatography.

Cotton (1973) has given a recent review of one year's experience of 1020 upper gastrointestinal endoscopies on 956 patients. Ages ranged from 3 months to 86 years and the only contraindication to examination was the possibility of transmitting infection such as active tuberculosis since endoscopes cannot be sterilized. Only three patients required general anaesthesia and more than three-quarters were carried out on outpatients. Only 2% of examinations failed and complications were few—one aspiration pneumonia and one upper oesophageal perforation; both patients recovered after conservative treatment. The most common indication was based on barium meal examination; either as a result of this being negative (200 examinations) or because it was abnormal or equivocal (363 examinations). Of the 200 patients with barium meal negative examinations, sixty-four were found to have an organic lesion, including four cancers of the oesophagus and forty benign peptic ulcers. Endoscopy was found to be valuable in distinguishing between benign and malignant causes of distortion of the gastric antrum, in detecting additional lesions in patients with hiatus hernia diagnosed radiologically (in no less than 28% of cases) and in the confirmation of peptic ulceration. In the whole year's study only two lesions were definitely known to have been missed (one high gastric ulcer and one duodenal ulcer).

In a further study, Cotton and his colleagues (1973) report on the diagnostic yield of endoscopy in 177 patients who were symptomatic after gastric surgery. Apart from 'gastritis', diagnosis was made in eighty-three of the patients, including forty-six with recurrent ulceration. Only 60% of these ulcers were seen on X-ray and there were many false positive radiological findings. Other lesions detected on endoscopy included one carcinoma of the oesophagus and five cancers of the stomach.

Endoscopy is of particular value in the early and precise diagnosis of the source of haemorrhage in

patients with haematemesis or melaena. Cotton *et al.* (1973) carried out oesophago-gastro-duodenoscopy successfully in 196 of 208 patients admitted with this condition and were able to make a precise diagnosis in 80% of all patients. This rose to 96% of those where the final diagnosis lay within the oesophagus, stomach and first two parts of the duodenum. The twelve failures were due to too much blood in eight cases and inability to intubate in four. Interestingly enough no less than thirty-two patients (15.4%) had more than one lesion found at endoscopy and included combined gastric and duodenal ulcer, oesophagitis with duodenal ulcer and oesophageal varices with gastric ulcer. Early in this series eighty-one patients underwent prior barium meal examinations; thirty-four of these were negative and yet twenty-six lesions were detected at subsequent endoscopy, including fourteen ulcers and one cancer. Findings at X-ray examination were positive in forty-seven cases but fifteen of these were found to be bleeding from another lesion at endoscopy. It is now common experience that endoscopy performed within the first 24 hr of admission by a skilled operator is likely to yield a very high proportion of positive findings compared to the use of emergency barium meal examination—90% compared with 54% in a series reported by Allen, Block and Schuman (1973).

Endoscopy in the investigation of suspected biliary and pancreatic disease

Perhaps the most ingenious application of modern fiberendoscopy is in the cannulation of the ampulla of Vater. This technique was first introduced in 1969 in Japan and is well described by Blumgart and Salmon (1973). The side-viewing duodenoscope is passed into the second part of the duodenum and the ampulla of Vater is sought on its lesser curve aspect. The ampulla most commonly has the appearance of a hemispherical nipple-shaped mound but it may have a papillary appearance or it may be no more than a flat macular area lying at the end of a longitudinal mucosal fold. The ampulla can then be cannulated using a polythene catheter, which may be a very easy procedure but may on some occasions occupy an hour or more of patient manipulation. Contrast medium is then injected slowly under fluoroscopic control; on occasions both biliary and pancreatic duct systems fill simultaneously, but more often one duct fills first. The technique is of value in the investigation of persistent or recurrent undiagnosed jaundice, the investigation of undiagnosed upper abdominal pain suspected to be biliary in origin, in postoperative biliary symptoms, in the investigation of undiagnosed abdominal or back pain suspected to be pancreatic in origin and in the study of chronic and relapsing pancreatitis. In

forty-one patients with suspected obstructive jaundice investigated by the authors, cannulation was successful in thirty (73%) and diagnostic information was obtained in twenty-nine of these. In twelve patients stones were visualized in the common bile duct, seven had obstruction due to carcinoma of the pancreas or of the biliary duct system, seven had normal unobstructed major ducts, and there was one example each of an ampullary carcinoma, of a stricture of the common bile duct with stones in the gall bladder and of sclerosing cholangitis together with carcinoma of the common bile duct. Patients with symptoms following cholecystectomy may be saved further exploration of the bile ducts if a clear duct system is demonstrated by this technique. In patients with suspected but unproven pancreatitis, a normal pancreatogram will exclude the diagnosis, whereas the presence of tortuosity, stricture, dilatation, obstruction or calculi in the main pancreatic duct or its branches is strongly suggestive of pancreatic disease (Loeb, Wheeler and Berk, 1973). Pancreatitis is also suggested by oedema and rigidity of the medial wall of the second part of the duodenum (Braasch and Gregg, 1973).

Many centres are now reporting large series of this procedure. Weiss and his colleagues (1973), for example, report 270 investigations in which it was possible to catheterize the pancreatic duct in 199 patients and the common bile duct in 115. Pancreatitis was shown in fifty-seven patients, pancreatic cancer in five, gall stones in nineteen, stenosis of the ampulla of Vater in twenty-one, stenosis of the common duct in five, hepatic cancer in two and duodenal diverticulum in eleven patients. The findings were normal in ninety of their cases. It must be pointed out, however, that the investigation requires considerable skill and training and is not free from complications. Loeb and his colleagues (1973) point out that they were able to cannulate the ampulla in only five of their first twelve patients although they were successful in twelve of their subsequent fifteen patients, and they reported similar experiences from other workers. Kozower and his colleagues (1973), in their first seventeen cases, had three failures and one misdiagnosis, although four of their patients were saved from surgery because their apparently 'surgical' jaundice was shown to be non-obstructive. Two of their patients had fever following the investigation. Cholangitis and bacteraemia may occasionally occur and mild pancreatitis may follow the procedure, indeed, the serum amylase often rises quite considerably following instrumentation. Ammann, Deyhle and Butikofer (1973) report a male patient of 34 with relapsing pancreatitis whose pancreatogram showed a pseudocyst. He became acutely ill following the procedure and at laparotomy 3 days later was found to have extensive pancreatic

necrosis. Five days postoperatively he died with a massive intra-abdominal haemorrhage.

In the investigation of hepatic and biliary pathology, the surgeon is now greatly aided by the development of other sophisticated fiberlight instruments. Berci and his colleagues (1973) described a new peritoneoscope whose trocar is only 7.0 mm in diameter, enabling safer evaluation of liver disease and liver biopsy under direct vision. The use of the choledochoscope makes direct inspection of the lumen of the bile duct system possible in order to check clearance after choledocholithotomy and to clarify a doubtful operative cholangiogram. Longland (1973) gives a useful recent review of his experience with this instrument.

Fiberoptic colonoscopy

Fiberoptic instruments have been used for examining the large bowel since 1957, but it is only in the last 5 years or so that increasing experience, together with the development of efficient instruments, have defined the role of this instrument in clinical practice. Sugarbaker and Vineyard (1973) state that the major indications for colonoscopy are: (1) Differentiation between carcinoma and diverticulitis of the colon. (2) Follow-up examination of colonic suture lines following cancer resection. (3) Clarification of confusing findings on barium enema. (4) Biopsy of polyps to determine therapy, and (5) Polypectomy. Less frequent indications include relief of sigmoid volvulus, examination of patients where the use of the ordinary sigmoidoscopy would be difficult such as those with rectal stenosis or patients in orthopaedic traction, regular follow-up study of patients with ulcerative colitis to detect carcinoma at an early stage and as a means of searching for a second lesion in a patient with a known neoplasm of the colon. In their series of 120 colonoscopies, including 40 polypectomies, one patient had a free perforation; this was a case of sigmoid diverticulitis who was on prednisone. The authors estimated that laparotomy was averted in thirty-two patients and twelve others who might have been followed up without surgery received definitive surgery immediately because of the findings at colonoscopy. Teague, Salmon and Read (1973) from Bristol reviewed their experience of 255 fiberoptic examinations of the colon. Again, complications were rare; the only serious problem being a perforation in a patient with post-irradiation proctitis. Their most important indication was rectal bleeding undiagnosed after barium enema, routine sigmoidoscopy and full clinical assessment. In seventy-five patients who fell into this category, endoscopy revealed the cause in 50%. The definitive diagnoses were: carcinoma in fourteen patients, polyps in seven, inflammatory disease in fifteen, diverticular

disease in one and haemorrhoids in another. Of a further seventeen patients examined because of a doubtful radiological report, seven were saved laparotomy by a confident negative colonoscopic examination.

Dean and Newell (1973) gave an interesting report of the use of the colonoscope in the difficult problem of differentiating between carcinoma and diverticulitis of the sigmoid colon. They examined thirty-six patients who, on barium enema examination, were suspected of having a carcinoma of the colon in association with diverticular disease. This condition may often make passage of the colonoscope difficult and indeed, in no less than seventeen of their patients, it was impossible to examine the involved segment in spite of using intravenous Probanthine if necessary. In four patients a definite diagnosis of carcinoma was made and in five others this was definitely excluded. In nine further patients the examination was helpful in excluding carcinoma with reasonable confidence although the whole segment was not seen and there was only one case in which a false negative examination was made. It is unfortunate that in one of the most important indications for the use of this instrument that the rigidity and deformity of the bowel, affected by diverticular disease, so often makes passage of the instrument difficult or indeed impossible.

A most interesting and important application of the colonoscope is in the removal of polyps in the large bowel (Gaisford, 1973). For this a variety of instruments can be introduced through the machine, including biopsy forceps, an electrosurgical polyp snare or a specially devised scissors-type electrosurgical forceps (Marks and Moses, 1973). Only about 25% of large bowel polyps occur within reach of the conventional rigid sigmoidoscope and removal of the remainder has until now required operative intervention or else, in the case of very small polyps, repeated observation by serial barium enemas with surgical intervention if there is evidence that the polyp is enlarging. Williams, Muto and Rutter (1973) now report on the use of a colonoscope diathermy snare to remove a total of seventy-five polyps in forty-three patients. There was some haemorrhage in four cases, but no other morbidity and all the patients were discharged home in 24 hr. To obviate any danger of explosion during diathermy carbon dioxide was insufflated into the lumen of the colon. All sites along the colon were dealt with as far as the caecum and the record number was seven polyps removed from a single patient.

Espiner *et al.* (1973) use the colonoscope at the time of laparotomy in order to help the surgeon locate a radiologically diagnosed lesion or to search for further lesions in the bowel. In twelve patients this procedure was carried out at the

time of removal of tumours or polyps of the large intestine or, in one case, at the time of colostomy closure after a previous resection for carcinoma of the colon. Additional polyps were found in five patients and in four of these the polyp was not readily palpable through the bowel wall and might well have been missed at laparotomy. In two other patients, one with a suspected polyp and the other with a suspected carcinoma of the caecum, a normal bowel was found at endoscopy so colotomy or bowel resection was thereby avoided. We have ourselves found operative colonoscopy of great value in locating large soft polyps at the time of surgery. Any experienced surgeon will confess how difficult it is to find these tumours at laparotomy. Even when he has a very good idea of where they are situated it is invaluable for the colonoscopist to be able to locate the lesion and to indicate the exact spot at which the surgeon needs to open the bowel (Richter, Littman and Levowitz, 1973). At the same time the surgeon can either be reassured that there are no other polyps within the bowel or these can be identified by his endoscopist colleague.

In carrying out endoscopic examination of the colon with biopsy, Fielding and Lumsden (1973) point out that performance of a barium enema should, if possible, not be carried out for a week or two because of the risk of converting a partial tear in the rectal wall into a complete perforation.

In the last year or so even the small intestine has not been able to escape the enquiring search of the endoscopist. Nagasako and Takemoto (1973) report that in 100 consecutive colonoscopies they were able to inspect the ileo-caecal valve in eighty-one patients and to enter and examine the terminal ileum in sixty-six of these. Salmon and his colleagues (1973) have used a new 2 m enteroscope (passed *per os* or, in some cases, through an ileostomy) to study the small bowel—in some instances this can be inspected throughout its entire length!

Seat belts and traffic trauma

Road accidents are the main cause of accidental death and major injuries in our population and, with increasing congestion on the motorways, the incidence and severity of the injuries show no signs of coming under control. The majority of car occupants who are fatally injured are thrown about within, or out of, a relatively intact passenger compartment (Gissane, 1973) and there is no doubt that the introduction of seat belts into cars has saved lives and reduced the incidence and severity of injuries to the occupants. The wearing of seat belts is already compulsory in France, Australia, New Zealand and Czechoslovakia. The Australian experience, which is the longest, estimates a 25% fall in mortality based on figures from the preceding decade, and this in

spite of a rise in the number of cars, of petrol consumption and of population (*Lancet*, leading article, 1973). As well as a fall in mortality there has also been a reduction in the incidence of eye injuries, facial fractures, spinal and head injuries and of crushed chests (Hughes, 1973). It has been estimated that the introduction of compulsory seat belts into the United Kingdom might save 1000 lives a year with a reduction of serious injuries by 14,000.

However, in the past 10 years, increasing numbers of examples of injuries due to the wearing of seat belts have been reported and the term 'seat belt syndrome' was introduced to describe this phenomenon by Garrett and Braunstein in 1962; of 3325 car occupants wearing seat belts and involved in accidents that they studied, 30% sustained some damage but only twenty-six of these (0.75%) had severe injuries. These appeared to be secondary to the restraint provided by the seat belt as the accident victim rapidly decelerated while inertia forced him forwards against the straps holding him to the car frame (leading article *British Medical Journal*, 1974).

Many accidents appear to be due to faulty use of the seat belts. A recent investigation by *Drive* (1973), the journal of the British Automobile Association, found that nineteen out of twenty motorists wear their seat belts in a faulty and potentially dangerous manner, that instructions issued with the belts are often vague, that rear seat belts are rarely fitted or requested and that inertia-reel automatic seat belts, which are becoming more and more popular, may not give as much protection as the more old-fashioned static seat belts. Where a combined lap-strap and diagonal belt is used, the buckle or the point where the lap and diagonal belts intersect must be at the side of the hip and not the front, the lap section must always lie on or below both iliac crests and not be allowed to creep up over the abdomen, the belt must be worn as tightly as comfort allows and it must not be permitted to be either twisted or to be snagged on the seat. This review concludes that unnecessary injuries from seat belts result from people not being told how to wear them properly or because the belts are not well enough designed in the first place.

Shennan (1973a) gives a useful review of the 'Seat belt Syndrome'. This falls into three groups; abdominal injury, trauma to the spinal column and pelvic girdle, and thoracic injuries. Diagonal seat belts may produce soft tissue injuries to the chest wall, fractures of the thoracic cage and upper vertebral column and intra-abdominal injuries, which particularly involve the solid viscera in the upper abdomen. The lap-strap belt is associated with soft tissue injuries of the abdominal wall, intra-abdominal trauma, which predominantly involves the hollow

viscera and the mesenteries, and injuries to the lower spinal column and pelvis. The combined lap-strap and diagonal belt system, which is now common in this country, is associated with soft tissue injuries to the trunk, intra-abdominal trauma, fractures of the thoracic cage and injuries to the cervical and upper thoracic spine. The jejunum and ileum with their mesentery are by far the most frequently damaged intra-abdominal structures in seat-belt injuries of the abdomen and about one-third of these are complicated by associated fracture of the lumbar spine. In addition, there are published accounts of trauma to the bladder, kidney, the common bile duct, stomach, duodenum, pancreas, spleen, the gravid uterus, the aorta, inferior vena cava, omentum and the colon. Shennan (1973b) reports two patients with isolated injury to the left colon produced by the lap-strap of the seat belt. Both wore belts of the combined lap-strap and diagonal belt variety, both were drivers and both were involved in head-on collision. Both were able to walk away from the accident, apparently without serious harm. The first patient, who sustained ischaemic damage to the descending colon with a segment of gangrene, developed pain after 12 hr. The second, who had an almost completely severed descending colon, developed severe pain 3 hr after the accident. The author points out that most reports of injury to either the small or large intestine produced by the seat belt have stressed that delay in presentation is commonly seen and that delayed rupture of the bowel following traumatic ischaemia is a definite entity which, although occurring usually before the fourth day, may be delayed for even longer periods of up to 13 days. These cases underline the importance of detaining patients with a suspicious history or with suggestive associated injuries in hospital for close observation in order not to miss delayed ischaemic perforation of the bowel.

Blunt injuries to the abdomen often present urgent and difficult diagnostic problems, particularly when the patient is unconscious from a head injury. Diagnostic paracentesis of the abdominal cavity has been popular for many years in the U.S.A., both in abdominal trauma and in acute abdominal emergencies, although it has been much less practised in this country. In blunt abdominal trauma many reports from the United States of taps of the peritoneal cavity in two or four quadrants have shown that when blood is obtained, 80% or more of the patients are found to have an intra-abdominal injury at laparotomy. However, there is a high percentage of false negative results. In an attempt to refine this diagnostic aid, the technique of peritoneal lavage has been introduced. Thal and Shires (1973) report their experience of 267 patients undergoing peritoneal lavage following abdominal trauma in Dallas, Texas.

A catheter is introduced via a trocar in the lower mid-line of the abdomen. The catheter is aspirated and if fresh blood returns freely the diagnosis of haemoperitoneum is made and the patient taken to the operating theatre. If no aspirate is obtained, 1 l of Ringer's solution is infused and siphoned out again after 5–10 min. This fluid is examined for blood, amylase, bile and bacteria. The technique is not employed if the clinical diagnosis is obvious, or if the diagnosis can be confirmed on two quadrant needle paracentesis. It is contra-indicated in patients who have undergone multiple abdominal operations and in whom the presence of adhesions increases the likelihood of gut penetration. Pregnancy, gross abdominal distension and gunshot or stab wounds are further contra-indications. The method is used, however, in patients where the diagnosis is complicated by a head injury or where consciousness is impaired by alcohol, shock or drugs. Of the 267 patients, 173 (64.8%) were observed on the basis of negative results on lavage. There were nine false negatives and ten false positive results, but many patients were spared laparotomy on the basis of negative lavage. The technique is not entirely free from complications, which included infusion of the lavage fluid into the abdominal wall, perforation of the bladder, bowel and mesenteric vessels, and retroperitoneal haemorrhage; these eventualities occurred in thirteen patients. Moreover, lavage is very inaccurate in the diagnosis of retroperitoneal injuries and most cases of pancreatic trauma are not detected by this method. Amylase elevation more generally indicates laceration of intestine rather than pancreatic injury. These authors only advocate peritoneal lavage in those patients where diagnosis is in doubt and laparotomy should not be delayed where visceral rupture or intra-abdominal bleeding is clinically obvious.

The surgical treatment of severe obesity

Obesity in its extreme form is a disabling and life-shortening condition which is, in addition, associated with hypertension, diabetes, degenerative changes in the hips and knees, lymphoedema and venous stasis complications of the legs, and with cardiac and respiratory problems. Reduction in total body fat can only occur when calorie intake is less than expenditure. This is achieved, in the vast majority of cases, by increasing physical activity, dietary restriction and the administration of various drugs, which include fenfluramine, diethylpropion or phentermine (Munro, 1973). In patients who fail to respond to this regime and whose massive obesity is life-threatening, intestinal bypass surgery should be considered.

The basic goal of the surgical procedure is to create a controlled malabsorption state which is

compatible with normal health and body function but which will result in the desired reduction of excessive adipose tissue depots. After considerable laboratory investigations, the first intestinal bypass procedures comprised jejunocolic short circuits, but in spite of extremely effective weight reduction there were considerable metabolic complications. After extensive experience Payne and Dewind (1969) recommended that the proximal 14 in of jejunum should be anastomosed end to side to the terminal 4 in of ileum and this jejuno-ileal shunt is the one most commonly favoured in centres with considerable experience with this type of procedure. Body weight rapidly falls within the first few weeks and then reaches a plateau at about 12 months, by which time an average weight loss in the region of 40 kg can be expected (Schwartz and Jensen, 1973; Hallberg and Backman, 1973; Scott *et al.*, 1973).

Baddeley (1973a, b) reports the results of this procedure on fifty-one females and nine males followed up from three to 42 months after operation. The average weight loss 3 months after surgery was 20 kg, after 6 months 31 kg and at one year 44 kg. Four patients developed acute fatty enlargement of the liver accompanied by weakness, lethargy and hypotonia. One of these died but the others responded to a high protein, high carbohydrate and low fat diet. Transient diarrhoea and vomiting were common but usually resolved by 3 months; however, troublesome and persistent diarrhoea occurred in four of the patients; one subsequently responded to cholestyramine but the remainder required massive doses of Lomotil and codeine phosphate. Weismann (1973) gives an extensive review of his experience of 123 patients undergoing jejuno-ileal bypass; in addition, eighty of these patients had a panniculectomy procedure in which the abdominal apron of superficial fat was excised. There were two deaths from pulmonary embolism and one patient died 6 months later with advanced necrosis of the liver. Two patients required reversal of the bypass, one because of progressive severe vomiting and malnutrition and the other because of the development of severe acute ulcerative colitis. Weight loss was dramatic, particularly in the grossly obese, and reached a plateau at approximately 12 months. This level was maintained in patients followed up over a 2–3 year period. Postoperative metabolic studies revealed a depression in serum potassium levels in the first few months until diarrhoea came under control. Serum cholesterol levels were markedly reduced and remained low. The Schilling test gave well below normal results in all patients tested. The glucose tolerance curve was significantly flattened for up to 2 years or more postoperatively, and appears to be a satisfactory laboratory test to assess the adequacy of the bypass procedure. The liver biopsy studies are interesting;

eighty-eight patients had needle biopsy at the time of operation which revealed mild to severe fatty infiltration. Forty patients have had biopsy performed at intervals of from 10 days to 3 years after surgery; the general pattern was of continued fatty infiltration with some quantitative increase between 6 and 12 months after operation and then a decrease of fatty infiltration in the subsequent 12-month period. No progressive cirrhotic changes were observed. The author concludes that there is only a small risk of acute hepatic failure as a serious late complication of the bypass. Almost all patients adapt well to the severe malabsorption and do not have evidence of the significant deficiency state. Vitamin B₁₂ absorption is impaired and parenteral Vitamin B₁₂ must be given indefinitely. Schwartz, Varco and Buchwald (1973) point out that these operations can be performed on grossly obese and often poor risk patients with reasonably low morbidity and mortality. In their experience of ninety-four patients there was only one death—a perforated acute stress ulcer of the left colon on the eighth post-operative day. Their complications were: two pulmonary emboli, seven urinary tract infections, two gross wound infections (with ten more patients having prolonged serous wound leaks) and four minor upper gastrointestinal haemorrhages not requiring transfusion. Payne and his colleagues (1973), with an extensive experience of 165 bypass operations spread over a 16-year period, report a 6% mortality related to the operation—from hepatic failure, cardiac failure, pulmonary embolism and, in one case, an acute haemorrhagic pancreatitis.

Bliss (1973), in a useful review of current publications, considers that the jejuno-ileal bypass is a good procedure for the short term treatment of massive obesity but more information is required about the long term results, since it is not possible entirely to exclude the risk of nutritional deficiencies and particularly the development of hepatic cirrhosis. These risks must be put against the poor long term prognosis of the untreated massively obese patient. The side effects of the operation have not in general detracted from its acceptability to patients and the procedure has a good record for rehabilitation of these unfortunate people back to a useful, active life.

Crohn's disease

Those two major modern granulomatous diseases of the intestine—Crohn's disease and ulcerative colitis—continue to tease the medical profession, whether from the point of view of aetiology, or differential diagnosis or management. One particular difficulty has been the failure, to date, to reproduce either condition as a satisfactory model in the experimental animal.

It has recently been reported that extracts of

various red seaweeds fed to animals in their drinking water caused ulcerative disease of the colon in several species, including guinea-pigs, rabbits, rats and mice (Watt and Marcus, 1973). These extracts contain carrageenan, which is a high molecular weight sulphated polysaccharide. It is interesting that this material has been used in the treatment of peptic ulcer! In both guinea-pigs and rabbits ulceration of the colon together with blood and mucus in the stools may appear within 3 weeks. The lesion appears first in the caecum and is mainly confined to mucosal inflammation and ulceration, together with crypt abscesses. From the clinical and pathological aspects, these lesions resemble ulcerative colitis in man, but there is no definite evidence that human colitis is produced by the ingestion of sulphated polysaccharides, nor is there evidence of an increase of ulcerative colitis in races taking seaweed in food, for example in Ireland, Japan and the Pacific Islands. However, this model may be useful in the study of the influence of drugs on the pathogenesis and course of the ulcerative disease process. Recent studies by Mitchell and Rees (1971) suggested that there might be a transmissible agent in tissue obtained from Crohn's disease. Extracts of such material injected into the foot pads of mice produced epithelioid and giant cell granulomas in periods varying from 24 to 70 weeks. In control animals non-specific inflammation only was produced. In two out of ten mice killed 600 days after inoculation there were granulomatous changes in the terminal ileum as well as in the inoculated foot pad. Homogenates obtained from the affected foot pads would themselves in turn produce these changes when inoculated into another generation of mice. Cave and his colleagues (1973) have produced further animal evidence by inoculating six rabbits intra-ileally with homogenates from patients with Crohn's disease. Granulomatous changes with focal epithelioid and giant cell granulomas were produced in four of the six animals, although not in controls. Bolton and his colleagues (1973), however, were unable to produce any typical lesions in inoculations of Crohn's material into rats, guinea-pigs and mice, whether the injections were made into the foot pad, the external ear or subcutaneous tissues. It is obvious that there is still a long way to go before uniformly satisfactory animal models of the granulomatous diseases of the bowel can be produced in the laboratory. There is, indeed, still considerable controversy as to whether Crohn's disease and ulcerative colitis are two entirely separate entities or whether they represent a range of different reactions of the bowel to the same aetiological insult. Cook and Dixon (1973) present an exhaustive analysis of ninety-five different pathological criteria to be used in the differential diagnosis between the two conditions, yet most pathologists find some 10%

of patients impossible to assign clearly to one or other group.

A condition of acute terminal ileitis, discovered at laparotomy on suspected cases of acute appendicitis, has long been well recognized and has commonly been considered to be a precursor in at least some cases of established chronic Crohn's disease. Thomasson and Havia (1973) have reported a careful follow-up study of seventeen such patients who underwent laparotomy for acute terminal ileitis and who were re-examined 2-24 years later (on average 11 years) and also studied by a detailed radiology of the alimentary tract; all were clinically and radiologically free from any evidence of Crohn's disease.

The spectrum of Crohn's disease and its complications is now very wide indeed. Although as originally described it was considered to be a disease confined to the terminal ileum, it is now known that it can extend throughout the alimentary canal.

More and more examples are being reported of Crohn's disease affecting the upper part of the gastro-intestinal tract. Kim, Zimmerman and Weiss (1973) record an example of massive haemorrhage from involved duodenum and distal part of the stomach in a young man of 23 who, in addition, had Crohn's disease of the terminal ileum for a period of 10 years. Haggitt and Meissner (1973) encountered ten patients with Crohn's disease of the stomach and/or duodenum in 350 consecutive cases of this condition (2.9%). One patient, in addition, had oesophageal involvement. All ten patients had typical Crohn's disease elsewhere, all ten in the ileum and five additionally in the colon, but four of the patients presented with pyloric obstruction. Indeed, Li Volsi and Jaretzki (1973) have recently reported a well documented case of granulomatous oesophagitis in a male aged 62 who underwent oesophagectomy. The specimen showed typical Crohn's-like sarcoid granulomas with involved mediastinal nodes. The patient subsequently died and at autopsy no disease was found elsewhere in the gastro-intestinal tract.

For many years, Crohn's disease was thought to affect primarily young adults, but more recent studies (leading article, *British Medical Journal*, 1973) have made it apparent that the disease has a much wider age distribution. Indeed, there may be a bimodal age incidence with a first peak occurring in young adults and the second around the age of 70. This second peak is mainly due to women suffering from Crohn's disease of the colon, whereas disease limited to the terminal ileum still tends to affect younger patients. Since diverticula of the colon are so commonly found in the elderly (Ellis, 1973) it is not surprising that examples of Crohn's disease with

co-existing diverticulosis of the colon may occur and this may hinder the diagnosis of the less common condition. In the early days, perforation of Crohn's disease was said not to occur. This is certainly a rare complication but Steinberg, Cooke and Williams (1973) had seven examples of free perforation in 360 consecutive patients with Crohn's disease in Birmingham. This complication tends to occur during an acute flare-up of chronic disease, especially in the presence of distal obstruction. Steroids do not appear to be a precipitating factor and only two of their seven patients were on this form of therapy. The treatment for this complication is resection of the perforated segment. More and more examples of associated skin ulceration are being reported, which may involve the perineal area, the region around a colostomy or ileostomy, or metastatic foci elsewhere over the body. A patient with Crohn's disease affecting the anterior part of the vulva is reported by Ansell and Hogbin (1973). Involvement of the right ureter in the inflammatory mass of terminal ileal Crohn's is reviewed by Steigmann (1973). Of sixty-four patients studied, no less than seven had urinary tract complications, with right hydronephrosis in two cases and a dilated right ureter in the remaining five.

Crohn's disease and cancer

It is well known that carcinomatous change may take place in chronic ulcerative colitis, but the association between Crohn's disease and malignant change is less well established. Darke and his colleagues (1973) review twenty-five examples of carcinoma involving the same segment of small intestine as Crohn's disease and of the large intestine in twenty further cases. They argue that there is a small but significant risk of malignant change in both the small and large intestine in this condition; the evidence is particularly strong in the case of malignant change in the small intestine, where 'Crohn's carcinoma' occurs in a younger age group and more frequently in the ileum than carcinoma arising *de novo*. Frank and Shorey (1973) report two cases of adenocarcinoma in association in Crohn's disease. The first affected the terminal ileum and the second the terminal ileum and the caecum. A review of these two patients, together with twenty-six cases previously reported of adenocarcinoma of the small bowel complicating Crohn's disease, revealed that no less than eleven patients developed the carcinoma in a surgically bypassed segment of intestine so that they suggest that, if there are no contra-indications to resection, excision rather than bypass of the affected area should be the treatment of choice. The diagnostic signs and symptoms of cancer of the small bowel are usually disguised by those of Crohn's disease and thus a pre-operative diagnosis was only

made in one of the twenty-eight cases. As well as affecting a younger age group they are more common in the lower ileum than small bowel carcinoma independent of Crohn's disease. These authors point out that the prognosis is worse than in adenocarcinoma alone and no 5-year survivals have as yet been reported.

Major excisional surgery in Crohn's disease

Nutritional disturbances in Crohn's disease are common and may be due to many factors, for example, decreased food intake, toxic depression of metabolism, malabsorption due to inflammation, resection or bypass of intestine, a stagnant loop syndrome due to stricture, fistula or surgically produced blind-loop, or gastrointestinal loss of blood, protein, water and electrolytes. Many clinicians are loath to submit their patients to surgery in Crohn's disease because they fear that loss of intestine brought about by surgical resection can only aggravate these disturbances. However, Dyer and Dawson (1973), in a careful study of sixty-three patients, suggest that the high incidence of malnutrition that they found was not related to malabsorption, but rather to the 'toxic mass' of the disease. In many patients with marked malnutrition the jejunum was normal and this situation might occur in patients whose disease was mainly confined to the colon. From this study they consider that major surgery should not be avoided in severe Crohn's disease, since resection of an extensive involved segment of bowel is more likely to improve the patient by removing a source of malnutrition without contributing to increased malabsorption.

When surgery is indicated, resection rather than short circuit has always been more favoured in this country. The reverse has been true in the U.S.A. Williams, Fielding and Cooke (1972), in a long-term follow-up of the Birmingham region, confirm a much higher recurrence rate in those patients submitted to bypass than those in whom resection of ileal Crohn's disease has been carried out.

Recurrence after resection of Crohn's disease of the small intestine eventually occurs in a high proportion of cases. The prognosis following Crohn's disease of the large bowel undoubtedly appears better. Nugent and his colleagues (1973), from the Lahey Clinic, reviewed thirty-three patients who had total colectomy and ileostomy for Crohn's disease of the colon between 1957 and 1959. Only one of these subsequently developed involvement of the ileum. Ritchie and Lockhart-Mummery (1973) studied fifty-six patients followed up an average of 8 years after colonic excision. Four of these patients had recurrent disease, all in the ileum above the ileostomy, but none had higher or skip lesions. An important finding in this study was that the perineal

wound would often take a long time to heal; indeed only 63% had healed at the end of 1 year.

However, Steinberg and his colleagues (1973), from Birmingham, paint a far more gloomy picture. In seventy-three patients undergoing excision of the large bowel for Crohn's disease, twenty-two had later development of proximal disease (31%). Ileal involvement at the time of the initial resection did not significantly increase the risk of later recurrence. The authors were unable to explain the striking differences of their results compared with other series but consider that they were more likely to be due to differences in the patients themselves rather than variations in surgical technique.

Following total colectomy the patient is, of course, left with a permanent ileostomy, the conventional management of which is to wear an ileostomy appliance. Kock (1969) of Goteborg devised an ingenious intra-abdominal reservoir fashioned from the terminal ileum and with a valved outlet. The stoma is flush with the skin in these patients and is emptied by passing a catheter through its orifice several times a day. Initially the pouch is manufactured to contain between 75 and 100 ml but this dilates to contain about 500 ml of ileal contents over the subsequent 6 months. Other surgeons are now reporting their experience with this procedure. Cameron (1973) reports six patients; one died in hospital from unconnected causes and one was only performed recently. Of the four remaining cases, three are continent (catheterizing the stoma two to four times daily) and one is incontinent. Behars and Adson (1973), from the Mayo clinic, report seven patients, six of whom are satisfied with the results. One had to have the pouch excised in the post-operative period because of obstruction proximal to it. Certainly this is a procedure that will require cautious appraisal and may well find its place in the management of some patients with permanent ileostomy.

Crohn's disease is well named 'the disease of fistulae' and these often present serious and sometimes fatal situations. An interesting approach to the management of this problem is parenteral hyperalimentation; the patient is fed by a caval catheter with no fluid allowed by mouth in order to rest the alimentary canal and to allow fistula healing to take place. MacFadyen, Dudrick and Ruberg (1973) report their experience of sixty-two patients with gastrointestinal fistulae managed by this method; no less than twenty-two of these were due to Crohn's disease. Spontaneous closure was achieved in 70% of the cases.

Cancer of the breast

It is not surprising that articles on cancer of the breast, the commonest killing tumour of women in

the Western World, continue to fill the surgical journals. There is unending controversy concerning the best management of the 'early case', whether the opposite breast requires therapy under such circumstances, and the management of advanced disease.

Anderson (1973) has reviewed critically the primary treatment of breast cancer. Twenty years ago hardly anyone would question that a radical mastectomy should be the first line of treatment of most patients with carcinoma of the breast and those who did found that their attitudes were criticized strongly by their colleagues on emotional rather than scientific lines. Since then the climate of opinion has changed almost to a point of indecision in the management of individual patients. Anderson has only been able to find six controlled trials of primary treatment in which statistically acceptable criteria of acceptance and random assignation of patients were used. All six are comparisons of different pairs of treatment combinations involving mastectomy (simple or radical) and irradiation of the wound and the regional lymph nodes. None of these show evidence of increased survival as a result of the radiotherapy. Fortunately for the clinician, there are a number of further trials in progress now which will help us to decide on which is the 'best buy' for a patient with an early carcinoma of the breast, not only from the point of view of survival but also taking into consideration the cosmetic and functional results of treatment. The incidence of local recurrence must also be taken into consideration, and there is evidence that local excision of the breast tumour combined with radiotherapy is less effective than more radical ablative procedures in this respect (Bailey, Ratnavel and Wyatt, 1973).

Many clinicians are gloomy about the prognosis for their young patients with carcinoma of the breast. This is to some extent dispersed by study of Birks and his colleagues (1973) from Vancouver. They reviewed 5038 patients with breast cancer treated over a 25-year period. Of these, fifty-eight were under the age of 30 years at the time of diagnosis (approximately 1%); the youngest was aged 16 and five were under the age of 25. Four of these patients developed a primary tumour in the opposite breast, of which three are alive and free from disease 5 years or more after the diagnosis of the second primary. Two presented during pregnancy; one died of cancer but the other is alive and well 8 years later. An analysis of the 5 and 10 year survivals demonstrated that the prognosis in this group of patients was the same as in those 30 years of age and above.

There has been much recent interest in the incidence of carcinoma of the second breast and its prophylaxis and management (leading article, *British Medical Journal*, 1973). A neoplasm of the

breast may invade the breast on the opposite side by lymphatic permeation or blood stream dissemination. In earlier cases it may be difficult to decide whether the patient has separate primary carcinomas of the breast or a primary on one side with spread to the other. Occasionally their different histological appearances makes the distinction obvious. A useful definition of a second primary cancer of the opposite breast is one in which there is no evidence of local spread of carcinoma across the midline or of distant metastases and the carcinoma in the second breast is a solitary lesion. Figures ranging from 1% to 12% have been given for bilateral breast cancer, with an average of 7% (Herrmann, 1973). Shah, Rosen and Robbins (1973), from the Memorial Hospital for Cancer in New York, have reported the surprisingly high figure of 110 patients with bilateral disease out of 508 (21.6%). Thirty-seven had simultaneous bilateral tumours and the others had subsequent development of a second cancer. Whatever the exact figure may be, it is clear that a woman who has had one carcinoma of the breast is more likely to develop a tumour on the opposite side than an unaffected woman. Several courses of action have been advised to deal with this problem, which include prophylactic mastectomy on the opposite side at the time of or after the removal of the primary lesion, a random biopsy of the apparently non-cancerous breast, or continued observation by clinical and special techniques of the second breast. Herrmann (1973) has given an account of his personal series of 418 patients operated upon for breast cancer. Three had synchronous bilateral primary operable growths and twenty-eight (6.7%) had asynchronous double lesions. There is a minimum of 5 years follow-up after the second mastectomy in this report. The 5 year cancer-free survival rate for the entire group was 52.6%. For those with bilateral cancer it was 57.9% following the second mastectomy. This author concludes that carcinoma in the second breast does not bring with it a particularly unfavourable prognosis. He argues against prophylactic mastectomy or random biopsy of the opposite breast and simply advises close follow-up after initial mastectomy with early treatment of carcinoma of the second breast should it develop. This approach would appear to eliminate unnecessary mastectomies and to accomplish the greatest good for the greatest number of women. Wilson and Alberty (1973) review 119 patients with bilateral breast cancer. Of these, thirty-nine were synchronous or occurred within 12 months of each other. Compared with patients with single primary tumours, they found that prognosis was poor in patients with synchronous bilateral tumours but that patients with consecutive bilateral growths have a more favourable prognosis than those with unilateral disease. These authors wonder

if a lower invasiveness of the initial carcinoma of the breast in these patients enables them to live long enough to develop a second primary! Certainly the results of these surveys indicate that the battle is far from lost when a patient, following a mastectomy, is found to have a tumour in the opposite breast. This must be treated on its own merits and the results of such treatment are at least no worse than the prognosis following mastectomy for a unilateral growth.

Turning now to a more advanced stage of the disease, Strickland (1973) reviews the 385 patients with locally advanced breast cancer treated by radical supervoltage radiation at Mount Vernon Hospital. The treatment may leave a hard, fixed, fibrous mass in the breast, there may be episodes of inflammation which mimic local recurrence but gradually settle, and there may be pathological fractures of the ribs or even the sternum from avascular necrosis. Most cases were large primary growths with substantial skin involvement or ulceration, and evidence of fixation in underlying muscle. Supra-clavicular nodes were occasionally palpable and every case was histologically proved. In spite of the advanced nature of these tumours, 48% of patients at Stage T2 and 32% at Stage T3 were disease-free at 5 year follow-up.

Wound healing

Members of other branches of the profession should not be surprised, indeed should feel relieved, that surgeons are intensely interested in obtaining rapid and uncomplicated healing of the wounds they inflict. This is reflected by ever-increasing publications, both clinical and experimental, in the field of wound healing.

Whenever extensive wound flaps are employed the surgeon is faced by the problem of fluid collections beneath them. The commonest example of this in general surgery is the operation of mastectomy, where there is always concern about necrosis of the skin flaps, breakdown of the wound and haematoma and seroma collections under the flap with consequent risk of wound infection. As well as delaying the patient's discharge from hospital the consequences of these complications include an ugly scar, tethering of the skin to the chest wall, limitation of shoulder movement and development of unpleasant and even disabling lymphoedema of the arm (leading article, *British Medical Journal*, 1973). Rather similar problems involve the skin flaps employed in block dissection of the neck and the groin. Of particular value in the management of this type of wound is the use of suction drainage, first employed in the 1940s. Most surgeons who use this technique are convinced of its value simply as a result of comparing their present experience with former days,

but Morris (1973) now reports a controlled trial of radical mastectomy treated with conventional drainage (by means of two lengths of Paul's tubing, one brought out through the lower end of the wound, the second via a stab incision in the lower flap), compared with patients managed by means of two suction drainage tubes employed, on average, for 8 days. Infection, necrosis of wound edges and stay in hospital were all reduced in the suction drainage group.

Extensive skin flaps are particularly at risk in patients who have undergone previous radiotherapy, which reduces the vascularity of the tissues. Greenwood and Gilchrist (1973) report four patients with carcinoma of the larynx who had irradiation and subsequent laryngectomy which was followed by hyperbaric oxygen therapy at between 2 and 3 atm pressure in order to improve the tissue oxygen supply. Their clinical impression was that wound healing was enhanced. Jurell and Kaijser (1973) report their interesting experimental findings in which the survival of pedicle skin flaps in rats was studied in relationship to hyperbaric oxygen therapy. Provided that this was commenced immediately the flaps were fashioned, skin survival was increased by anything up to twice the controls. However, the effect was much less marked if treatment was delayed until 24 hr after the flap had been raised.

Antibiotics in wound infection

Wound infection is, unfortunately, still a common post-operative complication and one of the most important factors in delay in wound healing. Keill and his colleagues (1973) have carried out an extensive study of 4242 patients undergoing abdominal operations. Forty-seven of these suffered wound dehiscence; this was found to be significantly more likely to occur in those with wound infection, although it was not related to malignant disease, jaundice or the use of steroids. Evidence continues to accumulate which demonstrates that in modern surgical practice the common source of wound infection is the patient's own gastro-intestinal tract in operations which involve opening the gut or its adnexae (Altemeier *et al.*, 1973; Shaw, Doig and Douglas, 1973); in one recent study, for example, no less than sixty-one out of 100 consecutive patients undergoing colonic or rectal surgery developed post-operative wound infection (Burton, 1973). Because most infections today are therefore due to contamination of the wound from the patient's own gut lumen at the time of operation, there is increased interest in the use of local wound antibiotics or antiseptics inserted at the end of the operation in order to reduce the extent of contamination. A series of controlled trials in patients undergoing appendicectomy

have shown that the infection rate could be reduced from 16% to 9.3% by using a poly-antibiotic spray containing neomycin sulphate, zinc bacitracin and polymyxin B sulphate and to 8% by using a povidone iodine spray. The difference between the controls and both the antibiotic and iodine groups was significant. It is interesting that in this study there was a tenfold increase in wound infection comparing those patients with appendicectomies performed without wound contamination and those in whom gangrenous and perforated organs were removed (Gilmore, 1973; Gilmore, Martin and Fletcher, 1973). Another group in which infection is particularly likely to occur is in patients undergoing renal transplantation. Belzer and his colleagues (1973) report a trial of wound irrigation using a mixture of bacitracin and neomycin. In primary transplant cases, wound infection was reduced from 5% to 0.5% by this technique and in those cases requiring secondary surgery, infection fell from 28.6% to 4.8%.

Evans and Pollock (1973) found that systemic cephaloridine given for three doses, the first started pre-operatively, effectively reduced wound infection in both clean and contaminated wounds, except in the cases of colorectal and lower limb vascular surgery.

Stone and Hester (1973) report an important trial in which cephalothin given by intravenous injection was used in patients with suspected bowel perforation at emergency laparotomy. This antibiotic was either commenced pre-operatively or in the immediate postoperative period and this regime was then split up into patients undergoing primary wound closure, delayed primary suture and immediate suture of the wound combined with neosporin aerosol spray. The infection rate for patients undergoing primary closure in contaminated wounds was 48.7% (compared with only 4.1% in 'clean' wounds). However, this dropped to 15.6% in patients undergoing delayed suture and to 10.3% in patients whose wounds were closed with an antibiotic spray. Commencing systemic antibiotic therapy pre-operatively halved the incidence of peritoneal abscess compared with the group in which systemic cephalothin was commenced postoperatively. It is obvious that prophylactic antibiotic therapy commenced subsequent to surgery is of very little value in the treatment of wound infection.

One recent trial which found local antibiotic therapy of little value is reported by Logan (1973), who studied 100 patients undergoing gall bladder surgery distributed between those in whom ampicillin 250 mg in 5 ml of saline placed in the wound was compared with those in which saline only was used. There was no significant difference between the two groups but it should be noticed that the

dosage of ampicillin was small and its solution in saline might well enable the antibiotic to be rapidly washed away from the wound edges.

One factor in postoperative wound infection and breakdown which has not been considered very fully previously is the possibility of individual sensitivity to suture material. Lord (1973) carried out 200 clean elective abdominal operations in which the wounds were sutured with catgut, thread and nylon. At the same time these suture materials were implanted in the skin and any erythema produced by them was measured. Twenty-one patients developed wound infection and breakdown and, of these, sixteen had severe skin reactions to the suture material. In the non-infective group only eleven had such severe reactions. Obviously this aspect will require further investigation.

Wound healing malignant diseases

A well known clinical observation is that patients with malignant disease at advanced stage heal badly. The influence of tumours on the healing of colonic anastomoses has recently been studied experimentally in our laboratory (Stewart, 1973; Stewart and MacNaughton, 1973). A one layer anastomosis was carried out in the colon of the rat. In normal animals there was a rapid rise in the strength of the suture line during the first 7 days; this reached the strength of the normal intact colon at 8 days. Assessment was therefore carried out in this study at the seventh day, in which the strength of the anastomosis in normal animals was compared to those with local implants of transplantable tumour and in those in whom tumour was implanted at a distant site. The presence of tumour cells at the anastomosis significantly impaired tissue healing; this might be simply due to interposition of cancer cells between the wound edges but there was also evidence of inhibition of growth of neighbouring wound fibroblasts and epithelial cells. Distant tumour implants also impaired healing, but only by using a much higher concentration of cells than would produce similar inhibition at the local site. This impairment was found to be directly correlated with a fall in serum proteins which took place in the animals bearing tumour implants and was similar in effect to protein depleted animals *without* tumour. This would fit in well with the clinical impression that it is the cachexia associated with advanced malignant disease that is related to impaired wound healing.

Penile emergencies

Paraphimosis is a common and painful emergency. Manual reduction by compression of the oedematous tissues and manipulation of the constricting band over the glans is often successful, although

without a general anaesthetic it is extremely painful. Other procedures which are used include the application of ice packs, injection of hyaluronidase, a dorsal slit operation or an immediate circumcision. A very simple new technique which avoids a general anaesthetic or the incision or puncturing of the oedematous tissue has been described by Houghton (1973) who has named it the 'iced-glove' method. The glans and oedematous prepuce are coated with xylocaine gel for 2 min to achieve surface anaesthesia. A rubber glove is half-filled with ice and water and is tied at the cuff to prevent the contents from escaping. The penis is then placed into the thumb of the glove, which is held invaginated by the surgeon. The distended glove is pressed onto the penis and held in place for 5 min. The combination of cooling and compression causes reduction of the oedema, and the method succeeded in nine out of ten cases. In six of these patients, previous attempts at manual reduction had failed.

Persistent priapism may occur in leukaemia and sickle-cell anaemia, may result from the use of anti-hypertensive drugs and is usually seen in patients with spinal cord transection due to injury or tumour, as well as often being entirely idiopathic. Unless treated urgently, gangrene of the penis may occur or, in less serious cases, fibrosis and impotence may follow. Although many forms of treatment have been described, most of them are ineffective. However, in recent years the operation of cavernosaphenous shunt has been shown to be highly effective. In this procedure, the saphenous vein is dissected at the groin, divided, brought through a sub-cutaneous tunnel, and an anastomosis performed (using fine atraumatic arterial sutures) to a small incision made into the corpus cavernosus. Meideiros and Carvalho (1973) advise that bilateral drainage should be performed using both saphenous veins. In four patients whom they submitted to this bilateral procedure they found that complete flaccidity was only achieved when the second anastomosis was completed. They do not advise the use of systemic heparin. It is interesting that two of the three patients reported by Lehtonen and Tenhunen (1973) were on anti-coagulants at the time that they developed priapism. Griffiths and Webb (1973) report five patients who developed priapism. One had chronic myeloid leukaemia, one was being treated with guanethidine for hypertension, two were on heparin therapy and home haemodialysis and one had spontaneous idiopathic priapism. Two patients had bilateral by-passes and three unilateral shunts. All experienced considerable relief of pain and swelling after the operation, but one patient developed a severe recurrence after 9 months. This was treated by a shunt between the corpus cavernosus and corpus

spongiosum with satisfactory immediate relief. Unfortunately, the long-term functional results following these caverno-spongiosum shunts are not very satisfactory. These authors consider that no time should be wasted on conservative measures if priapism continues for longer than 8 hr.

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