Review Article

Review of general surgery 1985

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Introduction

Nineteen eighty-five has been an interesting year in general surgery and I have picked out some of the highlights that I have found of special value. They reflect the present trend to critical review of patient management, scientifically conducted prospective trials and the application of modern technology to patient care. This year I review abdominal emergency surgery (including appendicitis, pancreatitis, peritonitis and abdominal trauma), gall stone surgery, diverticula, inflammatory disease and cancer of the large bowel and the urogenital tract (urinary stone, urothelial cancer, testicular disease and prostatectomy). I make no excuse for dealing extensively with breast cancer, where important progress is being made in assessing the value of screening, adjuvant cytotoxic therapy and conservative surgical treatment. Finally, I review some interesting problems in the diagnosis of pulmonary emboli, wound healing and wound closure. The great majority of the papers quoted have been published in 1985.

Emergency abdominal surgery

Appendicitis

Acute appendicitis has long been linked with the modern low bulk diet and this has been used to explain its marked geographical and historical variations in incidence. Barker (1985) puts forward an interesting alternative hypothesis. In this country the incidence of appendicitis rose steeply from around 1895 and then fell from the 1930s onwards. Contrary to previous statements, he puts forward figures to show no evidence that the disease rate was greatly influenced by the dietary changes in the Second World War. At that time, both cereal and vegetable fibre consumption were appreciably above the 1880 levels and meat and sugar consumption fell to levels close to those in 1880.

Given a latent period of no longer than a few years, at least in children, these dietary changes would be predicted to cause a sharp drop in appendicitis in the 1940s followed by a rise in incidence in the 1950s when food rationing ceased. There is no evidence that this occurred. Barker considers that the time trends are more readily explained by the hypothesis that appendicitis is primarily an infectious disease. Explanation of the fall in the incidence of appendicitis may depend on continued changes in the population's immunity.

Appendicitis in pregnancy is always a worrying problem. Doberneck (1985) points out that fetal and maternal deaths in extensive reviews of modern publications are associated with delayed diagnosis and perforation of the appendix. In early appendicitis, fetal loss is 1.5% with no maternal mortality, compared with 35% and 4% respectively if the appendix is perforated. These figures support the concept that it is peritonitis rather than the appendicectomy that is the cause of fetal and maternal death and complications in pregnant women and argues for early removal of the appendix in such cases. Horowitz and his colleagues (1985), reviewing 12 of their own cases, reach similar conclusions.

In contrast, there is much to be said for conservatism in the treatment of patients with a localized appendix mass. Shipsey & O'Donnell (1985) analysed their experience of 834 patients with acute appendicitis under the age of 15. Seventy-seven of these (9.2%) had an appendix mass on admission and, in those under 6 years of age, about 60% had an appendix mass. Treatment comprised intravenous fluids with antibiotics (metronidazole, usually with gentamicin) and only eight patients failed to resolve. Four of these were submitted to drainage and four to appendicectomy. Following resolution of the abscess on conservative management, appendicectomy was carried out one month after discharge from hospital. There were no late complications or re-laparotomies.

A most unusual complication of appendicectomy is reported by Ubieto and his colleagues (1985). The patient was a boy of 18 who had undergone appen-

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dicectomy 18 months previously. He was admitted with right iliac fossa pain, blood and mucus *per rectum* and a haematocrit of 25%. At operation a caecal mass was excised. A black silk suture at the site of ligation of the appendix had produced a small ulcer of the mucosa with surrounding granulation tissue. These authors had traced records of three previous cases of granuloma of the appendix stump producing intestinal haemorrhage.

Surgeons have long argued whether, at appendicectomy, the appendix stump should merely be ligated or should be ligated and invaginated. Watters and his colleagues (1984) have reported the first prospective trial in 103 non-perforated appendices, with no difference in infection rate or post-operative hospital stay between the two groups.

Engstrom & Fenyo (1985) now report a second, and much more extensive trial, randomizing 735 appendicectomies between the two groups and including perforated and gangrenous cases in their series. Again, no difference was found in the rate of wound infection or hospital stay, nor in the incidence of post-operative pyrexia. Moreover, hardly surprisingly, simple ligation took, on average, five minutes less to perform. An interesting finding was that the incidence of post-operative obstruction due to adhesions in the first two months was 1.6% in the invaginated group compared with 0.3% in the ligated group ($P < 0.05$).

Pancreatitis

Acute pancreatitis remains a common clinical problem and, indeed, is probably increasing in incidence in this country. Corfield *et al.* (1985) compute an annual incidence of 73 cases per million of the population in the Bristol area in the period 1968 to 1979 compared with 54 per million in the preceding 20 years. During this period, the case mortality remained unchanged at 20%. Half the patients had gall stones, 23% had no aetiological factor and overall, 8% were alcoholics, although there was a threefold increase in this factor during the study period.

It is well recognized that acute pancreatitis may complicate open heart surgery. Haas and his colleagues (1985) note that the serum amylase shows a rise in about a quarter of patients after cardiopulmonary bypass, although the vast majority are symptomless. They report 12 clinical cases, representing about 0.2% of their bypass series, three of which were mild but nine were fulminating cases. Only two of these survived after debridement. In this study, from Boston, 138 cases dying after cardiac surgery were investigated at autopsy and 25% of these had pancreatitis, which was the principal cause of death in 4%. Of 38 non-surgical cases dying from cardiac failure and hypo-perfusion, 24% had pancreatitis. They suggest that mild sub-clinical injury to the pancreas may occur

as a consequence of cardio-pulmonary bypass which may become precipitated into a fulminating attack if hypo-perfusion follows in the post-operative period. Moneta *et al.* (1985) found that 22 patients out of 2428 adult open heart operations developed gastrointestinal complications within 30 days of surgery; six of these were examples of acute pancreatitis. Risk factors were a bypass time approaching 100 minutes and post-operative cardiogenic shock. It is interesting that the study by Corfield and his colleagues (1985) included only one example of pancreatitis following cardiopulmonary bypass.

Pancreatitis is a well recognized complication in renal transplant recipients and this is now being reported after cardiac transplantation. Aziz and his colleagues (1985) from Stanford University review 176 patients who died after either cardiac or cardiopulmonary transplantation; 15 cases of pancreatitis were identified. A variety of factors may have contributed, including infection (one had an aspergillosis abscess and two cytomegalovirus pancreatitis), steroids, azathioprine, low-flow states, extracorporeal circulation, vasopressors, renal failure and graft rejection.

Pancreatitis may complicate endoscopic intubation or sphincterotomy and also transduodenal surgical exploration of the common bile duct. Finan and his colleagues (1985) report 100 consecutive patients on whom this operation was performed. Half had a hyperamylasaemia at some time during the first five post-operative days but five actually developed clinical pancreatitis with two deaths. Interestingly, 12 of these operations were for gall stone-associated pancreatitis and none of these developed complications after transduodenal exploration.

It is now agreed that massive necrosis of the pancreas complicating pancreatitis should be managed surgically by removal of the pancreatic slough and wide drainage. However, it may be difficult at operation to assess the condition of the pancreas. Nordback and his colleagues (1985), from Finland, report 54 patients undergoing pancreatic resection for what was thought to be acute necrotizing pancreatitis. Haemorrhage and necrosis on the surface of the pancreas might be associated with a normal underlying pancreas, whereas deep necrosis might be hidden by congested peri-pancreatic tissues. Indeed, the degree of necrosis varied from 0 to 100% of the resected specimen. They found that no clinical or biochemical criteria helped but, in fact, computerized tomography, particularly with enhancement, can be valuable in such cases (Crass *et al.*, 1985; Matts *et al.*, 1985).

Colonic complications occur in about 1% of cases of acute pancreatitis; there may be colonic ileus or pseudo-obstruction, inflammatory stenosis or perforation from an eroding pancreatic abscess. Kukora (1985) reports three cases of extensive necrosis of the

colon with two survivors after resection and exteriorization of the colon together with peri-pancreatic drainage. Only 10 cases have previously been reported in the English language and five of these had died. Aldridge and his colleagues (1985) record no fewer than eight cases of ischaemia of the transverse colon in 15 patients with acute necrotizing pancreatitis. Another unusual complication is reported by Brown *et al.* (1985) – massive haemorrhage along the pancreatic duct. Haemorrhage complicating pancreatitis usually results from inflammatory or enzymatic erosion of vessels of adjacent viscera with an expanding false aneurysm which then ruptures into the stomach or duodenum. Rarely the false aneurysm ruptures into the pancreatic duct with bleeding along the duct into the duodenum.

Peritonitis

General peritonitis remains a common, and dangerous, surgical emergency. We have reviewed 100 consecutive adult patients with this condition on our unit (Crawford & Ellis, 1985); perforated peptic ulcer topped the list with 38 examples. Perforated appendicitis accounted for 20 cases. There were eight cases of post-operative peritonitis, eight of gangrenous small bowel (one a mesenteric thrombosis, the others late obstructions), five perforated sigmoid diverticula, five gangrenous gall bladders and four severe examples of pancreatitis. The remaining 12 patients had a variety of less common causes, including stercoral perforation of the colon and traumatic rupture of the stomach. The mortality overall was 16%.

Unusual causes of peritonitis are always of interest. Leijonmarck & Raf (1985) report an important study from Stockholm county showing that slow release potassium chloride tablets, although less dangerous than enteric coated tablets, may still produce stricture and/or perforation of the small bowel. A survey covering 1970 to 1983 revealed 22 cases in a population of some 1½ million people; there were 17 examples of stenosis (five with perforation) and five perforations without stenosis. As signs of the times, Lischick and his colleagues (1985) report five examples of rectosigmoid perforations in homosexuals, four resulting from trauma by fist insertion into the rectum and one from a dildo.

Spontaneous bacterial peritonitis

It is now well recognized that infection of ascitic fluid without any apparent intra-abdominal focus of sepsis is an often fatal complication of cirrhosis, and this subject is well reviewed by Crossley & Williams (1985). Overall prevalence figures in recently reported series approach 25%. About 70% of the organisms are of bowel origin, principally *Escherichia coli*. About 10 to

20% of cases show Gram positive cocci, particularly the pneumococcus, while anaerobes are found in between 6 to 14% of cases. Aetiology is still not certain. It is known that patients with cirrhosis have colonization of the upper small bowel with colonic organisms. In portal hypertension the permeability of the gut wall may be increased so that organisms may be able to migrate across it, particularly in the presence of hypertonic fluid in the peritoneal cavity. Some patients with infections of the respiratory or urinary tract also develop spontaneous bacterial peritonitis with the same organism, suggesting a haematogenous spread. Both clinical and experimental data suggest that impaired function of the Kupffer cells of the liver occurs in cirrhosis which would impair filtration of enteric bacteria from the portal blood stream.

From the clinical point of view, although fever, abdominal pain and tenderness do occur in most patients, symptoms are often minimal and easily overlooked. Indeed, in about one-third of the patients there are no symptoms or signs directly referable to the abdomen and there may simply be deterioration in hepatic or renal function, increasing encephalopathy or exacerbation of ascites.

Diagnosis depends on bacteriological examination of aspirated ascitic fluid. Gram staining reveals organisms in only about one-third of the cases but Scemama-Clergue and his colleagues (1985) have demonstrated that a count of over 250 polymorphs per mm³ in the aspirated fluid is a very good discriminant for the presence of spontaneous bacterial peritonitis.

The mortality is high, varying from 48 to 70%, so urgent active treatment is necessary, using a cephalosporin for choice.

Abdominal trauma

Splenectomy has long been the accepted treatment for injuries to the spleen. However, in the last decade documentation that overwhelming post-splenectomy infection can occur in adults as well as children after splenectomy for trauma has meant that preservation of the spleen has been utilized with increasing frequency. Feliciano and his colleagues (1985) report their enormous experience at the Ben Taub General Hospital in Houston where, over 4 years, they dealt with 326 patients with splenic injury. No fewer than 116 of these were due to various types of gunshot wounds and another 51 resulted from stab injuries. Blunt injuries accounted for another 150 patients and nine splenic injuries were iatrogenic. Splenorrhaphy by suturing with chromic catgut, with or without the addition of topical haemostatic agents, was attempted in all patients except when the spleen was shattered or avulsed or when multiple injuries were present. This was achieved in 136 of the cases (44.6%), naturally the majority were those cases of less severe injury to the

spleen. Complications after splenorrhaphy occurred in 16 patients (11.8%), mostly for drainage of infection. One patient underwent re-operation for suspected bleeding but this was not confirmed and another had a shotgun pellet erosion into his splenic artery and required delayed splenectomy. However, there was the remarkable achievement that no repaired spleen in the entire series required re-operation for bleeding from the splenorrhaphy site. These authors conclude, therefore, that splenic preservation can be performed in approximately half the patients with injured spleens with practically no risk of rebleeding.

Chaikof & McCabe (1985) give a useful assessment of the risks of post-splenectomy infection in a review of 584 adult patients and 53 children who had undergone splenectomy between 1962 and 1972 at the Massachusetts General Hospital and who were reviewed in 1982. The mean follow up was 8 years. In this whole series, there were four cases identified of overwhelming sepsis – two in adults and two in children. This gave an incidence of 3.77% in children and 0.34% in adults. The incidence was unrelated to the indication for splenectomy. These authors conclude that 'the aggressive approach to splenic preservation in adults should be tempered by these results'.

Biliary tract

Gall stones are common, although wide geographical differences in distribution exist. Thus recent population surveys using radiology or ultrasonography have shown prevalences ranging from 12% in Welsh women over the age of 45 to 76% in Pima Indian women over this age. Of the many factors thought to be risk factors for gall stones, only obesity, female gender and increasing age have been confirmed convincingly. Pixley and her colleagues (1985) have carried out a survey of women in two Oxford general practices which included ultrasound investigation for gall stones. Of 632 meat-eating women between 40 and 69 years there was a 25% incidence of gall stones compared with only 15% in 130 women who were members of vegetarian groups ($P < 0.01$). The prevalence of gall stones was found to increase with age and body mass index and this 2.5-fold increase in risk of developing gall stones in non-vegetarians compared with vegetarians was reduced to 1.9 when controlled for these two potentially confounding factors, but still remained significant. It is interesting that rural Africans, who have a traditional diet, rarely develop gall stones and diet, particularly a deficiency of fibre, may be important in the aetiology of this condition. The authors suggest that a case controlled study may help to identify a dietary factor.

Endoscopic sphincterotomy is now widely accepted

in the management of stones in the common bile duct. The main indication is retained or recurrent calculi following cholecystectomy, particularly in the elderly or high surgical risk patient. Increasingly it is being used in patients with common duct stones and an *in situ* gall bladder, either alone, in patients considered unsuitable for surgery, or as an adjunct to surgery. Leese *et al.* (1985) report a 6 year experience from Leicester in which 92% of common duct stones were cleared successfully in 319 patients. The complication rate was 10.4%, nearly half of which comprised haemorrhage, and emergency surgery was needed in 15 patients (3.8%). There were eight cases of pancreatitis following this procedure with one death. Endoscopic sphincterotomy can be valuable as a preliminary to surgery where there are additional risk factors such as jaundice, ascending cholangitis and gross obesity. In this group the need for subsequent exploration of the common duct is reduced. However, the relative merits of surgery alone versus endoscopic sphincterotomy preceding surgery for other groups of patients with common duct calculi will require properly conducted prospective trials. Another interesting report from Leicester (Baker *et al.*, 1985) described the 'sump syndrome' which may follow choledochoduodenostomy. This procedure is most valuable in patients with a grossly dilated common duct, often containing multiple stones, which can be drained side-to-side into the first part of the duodenum. Complications are unusual, but may comprise recurrent cholangitis with debris in the sump of the dilated duct below the anastomosis, or a blind loop syndrome due to bacterial infection of the duct with deconjugation of bile salts and resultant steatorrhea and malabsorption. They record eight cases, an incidence of about 3% of choledochoduodenostomies. Five of these were cured by endoscopic sphincterotomy, one by endoscopic removal of food debris and only two required further surgery.

One of the things surgeons fear is damage to the common bile duct during cholecystectomy with the tragedy of subsequent stricture formation. This is often associated with repeated attempts at surgical correction and is associated with a high morbidity and mortality. One cause of this disaster is failure to determine the exact anatomy of the duct system (often the site of congenital anomalies), and this can be greatly reduced by operative cholangiography. Kelley & Blumgart (1985) report that of 78 post-cholecystectomy strictures, no less than 71% had not had an operative cholangiogram at the time of the initial cholecystectomy, and in a couple of further cases the X-rays taken were of poor quality. They stress the importance of this procedure to establish the anatomy of the duct system as well as the presence of possible stones in the common bile duct.

Another potential cause of bile duct damage is the

'difficult' cholecystectomy – where severe fibrosis, inflammation or associated portal hypertension make anatomical dissection tedious and trying. In such cases, Bornman & Terblanche (1985) advocate sub-total cholecystectomy; the posterior wall of the gall bladder is left attached to the liver, the cystic duct is secured at its origin with the gall bladder by means of a purse string suture and a running haemostatic stitch is placed along the cut edge of the retained gall bladder wall. The exposed mucosa can be diathermized or simply left behind and the area is drained. They report 18 patients dealt with safely by this technique, representing 7% of all cholecystectomies performed over an 18 month period.

It is still a time-honoured custom to drain the liver bed following cholecystectomy. A detailed review by Hoffmann & Lorentzen (1985) concludes 'drains can safely be dispensed with in the vast majority of cholecystectomy patients'. Playforth and his colleagues (1985) carried out a prospective trial in both emergency and elective cholecystectomies without exploration of the common bile duct in which 78 patients had suction drainage to the liver bed and in 77 no drain was employed. There was no difference in wound infection, fever, post-operative chest or duration of hospital stay. It has been my own practice now for several years not to drain following cholecystectomy, except when the common bile duct has been explored, and I have certainly encountered no problem as a result of this.

The large bowel

Diverticulosis

Diverticulosis is extremely common in the Western world and appears to have a very strong correlation with dietary factors. Heaton (1985), in an excellent review of this topic, points out that subjects with this condition have a low beta sitosterol in the faeces, an unabsorbed plant sterol, which is a marker of dietary fibre. Vegetarians have less than half the incidence of symptomatic diverticular disease than non-vegetarians and the incidence has increased in the Japanese since the end of World War II, corresponding with a decrease in their dietary fibre. An interesting study by Manousos and his colleagues (1985) from Greece, where the incidence of diverticulosis is low (less than 10% of the population) compared 100 consecutive patients with symptomatic diverticular disease with a control population. In the former the diet is lower in vegetables, brown bread, potatoes and fruit and is higher in meat and dairy products.

Perhaps the most exciting recent report on this condition is the histological and electron microscopic study of resected specimens of uncomplicated diver-

ticular disease by Whiteway & Morson (1985). The gross thickening of the colon wall at the site of the diverticular disease has been assumed to be due to muscle hypertrophy. These workers have shown, however, that the muscle cells are quite normal but that the elastin in the taenia coli is increased by more than 200%. This is laid down between the muscle cells with distortion of the normal fascicular pattern of the muscles. There is no increase of elastin in the circular fibres but the contracture of the taeniae produced by the elastin is probably responsible for the characteristic concertina-like corrugations of the circular muscle. The reason for the deposition of the elastin in this condition remains a mystery.

Many cases of large bowel massive haemorrhage, previously ascribed to diverticula, are now known to be due to bleeding from angiodysplastic malformations – areas of submucosal dilated arteries and veins associated with overlying mucosal thinning and sometimes ulceration. This condition has only been recognized since visceral angiography and colonoscopy have been available in the workup of such patients. Salem and his colleagues (1985) present a useful comparison of colonoscopy and selective visceral angiography in the diagnosis of this condition. In 56 patients with angiodysplasia shown on angiography, 34 were submitted to colonoscopy. In 23 patients the diagnosis was confirmed, in three it was negative and in eight the examination was incomplete. Useful information may be obtained about the presence of other pathologies; thus, in eight patients other lesions were detected – four diverticula, three large polyps and one carcinoma. Colonoscopy may also enable electrocoagulation to be used as a therapeutic measure. The authors point out that unless active bleeding is seen at the time of angiography, it cannot be assumed that the vascular malformation is necessarily the source of the patient's haemorrhage.

Pre-operative localization of a site of bleeding throughout the intestinal canal remains a difficult clinical problem. Harvey and his colleagues (1985), from Leicester, give a detailed account of technetium-labelled red blood cell scintigraphy in detecting the site of haemorrhage. A series of 16 patients with suspected small or large bowel bleeding who required a transfusion of at least five units of blood were studied. The patients received an intravenous injection of stannous chloride and of sodium pyrophosphate. Twenty minutes later, a second injection of 99m-technetium pertechnetate was given. Stannous pyrophosphate binds to red blood cells and then combines with the radioactive technetium to give labelled red cells. Imaging, using the gamma camera, was begun immediately and repeated at 10 minute intervals up to one hour and scans were considered positive if focal areas of activity were noted in the abdomen in regions normally free from activity. A comparison of this

technique compared with other investigations and the findings at laparotomy (in 10 of the cases) demonstrated the high degree of accuracy of this interesting and relatively non-invasive technique.

Inflammatory disease of the bowel

Two important studies from Denmark have carried out careful documentation of ulcerative colitis and Crohn's disease in the county of Copenhagen. In a population of some 500,000, 783 cases of ulcerative colitis have been indexed with a follow-up of one to 18 years (median 6.7). During this period there have been only seven examples of malignant change in the affected colon (Hendriksen *et al.*, 1985). In the first year of diagnosis, 9.6% of the patients required colectomy and this figure had risen to 31% at the 18 year follow-up. Ninety-seven percent of the patients had at least one relapse during 10 years of review. Interestingly, with modern treatment the mortality in female patients with colitis is identical with the non-colitic background population of Copenhagen. Among men, there is a slightly increased mortality in the first and second years of the disease but this then becomes the same as the non-colitic population. A review of Crohn's disease in the same population (Binder *et al.*, 1985) reveals 185 examples of this disease, of which about a third affects small bowel, a third the large bowel and a third both small and large intestine. During the period of one to 18 years of follow-up (median 5 years) there was one example of malignant change affecting the ileum. After 10 years, 45% had had surgery. After 10 years, 99% of the patients had experienced at least one relapse but interestingly in all years except the year of diagnosis, 75% of the patients were at work.

Regrettably, in spite of much research, the aetiologies of both ulcerative colitis and Crohn's disease remain enigmatic (Mayberry, 1985).

Cancer of the large bowel

Colorectal carcinoma is the second commonest malignancy in the United Kingdom and is therefore one of the most common major problems facing the general surgeon to-day. Although the results of treatment from specialist centres seem encouraging, they hardly reflect the situation in the country as a whole. Stower & Hardcastle (1985) present an important review of 1115 patients with colorectal cancer over an 8 year period admitted to the Nottingham General Hospital and these figures are likely to reflect the country as a whole. Disappointingly, less than half the patients (46.7%) were considered to have undergone a 'curative' resection and 20% had either no operation at all or only a palliative procedure. Liver metastases were found to be present in no less than 26.7% of the

patients. The hospital mortality was 21.5%, the operative mortality 14% and one-third of the patients admitted as an emergency (and these accounted for no less than 40% of all the patients) had a five year survival of only 24% compared to the elective admissions, of whom 34% survived for five years. Interestingly, the length of the patient's history, sex and the site of the tumour had no effect on prognosis. These disappointing figures will only be improved by earlier diagnosis, perhaps by population screening, and reduction in the number of patients who reach an emergency situation before arriving at hospital.

Population screening for colorectal cancer usually depends on detection of occult blood by the Hemoccult method. Simon (1985), in a critical review, points out that although three to 20 colorectal cancers can be detected per 10,000 subjects enrolled in an occult blood screening programme, only 5 to 10% of positive tests are due to cancer and public compliance is often poor. Only controlled trials will answer the central question of whether or not screening actually decreases mortality. Such trials are being carried out in Minnesota and at the Sloan-Kettering Institute but the results are not yet available and are eagerly awaited.

At laparotomy, the surgeon should not be deterred by a tumour which is invading surrounding viscera, provided widespread dissemination has not occurred. Some years ago we reported a small series of six patients where right sided colonic tumours invading the duodenum had been successfully resected (Ellis *et al.*, 1972). Cawthorn and his colleagues (1985) now report a further case in which a tumour of the hepatic flexure invading the second part of the duodenum was resected *en bloc*, the excised portion of the anterior wall of the duodenum being replaced by a short segment of terminal ileum isolated on a vascular pedicle which was sutured mucosa to mucosa into the duodenal defect. The patient remains free of disease 6 years later.

Phillips and his colleagues (1985) present an important review of malignant large bowel obstruction from the large bowel cancer project centred at St Mary's Hospital, London; 4583 patients were involved in this study, which involves 23 hospitals between 1976 and 1980. Of these, 713 patients (16%) were admitted with obstruction. The greatest risk of obstruction is with tumours at the splenic flexure (49%), the least with tumours at the rectum and rectosigmoid (6%). The in-hospital mortality was much higher, 23% compared with 11% in non-obstructed cases and a five year survival much worse – 25% against 45%. This in spite of the fact that there was no greater risk of vascular invasion, lymph node invasion or difference in tumour differentiation between the obstructed and non-obstructed cases. The in-hospital mortality rate was not reduced by either a policy of primary or staged resection nor was there a survival advantage for either

policy. However, hospital stay after primary resection was half that of staged operations. However, immediate anastomosis in the obstructed left colon had a high clinical leak rate (18% versus 6% in the elective case).

A possible solution to the problem of the obstructing left sided colonic tumour is to carry out an extended resection of the whole of the obstructed large bowel down to and including the tumour, anastomosing the ileum to the distal colon. Morgan and his colleagues (1985), from Cardiff, report 16 such cases. There were two deaths, both from myocardial infarction, neither of which showed anastomotic leakage at autopsy. Of the surviving cases, there was no evidence of leakage on the seventh day post-operative Hypaque enema examination. This technique obviously merits further careful assessment.

Recurrent disease

The incidence of recurrence after 'curative' resection is well known to be associated with poorly differentiated tumour, lymph node involvement and invasion of adjacent blood vessels. It is also associated with a rise in titre in sequential carcino-embryonic antigen (CEA) determinations. Staab and his colleagues (1985) confirm that a rapid rise in these determinations indicates the presence of liver or peritoneal secondaries, whereas a slow rise suggests either localized recurrence or a second primary tumour. Blumberg *et al.* (1985) now present a retrospective study which suggests that blood transfusion may be a significant risk factor in the prognosis of colonic cancer. Tumours recurred in six of 68 patients (9%) who had not been given transfusions and in 56 of 129 patients (43%) who had – a highly significant difference. Transfusion was also found to be significantly associated with the time to recurrence after adjustment for other baseline prognostic factors. A possibility is that blood transfusion decreases immune responsiveness, but the authors go no further than to point out that an association exists and it remains unexplained. However, Frankish and his colleagues (1985) from Auckland were unable to demonstrate any association between recurrence and transfusion in 71 non-transfused and 103 transfused patients undergoing curative surgery for large bowel cancer. Obviously this relationship requires further prospective study.

Despite the large number of studies that have been conducted, there is still as yet no significant survival benefit that has accrued from radiotherapy, cytotoxic therapy (Hafstrom *et al.* 1985) or immunotherapy in reducing the relapse rate and improving disease-free survival in colorectal cancer (Metzger *et al.*, 1985). The most encouraging report comes from Taylor and his colleagues (1985) in Southampton. In this randomized trial adjuvant cytotoxic portal vein perfusion was

carried out in patients undergoing surgery for colorectal cancer without liver metastases. There were 127 control patients and 117 patients who received adjuvant perfusion. There were fewer liver metastases in the perfusion patients. An apparent survival advantage occurred in patients with Dukes' B colon cancers undergoing perfusion but this was not so in Dukes' B rectal lesions or in Dukes' C colon tumours. The authors stress that it is essential that further studies be performed to confirm or refute this apparent benefit before the treatment is administered to patients outside a clinical trial setting.

Liver secondaries

Secondary deposits in the liver, particularly those arising from large bowel cancers, have been the subject of intense research and endeavour in recent years. This can be attributed first to improved techniques of pre-operative assessment by sophisticated scanning and angiography and, second, because of the development of various methods of delivering high concentrations of cytotoxic drugs selectively to the tumour. Unfortunately, to date, the rewards for these endeavours have been disappointingly few.

In specialist referral centres, highly selective examples of early and often solitary deposits are amenable to hepatic resection with encouraging results. Cady & McDermott (1985) review 23 patients submitted to major hepatic resection for metachronous metastases from colonic cancer. Eighteen of these patients had one to three metastases only. There was a 25 month median survival and 11 of the patients were still alive at the time of report; three patients had developed further liver deposits. Of the five patients with four or more metastases, the median survival was only 13 months and all died of their disease, four of them with further liver deposits. These authors suggest there may be a biological difference between those patients with one to three metastases and those with four or more. They point out that since early detection by a rise in the carcino-embryonic antigen titre will not differentiate between these two varieties, they consider that this screening technique is not likely to increase the cure rate. Unfortunately, no randomized trials exist comparing excision of solitary secondaries with a conservative policy, so scientific proof of the value of such resections is not available in spite of the obvious emotional appeal of surgery.

Therapeutic embolization of the hepatic artery, performed by a percutaneous technique, can be valuable for post-surgical or traumatic haemorrhage from the liver, for the treatment of benign vascular tumours and for the treatment of carcinoid deposits. Unfortunately it has proved disappointing in the treatment of liver secondaries. Allison *et al.* (1985) performed this in 16 cases with only 50% showing any alleviation of

symptoms. Eight of the patients died in a median of 6 months, eight were alive at a median of 7 months and the longest survivor was only 13 months.

There has been intense interest, particularly in the USA, in the use of an implantable infusion pump for the treatment of metastatic hepatic deposits. The pump is placed subcutaneously where it can be primed with the appropriate cytotoxic drug. From it, a catheter is threaded through the gastroduodenal artery into the hepatic artery. Since first being used in 1972, large numbers of pumps have been employed but it would be true to say that little has been done to assess their value critically. On the other hand, the pump is costly and the laparotomy for catheter placement carried with it a definite mortality and morbidity. Oliver & Shorb (1985) put the hospital charges, excluding professional fees, at an average of \$18,000 per patient. Schwartz *et al.* (1985) present an important and sensible review of this technique based on an experience of 30 cases. Three-quarters showed signs of toxicity (heartburn, abdominal pain, vomiting and diarrhoea). Only three of 20 patients followed with sequential imaging studies showed a 50% decrease in the size of the tumour mass. Their experience, coupled with a detailed review of the publications in this field, indicate that the implantable pump does provide an excellent, although expensive, technique of delivering cytotoxic drugs to the liver but improvement over conventional intravenous chemotherapy has not been defined and the claim that survival time has been lengthened remains unsubstantiated. They point out that there is still a need to compare results of this technique with control patients receiving systemic intravenous chemotherapy. They consider that the method should still be regarded as an experimental procedure and should not be applied liberally until a significant cost benefit and risk benefit has been demonstrated. Sterchi (1985) also gives an excellent collective review of the different techniques of hepatic artery infusion for metastatic disease. Catheters can be placed either at laparotomy via the gastroduodenal artery or by a percutaneous technique. The former has a higher mortality but the second a higher morbidity, up to 40% of cases. Although a response rate can be demonstrated in about 50% of cases, there are extremely few examples of complete responders and the median survival following treatment remains about 12 months.

Taylor (1985) presents an important overview of the treatment of colorectal liver metastases. There is very little convincing evidence of benefit from either single agent or combination chemotherapy and whether systemic chemotherapy is any less effective than intrahepatic chemotherapy remains controversial. Radiotherapy, either externally or internally by means of injection of yttrium-90 microspheres may give palliation of severe pain but there is no convincing

evidence that overall survival is improved. Hepatic artery ligation and devascularization may relieve pain but does not give adequate control of tumour growth within the liver. Taylor concludes that surgical excision should certainly be considered for the occasional case of a truly solitary liver metastasis in an otherwise fit patient. For patients with multiple liver metastases, the outlook remains bleak and treatment should be directed primarily at palliation. In the presence of severe pain, percutaneous hepatic arterial embolization has a role but probably does not affect survival. Hepatic artery ligation, hepatic dearterialization, liver irradiation and systemic chemotherapy have not been shown to produce worthwhile benefit either in terms of palliation or survival. There are theoretical advantages to hepatic arterial ligation and portal vein cytotoxic perfusion but this approach requires laparotomy and survival may not be improved. There is insufficient evidence at present to recommend continuous hepatic artery infusion and the side effects, as well as expense, probably do not justify its routine use at present outside a clinical trial.

Urogenital system

Urinary calculi

Stones in the upper urinary tract are fairly common in the United Kingdom, cause considerably morbidity and may require lengthy and difficult surgical procedures. Furthermore, patients who have one episode of calculus disease have up to a 60% chance of developing recurrent stones. Extracorporeal shock wave lithotripsy (ESWL), which causes disintegration of the stone without contact, was first reported in 1980 and some 8000 cases have now been treated. A Unit has now been established in London, and Wickham and his colleagues (1985) present an interesting account of the first 50 patients treated in this country. The shock waves are generated outside the body by an ultra-short high tension electrical discharge under water to vaporize a fluid medium. The gas bubble produced by this discharge expands with great speed and acts as a shock wave at the gas-fluid interface. This is focused to produce a high tensile pressure at a small area, the patient being suspended in a water bath to facilitate transmission of the shock waves. These are focused precisely onto the calculus with biplanar radiography and the resultant fine fragments are passed spontaneously in the urine. Of the 50 patients treated, the average hospital stay was 3.7 days (range 2 to 10), the average operative time was 23 minutes (10 to 60) and auxiliary procedures were only required in four cases. There were no deaths and only minimal morbidity.

Auvert (1985) reports on 399 patients treated by this

technique in nine urological services in Paris over a 4 month period. At the time of his communication 62% were stone-free, 4% had no effect and the remainder had fragmented stones still passing or *in situ*. Complications had occurred – 2% had had severe infection requiring drainage, 4.5% had traumatic complications, mainly subrenal haematoma, and 10 patients had required secondary surgical procedures.

Obviously future development of this novel technique and its place in the urologist's armamentarium will be watched with great interest. Webb and his colleagues (1985) estimate that when facilities for ESWL and percutaneous nephrolithotripsy become fully available open surgery should only be necessary for less than 5% of upper urinary tract stones.

Tumours

Sole & Sorahan (1985), from the Queen Elizabeth Hospital, Birmingham, present an intriguing study of risk factors in urothelial cancer. They compared 240 male patients with urothelial cancer with 240 matched controls. Smoking and coarse fishing were significantly associated with urothelial malignant disease. The duration of exposure to the chrysoidine azo dye used to stain maggot bait was the most important risk predictor. This chemical agent is similar to some putative mammalian carcinogens and chrysoidine dyes are constituents of hair tinting solutions. The authors are concerned that fishermen may use this chemical as a bait dye when fishing in reservoirs used for storing drinking water – obviously a subject for fairly urgent investigation.

Oliver (1985) points out the importance of early diagnosis of testicular tumours. At The London Hospital, an average delay of two months was associated with patients free from disease at one year after treatment. Patients who had developed metastases cured by chemotherapy in the first year had an average delay of 4 months whereas patients with metastases at diagnosis or who died of drug resistant disease had an average delay in diagnosis of 7 months. Of particular difficulty were the minority of testicular tumours that presented either as small nodules in the testis without gross swelling or as a painful testis mimicking epididymitis. An interesting study by Desai *et al.* (1985) from Southmead Hospital, Bristol describes the use of ultrasound in the diagnosis of scrotal swellings. Of 105 patients presenting with either a pain or testicular swelling, 92 showed ultrasound abnormalities. The technique was of particular value in just this important point of differentiating between tumour and epididymitis. It was also valuable in confirming an underlying normal testis in association with a cyst, thus obviating the need for out-patient aspiration, for distinguishing a haematocele, which might need evacuation, from a haematoma infiltrating

the tissues and which can be left alone, and for confirming normality of the testis in a patient complaining of testicular pain. In the group of 83 patients with a palpable abnormality, only one scan was incorrectly reported as normal and this was a man with a small post-vasectomy nodule. In the early part of the study one case was misinterpreted as a testicular tumour which proved to be an epididymitis with a testicular abscess. The recognition of the rather bizarre echo pattern in this case resulted in an improved accuracy of interpretation in subsequent scans. Our own preliminary investigation of the use of testicular ultrasound certainly corroborates these authors' view of its value.

Testicular torsion

Thomas and his colleagues (1985) in Bristol have been carrying out interesting and important studies on testicular torsion. A retrospective study of 67 patients showed that this was followed by significant oligospermia in 86%. Experimental work in rats suggested that this might be related to contra-lateral testicular damage produced by immunological mechanisms. Twenty-one patients were submitted to a prospective study of auto-antibodies to testicular tissue. No patients had antibodies present on admission but within one to 12 weeks, 12 patients had developed either antisperm or antitestis antibodies. Of the nine who did not develop these, four had an ischaemic time of less than 4 hours, four had an immediate orchidectomy without restoration of blood flow and one had a delayed orchidectomy for sloughing of the testis which was never properly revascularized. Of those who developed antibodies, all had an ischaemia time of over four and a half hours, after which the testis was untwisted prior to orchidopexy or orchidectomy. The authors consider that these results indicate that ischaemic damage to the testis following torsion can result in contra-lateral testicular damage from auto-immunization. This may explain the alarming degree of oligospermia in these patients.

The impalpable testis

The impalpable testis in a child is a difficult clinical problem because it is impossible by clinical examination to determine where such a testis is located or whether it is absent. Various techniques have been employed such as arteriography, CT scanning and ultrasound (Kullendorff *et al.*, 1985). Boddy *et al.* (1985) review their experience of the place of laparoscopy in this situation in a series of 46 boys with 55 impalpable testes. In 13 impalpable testes, the ipsilateral vas and testicular vessels were seen to end blindly within the abdomen, the so-called 'vanishing testis', where a previously present testis has undergone

ischaemic necrosis and where no further intervention is necessary. Eighteen testes were located intra-abdominally and in 21, the vas and testicular vessels were seen to enter the internal inguinal ring, either with a testis in the canal or where the vessels and vas ended blindly within the inguinal canal. Laparotomy was only needed in three boys to locate the testis and the authors conclude that laparoscopy is the investigation of choice when trying to locate an impalpable testis.

Prostatectomy

Something like 10% of the adult male population in this country undergo prostatic surgery. Many believe that these operations should be performed by specialist urologists, but the demand for this operation exceeds the available urological services. Morris *et al.* (1985) discuss this important and controversial topic in a review of the results of 600 prostatectomies performed at Kingston Hospital by four general surgeons and their junior staff. A third of the cases were patients admitted with retention of urine as emergencies and over half the operations were performed by junior staff. Transurethral resection was performed in 65% of the operations with a mean post-operative stay of 6 days. The remainder underwent open prostatectomy with a mean stay of 10 days. The overall complication rate, including urinary tract infections, was 14.8%, with an overall mortality of 1.3%. Interestingly, there was a zero mortality for open prostatectomy and of the eight patients who died after transurethral resection, five had an age range of 81 to 94 years. These figures shown that general surgeons with an interest in urology can adapt to a higher transurethral resection rate without compromising standards and indeed with a reduction in mortality, morbidity and hospital stay and with figures comparable to those achieved by specialist urologists.

Carcinoma of the breast

The last year has seen a number of very important publications pertaining to this topic, especially in the fields of breast screening, adjuvant therapy and the local treatment of early breast tumours. Several of these papers represent eagerly awaited results of prospective clinical trials.

The first indication that screening for breast cancer might result in considerable benefit came from a randomized controlled trial in New York in the 1960s. Obviously further trials were needed to confirm or refute these findings before widespread screening programmes were embarked upon (Leading Article, 1985). Tabar and his colleagues (1985) report on an

important Swedish trial which commenced in 1977 and which has involved over 162,000 women over the age of 40. These have been randomized into those receiving a single-view mammogram every 2 to 3 years compared with controls. Compliance was 89% at the first screening. At 7 years there was a 31% reduction in mortality in the screened versus the control group and a 25% reduction in the rate of Stage II or more advanced tumours in the screened group. The MRC study in the United Kingdom is investigating the efficiency and costs of clinical examination on its own, combined clinical examination and mammography and education programmes (Leading article, 1985) but the Swedish trial is already indicating that the National Health Service must expect increasing demands to be placed upon it for efficient X-ray equipment, trained radiologists and trained radiographers to provide services for early detection of breast cancer.

The Swedish trial has naturally excited worldwide interest but must be interpreted with caution. Skrabanek (1985), for example, points out that no benefits are shown for women under 50 and even in the 50 to 74 age group results were significant in only one of the two counties surveyed. Moreover, the number of deaths prevented by screening were small and no data is available on interval cancers (diagnosed between screenings) in the study. He also points out that in the USA it is estimated that mammography costs \$195,000 per cancer detected. Roberts and his colleagues (1985) estimate a cost of £80,000 to save one death or long-term disability from breast cancer by screening programmes and, unfortunately, these days cost-effectiveness of medical care is a factor which has to be taken into consideration.

Although adjuvant cytotoxic therapy has been adopted with enthusiasm in the USA for patients with axillary node involvement, it would be true to say that surgeons in this country have been inclined to a greater degree of scepticism. It is interesting, therefore, that Gough and his colleagues (1985) can now report a randomized controlled trial of prophylactic cytotoxic chemotherapy in the Oxford region which has been in progress since 1977. Patients were allocated to treatment with melphalan for 2 years or to melphalan, methotrexate and 5-fluorouracil for 2 years or to a control group in a total of 273 patients. At the time of report, 125 patients had suffered a recurrence of tumour and 85 had died. No statistically significant differences in outcome were apparent between the three treatment groups, although there was some indication of a beneficial effect of chemotherapy on the disease-free interval in pre-menopausal patients. Against this, toxic effects of treatment, notably nausea, vomiting and bone marrow depression, were moderately severe. These authors conclude 'the beneficial effects of current adjuvant cytotoxic chemoth-

erapy, if any, are too modest to justify the suffering which such treatment can cause at a time when a woman with breast cancer might otherwise expect to feel physically well'.

Even the most enthusiastic proponents of adjuvant chemotherapy, the group at the National Tumour Institute in Milan, have to confess that their regime of cyclophosphamide, methotrexate and fluorouracil has produced no significant difference in relapse-free or survival time in post-menopausal women compared with controls. However, in their group of 103 treated pre-menopausal women, there was a 48% relapse-free survival and 59% overall survival at 10 years compared respectively with 31% and 45% in their 86 control cases, which is statistically significant (Bonadonna *et al.*, 1985).

In contrast, there is considerable interest in the United Kingdom in the use of the anti-oestrogen tamoxifen as an adjuvant agent. Baum and his colleagues (1985) are now able to report the results of their multicentre trial on 1285 patients following mastectomy. Pre-menopausal patients with involved lymph nodes, and post-menopausal patients with or without lymph node involvement were included. These were randomized between controls and those receiving 10 mg of tamoxifen twice daily for 2 years. There was prolongation of the disease-free interval and a significant reduction in the death rate in the treated patients with 34% fewer deaths in the treated compared with the control group. The response was independent of the menopausal, nodal or oestrogen-receptor status of the patients.

In last year's review (Ellis, 1985) I discussed the increasing interest in the treatment of early breast cancer by local excision of the tumour ('lumpectomy') followed by radical radiotherapy which we have now practised exclusively in my own Unit in Westminster over the past 6 years. I pointed out the ethical problems of carrying out a controlled trial comparing this conservative treatment with conventional mastectomy, which many of us have considered insuperable; how could we say to our patients that the decision on whether or not she was to lose the breast depended on the drawing of a random number? Yet, until the experiment could be carried out, we had only anecdotal evidence that our conservative treatment would give the same expectation of life and same degree of local control of the disease as conventional mastectomy. Fortunately, Fisher and his colleagues (1985) have been able to carry out a multicentre randomized trial of these two modalities of treatment in the USA and have published a long awaited and most important report on this subject. The trial covers 1976 to January 1984, includes tumours 4 cm or less in diameter and comprises 1843 patients randomly assigned to total mastectomy, segmental mastectomy alone or segmental mastectomy followed by breast irradiation.

All patients had axillary dissections and all patients with positive nodes received, in addition, chemotherapy. Life table estimates indicated that treatment by local excision of the tumour with or without breast irradiation resulted in disease-free, distant-disease-free and overall survival at 5 years that was no worse than after total breast removal. The value of radiation was shown by the fact that a total of 92.3% of women treated with radiation remained free of breast tumour at 5 years as compared with 72.1% of those receiving no radiation (a highly significant figure). Disease-free survival after local excision plus radiation was actually better than disease-free survival after total mastectomy. These authors conclude that local excision of the tumour followed by breast irradiation in all patients with adjuvant chemotherapy in women with positive nodes is appropriate for Stage I and II breast tumours up to 4 cm in diameter provided that the margins of the resected specimens are free of tumour.

Veronesi *et al.* (1985) have also updated their figures from the Milan randomized trial; 349 patients underwent radical mastectomy and 352 quadrantectomy and radiotherapy between 1973 and 1980. There was no demonstrable disadvantage with regard to relapse-free survival or local recurrence in the conservatively treated group in this series of cases with tumours 2 cm or less in diameter and clinically negative nodes.

Tagart and his colleagues (1985) present further evidence that local excision alone is inadequate treatment. In 1971, 37 patients were treated by wide local excision without radiotherapy. At three years, local recurrence had occurred in one-third of the patients and eventually in 20 of the cases (54%) who had been disease-free for 8 to 50 (average 24) months post-operatively. In all but one patient, the recurrence lay immediately below the operation scar, suggesting that remaining malignant cells had colonized the wound.

A valuable resumé of the case for alternatives to mastectomy in the primary management of breast cancer is provided by a recent monograph edited by Tobias & Peckham (1985).

Local recurrence after lumpectomy and radiotherapy occurs with about the same incidence as following mastectomy but is, of course, most disappointing. This problem has been investigated by Harris and his colleagues (1985) in Boston. They assessed 221 patients undergoing conservative therapy and found that they could identify three unfavourable pathological features in the excised specimen: prominent intraductal carcinoma in the tumour, intraductal carcinoma in the grossly normal adjacent breast tissue and poorly differentiated nuclei. If none of these features was present, at 6 years there were no failures of treatment, whereas 42% of patients with all these three features developed recurrent disease. These authors argue that patients with these pathological

features should undergo wider resection to make sure that areas of intraductal carcinoma surrounding the main tumour are removed. They discuss whether such patients should, in fact, be submitted to mastectomy. As yet, it is not known if these pathological features would also represent poor prognosis for local recurrence in patients undergoing mastectomy and this they are now studying. Such a report will obviously be awaited with considerable interest.

Certainly the cosmetic and functional results following conservative treatment of breast cancer are excellent. We reviewed 47 patients treated by lumpectomy and radical radiotherapy in 1982 and assessed at one year for the functional result (Bulman *et al.*, 1985). The appearance of both breasts was identical in 34% of the patients and only four had marked distortion of the breast. No patient had severe telangiectasis, arm oedema, restricted arm movements or severe pain.

The psychological consequence of mastectomy, with a high incidence of depression and anxiety, have been well documented, but there is less information about the psychological consequences of conservative treatment. We are at present engaged in such a study but it is interesting that Ashcroft *et al.* (1985) have reported on 40 patients who were counselled and allowed to choose between mastectomy or lumpectomy plus radiotherapy. Very little adverse psychosocial reaction was subsequently found in either group.

The move towards conservative treatment is demonstrated by a survey performed by Gazet and his colleagues (1985) among surgeons in the United Kingdom. This was carried out in September 1983 with replies from 537 consultant surgeons. At that time, 84% of the surgeons treated most of their patients with breast cancer by mastectomy but about a quarter of the patients underwent some form of operation aimed at conserving the breast. It would be interesting to have an up-dated review of surgical practice in this country which might well show that the swing towards conservatism is increasing since, at the time of this survey, controlled trials such as those by Fisher and his colleagues, quoted above, were not yet, of course, available.

Three groups of patients present particular problems in local management of breast cancer – the elderly, the pregnant and those with advanced local disease. Professor Forrest's group in Edinburgh (Allan *et al.*, 1985) report on the use of tamoxifen as the primary treatment for breast cancer in elderly or frail patients. They treated a group of a hundred such cases, with a mean age of 76 years (28 of them over 80), of which over a third had other major systemic disease, with tamoxifen 10 mg three times a day. The response rate was 68% and only 10 had progressive disease. The actuarial five year survival was a surprising 52%. Only 37 patients had oestrogen receptor status estimates

performed in this group but of these, 35 were shown to be rich in receptors and this group had the same response to tamoxifen as the remainder who were not tested. These authors suggest that 'such tumours in the elderly should be regarded as rich in oestrogen receptors'.

King and his colleagues (1985) give a useful review of carcinoma of the breast associated with pregnancy at the Mayo Clinic and report on a series of 63 patients treated between 1950 and 1980. The incidence of pregnancy associated with carcinoma is between 1.4 and 4% of reported cases. Although such tumours are often thought to be highly aggressive, in fact in this series only four were disseminated and 12 locally advanced, of which eight were 'inflammatory'. For such advanced cases, they advocate chemotherapy with irradiation followed by subsequent mastectomy, if possible. If chemotherapy is to be used, then obviously pregnancy must be terminated unless the patient can go to early delivery. In early cases, the authors could not demonstrate any advantage in termination of the pregnancy. Indeed, in the 20 patients with Stage I disease, 16 (80%) survived five years, and these included 15 of the 17 patients with early disease who were allowed to go to term.

It is still not unusual to see patients with locally advanced breast cancer without clinical or laboratory evidence of disseminated disease, the so-called Stage III cases. Mastectomy in such patients is associated with an extremely high and early local recurrence rate. Most centres (including our own) treat such patients by radiotherapy with adjuvant tamoxifen and proceed to 'toilet' mastectomy if the tumour fails to respond completely or recurs. It is well recognized that the local recurrence rate in such cases is high. In an attempt to reduce this, Townsend and his colleagues (1985) have performed a trial of radiotherapy followed by total mastectomy. In a series of 53 patients followed up from three to 134 months, local recurrences occurred in only six patients, a gratifyingly low incidence. However, the overall prognosis was grave, since 28 patients had died with distant metastases and only 12 of the total were free of disease. The authors anticipate that the use of combination chemotherapy with or without endocrine manipulation might improve the survival in this group of patients.

The woman at greatest risk of developing a cancer of the breast is the woman who has already had a carcinoma on the opposite side. Indeed, the risk of metachronous contra-lateral cancer is some 5.9 times that of the risk in the first breast in the general population (Hughes & Courtney, 1985). Many studies have shown that a contralateral breast cancer carried no worse prognosis than that of the first breast, so early detection and treatment is clearly worthwhile and this alone makes a strong case for following up all

patients who have had a carcinoma of the breast treated. Wanebo and his colleagues (1985) carried out biopsy of the contra-lateral breast at the time of mastectomy in 62 patients, either at the mirror image of the primary tumour or, more often, as a wide excision of the upper outer quadrant of the opposite breast. Two of the patients had clinically overt cancers and in no less than 11 others (18%) an occult tumour was detected, 10 of which were non-invasive. In a previous series of 500 patients, 37 (7.4%) developed either metachronous (33) or had synchronous (4) contra-lateral tumours of which 35 were invasive and two were non-invasive. These authors performed simple mastectomy on the contra-lateral breast when an occult tumour was detected but it remains to be seen whether this therapy should be regarded as over-enthusiastic treatment until more is known about the natural history of occult non-invasive breast tumours.

Experimental surgery and wound healing

Pulmonary embolism

Pulmonary embolism remains a serious and common complication in surgical patients. Bergqvist & Lindblad (1985) present an extensive 30 year survey of pulmonary embolism from Malmo in 5477 hospital deaths in surgical patients. The autopsy rate varied from 73 to 100% annually, with a remarkably high average of 90%. Pulmonary embolism was found at 23.6% of all autopsies – roughly a half were incidental findings, a quarter contributed to death and a quarter were the cause of fatality. Interestingly, the frequency of pulmonary embolism showed a decrease in the last five year period. The accurate diagnosis of post-operative deep venous thrombosis was greatly improved by the introduction of radioactive iodine labelled fibrinogen scanning of the legs. However, this is of limited value in detecting thrombi located in the proximal femoral vein and cannot diagnose pelvic venous thrombosis or pulmonary emboli. An important new advance is discussed by Clarke-Pearson and his colleagues (1985) from the Duke University Medical Center. These workers have evaluated the imaging results of patients injected with radioactive indium-labelled platelets after abdominal and pelvic surgery. Either autologous platelets or donor platelets were used and were separated from the blood by differential centrifugation. Imaging of the legs, pelvis and chest was performed with a gamma camera and the entire study took approximately 30 minutes. A total of 171 patients was studied. Fifteen were found to have inadequate circulating platelets but 156 patients achieved technically satisfactory images; 46 (29.5%) had images consistent with deep venous thrombosis and/or pulmonary emboli. Eighty patients had normal

scans and 30 had diffusely distributed labelled platelets found in the operative field, suggesting accumulation in a post-operative haematoma. None of these results was confused with a diagnosis of deep venous thrombosis. Of the five patients who had pulmonary emboli detected on platelet imaging (all asymptomatic) four were confirmed by pulmonary arteriography and the fifth by a ventilation-perfusion lung scan. The authors point out that this diagnostic technique has the advantage of allowing surveillance of the legs, pelvis, abdomen and chest by a single method, making it near ideal for post-operative thrombo-embolism surveillance.

Surgical ritual

I have often commented in these annual reviews on the fact that almost every part of the surgical ritual is likely to be carefully dissected by means of controlled trials – often with surprising results. Hill and his colleagues (1985) found that the great majority of surgeons they canvassed admitted to the custom of using one blade to incise the skin and another for deeper dissection. A previous controlled trial had already shown no difference in wound infection if one or two knives were used. Now a bacteriological study that they performed showed that they could only grow skin contaminants from the discarded blades in eight out of 93 outer blades, and eight out of 93 inner blades. In three instances both blades grew skin contaminants. A modest saving of time and money could be achieved by abandoning this custom.

I have all but abandoned the use of post-operative nasogastric suction after abdominal surgery, reserving it for patients with severe peritonitis, obstruction or oesophageal surgery. Two recent randomized studies have confirmed my clinical impression. Bashey & Cuschieri (1985) from Dundee randomized 52 patients undergoing routine cholecystectomy or vagotomy to nasogastric suction or tubeless surgery. Only two of the 25 without tubes required a therapeutic passage of a nasogastric tube for post-operative vomiting. There was a higher incidence and severity of symptoms overall in the nasogastric tube group, especially sore throat, aerophagy and dysphagia. Bauer and his colleagues (1985), from Mount Sinai Hospital, New York, treated 100 major abdominal cases with nasogastric suction until flatus was passed (an average of 6 days) and compared these with 100 patients where a tube was passed only if there was vomiting, gross distension or if obstruction supervened; six required this treatment. The majority of the patients had undergone large bowel resections. There was no difference in wound infection or leakage rate between the two groups but there was increased comfort and mobility in those treated without nasogastric decompression.

Abdominal wound closure

Burst abdomen – complete dehiscence of the laparotomy wound – is still being reported at an incidence of 1 to 3% and with a significant mortality of up to 20% of cases (Fagnicz *et al.*, 1985; Muckart & Luuno, 1985; Poole, 1985). Many studies have demonstrated that wide bites of tissue, using preferably non-absorbable suture materials, can reduce this figure to well below the 1% level (Ellis *et al.*, 1985; Leaper, 1985). However, incisional hernias are still common complications of major laparotomies and occur in something like 10% of cases when these are carefully followed-up. When do these incisional hernias actually occur? We recently reported on 363 patients whose laparotomy wounds had soundly healed at one year but whom we reviewed again between two and a half and five and a half years later. No less than 21 of these (5.8%) were found on their follow-up examination to have developed incisional hernias (Ellis *et al.*, 1983). A fascinating study by Playforth and his colleagues (1985) suggests that incisional herniation may be a much earlier event. A group of 63 patients had steel clips placed on either side of the fascial incision and were X-rayed one month later. At follow-up 6 to 42 months later (median 29 months) 10 of these patients had developed an incisional hernia and in each the clips had separated from between 12 to 70 mm (median 26 mm) at the one month X-ray. In contrast, of the 53 patients with no herniation, none had more than a 9 mm separation of the steel clips. The authors conclude 'that the origin of incisional hernias can be traced back to events in the first month after operation and that they are not the result of later weakening of a well-healed laparotomy incision'. According to these authors, then, our own findings of late herniation can be ascribed entirely to observer error!

Recently, Donaldson and his colleagues (1982) have introduced the lateral paramedian incision which provides a wide flap of rectus muscle as a shutter mechanism. We have now carried out a prospective randomized trial, in conjunction with Mr Alan Pollock at Scarborough Hospital, comparing 221 midline incisions with 209 wide paramedian. There were two burst abdomens in the wide paramedian group (one at each hospital) during the early 'learning' stage with none in the midline series closed by the mass suture technique. However, there were 20 incisional hernias in the midline group compared to two in the wide paramedian group, a highly significant difference (Ellis *et al.*, 1985). Unfortunately, this incision cannot be used in all instances – for example acute emergencies for severe haemorrhage or where there are already scars from a previous laparotomy or an incisional hernia.

The poor results of incisional hernia repair are not widely advertised; very few long term results, in fact,

have been reported. Langer & Christiansen (1985) followed up 154 such cases for from 4 to 10 years, all but three having been repaired by one or two layered closure of interrupted silk or Mersilene. There was a recurrence rate of no less than 31%. Of 21 undergoing repair of recurrence, nine recurred (44%). Most recurrences occurred within 3 years of repair. A study from my own Unit (in press) gives similar gloomy results.

It is interesting that the healing of laparotomy wounds in children has received little attention. Kiely & Spitz (1985) now remedy this with a study from Great Ormond Street; 507 infants and children under 16 years of age were randomized between layered and mass closures. All were sutured using polyglycolic acid sutures. There was but a single burst abdomen (in a 2 year old boy with a midline incision closed by the layered technique). There were four incisional hernias, all in infants under 12 weeks of age and all in transverse wounds, three in the layered closure and one in the mass closure series. There was no statistically significant difference in the incidence of wound complications between the two groups. The fascinating observation was made that all four incisional hernias healed within 16 weeks of surgery and late occurrence of incisional hernia was not seen in any patient in the series with a follow-up period of over two years. This particular complication of abdominal surgery does not appear to be a problem in children.

Factors affecting wound healing

An interesting and unusual paper by Trovillet and his colleagues (1985) reports the use of granulated sugar as a dressing for open infected sternotomy wounds with mediastinitis after cardiac surgery. Nineteen critically ill patients were all rapidly debrided with sterilization of the wound within a week. The authors colourfully claim that the sugar produces 'a series of osmotic shocks to any bacteria present'.

Topical antimicrobials may have the disadvantage that they inhibit healing. Lineweaver and his colleagues (1985) used tissue cultured fibroblasts and also open cutaneous wounds in rats to study this phenomenon. The antibiotics investigated (bacitracin, neomycin and kanamycin) had no effects on fibroblast proliferation or wound healing, but the antiseptics Providone iodine, acetic acid, sodium hypochlorite and hydrogen peroxide, all inhibited fibroblast growth and all but peroxide inhibited wound epithelialization. Brennan & Leaper (1985) used the rabbit ear chamber technique and a laser Doppler flow meter to study the microcirculation in the healing wound and could demonstrate cessation of capillary circulation when hypochlorite antiseptics (Eusol or Chloramine T) were applied.

Borden and his colleagues (1985) noted decreased

breaking strength of fascial wounds in rats treated by metronidazole, although wound contraction and skin healing were not affected.

These studies certainly indicate that caution is

needed in the indiscriminate use of powerful topical antiseptics in the dressing of granulating wounds and ulcers.

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