Review of general surgery 1984–85

Harold Ellis

Surgical Unit, Westminster Hospital, London SW1, UK.

Introduction

This review of general surgery has a distinctly abdominal flavour, with sections on the acute abdomen, inflammatory bowel disease, large bowel tumours, and diseases of the biliary system and pancreas. However, I also include peripheral vascular disease, the breast and experimental surgery as topics for discussion. As usual, the papers reviewed are those that particularly caught the author's eye during the year and the great bulk of the references refer to 1984 publications.

Peripheral vascular disease

Occlusion of arteriosclerotic arteries accounts for an enormous amount of mortality and morbidity in the Western world and much of the work of the vascular surgeon consists of attempting to disobliterate or bypass such occlusions. Still in the experimental stage is the use of the laser for endoscopic endarterectomy. Stiegmann and his colleagues (1984) give a fascinating description of their experiments in Cape Town in both cadaver arteriosclerotic aortas and in normal pigs which demonstrate the effectiveness of this technique in ablating atherosclerotic plaques. It may be that in the future an endoscopic laser instrument may be introduced through the femoral artery into the aorta to clear major occluded vessels by a relatively 'low-invasive' technique.

Vascular grafts themselves have greatly improved in recent years but are still not perfect. Clarke and his colleagues (1984), at the Middlesex Hospital, are developing a technique of seeding mesothelial cells obtained from the omentum onto the inner surface of Dacron grafts. They are able to produce a 94% cover of the luminal surface of the graft and have shown that these mesothelial cells secrete prostacyclin and also possess fibrinolytic activity – factors which may improve long term graft patency.

Unfortunately, the dream of 'medical' treatment of atherosclerotic occlusion seems as far away as ever. A large number of pharmacological agents have been

evaluated in the past in the treatment of peripheral vascular disease but the results in general have been disappointing. Recently, prostaglandin E₁ (PGE₁) has been reported to promote relief of pain and healing of ulcers in patients with Raynaud's syndrome and in those with distal arteriopathies. Telles and his colleagues (1984), in Oxford, have carried out a trial in 30 patients with ischaemic ulceration or rest pain due to lower limb atherosclerosis treated with either intravenous PGE₁, or placebo in a prospective double-blind controlled trial. There was no significant improvement of rest pain, nor was PGE₁ effective in promoting ulcer healing.

The technique of percutaneous transluminal angioplasty was described by Dotter & Judkins in 1964 for the treatment of peripheral vascular disease. Gruntzig developed the double-lumen catheter in 1972. Basically, the technique consists of positioning a double-lumen catheter, introduced percutaneously, across the stenosis, dilating the balloon and thus distending the vessel wall to restore its lumen to normal calibre. In the process, the intima is split and disrupted, the media is overstretched and there is permanent derangement of both the elastic fibres and smooth muscle. This controlled trauma to the vessel wall heals with fibrous tissue and the result is restoration of a stenotic vessel to a more normal luminal diameter (Wilson & Fuchs, 1984).

An important review of the published results of treatment of over 5000 ischaemic limbs between 1970 and 1981 is presented by Doubilet & Abrams (1984), in which they compare percutaneous angioplasty with surgery or a combination of the two when surgery is used if the dilated vessel subsequently becomes occluded. A comparison of angioplasty and femoropopliteal open surgery is most revealing; on average, angioplasty costs \$2585, has a complication rate of 2.3% and a 5 year patency of 29.4%. Open surgery costs on average \$13,970, has a complication rate of 6.7% and a 5 year patency of 59.9%; this last figure obviously offsets the advantages as regards costs and complication rate of angioplasty. The best results followed the combined approach of angioplasty followed by surgery if and when subsequent occlusion occurred, and this technique was most likely

to give patency of limb vessels at 5 years. These authors point out that in 1980 only 6.7% of peripheral vascular operations in the USA were performed by the percutaneous technique and they argue that this should be nearer the 40% level. There seems little doubt that this valuable method of treatment will be used much more widely over the next few years, not only in the management of peripheral arterial occlusions, but also in coronary and renal vessel disease.

Breast

Women with breast complaints form a large and important part of general surgical practice. A responsible role that the surgeon has to play is one of reassurance to women who are petrified that they have cancer and it is interesting that of 1000 consecutive referrals to our general surgical clinic of patients with breast complaints no less than 306 were entirely normal women and another 223 had fibroadenosis only. Cysts, which were almost invariably treated by aspiration, accounted for another 150 patients, fibroadenoma for 77 and a whole group of miscellaneous conditions (abscesses, lipomas, etc) accounted for another 126 patients. One hundred and eighteen of the patients had carcinoma of the breast, accounting for 26% of the 457 patients coming to excisional biopsy (Ellis & Cox, 1984).

There is no doubt that most women, on discovering a lump in the breast, dread the possibility of mastectomy and there is naturally increasing interest in the treatment of early breast cancer by local excision of the tumour ('lumpectomy') followed by radical radiotherapy. Indeed, we have practised this treatment exclusively in my own unit at Westminster over the last 5 years and now have a series of some 350 patients undergoing careful follow-up and evaluation. The exact details of the technique are important and cannot be carried out without expert radiotherapists, technicians and first class equipment. Full details of the Westminster technique have recently been published (Ashford *et al.*, 1984). The Guy's Hospital group have also taken up this conservative approach with enthusiasm and Hayward and his colleagues (1984) have treated 96 patients to date.

In this country and in the USA, the ethical problems of carrying out a controlled trial comparing conservative treatment with conventional mastectomy have proved insuperable. However, Sarrazin and his colleagues (1984) in France have randomized 179 patients between mastectomy (88 patients) or local excision plus cobalt irradiation (in 91 patients). The trial was restricted to women presenting with tumours of 2 cm or less. In both groups, low axillary dissection was carried out and if one or more nodes were found to be positive, the patient received a complete axillary

dissection. At the time of this report, 95% of the patients had been followed up for 3 years or more and 66% for at least 5 years. There was no significant difference between the two types of treatment although the lumpectomy with radiotherapy treated group did fair slightly better. Among the lumpectomy group, the aesthetic result of the breast was judged excellent in 32% of cases and good in 60%. At 5 years local recurrence had occurred in 5% of the lumpectomy group and 12% of the mastectomy patients (not a statistically significant difference).

From Stockholm, Cedermark *et al.* (1984) report on 158 breast cancers equal to or less than 2 cm in diameter treated by wide local excision, low axillary dissection and 5000 rad. A follow-up from 6 months to 5 years revealed two local recurrences and they could identify no difference in the local, regional or distant recurrences or in survival rate with results obtained in their centre by mastectomy. Montague (1984) presents an extensive review of 1073 patients with breast cancer treated at the M.D. Anderson Hospital, Houston between 1955 and 1980. Of these, 345 were treated with conservation surgery and irradiation and 728 with radical or modified radical mastectomy alone. The loco-regional recurrence in patients treated with an intact breast was 4.9% and 5.6% in patients treated by mastectomy; there was no significant difference in the disease-free survival rates between the groups.

It is now agreed that local treatment will not affect prognosis with regard to survival of the patient and the controversy focuses on the ability of lumpectomy and radical radiotherapy to produce local control equivalent to that achieved by mastectomy. It is often overlooked that even the most carefully performed radical mastectomy, in the hands of master surgeons, is followed by a significant percentage of local recurrences. Haagensen is acknowledged as probably the most experienced exponent of radical mastectomy and yet in his own personal experience of 1036 cases there was a 3.7% local recurrence within the first 10 years in his stage A patients and 12% in his stage B, node positive, cases (Haagensen & Bodian, 1984).

As a compromise, many surgeons are performing mastectomy and then carrying out breast reconstruction procedures. Hinton *et al.* (1984) implant a silicone prosthesis about 6 months following subcutaneous mastectomy. However, these reconstructive procedures bear with them their own morbidity. In this series of 84 patients, for example, there were 11 poor cosmetic results, 28 patients developed marked capsule formation around the prosthesis, which required treatment in 25 of the patients by either rupture of the capsule in out-patients or open capsulotomy, three patients developed a severe fibrous reaction, two had skin necrosis and three had the prosthesis removed, in two cases because of infection.

It is often considered that young women with breast

cancer bear a particularly sinister prognosis. It is reassuring, therefore, that Rosen and his colleagues (1984), at the Sloan Kettering Cancer Center in New York, have reviewed 166 women under the age of 35 with breast cancer and found that the 5 and 10 year survival rate was not appreciably different from women in other age groups from their own or from other centres. Their youngest patient was aged 20 and eight of their cases were between the ages of 20 and 25.

Breast screening

Optimists hope that early diagnosis of breast cancer by screening may improve the depressing survival figures for breast cancer that have remained almost stationary for decades. The most ambitious programme to date was developed in 1962 by the Health Insurance Plan of New York, in which 62,000 women were randomized into a study group who received clinical examinations and mammography annually for 3 years compared with a control group. Only two-thirds of the invited women in the study group came at least once. The one-third of the women in this group who never came at all have been continued as part of the study in statistical comparison with the control group. After 14 years of follow-up there have been 118 deaths from breast cancer in the study group versus 153 in the control group, most of the difference between the two groups occurring in the women between the ages of 50 and 59 at entry into the study (Strax, 1984).

Obviously this interesting study requires corroboration and a multi-centre trial of screening is at present being conducted in this country under the aegis of the Medical Research Council; results are not expected for some years but they will obviously throw an important light on the question of whether mortality is indeed reduced and whether, with present constraints, the exercise can be cost-effective.

A screening technique which is certainly cheap is self-examination. In an important paper, Foster & Constanza (1984) have reviewed 1004 newly diagnosed cases of breast cancer attending the Vermont Hospital in the USA. Self-examination of the breasts had been carried out at least monthly by 23% of the patients. At a mean follow-up of 52 months, 14% of the self-examination group were dead compared with 26% of the non-examiners – a highly statistically significant difference. In the self-examination group the cancers tended to be at earlier clinical stage, of smaller pathological tumour size and there were fewer with axillary node involvement. The authors estimate that the lead time would have to be at least 3 years to negate the apparent beneficial effects of self-examination on survival and they consider that self-examination in this population was related to earlier detection and to improved survival. Some confirmation of this study comes from Turner and his colleagues (1984) in

Belfast who randomized over 2800 women between patients receiving a booklet on breast self-examination and controls. During the 2 year follow-up, the frequency of breast abnormalities was identical in both groups but there were more early malignant breast cancers in the 'self-examination' patients than in the control group. Again, controlled trials are urgently needed in this important field.

The disappointing results of screening may be explained by an important report by Heuser and his colleagues (1984) who compare breast cancers picked up at screening with a group that were detected *between* annual screening examinations. The latter had a faster growth rate, occurred in younger patients and were associated with an absence of microscopic and mammographic calcification. The 5 year survival rate was also worse and there was a significant association between the absence of calcification and the presence of axillary metastases. These 'interval' cancers, with their bad prognosis, make the impact of screening on healthy female populations less than would be anticipated.

Adjuvant chemotherapy

There has been great interest in the preliminary results from Milan of adjuvant therapy using cyclophosphamide, methotrexate and 5-fluorouracil (CMF) in operable breast cancer. This demonstrated a significant benefit in terms of recurrence rate but this advantage, however, appeared to be limited to premenopausal women. Indeed, in many centres, particularly in the USA, adjuvant therapy has now become the norm. An important report from a combined Manchester and Guy's Hospital group, which attempted to repeat this trial, is therefore of great importance (Howell *et al.*, 1984). A series of 327 patients with involved axillary nodes were randomized after total mastectomy and axillary clearance to receive either no additional treatment or the CMF regime repeated monthly for 12 cycles. There was indeed a significantly longer relapse-free survival in the treated group, which was seen in premenopausal patients, those with one to three lymph nodes involved, and those with four or more nodes involved, but a similar trend in post-menopausal patients failed to reach statistical significance. However, at 3 years there was *no* difference in overall survival between the control group and those receiving adjuvant CMF, and this applied to both the pre-menopausal and post-menopausal patients. The psychological, physical and haematological toxicity of the CMF regime was considerable (for example, 82% nausea or vomiting, 65% alopecia and 22% diarrhoea); more than half the patients were anxious or depressed. The authors conclude that these early results indicate a need for caution before advocating the widespread use of CMF

as adjuvant treatment and consider that new approaches are required, perhaps using short duration intensive drug administration.

There is now increasing interest in the use of the anti-oestrogen, tamoxifen, as an adjuvant agent. A survey of 1285 patients randomized after mastectomy into a group receiving tamoxifen for 2 years and a control group, reveals a significant diminution of mortality in the treated group which was not related to age, menopause or nodal status (Wilson *et al.*, 1984).

The acute abdomen

Patients with acute abdominal pain remain a common and important problem to the general surgeon. Stower and his colleagues (1984) in Nottingham reviewed their total admissions to one general surgical firm in 1979. These amounted to 1068 patients. Of these, 524 were emergencies (49.1%). The sex distribution was equal and the under 20 year old was the largest age group admitted. The commonest diagnosis was non-specific abdominal pain, accounting for 22.9% of all the patients. Acute appendicitis accounted for a further 11.1%. Other emergency categories were far less common, and included peptic ulceration and its complications in 4.2% of cases, painful biliary tract disease in 3% and intestinal obstruction in 4.9%. Strangulated hernia accounted for a further 2.9% of admissions and acute pancreatitis 2.1%.

There is no doubt that the overall spectrum of emergencies is changing. Strangulated hernia is now relatively uncommon because of the efficient elective treatment of external hernias before strangulation ensues. Perforated peptic ulcer is also undoubtedly on the decline. Watkins and his colleagues (1984) carried out an 18 year review of this complication in Oxford between 1965 and 1982. The incidence fell from 8.7 to 6.9 per 100,000 per year. Interestingly, the male to female ratio decreased from 4.9 to 1 to 1.9 to 1 during this period, due to a reduction in the male, but an actual increase in female, patients. No less than 65% of the perforations occurred in acute ulcers and the overall mortality was 12.7% (operative mortality 8.9%).

Adler *et al.* (1984) have analysed the total admissions with perforated peptic ulcer in the state of Western Australia between 1971 and 1981. There were 1187 admissions and it is interesting that over the last 3 years there was a 35% drop in the annual admissions compared with the previous incidence of this emergency. In North-East Scotland, the incidence of perforated duodenal ulcer 1972–1981 was one-third that of the period 1956–7 (Hendry *et al.*, 1984).

Some authorities have suggested that the incidence of appendicitis is actually on the decline. But Soreide (1984), in a detailed review, suggested that most of the

reported reduction in incidence rates is probably caused by a more reliable data base in recent years.

There are, of course, fascinating geographical variations in acute abdominal conditions throughout the world. For example, Khanna & Misra (1984) review 204 examples of gastrointestinal perforation from Benares, India. No fewer than 108 of these were due to typhoid. The next commonest cause was perforated duodenal ulcer (58 cases) and all other conditions were uncommon – including only nine examples of perforated appendicitis. Ajao (1984) points out that in Ibadan, Nigeria, gall stone disease is rare, accounting for less than 0.5% of all acute abdomens, and pancreatitis is also very uncommon, perhaps related to the rarity of gall stones and alcoholism. Only five patients with symptomatic diverticular disease were seen in the University Hospital over a 20 year period. While on the subject of geographical variations, Tseng and his colleagues (1984) give a fascinating account of current surgical interests in China and point out that traditional medicine and acupuncture are used for early cases of appendicitis, perforated duodenal ulcer, pancreatitis and obstruction due to adhesions, although they point out that this is abandoned if there is evidence of extensive peritoneal sepsis.

Intestinal obstruction

The aetiology of intestinal obstruction has changed markedly over the last 50 years in the Western world. Strangulated hernias used to be common and obstruction due to adhesions relatively rare. Nowadays, thanks to the great increase in the number of abdominal operations, obstruction due to adhesions is now the commonest cause of small bowel obstruction and although strangulated hernias are still not uncommon, they have certainly lost their previous pride of place. An analysis of 279 adult patients operated on at Westminster Hospital with intestinal obstruction (Nelson & Ellis, 1984) showed that 31% were due to adhesions, 30% due to large bowel cancer and 23% due to strangulated hernias. Other causes of obstruction included volvulus 5.4%, diverticular disease 3.9% and intussusception in 1.4%. Incidentally, the overall mortality was 7.9%. Bevan (1984) reports that adhesions were responsible for 37.9% of 277 consecutive patients admitted to Dudley Road Hospital, Birmingham with intestinal obstruction. Of these 104 patients, 91 (88.2%) had had previous abdominal surgery.

Adhesions producing intestinal obstruction, in the vast majority of cases, follow abdominal surgery. Adhesions will develop certainly in 90% or more of patients following major laparotomy (Ellis, 1984) yet the incidence of adhesive obstruction is quite rare. In many cases, of course, the adhesions simply involve omentum, but even when the small bowel is im-

plicated, obstruction frequently does not take place. Maetani and his colleagues (1984) in Kyoto, Japan, have published some fascinating clinical studies on the mechanism of simple adhesive bowel obstruction. They point out that it had generally been believed that kinking or angulation of the bowel would be the common cause of simple intestinal obstruction due to adhesions. However, they show that when resected bowel is folded in half and inflated with air introduced from one end, the air passes freely through the angulation. Critical studies at the time of laparotomy showed that either torsion (twisting of the bowel about its axis) or constriction by a band were frequently found and are important causes of both simple bowel obstruction and of strangulation.

Intestinal obstruction can be diagnosed in the majority of patients on the basis of clinical findings and plain abdominal radiographs. However, it is important to remember that if small bowel loops are filled with fluid, the typical gas pattern may be absent, giving a false negative X-ray appearance. Where diagnosis is equivocal, modern interventional contrast radiography may be of considerable value. Maglinte *et al.* (1984) point out the value of contrast enteroclysis in suspected cases of small bowel obstruction. In this technique, a barium suspension is infused through a tube introduced trans-nasally or per-orally into the distal duodenum. The site of obstruction can be identified by stasis of the head of the barium column and an abrupt change in the calibre between the distended loop proximal to the obstructing lesion and the collapsed or normal segments distal to it. The examination was usually completed in between a quarter to half an hour. Of 56 patients studied, mechanical partial obstruction was diagnosed in 38, 24 of whom required surgery, when the diagnosis was confirmed in 23 of the patients. The single false positive was a patient in whom the obstruction had been interpreted radiologically as minimal. The 13 remaining patients were managed conservatively. The possibility of significant mechanical obstruction was excluded in the remaining patients.

There has been a reluctance in the past on the part of many surgeons to use barium for contrast examination of the obstructed bowel for fear of converting a partial to a complete obstruction by barium impaction. However, this is not the case in clinical practice. Similarly surgeons have been somewhat reluctant to carry out interventional radiography in suspected cases of large bowel obstruction. Stewart and his colleagues (1984) at St James' Hospital, Leeds, report an extensive prospective study on 117 patients with a suspected mechanical large bowel obstruction or pseudo-obstruction using a single contrast water soluble enema (Diodone). In 99 cases where the plain film suggested mechanical obstruction, the contrast enema confirmed its presence in 52 but relocated its site in 11.

There was a free flow of contrast of the caecum in the remaining 35, (11 of whom were shown to have idiopathic pseudo-obstruction) and one examination failed. In 18 patients diagnosed on plain film as having colonic pseudo-obstruction, the Diodone enema confirmed the diagnosis in 15 but revealed an unsuspected mechanical obstruction due to a tumour in two and failed in the remaining case. The technique is simple and quick to perform and there were no complications in this series. When the obstruction is mechanical, its site may be accurately localized and surgical correction expedited using an appropriate incision. When the diagnosis is one of pseudo-obstruction, unnecessary surgery can be avoided. Indeed, Bode and his colleagues (1984) confirm that the majority of these cases can be decompressed safely via the colonoscope.

Intestinal obstruction occurring late in the course of malignant disease usually carried with it a serious prognosis, the majority of patients being found to have extensive serosal carcinomatosis. However, one must always bear in mind the possibility that the obstruction may, in fact, simply be due to post-operative adhesions, as in any other patient who has been submitted to laparotomy. Aabo and his colleagues (1984) from the Finsen Institute, Copenhagen, review 41 patients submitted to laparotomy in the late course of malignant disease, seven of whom were found to be due to adhesions and in five of these (12%) there was no evidence of residual malignant disease.

In the acute abdomen, it is surprising how often the unusual is found at surgical exploration! Recent reports include the first example of strangulated stomach with a femoral hernia (Cade & Lane, 1984), a patient who lived to be 90 before developing intestinal obstruction through a defect in the omentum, which I believe is usually congenital in origin (Watt, 1983) and a bizarre example of large bowel obstruction due to compression of the rectosigmoid between bilateral calcified serous cystadenomas (the right having undergone torsion and infarction) and the lip of an advanced spondylolisthesis, which we operated upon with success (Leese & Ellis, 1984).

Peritonitis

Acute appendicitis remains the commonest cause of peritoneal infection in the Western world. Unfortunately, diagnosis of the early case is all too often missed, either by the general practitioner or the surgeon. This may happen even in the most prestigious surroundings; Buchman & Zuidema (1984) found that, of 59 patients with acute appendicitis admitted over a 12 month period at the Johns Hopkins Hospital, Baltimore, no less than 16 were either sent home or were inappropriately treated initially. No fewer than 14 of these patients had perforated by the time diagnosis was made and surgery performed. These authors

confess that, despite proliferation of laboratory tests and imaging procedures, early diagnosis rests on the clinical skills of the physician.

There has been controversy concerning the question of an increased incidence of infertility in women who have suffered perforated appendicitis in childhood. An interesting study by Puri and his colleagues (1984) from Dublin reviewed 134 girls under the age of 13 who underwent appendectomy for perforated appendicitis between 1957 and 1970. They succeeded in tracing 103 of the patients, of whom 59 were married and 'of these' 50 had had one or more children (two unmarried women had also had children). Of the nine women who were married but childless, five had been married not more than a year, a sixth had miscarried, indicating that she was able to conceive, a seventh patient had been married for over two years but did not cooperate with further studies. The remaining two patients were investigated for infertility. One had patent tubes on testing and the other patient was found to have a sterile husband, so that tubal patency testing was not performed. These authors conclude that although the Fallopian tubes may be affected by the initial inflammation of perforated appendicitis with pelvic abscess or pelvic peritonitis in childhood, their data refute the claim that perforated appendicitis in girls increases the incidence of infertility. The inflammatory process usually resolves completely with appendectomy and adequate antibiotic treatment and does not have the implications that salpingitis or endometriosis have in the adult patient.

Conventionally, a patient with an inflammatory appendix mass is treated conservatively (unless an enlarging abscess requires drainage), with a subsequent elective interval appendectomy. In recent years this convention has been challenged, the antagonists maintaining that a further attack of acute appendicitis is rare enough to make routine interval appendectomy a superfluous procedure. Hoffmann *et al.* (1984) reviewed 49 patients in Copenhagen with an appendix mass that had been treated conservatively. Five were lost to follow-up but of the remaining 44, reviewed between 6 months and 22 years (average 8 years) later, nine developed recurrent appendicitis (20.5%) and six had recurrent abdominal pain but were not submitted to appendectomy. It is, of course, important to ensure, particularly in middle aged and elderly patients, that the mass is not in fact some other pathology, particularly a caecal carcinoma and indeed in this series there were three misdiagnoses – two tumours and one pseudo-cyst of the pancreas. Although it is true that perhaps three-quarters of the patients may have no further trouble after surviving an appendix mass, the fact that a considerable minority are going to develop further trouble still makes it perfectly reasonable advice to advocate interval removal of the offending organ.

Iatrogenic peritonitis may follow chronic peritoneal dialysis or be consequent upon the use of the peritoneovenous LeVeen shunt. Francis and his colleagues (1984) review 122 patients undergoing continuous ambulatory peritoneal dialysis at the Royal Victoria Infirmary, Newcastle. No fewer than 94 of these had catheter-related peritonitis, in a total of 233 episodes. Removal of the catheter is advised under the following circumstances: (1) If peritonitis occurs within a week of the second course of the appropriate antibiotic regime. (2) If symptoms and signs are severe and fail to improve within 48 hours of commencing antibiotic treatment. (3) If infection is due to *Candida albicans* (two patients). The catheter can be reintroduced within 2 to 5 weeks after removal. Rosenman *et al.* (1984) report an unusual case of peritonitis resulting from perforation of the left colon in a patient with a LeVeen shunt which had been *in situ* for 6 years in a patient of 60 with cirrhosis. Recovery followed resection of the perforation and a covering colostomy. Cambria & Shamberger (1984) describe a patient who developed intestinal obstruction caused by encasement of the entire small bowel in a fibrotic cocoon while undergoing treatment with a LeVeen shunt for alcoholic cirrhosis and ascites. One previous series of five cases has been described in abstract form (Greenlee *et al.*, 1979) and the syndrome resembles those cases of peritoneal cocoon associated with practolol. Interestingly, Bainbridge & Sage (1984) describe an alcoholic cirrhotic who developed sclerosing peritonitis with a smooth, thickened sheath enclosing the entire gastrointestinal tract, who had neither had a shunt nor taken beta-blockers. Histologically, the peritoneal sheath consisted of a dense layer of hyalinized, laminated fibrous tissue containing fibroblasts and a few mononuclear cells.

Surely the most unusual case of peritonitis of the year was reported from Westminster Hospital by Scurr & Cutting (1984). A man of 22 was admitted after a severe crush injury to the lower abdomen and pelvis. On admission, he was wearing tight fitting jeans and a broad leather belt. His condition was stable and he was not shocked. However, when his tight jeans were cut off, the left leg was seen visibly to expand, his abdomen distended and he collapsed with an unrecordable blood pressure. After resuscitation, laparotomy revealed a large quantity of free blood and bowel contents in the peritoneal cavity with five perforations of the ileum and extensive damage to the descending colon, together with a large retroperitoneal haematoma from his fractured pelvis. Recovery followed repair of the bowel defects. Obviously the patient's tight jeans had acted as a compression garment (or G-suit) which limited blood loss and prevented venous pooling. The authors caution that there may be similar patients with major injuries to the legs and pelvis where removal of tight garments may

be counter-productive before instituting fluid or blood replacement.

Inflammatory bowel disease

Crohn's disease can be defined as an idiopathic, patchy, transmural inflammation affecting any part of the gastrointestinal tract, and characterized by the presence of ulceration, fissures, fistulae and, in two-thirds of cases, granulomas. The incidence and mortality of this condition have both been rising for several decades.

The epidemiology of Crohn's disease is fully reviewed by Mayberry & Rhodes (1984). The disease is most common in the USA and North Europe, with the highest prevalence figures coming from Scandinavia; the incidence is rising and it is more common in urban than in rural communities. There is a small genetic predisposition but no firm dietary association. The statement that it is more common among Jews is based on small numbers of cases, but there is undoubtedly an increased risk of carcinoma of the gastrointestinal tract. Slater and his colleagues (1984) report from the birth place of Crohn's disease, Mount Sinai Hospital, New York, that between 1960 and 1981, 1227 patients were operated on for Crohn's disease at that institution. There were 63 malignancies, of which 21 were of the large bowel. They record that three of these tumours were of the anal canal, two being squamous carcinomas and one a carcinoma of cloacogenic origin. Interestingly, Somerville and his colleagues (1984) record what appears to be a unique case of squamous carcinomatous transformation in the anal skin tags of a male patient of 26 with Crohn's disease of the terminal ileum.

Booth & Harries (1984) point out that diagnosis is often delayed in children where there is a higher recurrence rate and mortality than in adults. Treatment is particularly difficult in this age group because of the risk of growth retardation, both from malnutrition and from treatment with steroids. Indeed, growth failure and sexual retardation is found in up to 30% of cases. Ferguson (1984), in an excellent review of this condition in children and adolescents, estimates a prevalence of about one per 10,000 in the population of Britain up to the age of 18. She points out that several studies have demonstrated the efficacy of parenteral feeding in children with Crohn's disease and growth retardation. Administration of elemental diet by nasogastric intubation may produce similar benefits.

At present, medical treatment for Crohn's disease is non-specific. Sulphasalazine, prednisolone and azathioprine may induce remission in active cases, but none appear to prolong the duration of clinical remission in patients in remission or in whom surgical extirpation

of all macroscopic disease has been performed (Ferguson, 1984). An interesting paper by O'Morain *et al.* (1984) reports a controlled trial in which 21 patients acutely ill with exacerbations of Crohn's disease were randomized to receive either prednisolone or an elemental diet (Vivonex) for 4 weeks. Assessment at 1 and 3 months showed that patients treated with the elemental diet had improved as much as those in the steroid treated group and this would certainly warrant further studies. These authors postulate that the elemental diet may act by 'resting' the lower bowel or may prevent a secondary immunological reaction to the passage of large amounts of foreign protein through the damaged gut wall.

Turning to surgical treatment, Lee (1984) points out that Crohn's disease is probably diffuse from the start and, since there is no evidence that wide excision gives any better results than localized surgery, resection should be limited to macroscopically diseased bowel. In the majority of cases, this comprises a standard resection but in extensive disease, Lee advocates short resections, side-to-side bypass or stricturoplasties, which, in his experience, will heal even if anastomosis is performed through active macroscopic disease.

Pace *et al.* (1984) record an interesting case of a patient undergoing six stricturoplasties of the small intestine. Seven months later he underwent re-exploration for stenosis of a previously unaffected area; the stricturoplasties were all healed and two further ones were performed, together with a resection of a distal ileal segment. Obviously in this patient massive bowel resection was avoided by this technique.

Naturally in large bowel Crohn's disease, there is the problem of whether or not the rectum and anal sphincter can be preserved. Ambrose and his colleagues (1984) report their extensive experience from the General Hospital, Birmingham of 63 cases undergoing colectomy and ileorectal anastomosis between the years 1951 and 1981. At 10 years, the re-operative rate was 48% and the recurrence rate 64%, but two-thirds of the patients under review still have an intact ileorectal anastomosis. Suitable cases are young patients with minimal anal disease. Where recurrence occurs in the ileum, the ileorectal anastomosis can still be refashioned but if the recurrent disease is in the ano-rectum, these authors advise proctocolectomy. Sanfrey and his colleagues (1984), from the Johns Hopkins Hospital, Baltimore have also reviewed 41 resections for large bowel Crohn's disease over the 20 year period from 1961. Limited resection can be performed for segmental disease, but if the whole bowel is involved with only rectal sparing, they find the chances of maintaining enteric continuity is low and, unless the patient is young and in the child bearing age, they consider total proctocolectomy should be carried out in such cases.

Acute Crohn's disease of the colon requiring emer-

gency surgery is uncommon, but Mortensen and his colleagues (1984) from St Mark's Hospital review 18 such patients with one post-operative death. Emergency treatment had been required for toxic dilatation, perforation or acute deterioration. Only one patient required immediate proctocolectomy but subsequent rectal excision was necessary in 10 of 16 patients in an average follow-up of 8 years. These authors conclude that acute colonic Crohn's disease requiring surgery is less likely than ulcerative colitis to be amenable to restorative surgery despite their policy of rectal conservation.

Psoas abscess is becoming well recognized as a rare complication of Crohn's disease. Durning & Schofield (1984) report four examples. There were no general or abdominal signs of sepsis but all four had wasting of the right quadriceps femoris muscle and hip flexion. They advise surgical drainage followed by resection of the affected bowel, performing the anastomosis away from the area of the abscess, or else, if possible, interposing omentum between the anastomotic line and the region of previous sepsis. Tweedie & McCann (1984) report what appears to be a unique case of metastatic granulomas affecting the forearm, buttock, thigh and anterior abdominal wall in a man of 65, occurring several months after proctocolectomy for Crohn's disease. These cutaneous lesions cleared on prednisolone therapy.

Tumours of the large bowel

Large bowel cancer remains the second commonest cause of deaths from malignant disease in the Western world and, in spite of intensive efforts, the results of treatment, especially of relatively advanced cases, remain disappointing. In spite of previous more encouraging reports, the MRC Working Party (1984) has found a lack of any benefit from pre-operative mega voltage X-ray therapy in the management of operable rectal carcinoma. A total of 824 patients were randomized to receive no adjuvant therapy, 2,000 rad to the pelvis in 10 daily fractions, or 500 rad in a single exposure before tumour excision. No difference could be demonstrated in 5 year survival, local recurrence-free period or development of metastases between the three groups. There was no evidence of benefit in any of the Dukes' sub-groups, but at least the complication rates in the three treatment groups were the same. The most important prognostic factor identified was the mobility of the primary tumour, but there were again no significant differences between the treatment groups when analysed by tumour mobility. The Yorkshire gastrointestinal tumour group (Giles, 1984) studied the effects of cytotoxic therapy (5-fluorouracil and methyl CCNU) on patients where minimal residual disease was left behind after palliative resection

of colorectal cancers. There were 27 patients in the treatment group and 30 in the control group. The cytotoxic therapy did not delay the onset of recurrence or alter prognosis but 11 of the 27 patients receiving chemotherapy did develop marked toxic effects from the drugs.

From the USA, the Gastrointestinal Study Group (1984) reports a 6 year randomized trial of colon cancer in 621 patients divided into four arms after surgery; no treatment control, 5-FU and Semustine, BCG immunotherapy and a combination of chemotherapy and immunotherapy. No differences in disease-free survival or survival were found between any of these four groups. However, there was one toxic death and seven leukaemias in patients receiving chemotherapy. House (1984) gives a useful and up to date review of the present rather gloomy theme of adjuvant therapy in colorectal cancer with radiotherapy, cytotoxic drugs and immunotherapy.

Despite attempts to achieve early diagnosis, many patients present at a stage when the tumour has already spread to involve adjacent organs, a situation that may dissuade the surgeon from attempting curative resection. We have recently analysed survival after extended resection in such cases (Pittam *et al.*, 1984). Of 242 patients undergoing surgical treatment for carcinoma of the colorectum on the surgical unit at Westminster Hospital, 57 had tumours which were firmly adherent to neighbouring organs or the abdominal wall and were treated by extended *en bloc* resection of the tumour and neighbouring organs. Subsequent survival did not differ significantly from survival after standard excisions for tumours of the same Dukes' stage. Histological examination of the neighbouring organs included in the resections confirmed direct tumour spread in only 33% of the cases. Certainly the fact the tumour is locally advanced should not deter the surgeon from attempted radical cure in cases where wide dissemination has not taken place.

Recent years have seen an increasing tendency to preserve the anal sphincter in patients operated upon for carcinoma of the rectum. The introduction of the stapling gun, which has rendered low anastomosis technically much simpler, has undoubtedly had an important part to play. There is naturally anxiety that this more conservative approach might bring with it an increased risk of local recurrence. Indeed, Phillips and his colleagues (1984), in a multi-centre study of nearly 2000 patients with cancer of the rectum and rectosigmoid, found a local recurrence rate of 18% after anterior resection compared with 12% after abdomino-perineal excision of the rectum, a statistically significant difference. However, Williams & Johnston (1984) carried out a retrospective study of 83 patients undergoing abdomino-perineal excision compared with 71 submitted to a low sphincter saving resection. They could find no difference in recurrence

rate, local recurrence or 5 year survival between the two groups when tumours of similar pathology were compared. Other studies show similar results, but these authors point out that we still require prospective randomized controlled trials before definitive conclusions can be drawn on this important subject.

Malignant change in ulcerative colitis has usually been regarded as a condition of particularly sinister prognosis. It is encouraging, therefore, that Gyde and his colleagues (1984) from the Birmingham General Hospital, in a study of 35 patients with malignant changes out of a total of 676 patients with ulcerative colitis, found a similar 5 year prognosis following resection to patients with non-colitic large bowel tumours

Liver metastases

Another prognostic factor of almost complete gloom is, of course, the development of hepatic metastases. In the great majority of cases little can be offered to the patient. However, from time to time, localized secondaries may be resected with success. Such reports usually come from major referral centres; Kortz and his co-workers (1984) from Duke University Medical Center describe 16 patients with colorectal cancer undergoing hepatic resection, six of whom enjoyed 7 year survivals.

Adson and his colleagues (1984), from the Mayo Clinic, have probably the largest experience of resection for hepatic metastases. They review their series of 141 resections carried out between 1948 and 1982 from colorectal primary cancers. There was an overall 5 year survival rate of 25%. Favourable factors include the Dukes' staging of the primary lesion and absence of extra-hepatic metastases. Female patients appear to fare better than males. However, these authors point out that 50% of patients so treated are not helped at all. In a further important study from the same centre (Wagner *et al.*, 1984) an analysis of the survival rates of 252 patients who had biopsy proven but *unresected* hepatic metastases showed that patients with solitary metastases had a median survival of 24 months and 20% of these cases had a 3 year or more survival. Where there were multiple deposits confined to one lobe of the liver, the median survival rate was 18 months. It is obviously vitally important that comparisons of treatments of hepatic metastases must be made against our knowledge of the natural history of untreated cases in which we must take into account the extent of hepatic involvement as well as the presence of uncontrolled primary or regional growth and the presence or absence of extra-hepatic deposits.

Local recurrence

Local recurrence following attempted curative surgery for large bowel cancer is a serious problem. It often

occurs within the first 1 or 2 years following surgery and it is usually not amenable to further curative excision. Phillips and his colleagues (1984), in an extensive multi-centre trial, found that of 4228 patients with large bowel cancer, 55% survived curative resection. Of these, 14% developed local recurrence. Significant factors in this complication were advanced Dukes' staging, poor differentiation, obstruction, perforation and patients undergoing anterior resection for rectal cancer. The mechanism of anastomotic recurrence is still uncertain, although a percentage, at least, may well be caused by implantation of exfoliated cancer cells into freshly cut tissues. Support for this thesis is provided by Umpleby and his colleagues (1984), who have demonstrated that large numbers of apparently viable tumour cells can indeed be retrieved from the lumen of the large intestine. Pre-operative colorectal lavage was performed in 19 patients and irrigation of the cut ends of the operative specimen in a further 30. The resulting cell suspensions were centrifuged on a linear density gradient column so that tumour cells, being larger, were concentrated in a band at the top. Viable tumour cells were assessed by their characteristic morphology and ability to exclude intra-vital staining by trypan blue. Viable exfoliated tumour cells were demonstrated in 70% of the specimens. Surgeons should continue to employ tumoricidal agents such as cetrimide in washing out the bowel at the time of resection in an effort to eliminate this source of anastomotic recurrence.

A rare but particularly unpleasant malignancy of the large bowel is melanoma of the anal canal. Pyper & Parks (1984) describe 14 such cases from Belfast, amounting to 10.9% of all anal malignancies seen between 1960 and 1982. Four had inguinal lymph node involvement at the time of presentation and a further patient already had liver metastases. Only one patient survived more than 5 years, dying of metastases at 9 years following local excision of a small anal lesion. To date approximately 457 cases have been reported. Prognosis is so poor that these authors advise conservative excision, wherever possible, rather than mutilating surgery which does not appear to make a difference to the likelihood of survival.

Should colonoscopy be routine?

There is a good case to be made for routine colonoscopy as a pre-operative procedure in all cases of large bowel cancer. Maxfield (1984) noted that, in 90 patients, four unsuspected synchronous carcinomas were picked up by this examination; barium enema had only revealed one of these and had missed the other three. It is interesting that all three missed cases were outside the normal limits of resection of the presenting tumour and would almost certainly have been left behind. In addition, 36 of these patients had

associated benign polyps, which were removed at the time of colonoscopy. Langevin & Nivatvongs (1984), in a larger Canadian series of 166 cases of primary colorectal cancer, picked up eight synchronous tumours (5%) as well as benign polyps in 46 patients (27.7%). Again, they make the point that seven out of eight of these synchronous cancers would not have been included in the standard surgical resection of the tumour and stress the importance of total large bowel evaluation, preferably by colonoscopy, in all cases of large bowel cancer.

An interesting, if rather disturbing, report from University College Hospital (Boulos *et al.*, 1984) indicates that colonoscopy should be carried out in patients with bowel symptoms where a barium enema merely shows diverticular disease. In 65 such patients, 19 were shown to have an associated neoplastic lesion on the barium enema examination (two suspected carcinomas and 17 polyps). When these 65 patients were submitted to colonoscopy, nine out of the 17 were found, in fact, not to have polyps after all, one polyp proved to be a carcinoma and of the two suspected carcinomas, only one was confirmed. Of the 46 barium enemas which were reported as only showing diverticular disease, polyps were found in eight and an associated carcinoma in no fewer than three patients. Obviously this study will considerably increase the work load of the colonoscopist, particularly since it is well known that negotiating the colon in patients with this condition is notoriously more difficult than in the normal bowel.

Colonoscopy is also proving to be of considerable value in the follow-up of patients following resection of colorectal cancer. Buhler and his colleagues (1984), from Zurich, report their follow-up studies using the colonoscope in 188 patients. There were 20 local recurrences (10.6%). Of the nine picked up entirely on colonoscopy and otherwise asymptomatic, six were submitted to curative resection and five of these were alive and clear of disease 12 to 72 months later. In contrast, of 11 patients with clinical suspicion of recurrent disease, in not a single patient was curative resection possible. These authors propose that regular endoscopic follow-up is therefore mandatory.

Biliary tract

Cholecystectomy is the commonest elective abdominal operation performed by the general surgeon in this country to-day. Modern investigations of the biliary tract are now sophisticated and highly accurate. It is important to remember that even though gall stones are so common, there may often be other associated pathologies. An important study by Watt and his colleagues (1984) from Belfast demonstrates the value of carrying out a combined barium meal and cholecys-

togram in patients with upper abdominal symptoms. In a series of 144 such cases, 90% of whom were referred by their general practitioners, 25.5% had some pathology demonstrated on the barium meal only, 19% on the cholecystogram only and 8.1% on both investigations. Over half the patients (51.4%) had normal findings on both sets of films. Of the positive barium meal findings, 27.4% also had pathology demonstrated on cholecystography and of those patients with a positive cholecystogram, 29.8% also had some pathology demonstrated on the barium meal. There would seem every advantage to be gained from combining these two examinations at the same session.

Chronic calculous cholecystitis can be diagnosed with a high degree of accuracy both by ultrasound and by cholecystography. The diagnosis of acute cholecystitis, however, is less easy to make by these methods. Ultrasound is not specific although the presence of gall stones together with suggestive physical signs, particularly a positive Murphy's test, gives an 88% reliability (Khan *et al.*, 1984). A most useful test is cholecyst-scintigraphy using technetium labelled HIDA. This depends on the fact that acute cholecystitis occurs in association with a blocked cystic duct and the criteria for a positive scan are non-visualization of the gall bladder but prompt opacification of the bile duct and duodenum (Bouchier 1984a). The normal gall bladder is visualized in 30 minutes and empties within an hour. The accuracy of this scan approaches 100%, although false positive scans occur in alcoholic liver disease and in patients receiving parenteral nutrition. Joehl *et al.* (1984) point out that opioid drugs cause biliary duct spasm. These, naturally, are often given to patients with acute biliary disease but these authors found that opioids given to healthy volunteers delayed common bile duct clearance, simulating obstruction. They therefore suggest that opioids should not be administered for several hours before a diagnostic HIDA scan is carried out.

There is no doubt that from the therapeutic point of view the most important recent advance in the management of gall stones is endoscopic sphincterotomy to enable removal of impacted common duct calculi. Cotton (1984) gives a masterly review of this topic. Stones can be removed in the great majority of cases but there may be the complications of bleeding, pancreatitis, cholecystitis or retroperitoneal perforation in between 8 to 10% of cases. Urgent surgery is needed in about 1 to 2% and there is an overall mortality of about 1%. Technical problems include a previous partial gastrectomy with gastro-jejunal anastomosis, stricture of the duct and the presence of a large stone.

Having relieved the patient of his common duct obstruction, the usual advice is that an elective cholecystectomy should then be performed for the

residual calculous disease in the gall bladder, but it may be that this advice can be modified in patients of advanced age or in poor general condition. Escourrou *et al.* (1984) review 234 such cases in which the gall bladder was not removed following successful endoscopic evacuation of the obstructed common duct. In a follow-up of 6 to 78 months, late complications occurred in 12% of the patients, half of whom suffered attacks of cholecystitis. Yin *et al.* (1984) report a similar series of 159 cases carried out at the Middlesex Hospital; 142 patients had their ducts cleared at the end of the sphincterotomy, the remaining 15 requiring early surgery for retained stones. Of these 142 patients, 24 had cholecystectomy because they were otherwise fit or had symptoms. Of the remaining 121 patients, 107 with a mean age of 74, were followed up, for a period of 1 to 8 years. Only nine of these later required cholecystectomy. These authors therefore advise that in patients who are old and frail the risk of leaving the gall bladder behind is relatively small.

There is of course, great interest in the possibility of dissolution of gall stones using the bile acids chenodeoxycholic acid. Johansson (1984) points out that the number of cases suitable for this treatment is small. He reviews 342 consecutive patients admitted to the Karolinska Hospital in Stockholm for cholecystectomy who were considered for medical treatment. Only 22 were found to be eligible. Reasons for rejection included emergency admissions (20), non-functioning gall bladder (136), large gall stones (100), radio-opaque calculi (30) and hepatic disease (7). Other cases were rejected because of the severity of symptoms, the need for exploratory laparotomy and poor handling of medication. Twelve patients were actually treated with chenodeoxycholic acid. Of these, one had complete dissolution out of the five patients that completed the course within two years. Not unnaturally, this author doubts whether the introduction of medical treatment is going to reduce the work load of cholecystectomies in the surgical clinics! Even the most enthusiastic of physicians must agree that at present the treatment of choice for gall stone disease must be cholecystectomy (Bateson, 1984; Bouchier, 1984b).

Pancreas

Pancreatic pseudocyst has, of course, long been recognized as a complication of acute pancreatitis or pancreatic trauma. The introduction of imaging by computed tomographic (CT) scan or the more readily available ultrasound has greatly increased the accuracy and frequency of diagnosis and has also enabled percutaneous drainage under imaging control. Much, too, can be learned about the natural history of this condition. Goulet *et al.* (1984), for

example, were able to show that, of 91 cases of pseudocyst, no less than 13 (14.3%) were multiple on sonography; interestingly, all of these were alcoholic in origin. Of particular interest was the fact that, in five cases, all of which were small cysts up to 6.5 cm in diameter, spontaneous resolution occurred on serial scanning. Agha (1984) also reported that five uncomplicated pseudocysts out of a total of 20 cases, following acute pancreatitis, resolved 3 to 6 weeks after diagnosis on serial ultrasound studies.

Whereas drainage once required quite major surgery, usually involving anastomosis of the cyst with the posterior aspect of the stomach (cyst-gastrostomy), in many cases the cyst can be drained percutaneously under imaging control. Colhoun *et al.* (1984), from St Vincent's Hospital, Dublin, report that they were able to treat nine out of 10 cysts by percutaneous drainage. The remaining case had no less than 14 aspirations over a 3 month period, then leaked, was drained externally, recurred, was aspirated several more times and eventually was cured.

Fulminating haemorrhagic pancreatitis remains a serious management problem with a notoriously high morbidity and mortality. From Helsinki, Kivilaakso and his colleagues (1984) present an important prospective study of 35 such patients randomized between resection of the pancreas cephalad to the portal vein together with T-tube drainage of the common duct, and peritoneal lavage, (using two silicone catheters), continued for between 7 to 10 days. Treatment was otherwise the same with regard to antibiotics, cimetidine and fluid replacement. Of the resection group four out of 18 patients died (22.2%) compared with eight out of 17 (47.1%) in the lavage group. There was a higher incidence of re-operation in the lavage group as well as a higher incidence of severe pulmonary and renal complications. However, six out of the 14 survivors in the resection group developed diabetes compared with none out of the nine survivors of the lavage group. These authors conclude that pancreatic resection in these fulminating cases lowers the mortality and decreases the morbidity but is associated with a higher incidence of subsequent diabetes.

Pancreatic abscess is a serious complication of pancreatitis. Kaushik and his colleagues (1984) review 17 examples of this complication occurring in 190 cases of acute pancreatitis at Chandigarh. All were drained surgically, with no less than 10 post-operative deaths, a survival rate of only 41%. Post-operative complications were common, including four examples of secondary haemorrhage, four fistulae and two subphrenic abscesses.

Mok & Blumgart (1984) record an interesting physical sign and an example of applied anatomy in pancreatic disease. This is erythema *ab igne* over the back at the level of T12 to L2 due to applications of hot water bottles. Their first case was a patient with a

carcinoma of the pancreas, where this sign, to the left of the midline posteriorly, preceded the development of jaundice, and a second patient, with chronic pancreatitis, where the sign was detected to the right of the midline. They suggest that the presence of this typical pigmentation in this area of referred pain from the pancreas should suggest chronic pancreatic disease.

Experimental surgery and wound healing

Although sometimes, to the casual observer, research projects in surgical experimental laboratories may appear *recherché*, more often than not they have an intense practical basis. Reus and his colleagues (1984), for example, have used the ear of the nude mouse to enable direct microscopic intravital examination. When these animals are exposed to tobacco smoke, arteriolar blood flow is diminished and vasoconstriction can be observed. This same group (Lawrence *et al.*, 1984) then went on to study the effects of cigarette smoking on the survival of skin flaps. A standard skin flap in the rat demonstrated a 75% survival in control animals compared with only 40% in those exposed to cigarette smoke. The changes in carboxy-haemoglobin in the rat are similar to those in smoking humans. Certainly, this study will encourage plastic surgeons to invite their patients undergoing major reconstructive surgery to desist from smoking.

An interesting experimental study from the Marsden Hospital by Moshakis & Carter (1984) has investigated the important subject of neoplastic invasion of the arterial wall. The model used was the experimental VX2 tumour implanted into the rabbit groin. The intact femoral artery was found to be resistant to tumour invasion. However, if the femoral artery is ligated it becomes invaded and mostly destroyed by tumour. Similarly, if an arterio-venous fistula is constructed in the groin, this is invaded by tumour, although some mural structures remain intact. These authors conclude that a combination of normal artery wall structure and normal blood flow contributes to the relative resistance of vessel wall to tumour invasion.

Extensive burns may leave so little available donor site that their wounds cannot be covered by a single harvest of autograft skin. Cutaneous allografts are the most frequently used and most effective biological dressings to date. Interesting studies are being carried out on the development of tissue culture-derived skin substitutes and these have been reviewed by Pruitt & Levine (1984). Single-cell suspensions of human epidermal cells can be grown on collagen film into confluent multi-layered sheets, with the lower layer of cells morphologically similar to the basal cells of normal epidermis, and this has been used successfully

both in animal experiments and in some clinical cases. Other studies have employed composite grafts consisting of a fibroblast-seeded collagen lattice upon which epidermal cells are cultured. The time required to form 100 cm² composite graft from a 1 cm² biopsy specimen is from 20 to 26 days and at present this represents a major limitation to the clinical use of this material.

Surgery today is being performed on increasing numbers of patients who are elderly and ill so that it is important to assess the part played by systemic factors on wound healing. We have previously reported both clinical and experimental studies which demonstrate the inhibitory effect of jaundice on wound healing and on fibroblast proliferation (Ellis, 1977; Taube *et al.*, 1981). Snellen and his colleagues (1984) now confirm, in rats rendered jaundiced by obstruction of the common bile duct, that duodenal and colonic anastomoses and the laparotomy wound have their healing impaired. If the anastomosis is performed 1 week after relieving the obstruction, the healing process returns to normal. An important clinical study of jaundiced patients by Armstrong and his colleagues (1984a,b) indicates the serious problems that this condition presents to the surgeon. The operative mortality in 120 patients with severe jaundice (bilirubin of 100 µmol or above) was no less than 14.2%. Seven of these patients developed renal failure, although all patients in the series were given mannitol, and all seven died. Comparing patients undergoing surgery for obstructive jaundice with anicteric patients undergoing cholecystectomy, these authors report that the jaundiced patients demonstrated a 3.2% burst abdomen and 10.3% incisional hernia rate compared with 0.5% and 1.8% respectively in the non-jaundiced cases. Failure of wound healing was associated with a low haematocrit, low plasma albumin, a history of pancreatitis, malignant obstruction and post-operative infection and was not proportional independently to the level of raised bilirubin.

Oesophageal and colonic anastomoses are the ones which give the greatest anxiety to the surgeon because of risks of leakage. Ger & Ravo (1984) describe a most ingenious technique for prevention of gastrointestinal dehiscence. They employ a bypass tube of latex or silastic sutured to the mucosa or submucosa proximal to the anastomosis and threaded down along the lumen of the bowel across the line of the anastomosis in dogs, simulating perforation by producing defects in the gut wall and mimicking leakage by performing surgically inadequate anastomoses. In spite of these gross transgressions of surgical technique, the bypass tubes protected the anastomoses and the animals recovered. These authors have now used the technique in 18 colonic anastomoses with no complications and with no leaks as confirmed by barium enema studies and flexible sigmoidoscopy.

The abdominal incision

The search for the ideal technique of opening and closing the abdominal wall continues. The mass closure technique has reduced the risk of burst abdomen to under 1% but most surgeons still report an incidence of 7% or more of incisional hernias at 1 year and the percentage of incisional hernias increases as the years pass (Ellis, 1984a). To date, the best all round suture material appears to be monofilament nylon. We have compared this with the absorbable suture polydioxanone in a controlled trial. In 53 patients whose abdominal wall was closed with mass nylon there were four incisional hernias at 1 year compared with 10 in 53 patients sutured with polydioxanone (PDS). Although suggestive, this did not reach statistical significance ($P = 0.186$) (Leese & Ellis, 1984). We have also compared, in a random trial,

paramedian, midline and transverse incisions in 165 patients. There were a total of 32 hernias and one burst abdomen (in a paramedian incision) but there was no statistical difference in the hernia rate between the three incisions nor was any difference shown in incisions in the upper and lower abdomen (Ellis *et al.*, 1984). Recently, a modification of the standard paramedian incision has been strongly advocated by Brennan of St James' Hospital, Leeds (Guillou *et al.*, 1980). This is placed at the junction of the middle and outer one-thirds of the width of the rectus sheath and provides a wide shutter mechanism. We are currently engaged in a controlled trial comparing this incision with the conventional midline approach. Although this is not yet completed, the results are certainly very encouraging and this may well prove to be a considerable advantage.

References

Peripheral vascular disease

- CLARKE, J.M.F., PITTILO, R.M., NICHOLSON, L.J., WOOLF, N. & MARSTON, A. (1984). Seeding Dacron arterial prostheses with peritoneal mesothelial cells: a preliminary morphological study. *British Journal of Surgery*, **71**, 492.
- DOUBILET, P. & ABRAMS, H.L. (1984). The cost of under-utilization. Percutaneous transluminal angioplasty for peripheral vascular disease. *New England Journal of Medicine*, **310**, 95.
- STEIGMANN, G. VAN, KAHN, D., ROSE, A.G., BORNMAN, P.C., TERBLANCHE, J. (1984). Endoscopic laser endarterectomy. *Surgery, Gynecology and Obstetrics*, **158**, 529.
- TELLES, G.S., CAMPBELL, W.B., WOOD, R.F.M., COLLIN, J., BAIRD, R.N. & MORRIS, P.J. (1984). Prostaglandin E1 in severe lower limb ischaemia: a double-blind controlled trial. *British Journal of Surgery*, **71**, 506.
- WILSON, A.R. & FUCHS, J.C. (1984). Percutaneous transluminal angioplasty. The radiologist's contribution to the treatment of vascular disease. *Surgical Clinics of North America*, **64**, 121.

Breast

- ASHFORD, R.F., PHILLIPS, R.H., COE, M.A., PICKERING, D.C., BAILY, B. & ELLIS, H. (1984). Conservative excision and radiotherapy for early breast cancer – an acceptable alternative? *Clinical Oncology*, **10**, 45.
- CEDARMARK, B., ASKERGREN, J., ALVERYD, A., GLAS, U., KARNSTROM, L., SOMELL, A., THEVE, N. & WALLGREN, A. (1984). Breast-conserving treatment for breast cancer in Stockholm, Sweden. 1977 to 1981. *Cancer*, **53**, 1253.
- ELLIS, H. & COX, P.J. (1984). Breast problems in 1000 consecutive referrals to surgical out-patients. *Postgraduate Medical Journal*, **60**, 653.
- FOSTER, R.S. & CONSTANZA, M.C. (1984). Breast self-examination practices and breast cancer survival. *Cancer*, **53**, 999.
- HAAGENSEN, C.D. & BODIAN, C. (1984). A personal experience with Halsted's radical mastectomy. *Annals of Surgery*, **199**, 143.

- HAYWARD, J.L., WINTER, P.J., TONG, D., RUBENS, R.D., PAYNE, J.G., CHAUDRY, M.A. & HABIBOLLAHI, F. (1984). A new combined approach to the conservative treatment of breast cancer. *Surgery*, **95**, 270.
- HEUSER, L.S., SPRATT, J.S., KUHN, J.G., POLK, H.C., CHANG, A.F. & BUCHANAN, J.B. (1984). The association of pathologic and mammographic characteristics of primary human breast cancers with 'slow' and 'fast' growth rates and with axillary lymph node metastases. *Cancer*, **53**, 96.
- HINTON, C.P., DOYLE, P.J., BALMEY, R.W., DAVIES, C.J., HOLLIDAY, H.W. & ELSON, C.W. (1984). Subcutaneous mastectomy for primary operable breast cancer. *British Journal of Surgery*, **71**, 469.
- HOWELL, A., BUSH, H., GEORGE, W.D., HOWAT, J.M.T., CROWTHER, D., SELLWOOD, R.A., RUBENS, R.D., HAYWARD, J.L., BULBROOK, R.D., FENTIMAN, I.S. & CHAUDARY, M. (1984). Controlled trial of adjuvant chemotherapy with cyclophosphamide, methotrexate and fluorouracil for breast cancer. *Lancet*, **ii**, 307.
- MONTAGUE, E.D. (1984). Conservation surgery and radiation therapy in the treatment of operable breast cancer. *Cancer*, **53**, 700.
- ROSEN, P.P., LESSER, M.L., KINNE, D.W. & BEATTIE, E.J. (1984). Breast carcinoma in women 35 years of age or younger. *Annals of Surgery*, **199**, 133.
- SARRAZIN, D., LE, M., ROUESSE, J., CONTESSO, G., PETIT, J., LACOUR, J., VIGUIER, J. & HILL, C. (1984). Conservative treatment versus mastectomy in breast cancer tumors with macroscopic diameter of 20 millimetres or less. The experience of the Institut Gustave-Roussy. *Cancer*, **53**, 1209.
- STRAX, P. (1984). Mass screening for control of breast cancer. *Cancer*, **53**, 665.
- TURNER, J., BLANEY, R., ROY, D., ODLING-SMEE, W., IRWIN, G. & MACKENZIE, G. (1984). Does a booklet on breast self-examination improve subsequent detection rates? *Lancet*, **ii**, 337.
- WILSON, A.J., BAUM, M., BRINKLEY, D., DOSSETT, J.A.,

McPHERSON, K., RUBENS, R.D., STOLL, B.A., SMIDDY, F.G., PATTERSON, J., LEA, J., ELLIS, S. & RICHARDS, D. (1984). Improved survival after adjuvant 'Nolvadex' (tamoxifen) therapy in early breast cancer. *British Journal of Surgery*, **71**, 911 (abstract).

The acute abdomen

AABO, K., PEDERSEN, H., BACH, F. & KNUDSEN, J. (1984). Surgical management of intestinal obstruction in the late course of malignant disease. *Acta Chirurgica Scandinavica*, **150**, 173.

ADLER, J., INGRAM, D. & HOUSE, T. (1984). Perforated peptic ulcer – a seasonal disease? *Australian New Zealand Journal of Surgery*, **54**, 59.

AJAO, O.G. (1984). An outline of differences between temperate and tropical presentations of some surgical upper gastrointestinal diseases. *British Journal of Surgery*, **71**, 79.

BAINBRIDGE, E.T. & SAGE, R.H. (1984). Sclerosing peritonitis associated with alcoholic cirrhosis. *Gastroenterology in Practice*, **1**, 30.

BEVAN, P. (1984). Adhesive obstructions. *Annals of the Royal College of Surgeons of England*, **66**, 164.

BODE, W.E., BEART, R.W., SPENCER, R.J., CULP, C.E., WOLFF, B.G. & TAYLOR, B.M. (1984). Colonoscopic decompression for acute pseudo obstruction of the colon (Ogilvie's Syndrome). Report of 22 cases and review of the literature. *American Journal of Surgery*, **147**, 143.

BUCHMAN, T.G. & ZUIDEMA, G.D. (1984). Reasons for the delay of the diagnosis of acute appendicitis. *Surgery, Gynecology and Obstetrics*, **158**, 260.

CADE, R.J. & LANE, R.H. (1984). Strangulated stomach within a femoral hernia. *Postgraduate Medical Journal*, **60**, 376.

CAMBRIA, R.P. & SHAMBERGER, R.C. (1984). Small bowel obstruction caused by the abdominal cocoon syndrome: possible association with the LeVeen shunt. *Surgery*, **95**, 501.

ELLIS, H. (1984). Intra-abdominal adhesions: clinical problems. *International Medicine*, **4**, 2.

FRANCIS, D.M.A., DONNELLY, P.K., VEITCH, P.S., PROUD, G., TAYLOR, R.M.R., RAMOS, J.M., WARD, M.K., WILKINSON, R., ELLIOT, R.W. & KERR, D.N.S. (1984). Surgical aspects of continuous ambulatory peritoneal dialysis – 3 years experience. *British Journal of Surgery*, **71**, 225.

GREENLEE, H.B., STANLEY, M.M., REINHARDT, G.F. & CHEJFEC, G. (1979). Small bowel obstruction (SBO) from compression and kinking of intestine by thickened peritoneum in cirrhotics with ascites treated with LeVeen shunt. *Gastroenterology*, **76**, 1282 (abstract).

HENDRY, W.S., VALERIO, D. & KYLE, J. (1984). Perforated peptic ulcer in North-East Scotland 1972–1981. *Journal of the Royal College of Surgeons of Edinburgh*, **29**, 69.

HOFFMANN, J., LINDHARD, A. & JENSEN, H.E. (1984). Appendix mass: conservative management without interval appendectomy. *American Journal of Surgery*, **148**, 379.

KHANNA, A.K. & MISRA, M.K. (1984). Typhoid perforation of the gut. *Postgraduate Medical Journal*, **60**, 523.

LEESE, T. & ELLIS, H. (1984). Rectosigmoid obstruction due to compression between calcified ovarian tumours and the lip of an advanced spondylolisthesis. *Journal of the Royal Society of Medicine*, **77**, 520.

MAETANI, S., TOBE, T. & KASHIWARA, S. (1984). Neglected

role of torsion and constriction in pathogenesis of simple adhesive bowel obstruction. *British Journal of Surgery*, **71**, 127.

MAGLINTE, D.D.T., PETERSON, L.A., VAHEY, T.N. MILLER, R.E. & CHERNISH, S.M. (1984). Enteroclysis in partial small bowel obstruction. *American Journal of Surgery*, **147**, 325.

NELSON, I.W. & ELLIS, H. (1984). The spectrum of intestinal obstruction today. *British Journal of Clinical Practice*, **38**, 249.

PURI, P., GUINEY, E.J., O'DONNELL, B. & McGUINNESS, E.P.J. (1984). Effects of perforated appendicitis in girls on subsequent fertility. *British Medical Journal*, **288**, 25.

ROSEMAN, J.E., ALLISON, D.C. & SMITH, D.E. (1984). Colonic perforation as a complication of peritoneovenous shunt: a case report. *Surgery*, **95**, 619.

SCURR, J.H. & CUTTING, P. (1984). Tight jeans as a compression garment after major trauma. *British Medical Journal*, **288**, 828.

SOREIDE, O. (1984). Appendicitis – a study of incidence, death rates and consumption of hospital resources. *Postgraduate Medical Journal*, **60**, 341.

STEWART, J., FINAN, P.J., COURTNEY, D.F. & BRENNAN, T.G. (1984). Does a water soluble contrast enema assist in the management of acute large bowel obstruction: a prospective study of 117 cases. *British Journal of Surgery*, **71**, 799.

STOWER, M.J., HARDCASTLE, J.D. & BOURKE, J.B. (1984). Surgical emergencies and manpower. *Annals of the Royal College of Surgeons of England*, **66**, 117.

TSENG, H., XU, L., WU, Z., WU, D., YIN, Z. & FEI, L. (1984). Current surgical interests in China. *Surgery*, **95**, 169.

WATKINS, R.M., DENNISON, A.R. & COLLIN, J. (1984). What has happened to perforated peptic ulcer? *British Journal of Surgery*, **71**, 774.

WATT, P.C.H. (1983). Transomental hernia causing intestinal obstruction in an elderly patient. *Postgraduate Medical Journal*, **59**, 790.

Inflammatory bowel disease

AMBROSE, N.S., KEIGHLEY, M.R.B., ALEXANDER-WILLIAMS, J. & ALLAN, R.N. (1984). Clinical impact of colectomy and ileorectal anastomosis in the management of Crohn's disease. *Gut*, **25**, 223.

BOOTH, I.W. & HARRIES, J.T. (1984). Inflammatory bowel disease in childhood. *Gut*, **25**, 188.

DURNING, P. & SCHOFIELD, P.F. (1984). Diagnosis and management of psoas abscess in Crohn's disease. *Journal of the Royal Society of Medicine*, **77**, 33.

FERGUSON, A. (1984). Crohn's disease in children and adolescents. *Journal of the Royal Society of Medicine*, **77** (suppl.3), 30.

LEE, E.C.G. (1984). Aim of surgical treatment of Crohn's disease. *Gut*, **25**, 217.

MAYBERRY, J.F. & RHODES, J. (1984). Epidemiological aspects of Crohn's disease: a review of the literature. *Gut*, **25**, 886.

MORTENSEN, N.J.McC., RITCHIE, J.K., HAWLEY, P.R., TODD, I.P. & LENNARD-JONES, J.E. (1984). Surgery for acute Crohn's colitis: results and long term follow-up. *British Journal of Surgery*, **71**, 783.

O'MORAIN, C., SEGAL, A.W. & LEVI, A.J. (1984). Elemental

- diet as a primary treatment of acute Crohn's disease: a controlled trial. *British Medical Journal*, **288**, 1859.
- PACE, B.W., BANK, S. & WISE, L. (1984). Strictureplasty. An alternative in the surgical treatment of Crohn's disease. *Archives of Surgery*, **119**, 861.
- SANFREY, H., BAYLESS, T.M. & CAMERON, J.L. (1984). Crohn's disease of the colon. Is there a role for limited resection? *American Journal of Surgery*, **147**, 38.
- SLATER, G., GREENSTEIN, A. & AUFSES, A.H. (1984). Anal carcinoma in patients with Crohn's disease. *Annals of Surgery*, **199**, 348.
- SOMERVILLE, K.W., LANGMAN, M.J.S., CRUZ, D.J.D.A., BALFOUR, T.W. & SULLY, L. (1984). Malignant transformation of anal skin tags in Crohn's disease. *Gut*, **25**, 1124.
- TWEEDIE, J.H. & MCCANN, B.G. (1984). Metastatic Crohn's disease of thigh and forearm. *Gut*, **25**, 213.
- Large bowel tumours**
- ADSON, M.A., VAN HEERDEN, J.A., ADSON, M.H., WAGNER, J.S. & ILSTRUP, D.M. (1984). Resection of hepatic metastases from colorectal cancer. *Archives of Surgery*, **119**, 647.
- BOULOS, P.B., KARAMANOLIS, D.G., SALMON, P.R. & CLARK, C.G. (1984). Is colonoscopy necessary in diverticular disease. *Lancet*, **i**, 95.
- BUHLER, H., SEEFELD, U., DEYHLE, P., BUCHMANN, P., METZGER, U. & AMMANN, R. (1984). Endoscopic follow-up after colorectal cancer surgery. Early detection of local recurrence? *Cancer*, **54**, 791.
- GASTROINTESTINAL STUDY GROUP (1984). Adjuvant therapy of colon cancer – results of a prospectively randomized trial. *New England Journal of Medicine*, **310**, 737.
- GILES, G.R., LAWTON, J.O., MALHOTRA, A., HALL, R., MATHESON, T.S., CRAVEN, J.L., MACADAM, W.A.F. & BIRD, G.C. (1984). Chemotherapy after palliative resection of colorectal cancer. *British Journal of Surgery*, **71**, 283.
- GYDE, S.N., PRIOR, P., THOMPSON, H., WATERHOUSE, J.A.H. & ALLAN, R.N. (1984). Survival of patients with colorectal cancer complicating ulcerative colitis. *Gut*, **25**, 228.
- HOUSE, A.K. (1984). Adjuvant therapy in colorectal cancer. *Journal of the Royal Society of Medicine*, **77**, 445.
- KORTZ, W.J., MEYERS, W.C., HANKS, J.B., SCHIRMER, B.D. & JONES, R.S. (1984). Hepatic resection for metastatic cancer. *Annals of Surgery*, **199**, 182.
- LANGEVIN, J.M. & NIVATVONGS, S. (1984). The true incidence of synchronous cancer of the large bowel. A prospective study. *American Journal of Surgery*, **147**, 330.
- M.R.C. WORKING PARTY (1984). The evaluation of low dose pre-operative X-ray therapy in the management of operable rectal cancer; results of a randomly controlled trial. *British Journal of Surgery*, **71**, 21.
- MAXFIELD, R.G. (1984). Colonoscopy as a routine preoperative procedure for carcinoma of the colon. *American Journal of Surgery*, **147**, 477.
- PHILLIPS, R.K.S., HITTINGER, R., BLESOVSKY, L., FRY, J.S. & FIELDING, L.P. (1984). Local recurrence following 'curative' surgery for large bowel cancer: I. The overall picture. *British Journal of Surgery*, **71**, 12.
- PHILLIPS, R.K.S., HITTINGER, R., BELSOVSKY, L., FRY, J.S. & FIELDING, L.P. (1984). Local recurrence following 'curative' surgery for large bowel cancer: II. The rectum and rectosigmoid. *British Journal of Surgery*, **71**, 17.
- PITTAM, M.R., THORNTON, H. & ELLIS, H. (1984). Survival after extended resection for locally advanced carcinomas of the colon and rectum. *Annals of the Royal College of Surgeons of England*, **66**, 81.
- PYPER, P.C. & PARKS, T.G. (1984). Melanoma of the anal canal. *British Journal of Surgery*, **71**, 671.
- UMPLEBY, H.C., FERMOR, B., SYMES, M.O. & WILLIAMSON, R.C.N. (1984). Viability of exfoliated colorectal carcinoma cells. *British Journal of Surgery*, **71**, 659.
- WAGNER, J.S., ADSON, M.A., VAN HEERDEN, J.A., ADSON, M.H. & ILSTRUP, D.M. (1984). The natural history of hepatic metastases from colorectal cancer. A comparison with resective treatment. *Annals of Surgery*, **199**, 502.
- WILLIAMS, N.S. & JOHNSTON, D. (1984). Survival and recurrence after sphincter saving resection and abdominoperineal resection for carcinoma of the middle third of the rectum. *British Journal of Surgery*, **71**, 278.
- Biliary tract**
- BATESON, M.C. (1984). Progress in gallstone disease. *British Medical Journal*, **289**, 1163.
- BOUCHIER, I.A.D. (1984a). Gallstone dissolving agents. *International Medicine*, **4**, 20.
- BOUCHIER, I.A.D. (1984b). Imaging procedures to diagnose gall bladder disease. *British Medical Journal*, **288**, 1632.
- COTTON, P.B. (1984). Endoscopic management of bile duct stones; (apples and oranges). *Gut*, **25**, 587.
- ESCOURROU, J., CORDOVA, J.A., LAZORTHER, F., FREXINOS, J. & RIBET, A. (1984). Early and late complications after endoscopic sphincterotomy for biliary lithiasis with and without the gall bladder "in situ". *Gut*, **25**, 598.
- JOEHL, R.J., KOCH, K.L. & NAHRWOLD, D.L. (1984). Opioid drugs cause bile duct obstruction during hepatobiliary scans. *American Journal of Surgery*, **147**, 134.
- JOHANSSON, G. (1984). A prospective study of the clinical significance of the treatment of gallstones with chenodeoxycholic acid. *Surgery, Gynecology and Obstetrics*, **159**, 127.
- KHAN, O., GOODFELLOW, T., COSGROVE, D.O. & MELLER, S.T. (1984). Non-invasive imaging techniques in surgery. *Annals of the Royal College of Surgeons of England*, **66**, 127.
- WATT, P.C.H., CAMPBELL, R.C., SPENCE, R.A.J., MCGURK, J.J. & WHYTE, D.G.C. (1984). Combined barium meal and cholecystogram – an analysis of 1444 patients. *Postgraduate Medical Journal*, **61**, 518.
- YIN, T.P., LEUNG, J.W.C., VALLON, A.G. & COTTON, P.B. (1984). Sphincterotomy with gall bladder in situ; one to eight year follow up. *Gut*, **25**, 1186.
- Pancreas**
- AGHA, F.P. (1984). Spontaneous resolution of acute pancreatic pseudocysts. *Surgery, Gynecology and Obstetrics*, **158**, 22.
- COLHOUN, E., MURPHY, J.J. & MACERLEAN, D.P. (1984). Percutaneous drainage of pancreatic pseudocysts. *British Journal of Surgery*, **71**, 131.
- GOULET, R.J., GOODMAN, J., SCHAFFER, R., DALLEMAND, S. & ANDERSEN, D.K. (1984). Multiple pancreatic pseudocyst disease. *Annals of Surgery*, **199**, 6.
- KAUSHIK, S.P., VOHRA, R., VERMA, G.R., KAUSHIK, S. & SABHARWAL, A. (1984). Pancreatic abscess: a review of seventeen cases. *British Journal of Surgery*, **71**, 141.
- KIVILAAKSO, E., LEMPINEN, M., MAKELAINEN, A., NIKKI,

- P. & SCHRODER, T. (1984). Pancreatic resection versus peritoneal lavation for acute fulminant pancreatitis. A randomized prospective study. *Annals of Surgery*, **199**, 426.
- MOK, D.W.H. & BLUMGART, L.H. (1984). Erythema *ab igne* in chronic pancreatic pain: a diagnostic sign. *Journal of the Royal Society of Medicine*, **77**, 299.
- Experimental surgery & wound healing*
- ARMSTRONG, C.P., DIXON, J.M., TAYLOR, T.V. & DAVIES, G.C. (1984a). Surgical experience of deeply jaundiced patients with bile duct obstruction. *British Journal of Surgery*, **71**, 234.
- ARMSTRONG, C.P., DIXON, J.M., DUFFY, S.W., ELTON, R.A. & DAVIES, G.C. (1984b). Wound healing in obstructive jaundice. *British Journal of Surgery*, **71**, 267.
- ELLIS, H. (1984). Midline abdominal incisions. *British Journal of Obstetrics and Gynaecology*, **91**, 1.
- ELLIS, H. (1977). Wound healing. *Annals of the Royal College of Surgeons of England*, **59**, 382.
- ELLIS, H., COLERIDGE-SMITH, P.D. & JOYCE, A.D. (1984). Abdominal incisions – vertical or transverse? *Postgraduate Medical Journal*, **60**, 407.
- GER, R. & RAVO, B. (1984). Prevention and treatment of intestinal dehiscence by an intraluminal bypass graft. *British Journal of Surgery*, **71**, 726.
- GUILLOU, P.J., HALL, T.J., DONALDSON, D.R., BROUGH-TON, A.C. & BRENNAN, T.G. (1980). Vertical abdominal incisions – a choice? *British Journal of Surgery*, **67**, 395.
- LAWRENCE, W.T., MURPHY, R.C., ROBSON, M.C. & HEGGERS, J.P. (1984). The detrimental effects of cigarette smoking on flap survival: an experimental study in the rat. *British Journal of Plastic Surgery*, **37**, 216.
- LEESE, T. & ELLIS, H. (1984). Abdominal wound closure – A comparison of monofilament nylon and polydioxanone. *Surgery*, **95**, 125.
- MOSHAKIS, V. & CARTER, R.L. (1984). Neoplastic invasion of the arterial wall and its modification by surgery: an experimental model. *British Journal of Surgery*, **71**, 119.
- PRUITT, B.A. & LEVINE, N.S. (1984). Characteristics and uses of biological dressings and skin substitutes. *Archives of Surgery*, **119**, 312.
- REUS, W.F., ROBSON, M.C., ZACHARY, L. & HEGGERS, J.P. (1984). Acute effects of tobacco smoking on blood flow in the cutaneous micro-circulation. *British Journal of Plastic Surgery*, **37**, 213.
- SNELLEN, J.P., OBERTOP, H. & WESTBROEK, D.L. (1984). The effect of obstructive jaundice on wound healing in the rat. *European Surgical Research*, **62**, (Suppl. 1).
- TAUBE, M., ELLIOT, P. & ELLIS, H. (1981). Jaundice and wound healing: a tissue-culture study. *British Journal of Experimental Pathology*, **62**, 227.