REVIEW ARTICLE

Review of general surgery 1980

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Introduction

THIS year I have dealt with a number of topics quite unashamedly representing my own close interests – gastroenterology, the biliary system, peripheral vascular surgery, cancer surgery, diseases of the breast and wound healing. I hope this review gives a fair picture of the continued clinical and experimental advances which surgeons throughout the world are making in the scientific progress of our speciality.

Gastrointestinal surgery

There are 3 tenets in gastrointestinal surgery that I have never subscribed to: first, that the estimation of gastric acid secretion made before surgery for peptic ulcer is of help in deciding the type of surgery which should be employed – it has been suggested, for example, that high acid secretion requires antrectomy in addition to vagotomy. Second, that females fare worse than males when submitted to surgery for peptic ulcer and third, that surgery has an important part to play in the treatment of obese patients. A number of papers published this year now support me.

Boulos, Whitfield and Hobsley (1980), at the Middlesex Hospital, studied 68 patients with duodenal ulcer before they were submitted to vagotomy, by means of a histamine infusion test and an insulin test. Follow-up after vagotomy was for at least 2 years and any recurrence was diagnosed by endoscopy and/or at laparotomy. None of the pre-operative secretory indices studied bore any relation to the incidence of ulcer recurrence after vagotomy. The authors conclude that the magnitude of the parietal cell mass or of the vagal drive does not affect the chance that a vagotomy will fail to prevent recurrent ulceration and they find no foundation for a policy of 'tailoring' the form of acid-reducing operation to the results of pre-operative secretion studies.

Wheldon and his colleagues (1980), from Newcastle, report a prospective study of men and women following vagotomy with pyloroplasty and Bilroth I

gastrectomy. A review of 378 vagotomized patients (62 of whom were women) and 49 gastrectomized patients (23 women) followed-up for at least 5 years reveals that there are no essential differences in the symptoms found in women compared with men. These authors conclude that there is no justification for the belief that females fare worse than males after gastric surgery as far as symptoms are concerned and there are no grounds for reluctance to operate upon women unless forced to do so by complications.

Turning now to the surgical treatment of obesity, I have never myself thought that it was the surgeon's duty to carry out a life-endangering operation in order to allow a patient to eat as much food in a day as would keep a Vietnamese boat-people's family alive for a week. I will never forget a patient I saw in Pittsburgh who ate 20 chicken legs the night before her bypass procedure in order to 'give her strength for the operation'. The jejuno-colic bypass has now been abandoned and the jejuno-ileal bypass is also becoming increasingly unpopular because of its high immediate and late morbidity (MacLean *et al.*, 1980). Halverson and his colleagues (1980) have reviewed 101 patients submitted to jejuno-ileal bypass between 1972 and 1975. They found that no less than 28% were absolute failures and only 18% were considered to have achieved a good result. There had been 5 deaths as a result of the operation and 25 patients had required having the bypass taken down. They conclude that the procedure 'is not an appropriate operation for morbid obesity'.

Gastric bypass was first introduced by Mason (Mason, Printer and Blommers, 1980) but it is a difficult technical operation, and in the last 4 years many centres in the United States have been carrying out a gastroplasty in which the stomach is partitioned by means of a stapling instrument which leaves a narrow channel connecting a very small proximal gastric pouch to the distal stomach. Freeman and Burchett (1980), from Ottawa, give a frank account of the high complication rate they encountered in 63 patients undergoing gastroplasty. There was one

death postoperatively, and 6 leaks or subphrenic abscesses. Although initial weight loss was satisfactory, in many cases the patient ceased losing weight or regained weight after 6 months, and the overall failure in this group was no less than 35%. Unfortunately, gastric stapling is an easy technical operation and there is no doubt that it is being carried out on a very large scale throughout the New World; it is likely to produce a large number of still fat, vomiting and unhappy patients.

Inflammatory bowel disease

An interesting study from Cardiff by Mayberry, Rhodes and Newcombe (1980) reviews the familial prevalence of inflammatory bowel disease in relatives of patients with Crohn's disease. The current incidence in Cardiff is 55.7/10⁵ per year. Of 139 cases of Crohn's disease, 9% had relatives with either Crohn's or ulcerative colitis and this was 30 times the expected incidence. However, only one spouse out of 87 spouses was affected (with ulcerative colitis). This suggests that there may be a genetic factor in Crohn's disease but also external factors such as infection or diet might play a role. The aetiology of both these conditions remains as much a mystery as ever (Brooke, 1980) and the careful study by Phillpotts and his colleagues (1980) at St George's Hospital of cell cultures of Crohn's tissue and controls subjected to elaborate tests gave no evidence to support a persistent virus infection.

The General Hospital, Birmingham, which has provided so much information on the natural history of Crohn's disease in the past, provides yet another exhaustive review on the prognosis of distal ileal disease (Higgins and Allan, 1980): a consecutive series of 227 patients with Crohn's disease involving the distal ileum over the period between 1944 and 1978 is presented. The relatively favourable prognosis under modern management is demonstrated by the fact that of 185 patients upon whom there is full information, 161 are well and symptom-free and 7 have minor problems, while only 17 are unwell. Of the whole series, 87.6% have required surgery during the course of their disease and, despite the long period of review, the majority of patients (52%) have required only a single resection. Less than 6% have had more than 3 resections. Recurrent disease was nearly always localized to the ileum immediately at or proximal to the previous anastomosis, although 7 patients have developed extensive colonic involvement requiring colectomy. Actuarial analysis has shown that the re-operation rates are similar after first, second and third resections. Although there was a two-fold increase in mortality risk when compared with the general population, the majority of disease-related deaths occurred in the early years of

this study. Only 4 patients in the series have died of Crohn's disease in the last 10 years.

An important question which faces the surgeon operating on Crohn's disease is the extent of the resection which he should perform. There is very little guidance in the standard texts on whether he should be very radical, or whether a conservative resection, just clear of the macroscopic disease, is all that is necessary. For this reason, the important report by Pennington and his colleagues (1980) from the Johns Hopkins Hospital, Baltimore, deserves careful study. They investigated 97 patients undergoing a total of 103 resections for Crohn's disease. In 52 of these patients the edges of the resection were clear on microscopic examination, whereas in 51 there was histological evidence of the disease at the resection margins. The immediate postoperative anastomotic complications of the 2 groups (leakage, fistula formation and abscess) were identical at 6%. The follow-up, at a mean of 5.4 years, showed no statistical difference in either clinical flare-up of disease or suture line recurrence. As a result of this study, there is a firm recommendation for conservative resection, merely to achieve grossly uninvolved margins rather than the sacrifice of healthy bowel in order to obtain histologically normal tissue at the anastomotic line.

Pyoderma gangrenosum was first described in 1930 by Brunsting, Goeckerman and O'Leary. Its aetiology remains obscure but its association with ulcerative colitis is well known. Thornton and his colleagues (1980) have now carried out colonoscopy on all 14 patients with this condition attending the Department of Dermatology at the Bristol Royal Infirmary. Six of the patients had ulcerative colitis and all of these had disease affecting the whole colon. There was no correlation between exacerbations of the colitis and the onset or course of the skin lesion. The remaining 8 patients had no other disease, even on histological examination of colon biopsies, and they were found to be significantly older than those patients with co-existing colitis. The relationship between the 2 conditions remains unclear. It has been postulated that it is the result of an immunological reaction to bacterial or dietary antigens absorbed through a damaged colonic mucosa. The relationship between the 2 conditions is undoubted, since total colectomy causes the disappearance of the skin disease in those cases where they co-exist.

Intestinal obstruction

The picture of acute intestinal obstruction has changed quite remarkably in the active lifetime of surgeons to-day (Ellis, 1980a). Up to the 1930s, strangulated hernias accounted for about 50% of the total cases presenting to our hospitals but in more recent times these have become much less frequent,

no doubt because of the considerable enthusiasm with which hernias are repaired electively, even in the relatively old and feeble. Adhesions, in contrast, have become more and more common (Ellis, 1980b) and this, in turn, can be attributed to the enormous increase in the frequency of abdominal surgery. In addition, as the population ages, so the incidence of large bowel obstruction due to cancer of the colon rises. Recent reports from developing countries show that the situation there is very much that of the Western World half a century ago. Thus from Enugu in Nigeria, Attah and Anikwe (1980) found that 69% of their obstructions of the small bowel were due to strangulated hernia and only 16% due to adhesions. Chiedozi and his colleagues (1980), in Benin, found that 65% of their 316 cases were due to strangulated hernias and a mere 11% due to adhesions; these were mostly post-traumatic or post-inflammatory. Only 0.3% of their obstructions were due to tumour.

Another interesting geographical variation is the high incidence of volvulus of the sigmoid colon in many primitive farming communities compared with its comparative rarity in the U.K. Taha and Suleiman (1980) note that this condition accounts for 33% of all obstructions (and 70% of all colonic obstructions) in Khartoum in the Sudan. They associate this with the bulky cereal and vegetable diet of their patients. Not only is sigmoid volvulus common in Black Africa but the extraordinary entity of ileo-sigmoid knotting, in which a loop of small intestine knots around the base of the sigmoid volvulus, is also far from rare (Osime, 1980). This is a situation almost unknown in the Western World; Ver Steeg and Whitehead (1980) report a case in a girl of 22 years and state that this is only the second example they have found documented in the U.S.A. I have not heard of an example occurring in the United Kingdom.

One important decision that the surgeon has to make at the time of operation is whether a strangulated loop of bowel is or is not hopelessly infarcted. There is, of course, no doubt in the grossly advanced case, but all of us are well aware of the borderline when it is difficult to come to a definite clinical decision. Under these circumstances, the only safe thing to do is to resect the doubtful segment. Cooperman, Martin and Carey (1980a, b) describe both animal experiments and their clinical experience in determining the viability of intestine by means of Doppler ultrasonography. In dogs, 20 segments of small intestine were subjected to venous occlusion; in 10, the Doppler signals returned when the occlusion was released and 9 of these were found to be viable at re-operation 24 hr later, whereas in 10 segments where the signals did not return, only one was found to be viable subsequently. In the clinical situation, they report 25 segments of intestine of

questionable viability tested by Doppler ultrasound. Ten segments judged clinically non-viable, but with arterial flow detected on the Doppler probe, were preserved and all these patients had a benign course. Two were judged clinically viable but were Doppler-negative and were resected. Nine segments were clinically and Doppler non-viable and all these were resected. The remainder were viable by both tests and were preserved. Gorey (1980) revives interest in the use of fluorescein to define bowel viability and showed in rats that fluorescence was 95% accurate in predicting viable and non-viable bowel.

These days, when the great majority of the population seem to be on some form of medication or another, it is extremely important to take a careful history of drug ingestion in any acute abdominal emergency. George (1980) gives a useful résumé of the long list of drugs that may result in intestinal obstruction. These include substances occluding the bowel lumen, including barium sulphate and cholestyramine (and an example of this in an infant is reported by Merten and Grossman (1980)). Factors in the wall may include anticoagulant haematoma, strictures due to potassium chloride, and the effects of antihistamines, opiates, clonidine, ganglion-blocking agents and the tricyclic antidepressants, all of which affect the bowel smooth muscle. Factors outside the bowel wall include mesenteric vascular occlusion as a result of the contraceptive pill or adrenal corticosteroids, practolol adhesions and irradiation fibrosis, either from external beam therapy or from intra-abdominal radioactive materials.

Welch, Schweizer and Bartus (1980) point out that faecal impaction due to antacids is common in patients undergoing haemodialysis and renal transplantation. They record 6 instances in 250 dialysis patients and 4 in 180 undergoing transplantation. Six of these required surgery and 3 died as a result of perforation of the colon by stercoral ulceration. Finally, it may not be the drugs themselves but other parts of the modern pharmaceutical industry that produce gastrointestinal obstruction. Muhletaler and his colleagues (1980) describe 2 cases of partial bowel obstruction due to the ingestion of the desiccant (activated carbon or silicone gel) placed in the bottle of capsules and which may be swallowed by a partly-sighted patient in mistake for his pills.

Abdominal tuberculosis

Lambrianides, Ackroyd and Shorey (1980) give us a timely reminder that in areas with a high immigrant population, tuberculosis must now be considered in the differential diagnosis of abdominal pain. They detail 28 patients with abdominal tuberculosis who presented at the Hillingdon Hospital, Middlesex, between 1971 and 1979. Of these, 26 were Asian, one was Anglo-Indian and one English. Nine of the

patients had acute symptoms requiring laparotomy shortly after admission and in none of these was the diagnosis entertained pre-operatively; 2 had intestinal obstruction from ileo-caecal tuberculosis and right hemicolectomies were necessary in each. Most of the remainder had a long history of vague constitutional symptoms and laparotomy was required for diagnosis in all but 5, where diagnosis was made on the basis of a strongly positive Mantoux test, barium studies, chest radiographs and, in one case, a hepatic biopsy.

The biliary system

Retrospective studies over the last 30 years have indicated an increased incidence of gall-stones after gastric surgery. Some reports suggest that there is increase in the gall-bladder volume and impaired contractility after vagotomy or gastrectomy but other workers give contradictory results. In animal experiments there is evidence that vagotomy increases the lithogenicity of bile. Anderson and his colleagues (1980) now present a prospective study of 118 patients with proved duodenal ulcer disease which was undertaken to determine the true incidence of the development of gall-stones. Sixty-one patients undergoing surgery and 57 others treated medically were matched for age, sex and weight. All the patients had an oral cholecystogram at entry into the study and again at 18 months, and 109 were reviewed radiologically at 3 years. Three patients in the surgical group developed asymptomatic gall-stones whereas none was detected in the medical group. This gives an incidence of gall-stones of 4.9% 3 years after gastric surgery. Of course, a longer follow-up would be of interest and the authors point out the difficulty of persuading patients to come back for repeated investigations. The problem of excess radiation could be overcome by using ultrasound examination. Although the authors could draw no firm conclusions from the present study there is certainly a strong suggestion from its findings that cholelithiasis is increased after peptic ulcer surgery.

The investigation of the gall-bladder and the biliary tract is now becoming highly sophisticated. Excellent results are being obtained in the detection of gall-stones using grey-scale ultrasonography with findings at least as comparable as oral cholecystography in detecting stones or showing their absence (Krook *et al.*, 1980). Cooperberg and Burhenne (1980) showed that this technique missed only 5 patients out of 261 proved to have gall-stones (98% sensitivity). In 43 patients proved not to have stones, the scanning technique correctly diagnosed their absence and in only one case was the negative diagnosis given by scanning probably wrong, so here too the sensitivity was 98%. In only 6 patients was the scanning inconclusive. Most of these excellent

reports come from teaching hospitals, but Walker (1980) presents the results of the first year of use of a B-mode scanner in a district general hospital (the Royal Berkshire Hospital, Reading). Three hundred and sixty-seven cases were scanned, mostly after unsuccessful or equivocal oral cholecystograms, and operative confirmation was carried out in over one-third of the cases. Eighty-three per cent. of the surgical cases were correctly diagnosed, 10% were inconclusive and 7% incorrect. The author points out that although these results are not as good as some recent reports from major centres there was an impressively high accuracy obtained even while experience was being gained.

At present, the 2 imaging techniques, cholecystography and ultrasound, are best still considered as complementary rather than as alternatives (Leading Article, 1981). When the cholecystogram fails, scanning will usually give a diagnostic result and is the technique of choice in pregnancy, in liver disease and when a rapid diagnosis is required. However, good scans may be difficult to obtain in very fat patients and may be impossible when there is gas in the intestine overlying the gall-bladder. A shrunken, chronically inflamed gall-bladder may be impossible to locate.

It has now become well established that ultrasonography should always be undertaken as the first line of investigation in patients with suspected obstructive jaundice as it is a non-invasive procedure that may provide the surgeon with all the diagnostic information he requires. Wild and his colleagues (1980), at the Western General Hospital, Edinburgh, found that grey-scale ultrasonography distinguished between obstructive and hepato-cellular jaundice in 35 out of 46 patients (76%), indicated the site of the obstruction in 27 (58%) and the cause of the obstruction in 13 (28%). Percutaneous transhepatic cholangiography should be performed when ultrasonography has demonstrated dilated ducts but has failed to provide adequate diagnostic information for the surgeon. In those patients in whom ultrasonography shows non-dilated ducts, they recommended endoscopic retrograde cholangio-pancreatography as probably the contrast examination of choice.

There is increasing interest in the use of urgent hepato-biliary scanning in the investigation of suspected acute cholecystitis. O'Callaghan and his colleagues (1980) give a useful account of their experience using ^{99m}Tc-labelled HIDA, the scan being carried out usually within 24 hr of admission. In those patients having abnormal hepato-biliary scans, there was a 100% correlation with gall-bladder disease discovered at laparotomy. A normal scan does not exclude gall-stones (of 40 patients with normal scans, 7 were found to have gall-stones on further investigation) but it is important in excluding

cystic duct obstruction. There is a strong correlation between delay in the excretion of the tracer into the duodenum and common bile duct pathology – either stone or stricture.

Once the diagnosis of acute cholecystitis has been made, it would be true to say that most surgeons in this country adopt a conservative regime and perform an elective cholecystectomy 2–3 months later. In the U.S.A., in contrast, cholecystectomy is usually advocated in the acute phase. Fowkes and Gunn (1980) point out that the 2 control trials that have been carried out, one in Sweden and one in Liverpool, suggest that the mortality and morbidity are similar between the 2 approaches. In their own retrospective study of early and delayed cholecystectomy in the treatment of patients presenting with acute gall-bladder disease they found that the operating time, number of deaths, complications and re-admissions were similar in the 2 groups. However, 27% of patients on the waiting list for delayed cholecystectomy were re-admitted as emergencies with further flare-ups before they were called for elective surgery. The overall average length of stay in the delayed group was 16.1 days compared with 12.4 days in the early group, the main difference in length of stay being due to the initially medical admission in the delayed group. There seems little doubt that if the cholecystectomy in the acute phase is performed by an expert surgical team with facilities for operative cholangiography, results are very much the same as if the operation is performed electively. Unfortunately, with the National Health Service as it is, many emergency operations are performed by junior staff, often without skilled anaesthetic help or radiological facilities. Under such circumstances there seems little doubt that a safer policy would be to let the acute episode settle down and let the Chief do the operation as a cold case on the waiting list.

Two interesting studies of gall-stone-associated acute pancreatitis both point out the risk of further attacks of pancreatitis while the gall-stones remain; both suggest cholecystectomy during the initial admission, once the acute affair has settled down, and both point out that this is not associated with any evidence of increased mortality (Kelly, 1980; Osborne, Imrie and Carter, 1980).

Two complications following cholecystectomy haunt the surgeon; these are leaving a residual stone in the common bile duct and, even more disastrously, damaging the duct with resultant stricture. It is estimated that injury to the common bile duct may occur about once in every 4000 cholecystectomies and one need not emphasize the tragic consequences which so often follow this disaster. Reconstruction of the strictured duct is usually carried out by a choledocho-jejunal anastomosis. Many years ago it

was demonstrated in experimental studies by Engelbert Dunphy that even if a sliver of the common duct wall was preserved and the rest replaced by a vein patch graft, a remarkable regeneration of the remaining strip of common bile duct took place; a phenomenon rather reminiscent of the regeneration seen in the urethra in the treatment of hypospadias. We have had the opportunity of utilizing Dunphy's laboratory observations on 2 patients in the repair of short strictures of the common bile duct (Ellis and Hoile, 1980). The first patient, who had her common bile duct damaged in 1963, had a vein patch plasty of her stricture 10 years ago and remains well. Five years ago she required re-exploration for further stones, which had formed in the common bile duct below the repaired stricture, which were extracted *via* a duodenotomy. At that time the previously repaired common bile duct appeared entirely normal with no evidence of stenosis and there has been no further problem. The second patient, whose bile duct was damaged probably by diathermy coagulation at the time of cholecystectomy, had a vein patch repaired 2 years ago and remains well. These cases of short, easily accessible strictures of the common bile duct are few and far between and we have only been able to trace 3 other examples of duct patching; one was a teflon patch for a post-operative stricture and the other 2 were patches using vein in one case and gall-bladder wall in the second for a repair of the bile duct wall at the time of initial surgery.

Residual stones in the common bile duct have, until recently, required re-operation and surgical removal. Fortunately, both for the patient and the surgeon, ingenious endoscopic and radiological techniques have now been introduced which can deal with the majority of these cases.

If the residual stones are diagnosed after the common bile duct has been explored and while a T-tube is still in place, this serves as a portal of entry for a whole variety of stone baskets, special forceps and fiberoptic instruments for removal of the retained calculi. Moss and his colleagues (1980) give a useful account of postoperative choledochoscopy through the T-tube tract. This should not be performed earlier than 4 weeks after the operation to enable the tract to be well established and they report 17 successful cases in which difficult and impacted stones were removed from the common duct. Caprini, Thorpe and Fotopoulos (1980) give an account of an experience of 100 cases of retained stones dealt with over a 10-year period using the whole range of transcutaneous techniques *via* the T-tube tract. There were 96 successes, 85 of which required one to 3 sessions and the remainder between 4 to 9 sessions. There were 2 deaths in this group. Of the 4 remaining patients, the stones needed

operative removal with one death. Two further cases required re-operation for recurrent calculus obstruction after initial success with the percutaneous technique. Cotton (1980) reports on non-operative removal of bile-duct stones by duodenoscopic sphincterotomy. Of 134 cases (only 15 of whom had not had previous surgery), successful removal of the stones was carried out in 89%, 3 of the patients required emergency surgery and there was one death from secondary haemorrhage. The procedure becomes more difficult and hazardous with stones over 15 mm in diameter. At this stage one does not know if stricturing of the sphincterotomy may not occur, at least in some cases, as a late phenomenon and it may be that in young patients who are fit for surgery open operation might be safer in the long run. But, certainly in the older sick patient, this duodenoscopic technique represents a major therapeutic advance.

Sclerosing cholangitis

The aetiology of sclerosing cholangitis is obscure but there is a well documented association with ulcerative colitis and, less frequently, with Crohn's disease in between 30 and 40% of reported cases. Treatment with steroids, antibiotics and sulphasalazine have proved ineffective. Wood and Cuschieri (1980) from Dundee, present an important communication on 4 patients, all females, with sclerosing cholangitis associated with ulcerative colitis. These patients were treated by colectomy and prolonged biliary stenting by means of a silicone tube passed upwards from the ampulla through the stricture, across the liver and then brought out to the skin surface. Daily saline irrigation of the tube was carried out and antibiotics prescribed. Serial cholangiograms revealed regrowth of the extra-hepatic and intra-hepatic biliary tree and there was both clinical and biochemical improvement in the patients, which was sustained when the tube was removed. In 3 of the patients the stent was removed 12–16 months after surgery and at follow-up 3, 6 and 9 years later the patients remained well. The fourth patient still has the stent *in situ*. Further experience of this technique will be watched with interest in what has, up to now, proved to be a uniformly depressing subject.

Peripheral vascular surgery

Arteriosclerotic obstruction

The surgical treatment of severe occlusive arteriosclerotic disease in the lower limb usually comprises a Dacron bypass graft or thrombectomy in the aortofemoral segment (Nevelsteen *et al.*, 1980) or a saphenous vein bypass in superficial femoral disease, assuming, of course, that there is a satisfactory 'run off' distally.

In poor-risk patients with aorto-ilio-femoral

obliterative disease and those with graft infection in this area, reconstruction by means of an axillo-femoral bypass has now become an accepted procedure. Broomé and his colleagues (1980), in Sweden, report on 61 patients operated on over a 5-year period. There was a 3-year graft patency rate of 75% and a 3-year limb salvage rate of 90%. They compared velour-Dacron grafts with expanded polytetrafluoroethylene grafts and found a lower frequency of both early and late graft thrombosis and a higher success rate of late thrombectomies when the latter type of graft material is used.

Unfortunately, many patients eventually require a limb amputation because of peripheral vascular insufficiency which is unamenable to conventional reconstructive procedures. Goldsmith (1980) has shown that it is possible to mobilize the omentum on a vascular pedicle and bring this down as a graft to revascularize an ischaemic limb and describes this procedure in a patient with severe arteriosclerotic disease of the right upper limb. Two years following operation the patient has a viable right arm and hand and is free from pain. This technique is also applicable to the lower limb.

There is considerable interest in the technique of percutaneous transluminal dilatation of stenosed arteries in arteriosclerotic disease. This was first described by Dotter and Judkins in 1964 but the present method of balloon dilatation, introduced by Gruntzig and Kumpe (1979), has only been employed over the last 4 or 5 years. It comprises threading a guide wire through the stenosed segment followed by an angiographic catheter; this enlarges the stenosis to permit passage of a balloon catheter which is carefully positioned to straddle the stenosis. The balloon is then expanded under X-ray control and then deflated. A completion arteriogram is performed to confirm the adequacy of the dilatation and to ensure that no peripheral embolization has occurred. The technique is of particular value in dealing with iliac artery stenosis, either alone or in association with subsequent femoral block reconstruction (Alpert *et al.*, 1980; Colapinto, Harries-Jones and Johnston, 1980; Kumpe and Kempczinski, 1980). Although long-term results are obviously not yet available, Gruntzig himself (Gruntzig and Kumpe, 1979) indicates an 83% patency at 3 years. A repeat dilatation, if required, can be performed as easily as the initial one.

This technique is now being applied to stenosis of the carotid artery and even to coronary arterial disease. There is certainly need for more radiologists to be interested in the treatment side of vascular disease as well as its investigation, for more referrals from vascular surgeons and for more long-term evaluations of results (Editorial, 1980).

Unfortunately there remains a large group of

patients with peripheral arterial disease who are unsuitable for surgery because of cardiac disease or stroke or with extensive blockage not amenable to surgical correction. These patients create a considerable therapeutic problem. Cessation of smoking, encouragement of exercise, the withdrawal of vasoconstricting agents and phenol injection of the lumbar sympathetic chain may give symptomatic relief. This latter has a success rate about the same as surgical sympathectomy but of course with a much reduced hospital stay and avoidance of quite a major operation (Milleret, Lavaud and Gravier, 1980).

In spite of their increasing sales, there do not seem to be any satisfactory controlled clinical studies which confirm that vasodilator drugs increase the walking distance of the patient with claudication (Clyne, 1980).

Recently there has been considerable interest in the value of prostaglandins in the management of this condition. Pardy, Eastcott and Miles (1980) report the use of prostaglandin E_1 , which is a vasodilator and inhibitor of platelet aggregation, in the treatment of 15 patients with severe extremity ischaemia. These included examples of arteriosclerosis, Buerger's disease and Raynaud's phenomenon. They note relief of pain and promotion of tissue healing when this therapy was employed intra-arterially, or in a 6 times higher dose intravenously over a 3- to 4-day period. Clifford and his colleagues (1980a, b) report the use of prostaglandin E_1 in 26 patients with severe vasospastic disease of the hands by infusion *via* a central venous cannula over 72 hr. Increased digital perfusion was produced which could last for several weeks after treatment and 5 of 8 ischaemic ulcers healed in 6 weeks.

The aetiology of Raynaud's phenomenon remains a mystery. However, it is known that thromboxane A_2 , produced largely in platelets, is a potent vasoconstrictor and platelet aggregator, whereas prostacyclin is synthesized in, and released from, vascular endothelium and is a potent vasodilator and inhibitor of platelet aggregation. The interaction of these 2 compounds is thought to control the laying down and clearing of platelet thrombi within the vasculature and their interplay may prove to be an important factor in the pathogenesis of this condition (Leading Article, 1980).

Microvascular surgery

There is no doubt that the most exciting technical advance in vascular surgery is the development of microsurgical techniques which enable blood vessels of diameters down to 1 mm or less to be sutured. In major reconstructive surgery, a myocutaneous flap of skin and of muscle can be transferred as a one-stage procedure to repair a major defect and the muscular portion of the free flap can even be re-

innervated by performing a nerve anastomosis at the recipient site (Saliban, Achauer and Furnas, 1980). The neurosurgeon uses this technique in cerebral revascularization. Lumley (1980) gives an account of 77 extra-cranial/intracranial reconstructions in which the superficial temporal artery is anastomosed to the middle cerebral artery exposed *via* a burr hole which is extended if necessary.

The gastroenterological surgeons are employing microsurgery to enable reconstruction of the cervical oesophagus using a free jejunal graft; the arterial anastomosis is to a branch of the external carotid artery, and the venous to the internal jugular vein (Meyers, Seigler and Hanks, 1980). Hester and his colleagues (1980) report 17 cases of replacement of the cervical oesophagus or hypopharynx and 5 of oral cavity reconstruction using such grafts employing microvascular surgery to effect the vascular anastomoses.

There are interesting examples of microsurgical techniques applied to orthopaedics. Thus, Louis and his colleagues (1980) of Lyons described the case of a young man of 21 years with a massive defect of his femoral shaft caused by post-traumatic osteitis following a fractured femur, who was treated with a free graft of fibula revascularized by a micro-anastomosis. The vascular pedicle of vastus externus was used as the source of feeding artery and draining vein. The graft took well and weight bearing was allowed 5 months later.

Perhaps the most unusual report of microsurgical expertise this year comes from Uppsala, Sweden. Henriksson and his colleagues (1980) report a 38-year-old schizophrenic who amputated his penis. He was transferred 700 km by air together with his amputated organ to reach the microsurgical team. A catheter was passed and the urethra sutured back with catgut. The dorsal vein of the penis and the 2 dorsal arteries were repaired by microsurgery in a 7-hr operation with an excellent outcome.

Cancer

Oesophagus

It is only too well known that the prognosis of the majority of patients with carcinoma of the oesophagus and gastric cardia is poor and that the terminal stages of the disease can be most unpleasant. Even in those cases that are operable, the mortality is relatively high, even in specialist centres. Welvaart and Zwaveling (1980) report from Leiden on 133 cancers of the oesophagus and cardia. Less than 50% were resectable and the operative mortality was 12.7%. Twenty-eight of the patients with unresectable growths had the stricture intubated by means of a Celestin tube and 9 of them died within 30 days (32%); the rest lived an average of 5.5

months with a range of 2–9 months. Oesophago-respiratory fistula is a particularly unpleasant complication of oesophageal cancer and usually the patient lives only a few weeks and in considerable misery. Weaver and Matthews (1980) recommend a retrosternal oesophago-gastric bypass in such cases with oesophageal exclusion. Of 3 patients submitted to this procedure there was one postoperative death but one patient survived 7 months and the other for 22 months.

An extensive and critical review of the treatment of squamous cell carcinoma of the oesophagus is presented by Earlam and Cunha-Melo (1980a, b). They point out that most surveys of carcinoma of the oesophagus include adenocarcinomas and these may account for anything up to 75% of the cases studied. However, the true incidence of adenocarcinoma of the oesophagus is only 1% (the rest derive from the cardia). Although adenocarcinoma of the oesophagus has a lower operative mortality than the squamous tumour, the ultimate prognosis is poor, but there is no alternative other than surgery for these cases. Their review deals with the surgical treatment of no less than 83 783 cases collected from 122 articles on the subject and excluding adenocarcinoma wherever possible. They summarize the surgical results as follows: of 100 cases, 58 will be explored and of these, 39 will be resected. Thirteen will die in hospital and 26 will survive. Of the 26 survivors, 18 will live for one year; 9 for 2 years and only 4 for 5 years. The operative mortality will rise proportionally with the height of the tumour in the oesophagus. Turning to the use of radiotherapy in this condition, the authors point out that in most studies radiotherapy has been employed only for patients with extensive disease or those who are unfit for surgery. In spite of this, the one-year survival of 18% is similar to that for surgically treated patients and there is no equivalent operative mortality. The 5-year survival is 6% compared with that for surgery of 4%. About 50% of patients treated by radiotherapy do indeed require subsequent dilatations for stricture formation, but so do about 30% of cases following resection. Earlam and Cunha-Melo point out that there have been no controlled trials carried out of the results for early cases of squamous carcinoma of the oesophagus which are technically suitable for surgery and who have been randomized between surgical treatment and radiotherapy. It might be that radiotherapy is better than surgery for improving the quality and quantity of life in such patients.

In another extensive review, Roberts (1980) argues that combined pre-operative megavoltage radiotherapy with radical oesophagectomy within a few months may be the most effective approach in patients with localized disease, although this group

is likely to comprise at best a third of all patients. In those patients with severe intercurrent disease, a tumour longer than 10 cm or clinical evidence of disseminated disease, the prime requirement of therapy is rapid relief of dysphagia. Endoscopic intubation from above probably provides the most direct and safest method of achieving this, which may also prolong survival for a month or two. The survival after intubation may be prolonged further by the addition of megavoltage radiotherapy in the fitter patients.

Pancreas

With the exception of carcinoma of the ampulla of Vater, the prognosis of pancreatic cancer is frightful. This is highlighted by a report by Forrester and Pringle (1980) of 342 patients with pancreatic cancer in Dundee between 1959 and 1975. No operation was carried out in 87, because the tumour was too advanced or the patient unfit for surgery. The remaining 255 patients underwent laparotomy. Pancreatico-duodenectomy was carried out in 15, 4 ampullary growths were removed by local excision, 151 patients had palliative short-circuit procedures and the remaining 85 had laparotomies only. Of the 15 'curative' operations, 12 of the patients had ampullary tumours and 4 of these survived for 5 or more years; one patient had a peri-ampullary duodenal carcinoma and the remaining 2 had cancers of the head of the pancreas; both of these died in less than one year. There were 4 operative deaths in this group (26%). Of the remaining patients, 10 were still alive and well at 5 years but these cases had no histological confirmation and the original diagnosis was obviously at fault; they were excluded from further study. Of the remaining patients, only 9.3% were alive at the end of one year, 1.8% at the end of 2 years and 1.2% (4 patients) at the end of 5 years. The mean survival following palliative surgery was 5.5 months compared with only 1.6 months for patients submitted to no palliative procedure at all. The authors conclude that radical surgery may be indicated for the occasional peri-ampullary carcinoma but has little if any place in the treatment of carcinoma of the pancreas. The majority of surgeons in this country have certainly come round to this point of view.

Undoubtedly a short-circuit procedure is worthwhile for the relief of jaundice and the associated intense pruritus which may render the patient almost suicidal. However, even palliative bypass procedures carry a high operative mortality in the presence of deep jaundice. The percutaneous transhepatic route has been used to insert a permanent biliary prosthesis to obviate the need for surgical bypass (Burcharth, Jensen and Olesen, 1979) but even this technique carries appreciable risks. Lawrence and

Cotton (1980) now describe a technique of palliative biliary drainage in patients with malignant obstruction by duodenoscopic intubation of the bile duct in which a radio-opaque Teflon catheter is inserted through the ampulla, across the malignant obstruction into the dilated bile ducts above. There seems little doubt that the development of such a technique is going to prove invaluable in the palliative management of these patients.

But can anything further be done for pain relief or to improve the present frightful prognosis? Smith and Gazet (1980) describe the use of percutaneous intra-arterial chemotherapy in which an arterial catheter is placed either into the coeliac trunk or, preferentially, into the common hepatic artery *via* the femoral artery. The majority of their 63 patients were treated with 5-fluorouracil and in the remainder multiple drug therapy was used. After this initial 5-day intra-arterial course, weekly 5-fluorouracil was given as maintenance therapy by the i.v. route for 3 months. The patients all had inoperable carcinoma of the pancreas and the great majority (92%) were suffering from severe pain. Relief of pain was an immediate response in 55% of the cases and this was associated with low toxicity; only one death was attributable to the form of therapy used.

An important report by Mallinson and his colleagues (1980) from a group of district hospitals in London and in the South East presents a controlled, prospective, randomized trial of chemotherapy for histologically confirmed, unresectable, pancreatic cancer. Nineteen of the patients were treated with analgesics and other supportive measures while 21 patients received an initiation course of i.v. fluorouracil, cyclophosphamide, methotrexate and vincristine, followed by i.v. fluorouracil and mitomycin given over 3 or 5 days at 6-week intervals thereafter. The median survival in the treated patients was 44 weeks, which was significantly longer than the 9 weeks seen in the controls. In the patients without metastases, median survival was 48 weeks in the treated, and 12 weeks in the control group, while in patients with metastases it was 30 weeks in the treated patients and 7 weeks in the controls. The treatment was well tolerated and indeed the controls had at least as much nausea, vomiting and pain and no less diarrhoea than the treated patients. If these results are confirmed, the authors suggest that this combination of drugs seems to be acceptable to the patients and feasible in a district general hospital.

Large bowel

For many years the standard of staging of carcinoma of the large bowel was based on the Duke's classification: Stage A, the tumour confined to the mucosa; Stage B, involvement of the muscle wall;

Stage C, involvement of the regional nodes. Talbot and his colleagues (1980), from St Mark's Hospital, have now extended the staging of rectal cancer by considering venous invasion seen in the resected specimen. In a study of 703 surgical resections, vein invasion was noted in 52% of cases. The 5-year survival was worse and liver metastasis developed more commonly when venous invasion had occurred and it was found that spread into the extra-mural veins was more significant than intra-mural involvement. Moreover, invasion of thick walled veins was more significant than the thin walled vessels. Although venous spread paralleled the local and lymph node spread, this was not invariably so. For example, extra-mural venous spread occurred in one case (5%) of the Duke's A cases and was present in 75% of the Duke's C group. The authors suggest that venous spread should be used to supplement the original Duke's grading.

After radical surgery for carcinoma, the traditional policy is to keep the patients under review in out-patients for the rest of their lives. Cochrane and his colleagues (1980), at the Middlesex Hospital, reviewed the records of 406 patients with carcinoma of the large bowel who had been treated during the period 1958 to 1962. Of these, 180 were followed-up regularly after radical surgery and from 6 months to 15 years after operation they were seen a total of 2319 times; 71 developed a recurrent carcinoma but, of these, over 50% were diagnosed at times other than those of the patients' routine out-patients appointments! In 7 patients with recurrences in the suture line, an attempt was made to resect the recurrence but this was possible in only 5 patients, one of whom was apparently cured and the rest survived only one to 3 years after further resection. The authors wonder whether at the present, adequate education of patients in the symptoms of early recurrence, with instruction to return if any of these develop, might be more effective than the time-consuming and unsatisfactory routine follow-up still used in most hospitals.

However, the development of efficient tumour markers may change the value of follow-up procedures. Many centres are reporting re-exploration of patients who are symptomless but in whom there has been a rise in the plasma carcino-embryonic antigen (CEA) value after curative colorectal cancer resection. For example, Lagache, Dessaint and Triboulet (1980) in Lille report 3 curative excisions among 7 patients fulfilling these criteria. A careful study by Steele and his colleagues (1980) in Boston reviews 75 patients followed-up after curative resection of Duke's B or C cases. Fifteen out of 18 recurrences were first diagnosed as such based on 2 successive CEA rises. Of these, 4 underwent curative resection and 2 of these patients were clear at 13 and

24 months. However, the remaining patients either had widespread local or distant recurrences or were only amenable to partial resection of the tumour. Wood and his colleagues (1980) studied 37 recurrences in a group of 148 patients with potentially curative colorectal cancers studied by serial CEA estimations. Thirty-six of the 37 had raised CEA levels and in 27 the rise in CEA preceded clinical signs or symptoms. Only one patient had a local recurrence 4 months before the CEA level rose. They distinguish 2 patterns of CEA elevation – a fast rise and a slow one; the majority in the first category were found to have metastatic spread whereas the majority in the second group showed local recurrence only. There is obviously urgent need for a careful prospective study to determine whether a 'second look' operation based on a rising CEA level can offer any advantage over re-operation in patients who have developed clinical features suggesting recurrent disease and, indeed, such a multi-centre prospective trial is in active preparation. Certainly a policy of selective re-operation in patients with suspected recurrent disease may yield surprisingly pleasing results. Between 1962 and 1978 we re-explored a total of 47 patients with colorectal cancer under such circumstances (Ellis, 1980). Six of these were submitted to laparotomy only for hopeless recurrent disease, 5 had short-circuit or colostomy performed to overcome recurrence, 18 had local or distant recurrent disease resected, 11 had a second metachronous cancer resected (one of these had 2 metachronous resections performed), 3 had a second cancer in an organ other than the bowel and in 4 patients an entirely benign condition mimicking malignancy was detected and dealt with.

Probably the ultimate in a 'second look' operation was reported by Mixter (1980) who resected the abdominal aorta en bloc with a recurrent cancer of the colon and reported the patient to be alive and well 18 years later.

Unfortunately, when the disease disseminates, cytotoxic drugs are of only limited value, and Nicholls (1980) reviews the depressing results of recent trials. Although responses may be achieved with combination chemotherapy in up to a third of patients, there is no evidence that survival is actually extended, and against this must be placed the additional burden to the patient of the side effects of combination chemotherapy. Non-specific immunotherapy also appears to add nothing to the prognosis of large bowel cancer (Souter, Gill and Morris, 1980).

The breast

Breast cysts

Jones and Bradbeer (1980) present a useful review of 332 cases of macroscopic breast cysts at the

Mayday Hospital, Croydon, over a 5-year period. The majority occurred in the perimenopausal age group but the range was from 13 to 73 years. Only 5 patients presented after the age of 55 years and 11 were under 30 years old, of whom 6 had post-lactation cysts. Like most surgeons in the U.K., Jones and Bradbeer treat breast cysts by aspiration; this gives quick confirmation of the diagnosis in patients who obviously fear that they have cancer, it saves admission to hospital for operation and a vast accumulated clinical experience has shown that it is perfectly safe. The authors point out that if the fluid is blood-stained, if there is a residual lump after aspiration or if the cyst rapidly refills on more than one occasion (and, of course, if no fluid is obtained) the suspicion of an intracystic or co-existent neoplasm is aroused and excision biopsy should be carried out. Lumps on 9 attempted aspirations proved to be carcinomatous; in 6 no fluid was obtained and in 3 the fluid was blood-stained (2 of these had positive cytology). The value of aspiration in saving the patient surgery is shown by the fact that no less than 44% of the patients developed a second cyst and in two-thirds of these, more than one subsequent cyst developed. Again, as is the experience of most surgeons, the authors found that cytology was not a useful procedure since it did not reveal any case of malignancy which was not already suspected. Follow-up of this series of patients revealed that 7 (2%) developed a carcinoma arising either in the same as or the opposite breast to the original cyst with an average time interval between first presentation and development of the tumour of 5.75 years. This incidence of 2% was higher than would be expected in the age range and follow-up period of these patients, estimated to be 0.87%, and the authors advise careful follow-up of patients with macroscopic breast cysts on this account.

However, the relationship between benign disease of the breast and breast cancer remains uncertain. Chetty and his colleagues (1980) report a study of 7000 women attending a diagnostic breast clinic and the breast screening clinic in Edinburgh which fails to show any significant relationship between the occurrence of previous symptomatic breast disease and a risk of cancer. Indeed, it was found that those women attending the clinics who had benign disease of the breast were more likely to have a history of a previous breast complaint or biopsy than those with cancer. This same study gives an interesting idea of the proportions of diseases of the breast likely to be encountered in a modern diagnostic breast clinic. Of 3175 patients attending the Edinburgh clinic, 29% were found to be normal, 56% were diagnosed as having benign disease and 14% had breast cancer.

Undoubtedly the commonest breast condition we encounter in surgical clinics to-day is fibroadenosis

with concomitant breast pain which, in its severe form, is difficult to treat effectively. There is good evidence that gonadotrophin suppression by danazol reduces breast tenderness and nodularity in these cases. Mansell and Wisbey (1980), working in the Welsh National School of Medicine, report a 6-month study in 28 patients with severe intractable symptoms using a double-blind within-patient cross-over trial against a placebo. There was a significant improvement in breast symptoms in favour of danazol but side effects were commoner on danazol than on placebo and 15% dropped out of the study. Whether hormonal treatment of this nature should be continued for a long period in otherwise young and healthy women is something for further study and debate.

No matter how severe the symptoms of benign breast disease, probably few surgeons are driven to the length of performing subcutaneous mastectomy with silicone gel implants. However, Cuschieri (1980) reports this procedure in a group of 30 patients. A final satisfactory cosmetic result and freedom from symptoms was obtained in 27. Complications included partial skin necrosis in one patient, infection in another and breakdown of the wound with prolapse of the implant in 2 further cases. Late encapsulation of the implants was observed in 11 patients but this was painful or disturbing in only 4 of these, and one required removal of the implant because of persistent pain. The pathology of the excised breast tissue showed an incidence of significant proliferative change in both breasts in 50% and one example of a non-invasive ductal carcinoma. I must confess that in a long and extensive experience of dealing with benign breast disease I have never yet been driven to such radical therapy.

Breast cancer

We have mentioned above the aspiration treatment of cysts of the breast. One fear is always the possibility of the condition being due to a cystic carcinoma. The rarity of this condition is shown by an interesting study by Payne and Jackson (1980). In a histological examination of 4530 specimens of breast tissue there were 1277 breast cancers and, of these, there were 7 examples (0.55%) of intra-cystic papillary adenocarcinomas. In addition, there were 23 benign intra-cystic papillomas, 5 examples of cystic degeneration of a solid tumour (3 carcinomas and 2 sarcomas) and one squamous carcinoma in a cyst wall. Interestingly enough these carcinomas were often slow growing and confined to the cyst wall for many years. Indeed one of their cases had had the lump for 30 years!

Mammography is being used increasingly as a screening method, as an investigation of equivocal breast problems and even, in some centres, as a

routine investigation of every breast lump. However, like all techniques, it brings its own questions and problems with it. Mammography is not without potential hazard and concern has been expressed about the radiation risk. There is no safe minimal or threshold dose and for each rad of radiation received by the breast the increased risk of breast cancer has been calculated to be 6 extra cases per million women per year starting after a latent period of 10 years. The risk is greatest when radiation occurs in the young, particularly those of teenage years (Forrest and Roberts, 1980). Cahill and his colleagues (1980) from Guildford note that they use mammography in all patients where malignancy is suspected. In 323 consecutive patients with operable breast cancer no less than 9.2% showed no radiological evidence of neoplasm. In 30% of these cases no lesion at all was seen and in the remaining 70% the radiological features were not considered to be those of cancer. Interestingly enough, those tumours which were negative mammographically tended to be poorly differentiated tumours – 33% compared with only 10.8% of those which gave positive mammographic findings. These authors stress a lesson that all experienced clinicians know well: that all clinically suspicious palpable lesions in the breast should be subjected to biopsy regardless of the absence of mammographic features of malignancy. This especially applies to the young dysplastic breast where diagnosis mammographically may be particularly difficult.

On the other side of the coin is the lesion picked up by mammography but clinically impalpable. Schwartz and his colleagues (1980) have described a technique of needle-guided localization to identify the suspicious area precisely before excision and specimen radiography must then be used to ensure that the entire area has been removed. These authors then attempted to answer the question of whether conservative surgery could be employed in treating these extremely early breast lesions. They review 62 such non-palpable tumours detected by mammography. These included 30 invasive, 7 minimally invasive and 20 non-invasive ductal cancers and 5 lobular carcinomas *in situ*. When the mastectomy specimens were examined for evidence of multi-focal cancer, 39.6% of the breasts examined demonstrated the presence of foci of invasive or non-invasive ductal or lobular carcinoma in another quadrant of the breast. Moreover, of the 29 invasive cancers submitted to axillary node dissection, no less than 8 (27.6%) had metastases in the axillary nodes. Obviously, local excision of these early lesions alone must be regarded as inadequate therapy.

Oestrogen receptors

Assay for oestrogen receptor protein in breast

cancer tissue is a major contribution to the selection of patients for hormone and endocrine therapy with its presence predicting a favourable response in approximately 50% of patients compared with less than 10% in its absence (Allegra, Lippman and Thompson, 1980; British Breast Group, 1980). The presence of oestrogen receptor has also been allied with a favourable prognosis in early cases. Gapinski and Donegan (1980) give results typical of many centres: 14 of 20 post-menopausal patients with oestrogen receptor-rich tumours responded to endocrine therapy for their metastases whereas only one of 21 with oestrogen receptor-poor tumours responded. Interestingly, no correlation could be found between receptor status and responsiveness to chemotherapy. Following mastectomy, 44 of 212 oestrogen receptor-poor patients (20.8%) developed recurrences within 5 years compared with 5 out of 62 (8.1%) of oestrogen receptor-rich patients. The mean free-interval before recurrence was also considerably shorter, i.e. 14.8 months compared with 25.2 months.

Prognosis in early cases of breast cancer is obviously a subject of extreme importance. Most authorities agree that the 2 most valuable markers are whether or not the axillary nodes are implicated and the oestrogen receptor status of the patient (Forrest, Black and Humeniuk, 1980). An important study by Bishop and his colleagues (1980) from Nottingham investigated 62 post-menopausal patients with breast cancer with regard to the information provided by histological grading (using the Bloom-Richardson classification) and the oestrogen receptor status. Prognosis for survival was similar when comparing poorly differentiated with well differentiated tumours as with oestrogen receptor positive and negative tumours. Moreover, prognosis *quae* response to the anti-oestrogen tamoxifen in 38 women with distant recurrence was once again as accurate using the histological grade as using the oestrogen receptor status. This may represent an association between receptors and the morphological features of differentiation such as tubule and acinar formation; the presence of oestrogen receptors may be an index of differentiation (Hawkins, Roberts and Forrest, 1980; Leading Article, 1980). Elwood and Godolphin (1980) report that of 735 cases of breast cancer, 41% of positive receptors were poorly differentiated or anaplastic compared with 68% of the negative receptors.

In this context, the review of inflammatory carcinomas of the breast by Anderson (1980) is of interest. This group of tumours comprises less than 2% of all mammary cancers and about 25% are diagnosed initially as inflammatory disease and treated with antibiotics. There is no relationship to

pregnancy or lactation and cases have been reported in male patients. The prognosis is indeed grave and only 4.4% of the patients are alive at 5 years. A poor response is reported to endocrine and hormonal treatment and it is interesting that Anderson's 3 cases were all oestrogen receptor negative. Probably the best local treatment is with radiotherapy.

Adjuvant therapy

Probably the most important new concept in the treatment of mammary cancer in recent years is that of adjuvant chemotherapy aimed at the eradication of occult metastatic disease, since it is well recognized that no matter which effective local control therapy is utilized, metastatic relapse is the major cause of treatment failure and death. Among the principal proponents of this therapy are Fisher of Pittsburgh, using L-phenylalanine mustard, and Bonadonna of Milan using a cyclical 3-drug regime consisting of cyclophosphamide, methotrexate and fluorouracil (Bonadonna, 1980).

At this early stage of the various trials in progress, it would be fair to say that pre-menopausal patients with histological evidence of lymph node metastases who have undergone local treatment by mastectomy have experienced an increase in disease-free and overall survival after adjuvant chemotherapy with established combination regimens; so much so that a powerful panel of experts at the National Institutes of Health in the U.S.A. have stated 'adjuvant chemotherapy now appears indicated for this defined sub-set of patients' (NIH Panel, 1980). But of course much remains to be discovered; will this apparent advantage flatten out, disappear or even become reversed as the trial progresses? Is there risk of tumour formation in other organs or the development of lymphomas in the long-term follow-up of patients on cancer chemotherapy? And how important are the extra burdens of drug toxicity and the psychological and socio-economic problems resulting from adjuvant chemotherapy on the quality of the patient's life? Palmer and his colleagues (1980) at the Royal Marsden Hospital studied 47 patients who had completed a 6-month postoperative adjuvant chemotherapy course comprising either a single agent (chlorambucil) or a 5-drug combination of chlorambucil, methotrexate, fluorouracil, vincristine and doxorubicin. Side effects, including nausea, vomiting, malaise and alopecia, had been severe enough to interfere with life-style in 42% of the patients on the single agent and 79% of those who had received multiple-drug treatment. Twenty-nine per cent. of the patients who had received the multiple drug schedule voluntarily added that the treatment had been 'unbearable' or 'could never be gone through again'. The authors conclude that the proportion of patients who had experienced severe

side effects while receiving the treatment were considerable; hence such adjuvant chemotherapy is justifiable only if it will substantially improve the patient's prognosis.

Future advances may lie in the use of adjuvant hormonal or endocrine therapy rather than cytotoxic drugs in selected cases. The oestrogen receptor status may be of value in choosing the type of systemic treatment. Hawkins and his colleagues (1980) suggest that it could be that pre-menopausal receptor positive patients might obtain benefit from an oophorectomy. There is no doubt that the next few years will see the answers to many of these important questions (Baum, 1980).

Local control

Although it is now conceded that the local treatment of early breast cancer is unlikely to affect mortality from metastases, nevertheless it is important, wherever possible, to obtain local control of the tumour. Death from metastases is unpleasant enough but the added burden of uncontrolled local disease is particularly burdensome. Until a few years ago, the treatment of so-called 'early cases' of carcinoma of the breast was radical mastectomy. Anything less than this was considered to compromise the patient's chances of survival and to be tantamount to clinical malpractice. Although there are still advocates of radical surgery, to-day the majority of surgeons are carrying out less and less mutilating local operations (Hughes and Webster, 1980). We now know that simple removal of the lump itself is inadequate and is likely to be followed by local recurrence in something like one-third of the patients within 3 years. We have already quoted the interesting study by Schwartz and his colleagues (1980) showing that even in the earliest tumours a third of the specimens are likely to show multi-focal disease in another quadrant of the breast. Mastectomy is a mutilating procedure which no surgeon (and certainly no patient) can approach with equanimity and there is considerable interest in the conservative technique which comprises local excision of the tumour itself combined with intensive radiotherapy. We have reviewed the extensive reports from France, the U.S.A. and Canada on this technique, the results of which are most encouraging (Ellis and Phillips, 1980). Excellent local control is obtained with a less than 7–10% rate of recurrence in patients in clinical Stage I and II with good cosmesis and a low incidence of complications such as radiation-induced fractures and transient pneumonitis (Henderson and Canellos, 1980). At Westminster Hospital careful local excision of the tumour is carried out with accurate apposition of the skin edges and good haemostasis. The axillary lymph nodes are biopsied for staging purposes. Once the

wound has healed, high-energy irradiation is given to the chest wall, axilla and internal mammary lymph nodes together with the supra-clavicular fossa over a period of 5–6 weeks. Booster doses can then be given to the tumour site and its immediately surrounding area, either by external irradiation concentrated on a smaller volume or by implantation of radioactive iridium.

Unfortunately, we still see patients, often young women, who present to the doctor with frightful, fungating locally advanced tumours which are, of course, beyond surgical treatment and are unlikely to be controlled with radiotherapy. Stephens and his colleagues (1980) report on 4 such cases where excellent regressions have been obtained using intra-arterial chemotherapy.

The surgical wound

Recent years have seen a remarkable increase in both laboratory and clinical studies of wound healing and infection. Surgeons who were once willing to follow blindly the dogmatic teachings of their old chiefs are now eager to submit every aspect of their surgical ritual to the stern discipline of the laboratory or the controlled clinical trial. Thus, Milewski and Thomson (1980) found that a subcutaneous fat stitch, so beloved by many surgeons, made no difference to the incidence of haematoma formation or wound infection in either clean or contaminated cases. McLean and his colleagues (1980) found no difference in the infection rate of 105 consecutive laparotomies closed either with a continuous nylon suture or with interrupted nylon stitches. There was no difference in the rate of healing and the only difference was that putting in a continuous suture was considerably quicker.

We have investigated the value of postoperative suction drainage in inguinal hernia repair (Beacon, Hoile and Ellis, 1980). In a series of 301 adult males undergoing inguinal herniorrhaphy, the hernias were classified into 'simple' and 'complicated' (inguino-scrotal, the use of a truss, a recurrent hernia, large defects containing colon or bladder, associated cysts and the use of peri-operative anti-coagulants). In the complicated group, suction drainage for 24 hr significantly reduced the incidence of wound haematoma, seroma or infection from 48.7 to 17.6%. There was also an effect on the post-operative morbidity in the simple hernias although this just failed to achieve significance (4.5% in the suction group compared with 9.8% in the controls). There seems no doubt that suction drainage should be employed postoperatively following repair of hernias where dissection may be difficult or where other complicating factors are present.

Greenall, Evans and Pollock (1980a) studied the healing of midline and transverse laparotomy

incisions. There was a 7% incidence of incisional hernia at 6 months and failures were associated significantly with wound sepsis, postoperative chest complications, male sex, age over 60 years and blood transfusion. In the absence of infection the transverse incisions were less likely to produce incisional hernia but in the infected wounds the incidence of incisional hernia was the same in the 2 groups. In a study of the effects of the incision on postoperative pulmonary complications, the same authors (Greenall *et al.*, 1980b) found no difference between the two groups with regard to the incidence of pulmonary complications but they noted a high score in the male sex, patients with pre-operative pulmonary dysfunction, those with postoperative ventilatory depression, postoperative shock, inhaled gastric contents and pulmonary embolism. About one-third of all the patients developed chest complications. The reason for the male preponderance was unexplained.

Few studies have been made of the effects of systemic disease on wound healing. In the experimental animal we have shown that acute uraemia delays the healing of intestinal anastomoses and abdominal wounds and depresses cellular proliferation (Colin, Elliot and Ellis, 1979). Androulakakis (1980) now reports a study of 12 patients with acute postoperative uraemia undergoing muscle-split lumbar incisions among whom there were 7 complete dehiscences of the wound. This contrasted with no example of breakdown in 12 control patients. There is certainly need for further careful studies of such factors as diabetes, anaemia, protein deficiency, and jaundice on wound healing in the clinical situation.

Infection of the surgical wound still remains a common, annoying and sometimes dangerous post-operative complication which exercises the minds of most thinking surgeons. Indeed, it would need another whole review to deal with the large numbers of trials of systemic and topical antibiotics, and locally applied antiseptics that have been reported during the year. The extent of the problem is well demonstrated by a prospective study of 696 abdominal operations reported by Renvall, Niinikoski and Aho (1980) from Finland. The overall infection rate was 9.8%. When the cases were broken down according to the degree of contamination of the wound, it was found that clean operations had a 4.2% infection rate, clean contaminated wounds 9.1%, contaminated incisions 14.4% and frankly dirty wounds a 28.8% infection rate. It was found that the chances of infection were also increased in the elderly, those with associated medical illness, those with a prolonged pre-operative stay in hospital, extensive surgery, bowel strangulation and, of course, gross contamination of the wound at the time of operation.

Kelly (1980) has shown in experiments with guinea-pigs that there is a synergistic association between aerobic (*Escherichia coli*) and anaerobic (*Bacteroides fragilis*) bacteria. Inocula of one or other of these groups alone produced no infection but when the organisms were mixed, frank pus was obtained. In clinical studies he was also able to show a similar effect in that when both aerobes and anaerobes were present in the operative swab, wound infection took place in 71% of cases, a much higher percentage than when either one or other of these organisms alone was present. This author points out that this synergistic effect may well account for the value of metronidazole as a prophylactic and therapeutic agent in bowel surgery.

The skin sutures themselves may have at least a part to play in potentiating wound infection by local tissue damage. It is interesting that Eaton (1980) had no infections at all when a plastic dressing rather than sutures was used for wound closures in elective cases. Experimentally, Stillman, Bella and Seligman (1980) showed that a subcuticular suture of Dexon painted over with collodion was resistant to surface contamination with *Staphylococcus aureus* in mice compared with skin sutures or staples.

In our own department, Bucknall (1980) has shown very elegantly the malign effect of local infection upon the wound healing process. Infection was introduced into the rat abdominal wound using a standard bacterial inoculum. Three groups of organism were used: *Staph. aureus*, *Pseudomonas* and a combination group of *E. coli* and *Proteus*. Infection was shown to delay healing as judged by the bursting strength of the wound, and fibroblast proliferation was also shown to be depressed. Small vessel angiogenesis was increased in areas of abscess formation, but larger vessels were commonly blocked by thrombus or distorted by surrounding inflammatory tissue.

One of the most interesting pointers to the future in wound healing research comes from Eisinger and his colleagues (1980) from the Sloane-Kettering Institute, New York. They described the growth *in vitro* of multi-layered sheets of epidermal cells from the dog obtained from a single cell suspension and they were able to use these sheets to graft wound defects. It may well be that in future this technique might be applicable to the problem of covering large raw surfaces of burnt patients which to-day can only be achieved by multiple staged operations.

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