would enable us to give a better service to the living[4] as well as to those presumed dead.[5 6] The ambulance service would also benefit since much of the ambulance time at present spent in transporting dead bodies to the public mortuary would be saved if the body were held at the district general hospital instead of being immediately transferred.

The increased demands on the hospital mortuary could be accommodated in some cases since hospitals often have more than enough space in their existing mortuaries. Many, however, would need to have an enlarged mortuary built, or to arrange for bodies to be transferred to the public mortuary, possibly by police transport.

Finally, the change in procedure would lead to an increase in cadaver kidneys suitable for transplantation.[7] Clearly when a body arrives in the accident and emergency department resuscitation will be attempted if any doubt exists. Oxygenated perfusion of the kidney can then be maintained for long enough[8] in appropriate cases to allow the necessary arrangements to be made for its removal.

Conclusions

The working party made the following recommendations to the Casualty Surgeons Association, with the request that they should be forwarded to the DHSS for consideration.

(1) In principle, the practice of confirming death in the ambulance should cease and bodies should be properly examined by a doctor in the accident and emergency department.

(2) To make this possible the DHSS should make the available funds necessary for the capital and recurrent costs of such a change.

(3) Mortuary facilities at many district general hospitals should be improved and enlarged where necessary.

(4) The changes in procedure should be made immediately in those districts where facilities are already adequate.

We are indebted to the staff of the accident and emergency departments for their kind co-operation in completing our questionnaire.

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Surgical Process and Outcome

Large-bowel surgery, 1979: self-assessment

N A MATHESON, D VALERIO

Summary and conclusions

Evidence of wide variability in the immediate results of large-bowel surgery stimulated self-assessment during 1979. The hazards of large-bowel surgery can usually be avoided by good bowel preparation, sound anastomotic technique, primary resection in large bowel emergencies, avoidance of anastomosis when hazardous, and antibiotic lavage for extant or potential peritoneal and wound contamination.

Introduction

Large-bowel surgery is hazardous even when elective. The hazard is that of sepsis, most seriously in the peritoneal cavity but also in the wound, and anastomotic integrity is primarily important in its avoidance. As a result of Fielding's work, some of which has been reported,[1] there is now an awareness that the hazard varies from centre to centre and from surgeon to surgeon. Two recent papers on antibiotic prophylaxis illustrate this variability. Eykyn *et al*[2] reported 83 patients undergoing elective colonic or rectal surgery in whom leakage was clinically evident in 30% of anastomoses and was clearly important in the associated high incidence of wound sepsis (51% in control untreated patients and 14% in patients given intravenous metronidazole during and in the first 24 hours after operation). In contrast, in a rather similar study Higgins *et al*[3] reported 60 colorectal operations without anastomotic dehiscence when the anastomosis was made within the abdomen (although seven of nine anastomoses made through the anus leaked) and with a wound sepsis rate of 7% in patients given single peroperative intravenous doses of metronidazole and co-trimoxazole. The morbidity and mortality of emergency colorectal surgery is probably even more variable.

In the United States the public has seized on striking differences in surgical standards,[4] and public opinion is currently a factor in the awakening awareness of a professional responsibility towards audit and self-assessment.

We have assessed our performance in terms of the immediate results of large-bowel surgery during 1979 and in reporting this self-assessment propose a creed of management that appears to satisfy requirements for safety and economy in colorectal surgery.

Aberdeen Royal Infirmary and Department of Surgery, University of Aberdeen, Aberdeen

N A MATHESON, CHM, FRCS, consultant surgeon
D VALERIO, MB, FRCS, senior registrar

Methods

In elective cases the bowel was prepared by irrigating the whole gut[5] with irrigation fluid containing 1·6 g metronidazole and 20 g neomycin sulphate, except in patients with ileocolic or right-sided colonic disease in whom bowel washouts were used together with metronidazole 200 mg every six hours during the day before operation.

Peritoneal contamination extant at the time of emergency operation was invariably treated by eradicating its source together with thorough antibiotic lavage of the peritoneal cavity using warm saline containing 1 mg/ml tetracycline[6 7] in volumes usually of 1-3 l but occasionally larger, according to the degree of contamination. Tetracycline lavage (usually 500 ml) was also used for potential contamination in elective operations. In addition all patients were given a single peroperative intravenous dose of 500 mg tetracycline. Intraperitoneal drains designed to cater for either anastomotic leakage or residual peritoneal sepsis were avoided, but in operations using pelvic dissection a fine suction drain through a stab incision was usually placed in the hollow of the sacrum.

The abdominal wall, invariably opened through the midline, was closed with a continuous mass suture technique using polypropylene, after which the wound was washed out with 200-300 ml of the tetracycline solution before primary closure, except in one patient with gross faecal contamination in whom closure of the skin was delayed.

Patients and operations

In 1979 61 patients (25 men, 36 women; average age 64, range 28-88) under the care of one general surgeon were subjected to 65 separate operations (tables I and II). The miscellaneous group comprised caecal volvulus, spontaneous rupture of the right colic artery, perforated caecal diverticulum, and puerperal caecal perforation. Forty-three elective operations included 39 primary resections with anastomosis; one abdominoperineal excision of the rectum, which reflects the current trend to extend the use of sphincter-saving procedures to include tumours as low as 6 cm from the anus; and three procedures comprising restoration of continuity after Hartmann's operation, closure of exteriorised caecum, and revision of a stenosed ileocolic anastomosis. Twenty-two operations were emergencies and necessitated resection in 19. Primary anastomosis was carried out in eight cases, all end-to-end ileocolic anastomoses after resecting the right colon, and included three extended right hemicolectomies for obstructing carcinoma of the distal transverse colon. In 11 emergency resections of the left colon five were for perforated diverticular disease, five for perforated or obstructed rectosigmoid cancer, or both, and one for distal colonic necrosis after a failed stapled anastomosis.

TABLE I—*Underlying disease in 61 patients*

Diagnosis	Elective	Emergency	Total
Colorectal carcinoma	34	10	44
Diverticular disease	4	5	9
Inflammatory bowel disease	2	2	4
Miscellaneous	0	4	4
Total	40	21	61

TABLE II—*Operative treatment in 65 cases*

Operation	Elective	Emergency	Total
Resection and primary anastomosis	39	8	47
Resection, without anastomosis	1	11	12
Other	3	3	6
Total	43	22	65

After emergency left colonic resection anastomosis was avoided: the distal bowel was closed and the proximal end brought out as a terminal colostomy (Hartmann's procedure). The three operations in which the bowel was not resected comprised colocolic bypass for recurrent cancer, exteriorisation for puerperal perforation of the caecum, and caecopexy for caecal volvulus. In a total of 48 end-to-end anastomoses 42 were made using a single layer of interrupted non-absorbable (braided polyamide) seromuscular sutures, preferably by a "closed" technique,[8 9] which was possible in 24 cases including all eight emergency anastomoses. In 18 left-sided colocolic or colorectal anastomoses in which poor access precluded the closed technique a similar but "open" method was used.[8 9] Five low colorectal anastomoses were made with the Russian SPTU circular stapling instrument,[10] and one anastomosis was endoanal. Loop colostomy as a primary procedure or to "protect" an anastomosis was avoided.

Results

Two patients died, one a 71-year-old man with a perforated sigmoid carcinoma associated with extensive metastases who died 12 hours after Hartmann's procedure. The other, a grossly obese 38-year-old man with perforated diverticular disease and faecal peritonitis treated by Hartmann's procedure, developed ventilatory and renal failure, and finally died 23 days after operation from multiple intestinal necrosis and perforation.

One 52-year-old man with a rectal carcinoma 6 cm from the anal verge had a complicated course and required reoperation. The anastomosis made with the SPTU gun was technically a failure as a result of entrapment of anal mucosa in the instrument and incorporation of part of this mucosa in the anastomosis. The stapled anastomosis was dismantled and an endoanal anastomosis made, but on the seventh day anastomotic breakdown with peritonitis was obvious. At re-exploration the distal colon was gangrenous and was resected with the formation of a left iliac end colostomy; the anus was closed. This patient developed a superficial wound infection but was fit for discharge 16 days after his second operation. In addition to this single abdominal wound infection one patient developed paracolostomy sepsis with purulent discharge after Hartmann's operation. Otherwise wound infection, defined as discharge of pus, did not occur, and there was no evidence of pelvic, subphrenic, or intraperitoneal sepsis. Wound dehiscence did not occur.

There was no clinical evidence of leakage in any of the 42 hand-made single layer anastomoses.

Our early experience with the SPTU stapling instrument had been less satisfactory. Apart from the anastomotic failure described above, one patient developed a subclinical anastomotic leak, the defect being easily felt through the anus, and another developed a stricture.

The median postoperative duration of stay of the 59 surviving patients was 10 (range 6-26) days, and only seven patients stayed longer than 15 days.

Discussion

This audit for 1979 shows that the hazards of large-bowel surgery are usually avoidable. Death did not occur after elective operation, and the mortality in emergencies (9%) was low compared with other reports. In particular, it contrasts with a recently reported mortality of 35% after loop colostomy alone for distal colonic cancer.[1] Anastomotic integrity is a key factor in safe colorectal surgery. None of the 42 patients treated by primary resection and single layer anastomosis, including the eight emergency ileocolic anastomoses, showed clinical evidence of leakage. None was given postoperative antibiotics, and none developed wound infection. These results, which include emergencies, compare favourably with those recently quoted for elective colorectal surgery.[2 11 12] The 11 emergency resections of the left colon in which anastomosis was avoided included 10 patients with established peritoneal sepsis, of whom six had faecal peritonitis. Five of these patients were given metronidazole for between seven and 14 days after operation. Only one patient, of whom details have been given, developed infection of the abdominal wound, and the low incidence of septic complications was remarkable. Freedom from such complications is reflected in the mean total stay in hospital of 11·3 days compared with recent figures for elective colorectal surgery of 20·9 days[11] and 27·1 days for obstructed colonic carcinoma.[1]

These results may be in part attributable to the fact that all operations were done either by a consultant or senior registrar. Furthermore, we do not proclaim a special interest in large-bowel work and therefore operate on few patients with ulcerative colitis.

In elective surgery safety depends, firstly, on good bowel

preparation, secondly, on sound anastomotic technique, and, thirdly, on prevention of wound infection. In left-sided lesions preparation was by irrigation of the whole gut. Less vigorous preparation was used in right-sided lesions. We have confidence in single layer anastomosis which, when used as a closed technique, completely avoids visible contamination and when used open in the pelvis is associated with a low incidence of leakage.[13] Prophylaxis of wound infection was by lavage of the operative site and of the wound using tetracycline in saline with the addition of a single peroperative intravenous dose of 500 mg tetracycline.

In emergency operations eradication of a colonic source of peritoneal contamination by resection, or exteriorisation in one case, was obligatory. Similarly, primary resection was used for obstructing lesions unless inoperable, and staged procedures using loop colostomy were strictly avoided. After right-sided resection closed ileocolic anastomosis always followed, but on the left side peritoneal contamination and the unprepared bowel were contraindications to anastomosis, and Hartmann's procedure was used. Admittedly this attitude implies restoration of continuity in most patients at a subsequent and possibly difficult operation, but it certainly subserves the overriding requirements of safety by eradicating the source of peritoneal contamination without risking anastomotic failure when the risk is high.

Established peritoneal contamination was treated by thorough antibiotic lavage using tetracycline in saline; the wound was also washed out, and a single peroperative intravenous dose of 500 mg tetracycline was given. We have shown the effectiveness of tetracycline lavage for peritonitis[6 7] and believe that the low incidence of residual intraperitoneal and wound sepsis is mainly attributable to this practice. Five patients were also given metronidazole postoperatively, but we are uncertain whether postoperative antibiotics are necessary, provided contamination is managed by eradicating its source and by peritoneal lavage. Tetracycline lavage in established peritonitis or for potential contamination is simple, cheap, safe, and effective. Lavage, together with efficient preparation, sound anastomotic technique, primary resection in large-bowel emergencies, and the avoidance of anastomosis when hazardous comprise a creed of management that makes for safety and economy in large-bowel surgery.

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Are mucopolysaccharidase injections into local fatty areas, such as pendulous buttocks, of any help in reducing the excess fat? Are there any side effects?

Obese patients often observe that fatty tissue around the upper thighs and buttocks is of a lumpy consistency, and that this lumpiness does not decrease with dietary fat reduction. It was suggested[1] that the material below the skin was not normal fat but "cellulite"—material consisting of hypertonic lymph trapped in a collagenous matrix. On this assumption mucopolysaccharidases were injected to dissolve the matrix and release the lymph. We now know that the original premise was wrong, since analysis of needle biopsy samples of "cellulite" have shown that it is fat, not lymph, within stroma; this is found in any adipose tissue, but may become more noticeable as the patient gets older. These injections are therefore ineffective in reducing the local swelling, since they have no influence on the mobilisation of subcutaneous fat.

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At what age may a recently born baby safely accompany her parents to the Indian subcontinent? What inoculations are recommended?

It is not possible to state at what age a new baby may safely accompany parents to the Indian subcontinent. It would be safer if the baby in the first five or six months were fully breast-fed, for then gastroenteritis would not be a danger. Otherwise the main risk, that of gastroenteritis, will depend on the care with which infection in the preparation and administration of feeds is prevented. The baby should be immunised against whooping cough, diphtheria, tetanus, poliomyelitis, tuberculosis, typhoid fever, and cholera. Of the greatest importance is the prevention of poliomyelitis and tuberculosis. A further risk is that of infectious hepatitis, but gammaglobulin will not give protection for more than a few months. As for the timing of the immunisations, BCG can be given from birth onwards: DPT and poliomyelitis immunisation should be started at 2 months, and repeated at 4 and 6 months, with a booster at 15 to 18 months. Immunisation against typhoid and cholera should be completed before departure: but immunity against cholera is unlikely to last for more than about six months, and immunisation will have to be repeated. Immunisation against measles should not be performed before 15 months; anyway, the main risk of measles in tropical countries depends mainly on malnutrition, which presumably will not be a problem in the child in question.

Many patients who receive trimethoprim/sulphamethoxazole complain of tremor and generalised weakness. Are these neurological symptoms caused by folate deficiency, and can they be reversed by giving folic acid?

Tremor and generalised weakness are not commonly reported symptoms during treatment with trimethoprim/sulphamethoxazole combination. Although this combination has folate antagonist properties, it is much more active against bacterial than human cells, and folate deficiency becomes a problem only where it already exists. Patients with folate deficiency may be unresponsive to treatment of their haematological disorder while trimethoprim/sulphamethoxazole is given.

Should primate handlers be vaccinated for yellow fever?

Where primates have been caught in the wild and are from areas endemic for yellow fever—that is, broadly, Africa south of the Sahara and north of the Kalahari, and Central and South America—then vaccination against yellow fever should be carried out. In the case of primates originating from other parts of the world there is no need for this protection, and primates born in captivity could not possibly harbour the yellow fever virus.