THE PLACE OF ANTERIOR RESECTION IN THE TREATMENT OF RECTAL CANCER

JEAN-JACQUES BROSSY, F.R.C.S., *Johannesburg*

The great surgeons of the late nineteenth century faced a formidable task in the treatment of rectal cancer. With poor anaesthesia and without antibiotics, the removal of a pelvic growth and survival of the patient was a tremendous achievement. Asepsis was poor, and colostomies were dreaded by doctors and patients alike.

Several surgeons devised and performed operations to excise a segment of bowel and restore continuity. Noteworthy amongst these was Kraske,[1] and his approach is still used for certain tumours in the sacral hollow. Maunsell[2] in Britain and Weir[3] in America independently described a procedure in which an abdominal operator excised the affected bowel, after which a perineal operator pulled both ends of cut bowel through the anus to suture them, and finally pushed the newly formed rectum back into the pelvis. These operations were all technically difficult and did not achieve wide popularity.

Soon after this the work of Miles[4] established the abdomino-perineal excision on a sound anatomical and pathological basis. He showed that a low mortality and high survival rate could be achieved and he also showed that a well-made and properly-handled colostomy was no liability. The interest in conservative resection died down, and took 30 years to revive. In the past decade or two a great deal of work has been done to redevelop these operations[5-7] and we can now regard resection in continuity as an established operation with clear-cut indications. These indications vary according to the precise anatomical location of the growth, and we can conveniently discuss this in 4 groups:

ANATOMICAL LOCATION OF GROWTH

1. The growth is in the 'recto-sigmoid' and its lower border is at least 7 cm. (3 inches) above the peritoneal reflection. After excision of a suitable block of bowel and mesentery, an anastomosis can be performed which is entirely intra-peritoneal. I have specified 7 cm. to allow for 5 cm. (2 inches) clear below the tumour plus 2 cm. (1 inch) cuff for use in suturing. It has been shown quite conclusively that local intramural spread of adenocarcinoma rarely extends more than 5 cm. below the lower border of the main tumour mass[8, 9] and several authorities regard 3 cm. as an adequate margin (Pannett,[10] Wangensteen,[11] Babcock and Bacon[12]). In the male such a growth would be 15 or more cm. from

the anal margin and in some cases could be better described as a sigmoid-colon tumour; but in female patients the anterior peritoneal fold may be as low as 3 cm. above the pectinate line and a true intra-peritoneal resection may be possible with some growths as little as 8-10 cm. from the anal verge. The latter resection would admittedly require intrapelvic techniques (though in the female the true pelvis is usually broad and access relatively easy) but in general carry the same prognosis as the intraperitoneal operations in the male.

2. Those cases in whom the growth is less than 15 cm. but more than 10 cm. from the anal margin (males). These arbitrary measurements include tumours too low for an entirely intraperitoneal resection, but high enough to allow an adequate resection above the levator ani. In general these tumours are only just palpable by digital examination— 'growths that are easily felt are too low for anterior resection' (C. Naunton Morgan). It must be emphasized that the important assessment in these cases is *not* the relation of growth to peritoneum, but *its relation to the levator.* The puborectalis sling of this muscle is probably the most important factor in faecal control,[13] and provided the tumour is 5-7 cm. above the levator an anterior resection is feasible.

It is in this group of cases that the greatest controversy has raged. Several authorities have maintained that below the peritoneal reflection lateral spread is an important factor and occurs early.[14-16] Free communication from the rectum to numerous lymph channels in the lateral ligaments have been demonstrated by dye techniques, and it has been claimed that these cannot be properly cleared away except by a combined approach from above and below. The advocates of the conservative operation maintain that their resections[5, 7, 17-19] are as radical as the abdominoperineal resection, and that this factor is not relevant to the above discussion (although of course it influences the individual prognosis). Thus the word 'conservative' is used only to indicate conservation of continuity and of sphincteric function. If an adequate block of tissue is not removed, a high incidence of local recurrence will lead to unsatisfactory results. This is not an operation for 'poor-risk' patients; they deserve a colostomy only, or, if removal of the growth is desirable, either a Hartman procedure or a perineal resection should be performed.

There was no doubt that the first few series of conservative resections published did show a high incidence of local recurrence. Warren Cole showed the main reason.[14, 20] He took swabs of bowel content at operation and found neoplastic cells in nearly all those taken close to the site of anastomosis. Some of these cells become implanted into the suture line and lead to recurrent growth. It has also been shown that the act of palpating a tumour causes a shower of cells to be liberated into the lumen of the gut as well as into the blood and lymphatic streams. For this reason Cole advocates that palpation should be gentle, and that as soon as possible (a) the venous return should be occluded, and (b) tapes should be tied to occlude the lumen of the bowel above and below the tumour; this will prevent dispersal of tumour cells. In an intrapelvic operation it is not possible to tape the gut below the tumour. Instead, we ask a nurse to irrigate the rectal stump from below once the right-angle clamp is applied (we use one devised by Finch). In all probability saline or water would suffice to wash away the cancer cells, but for added safety a cell poison such as biniodide of mercury is usually employed. This does have the disadvantage of causing mucosal irritation, and the subsequent constant secretion of mucus while one is attempting an anastomosis is a nuisance. However, at St. Mark's Hospital the evidence available suggests that since this measure was employed the incidence of local recurrence has fallen considerably.[21]

It has also been shown that certain of the organisms normally present in the bowel inhibit cancer-cell viability,[22] and that a patient prepared with intestinal antibiotics has many more free tumour cells in the lumen than one not so prepared. This fact is not significant at present because the advantages of a sterile bowel outweigh the potential increase in cancer spread. What is more important is that the antibiotic should be continued *after* the operation. Apart from the recognized danger of peritoneal soiling during operation, there is a very real hazard of infection with peritonitis or abscess formation should a leak occur post-operatively.[23] The colon is notorious for its precarious blood supply, especially after this type of operation. The danger period is between the 3rd and 7th days, and local antibiotic cover during this period should reduce the incidence and severity of local necrosis. (The intestinal flora will return to normal within 36-48 hours in the absence of antibiotic).

Recent articles from 2 sources have suggested that lateral spread below the peritoneal reflection occurs no faster than spread from an intraperitoneal tumour.[17, 18] Waugh, from the Mayo Clinic,[7, 19] analysed the results of 105 anterior resections and came to the conclusion that the level of the lesion did not materially affect the prognosis. There are probably a number of fallacies in the interpretation of these statistics and the question should meantime remain *sub judice.*

3. The 3rd group of tumours comprises those which are 5-10 cm. from the anal margin. In these cases, both male and female, there is usually insufficient bowel below the tumour to allow of an adequate resection. One may be tempted to skimp on the amount of normal bowel resected below the lesion, or on the amount of lymphatico-fatty tissue removed in certain patients who already have distant spread, but this will too commonly lead to local recurrence and renewed obstruction before the distant metastases cause

death. The majority of these cases are better treated by combined synchronous abdominoperineal excision. If a conservative operation is used in the occasional selected case, a 'pull-through' of the Babcock-Bacon or Maunsell-Weir type, which removes most or all of the anorectal mucosa is preferred.

4. The 4th and last group consists of those carcinomas which are so low that the sphincter is inevitably compromised. Many of these are squamous-cell tumours and require an especially wide local excision; inguinal and external iliac lymph nodes must be carefully inspected. An abdominal colostomy is a *sine qua non* of an adequate curative operation.

TECHNIQUE OF ANTERIOR RESECTION

This paragraph will cover only the general principles and for detail the reader is referred to the original articles.[5, 24-27]

Adequate exposure is essential, and the bladder must be empty. After general exploration, the first step is to dissect and ligate/divide the vascular pedicle. Most surgeons tie off the inferior mesenteric artery at its origin. One important exception is Marden Black,[30] who has recently commented on his high incidence of necrosis and slough at the anastomosis. He thinks it may be possible to reduce this by sparing the left colic artery—though he stresses the importance of dissecting the lymphatic tissues away right up to the aorta. Provided the marginal vessels are intact, tying the left colic branch should seldom endanger the blood supply down to the sigmoid colon.[28, 29] By the time the surgeon has finished the subsequent dissection and is ready to perform the anastomosis, it will be easy to see whether or not the bowel is viable. If not, the splenic flexure will have to be mobilized to bring the left half of the transverse colon down to the pelvis. This is not particularly difficult.

The dissection of the intrapelvic colon and rectum is performed as for an abdominoperineal resection, but care must be taken to ligate or diathermize any bleeders because oozing will obscure the operative field and good vision is essential. The dissection is carried down the side walls of the pelvis until these and the levators are clean and exposed. At this stage the mesorectum is transected between ligatures at the line of resection.

The technique of restoring continuity will depend on the individual preference of the surgeon. D'Allaines employs an abdominosacral technique[25, 31] in which he exposes the lower rectum through a transsacral incision similar to Kraske's in order to finish the dissection and complete the anastomosis under direct vision. This approach was also used by Finsterer;[32] the access in difficult cases is easier than through the abdomen, and since the approach is above the levators, control is not interfered with. D'Allaines admits to a fairly high incidence of faecal fistula through this wound, but he always performs a proximal colostomy so this is seldom troublesome. Babcock and Bacon[24] prefer to remove the whole rectal mucosa in an abdomino-anal approach and exteriorize the colon through the anus, either leaving it to prolapse rather like a colostomy (trimming it later if necessary), or sewing it to the anal skin at once. Babcock used to divide and re-suture the anal sphincter, but this caused serious interference with continence and Bacon performs the operation without cutting the muscles. Those British operators who favour the abdomino-anal approach have preferred the Maunsell-Weir type of operation, in

which the lower 3-4 cm. of rectal mucosa are preserved. This stump is everted and sutured to the colon brought out through the same orifice.[33] The operation is performed as a combined synchronous procedure. It gives better control and continence than the Babcock-Bacon procedure.[33] On the other hand, Bacon has emphasized (in respect of both these patients and abdominal colostomies) that if control is not adequate, a daily enema or bowel wash-out is easily performed by the patient and is most satisfactory. Once empty, the bowel usually gives no further trouble until the next day.

Finally the technique, most popular in England is that of anterior resection, the whole operation being done through the abdominal incision. This technique and the whole question of sphincter-saving operations has been admirably discussed in a masterly review by Goligher,[5] who has a tremendous experience in this disease and is a leading exponent of sphincter preservation.

CONCLUSIONS

Resection of carcinoma of the rectum with restoration of continuity is a most satisfactory procedure for any growth more than 10 cm. from the anal margin. It may even be employed for tumours lower than this under certain circumstances. Goligher has recently said:[5] 'In my own practice and that of most other surgeons of my acquaintance, such as Naunton Morgan, Lloyd-Davies and other colleagues . . . who undertake sphincter-saving excisions, it is only very rarely now that any other form of resection is ever used . . . Many people imagine that for anterior resection a specially long piece of bowel is required in order to reach down into the pelvis. This is quite incorrect. As a rule one needs no more colon for this purpose than for establishing an ordinary left iliac colostomy.' The operation, if properly performed, is just as radical as the conventional abdomino-perineal resection; but it does require a little more time and patience. The functional result is in general good, and there are ways of controlling those cases who do not retain adequate continence. By and large, the conservative operation has gained favour in most British and American centres (it has long been established in Europe), for it does give a better psychological and functional result, and in most hospital series has produced a lower mortality and morbidity than the abdominoperineal excision. Local slough, faecal fistula and stricture at the anastomosis site do occur not infrequently, but these complications seldom present a serious problem. It is hoped that this form of operation will now become more popular in this country.

OPSOMMING

Aan die begin van hierdie eeu het wetenskaplikes die eerste keer 'n operasie probeer uitdink wat 'n gewas in die rectum sou verwyder sonder om die samehang van die derm te breek. Hulle moes ook teen infeksie en slegte narkose veg, en hulle resultate was nie baie goed nie. Teen hierdie tyd het Miles die chirurgiese anatomie van die colon en rectum mooi ondersoek en terselfdertyd 'n operasie aanbeveel wat op hierdie werk gebaseer is. Hy het ook gewys dat 'n behoorlike colostomie heeltemal bevredigend kon wees. Dertig jaar lank het niemand weer herstellende verwyderings probeer doen nie.

Nou word hierdie herstellende operasies weer aanvaar. 'n Gewas wat tussen 10 en 15 cm. van die anus in die manlike pasiënt is, is te laag om intraperitoneaal heeltemal uitgesny te word, maar as die chirurg 3-5 cm. van normale derm onder die kanker kan wegneem en nog 2 cm. bokant die levator ani kan laat, kan hy 'n herstellende reseksie uitvoer. Die tegniek is dieselfde as vir 'n abdominoperineale reseksie, d.w.s. dat die chirurg net so radikaal moet optree as by die Miles-operasie. Voordat die derm uitgesny word, is dit belangrik om 'n klem onder die gewas te sit, en die stomp van derm deur die anus met 'n selgif soos perchloried van kwik uit te was—dit sal lei tot 'n laer voorkoms van lokale kanker-herhaling. Dit is ook raadsaam om met die intestinale antibiotika minstens 5-6 dae *na* die operasie voort te gaan; daar sal minder perforasies wees, en hulle sal nie so gevaarlik wees nie.

Die stappe van die vernaamste operasies is kortliks beskryf, en statistiek aangehaal om te wys dat die oorlewingsvooruitsig met hierdie 'konserwatiewe' operasies net so goed is as met die abdominoperineale reseksies. Die funktionele resultate en die onmiddellike siekte- en sterftesyfers is aanmerklik verminder. Ons hoop dat hierdie herstellende verwyderings nou meer populêr sal word.

REFERENCES

1. Kraske, P. (1885): Verh. dtsch. Ges. Chir., **14**, 2, 464.
2. Maunsell, W. H. (1892): Lancet, **2**, 473.
3. Weir, R. F. (1901): J. Amer. Med. Assoc., **37**, 801.
4. Miles, W. E. (1908): Lancet, **2**, 1812.
5. Goligher, J. C. (1958): Ann. Roy. Coll. Surg. Engl., **22**, 311.
6. Muir, E. G. (1955): Ibid., **17**, 48.
7. Waugh, J. M., Miller, E. M. and Kurzweg, F. T. (1954): Arch. Surg. (Chicago) **68**, 469.
8. Dukes, C. E. (1944): Proc. Roy. Soc. Med., **43**, 697.
9. Grinnell, R. S. (1954): Surg. Gynec. Obstet., **99**, 421.
10. Pannett, C. A. (1935): Lancet, **2**, 423.
11. Wangensteen, O. H. and Toon, R. W. (1948): Amer. J. Surg., **75**, 384.
12. Bacon, H. E. (1949): *Anus, Rectum, Sigmoid Colon: Diagnosis and Treatment.* Philadelphia and London: Lippincott.
13. Brossy, J. (1958): S. Afr. Med. J., **32**, 285.
14. Cole, W. H. (1952): Arch. Surg. (Chicago), **62**, 264.
15. Gilchrist, R. K. and David, V. C. (1947): Ann. Surg., **126**, 421.
16. Morgan, C. N. (1950): Proc. Roy. Soc. Med., **43**, 701.
17. Bacon, H. E. (1956): J. Amer. Med. Assoc., **160**, 629.
18. Mayo, C. W. and Fly, O. A. (1956): Surg. Gynec. Obstet., **103**, 94.
19. Waugh, J. M., Block, M.A. and Gage, R. L. (1955): Ann. Surg., **142**, 752.
20. McGrew, E. A., Laws, J. F. and Cole, W. H. (1955): J. Amer. Med. Assoc., **154**, 1251.
21. Goligher, J. C., Dukes, C. E. and Bussey, H. S. R. (1951): Brit. J. Surg., **39**, 199.
22. Vinks, M. (1954): Ibid., **41**, 431.
23. Rives, J. D. and Cohn, I. (1956): Ann. Surg., **144**, 738.
24. Bacon, H. E. (1945): Surg. Gynec. Obstet., **81**, 113.
25. D'Allaines, F. (1946): *Le Traitement Chirurgical du Cancer du Rectum.* Paris.
26. Fallis, L. S. (1956): Amer. J. Surg., **92**, 696.
27. Mayo, C. W. and Wakefield, E. G. (1936): J. Amer. Med. Assoc., **107**, 342.
28. Goligher, J. C. (1949): Brit. J. Surg., **37**, 157.
29. Idem (1954): Ibid., **41**, 351.
30. Black, B. M. and Botham, R. J. (1958): Arch. Surg. (Chicago), **76**, 688.
31. D'Allaines, F. (1950): Proc. Roy. Soc. Med., **43**, 697.
32. Finsterer, H. (1941): Arch. klin. Chir., **202**, 15.
33. Goligher, J. C. (1951): Ann. Roy. Coll. Surg. (Engl.), **8**, 421.