Difficult Decisions

Anastomosis or stoma for low rectal cancer?

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Introduction

Approximately 7,700 new cases of rectal cancer were registered for men and women in England and Wales in 1984.¹ It would be expected that almost 70% of these would be in the distal two thirds of the rectum,² and about half of these would undergo curative resection.³ With the development of new techniques such as transanal coloanal anastomosis⁴ and the advent of the stapling gun,⁵ it is technically possible to restore gastrointestinal continuity in the majority of patients with rectal tumours undergoing elective surgery. Controversy exists as to whether sphincter saving resections (SSR) result in compromised control of local disease or overall survival.

Choice of procedure

By tradition, a rectal tumour situated up to 10 cm from the anal verge would be treated curatively by a synchronous combined abdomino-perineal excision of the rectum (APER), and there are many that hold the view today that this is still the best option. However, the idea that only APER can achieve adequate tumour clearance both *distally* and *laterally* has recently been questioned. Williams *et al.* in 1983⁶ examined 50 resected specimens histologically following APER paying specific attention to sections of the distal resection margin. It was demonstrated that 76% of specimens had no evidence of intramural tumour spread, 14% had spread of one centimetre or less and only 5 of the 50 specimens had distal spread beyond one centimetre. Moreover, these 5 cases had poorly differentiated Dukes' C tumours and hence formed a poor risk group. It was concluded that it was not always necessary to obtain a 5 cm margin of clearance distally thereby permitting an increased opportunity for sphincter saving procedures.

Similarly, Heald has shown that adequate *lateral* clearance can be achieved during SSR.^{7,8} Thus it

appears that it is technically feasible to preserve the sphincters with adequate distal and lateral clearance, but do the clinical results justify SSR as a routine approach?

Mortality and morbidity

A retrospective study from a single unit in Leeds reported a mortality rate within 28 days of operation of 10.8% in 93 patients undergoing APER and 9% in 78 patients having SSR.⁹ These findings were confirmed in the United Kingdom multicentre prospective Large Bowel Cancer Study: 1,376 patients underwent APER and 598 a SSR with in-hospital mortality rates of 8% and 7% respectively.¹⁰

Morbidity associated with each procedure is a more difficult parameter to compare. The main complication of SSR is anastomotic leakage with a reported incidence of between 3% and 8%.^{7,11} Because of this, some surgeons routinely perform a temporary defunctioning colostomy for all tumours below 7 cm,⁷ but evidence that this reduces overall morbidity is lacking. Late anastomotic disruption and stenosis at the site of the anastomosis are quite uncommon and stricture can usually be dealt with by simple dilatation.^{12,13}

Complete breakdown of the perineal wound or persistent discharge from this site following APER can be particularly distressing. Moreover, it has been estimated that 50% of all colostomy patients following resection of neoplastic disease suffer stoma complications of stenosis, prolapse or paracolostomy hernia.¹⁴ Overall, therefore, there is little to choose between SSR and APER with respect to post-operative mortality and morbidity.

Quality of life

In 1927, Lockhart-Mummery wrote that 'a colostomy opening done through the rectus muscle supplied an amount of control over the evacuation both of faeces and flatus which was sufficient in the great majority to

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enable them to live quite ordinary lives in the comfort and security from possible unpleasant accidents'.¹⁵ This view, which gained almost universal acceptance, has recently been challenged.

Devlin *et al.* showed in 1971 that of all patients who had had a colostomy for cancer, 89% had changed their working habits, less than 50% ate a normal diet and 25% were overtly depressed.¹⁶ Williams and Johnston from Leeds showed that 83% of patients after SSR were able to return to work, compared with only 45% of those after APER; sexual dysfunction was greater after APER (67% vs 30%) as was depression (mean depression score 4.6 vs 2.8). Moreover, all the patients with colostomies were incontinent and 66% of them had problems with leakage from the appliance.¹⁷

Leeds were completely continent at one year with further subsequent improvement.¹⁷ This finding has been substantiated by other centres, not only after low anterior resection, but also after coloanal anastomoses.^{18,19} It would appear on this evidence that preservation of the sphincter leads to a better quality of life.

Survival and recurrence

Despite the early scepticism, as more long term studies have been reported, it seems that the local recurrence rate and five year survival rate are similar for APER and SSR. Data is difficult to interpret, however, as there is a tendency for the lower more aggressive tumours to be dealt with by APER. Apart from two notable exceptions,^{10,20} most studies show that both the five year survival and the rate of local recurrence are comparable (Table I).

Suture or staple?

If we accept that an anastomosis can be performed safely, is there a demonstrable difference between the hand sewn and stapled technique? There are few randomized prospective trials of suture versus staple,²⁷ but most sequential reports confirm that leak rates and local recurrence rates have not increased on using the stapling device.² Although some would argue that a low anastomosis can be performed just as well using a suturing method as a stapling technique, the proportion of patients undergoing APER has dramatically decreased with the increasing use of staples. For example, the incidence of APER in the Large Bowel Cancer Study was 46%¹⁰ compared to only 11% in the Basingstoke series.⁸

Coloanal anastomosis

A few centres have reported the use of a coloanal anastomosis with a colonic J-pouch.^{28,29} This improves rectal capacity with a concomitant decrease in bowel frequency, but the real clinical benefit remains unproven and requires further evaluation.

Local therapy

There is unquestionably a place for local curative treatment of early rectal cancers. Surgical excision is the most widely practised in this country, but fulguration,³⁰ cryosurgery,^{31,32} electrocoagulation³³ and intracavity irradiation³⁴ are useful alternative approaches. A recent study from Rochester, New York, reports dramatic results using endocavitary irradiation.³⁵ Using a system which delivers high dose irradiation to the tumour with minimal irradiation of

Table I Comparison of clinical outcome following abdomino-perineal resection excision of rectum (APER) and sphincter saving resection (SSR)

Authors	APER					SSR				
	No. patients	Operative mortality	Operative morbidity	Local recurrence	5 year survival	No. patients	Operative mortality	Operative morbidity	Local recurrence	5 year survival
Deddish <i>et al.</i> 1961 ²¹	236	—	—	14.4%	—	65	—	—	9.2%	—
Morson <i>et al.</i> 1963 ²²	1,238	—	—	9.7%	—	177	—	—	7.3%	—
†Nicholls <i>et al.</i> 1979 ²³	112	—	—	—	74%	87	—	—	—	71%
McDermott <i>et al.</i> 1982 ²⁴	107	5.6%	—	16.8%	71%	310	5.8%	—	19.0%	68%
†Luke <i>et al.</i> 1983 ²⁵	36	—	—	22.2%	—	44	—	—	22.7%	—
Williams <i>et al.</i> 1984 ⁹	93	10.8%	—	8.0%	62%	78	9.0%	—	11.0%	74%
†Phillips <i>et al.</i> 1984 ¹⁰	778	8.0%	—	12.0%*	—	598	7.0%	—	18.0%*	—
†Wolmark <i>et al.</i> 1986 ²⁶	232	—	—	5.0%	38%	181	—	—	13.0%	48%
†Gillen <i>et al.</i> 1986 ¹¹	45	2.2%	60%	14.7%	—	55	7.2%	55%	25.0%	—

†APER and SSR groups matched for pathological stage/grade; *Significant difference ($P < 0.02$, χ^2)

surrounding tissues, they achieved 95% local control of disease and a 93% five year survival rate. These results are superior to radical surgery although endocavitary irradiation is only suitable for approximately 20% of all rectal cancers. As with any local therapy aiming for cure, the lesions must be mobile Dukes' A lesions with no evidence of nodal metastases and well, or moderately well, differentiated. A poorly differentiated lesion which is locally invading and close to the sphincters is clearly not going to be suited to any form of curative local therapy or SSR.³⁶

Rightly, many surgeons are reluctant to treat patients with rectal cancer by limited procedures, fearing such might not be curative. Most surgeons, if not totally confident on final histology that the lesion has been completely removed, would go on to perform a definitive major curative procedure.³⁷

Unfortunately, very few lesions can be so clearly staged. Pre-operative sampling is poor at grading a tumour: only 52% of poorly differentiated tumours are so diagnosed on the pre-operative biopsies.³⁸ In order to match the best possible curative procedure to the individual, it is essential that new techniques of local tumour assessment, estimation of distant disease and prognostic staging are explored.

Local tumour assessment

Digital rectal examination is still the most useful investigation available to every surgeon as it can assess the degree of local involvement with up to an 83% accuracy. However, this method is unable to determine the degree of spread with any useful accuracy.³⁹

Nevertheless, digital rectal examination may be supplemented by other investigations. Conventional ultrasound of the pelvis is unsuitable in low rectal tumours because they are difficult to visualize. On the other hand, endoluminal ultrasound is emerging as a highly effective method of pre-operative staging: sensitivity in determining spread beyond the muscularis propria is 96%.⁴⁰ It appears to be easy to use with little inter-observer variation but clinical experience is limited. It has been shown to be superior to both digital rectal examination and computerized tomography.⁴¹ Whereas computerized tomography cannot differentiate the individual layers of the rectal wall as well as endoluminal ultrasound, it is a better modality for differentiating between malignant and inflammatory extra-rectal fixity. These are early days yet and further prospective comparative studies are required.

Tumour markers

Initially, it was thought that serum carcinoembryonic antigen (CEA) estimations would be unique in helping

to stage colorectal cancer. Unfortunately, enthusiasm has now waned as it has become obvious that it is not tumour-specific. It is insensitive as a marker of resectability as it is only 72% accurate at predicting inoperability and lacks sensitivity in identifying patients with a poor prognosis.⁴² However, it may be useful in differentiating between malignant and inflammatory fixation once tumour fixity has been suggested by the discovery of raised serum α_1 acid glycoprotein and C-reactive protein.⁴³ CEA may yet, therefore, find a role in pre-operative local tumour assessment although the relevance of this approach to clinical practice has yet to be explored prospectively.

Assessment of the liver

Accurate detection of liver metastases is important in two aspects. Firstly, a local palliative excision with minimum hospital stay and morbidity would be preferable in a patient with advanced hepatic metastases rather than a more extensive resection. Secondly, reliable methods of detecting liver metastases would enable treatment to be directed towards this aspect of the disease either by adjuvant regional chemotherapy or, in suitable cases, by hepatic resection.

In 1941, Goligher was dismayed that, of 790 patients thought to have normal livers at surgery, liver metastases were found at autopsy in 16% of those dying in the immediate post-operative period.⁴⁴ This idea of 'occult' liver metastases has been independently substantiated, although the incidence recently reported is nearer 30%.^{45,46} The 'occult' nature of the metastasis may be due to several reasons: (i) an inaccessible liver due to adhesions from previous upper abdominal surgery; (ii) a large metastatic deposit lying in an inaccessible part of the liver such as the posterior aspect of the right lobe; (iii) genuine small deposits which are not palpable at surgery nor readily detectable by conventional radiological methods. Finlay *et al.* have shown CT scanning to be superior to conventional pre-operative ultrasonography for detecting hepatic metastases which in turn is superior to liver isotope scanning in this respect.⁴⁵

Estimation of the hepatic perfusion index (HPI) relies on the fact that hepatic metastases derive their blood supply preferentially from the hepatic artery. Using this technique, Leveson *et al.* have demonstrated a 96% sensitivity in detecting occult liver metastases prospectively,⁴⁶ but this degree of accuracy has yet to be independently substantiated.

Further advances lie in the use of intra-operative liver ultrasound. This has been shown to be extremely sensitive in detecting small tumour deposits and it is essential in order to allow minimal yet curative liver resections.⁴⁷⁻⁴⁹ There is little doubt that per-operative ultrasonography will be routinely used in the not too distant future.

Prognostic staging

DNA ploidy status can be readily determined by flow cytometry and pre-operative biopsies show a good concordance with the resected specimen.⁵⁰ Although retrospective studies have all shown promising results, differing conclusions have been reached. Kokal *et al.* found DNA ploidy to be the single most important prognostic factor⁵¹ whilst both Armitage and Quirke found it to be of individual significance, but less so than stage.^{52,53} Other centres have found it to be of no prognostic significance.⁵⁴

There have been three prospective studies^{55–57} which have all shown a survival advantage for the DNA diploid tumours. In the studies of both Armitage and Jones this was more marked for the early stages.

Staging is always performed post-operatively on the resected specimen, usually by the Dukes' classification or one of the many modifications.⁵⁸ However, this only accurately predicts the prognosis of the 15% who have an approximately 95% cure rate (Dukes' stage A) and the 10% who have a dreadful prognosis (Dukes' C₂). It leaves us guessing at the outcome of the intermediate 75% of cases. Jass *et al.* has recently proposed a major modification in staging which takes into account venous invasion, nodal spread, lymphocytic infiltration and extent of direct spread.⁵⁹ It appears to be superior to the method of Dukes' inasmuch as it confidentially predicts the outcome of patients in 50% of cases. The challenge remains, however, to accurately classify patients pre-operatively.

Per-operative pelvic wall cytology and adjuvant post-operative therapy

In a preliminary study, pelvic scrape cytology of the pelvis has been shown to be capable of detecting malignant cells remaining in the tumour bed. Moreover, 55% of the patients with positive cytology developed a local recurrence within 20 months⁶⁰ and so this may prove to be an easy, quick and inexpensive method of selecting high risk patients for adjuvant therapy.

Conclusions

There is now strong, albeit not incontrovertible, evidence that sphincter preserving surgery does not compromise overall survival or the disease free interval. It has been recommended that patients with poorly differentiated tumours should undergo APER rather than SSR. However, if we believe that APER and SSR both provide sufficiently wide resection margins, this recommendation surely becomes paradoxical, particularly as pre-operative assessment of tumour grade is unreliable.

Undoubtedly, advances in treating this disease for cure will be dependent upon improvements in the pre-operative prognostication and staging of rectal tumours as well as in development of effective adjuvant therapies.

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