Local recurrence after ‘standard’ abdominoperineal resection: do we really need ELAPE?

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ABSTRACT

INTRODUCTION Low rectal cancers requiring abdominoperineal resection tend to have a worse prognosis than higher tumours, which may be treated by anterior resection. One of the reasons for this may be inadequate local surgery, in particular the narrow waist of the resection specimen of a standard abdominoperineal resection may be associated with a high positive circumferential resection margin. The extralevator abdominoperineal excision (ELAPE) aims to improve the R0 resection rate but carries significant morbidity. We examined our own results of standard abdominoperineal resection to assess the need for a change of policy.

METHODS We performed a retrospective analysis of consecutive standard abdominoperineal resections for rectal cancer in a single centre from June 2002 to December 2011.

RESULTS A total of 102 patients underwent standard abdominoperineal resection with curative intent; 19 had no preoperative treatment, 42 had short course radiotherapy, 9 had long course radiotherapy and 32 had neoadjuvant chemotherapy followed by long course chemoradiotherapy. In 17/102 (16.6%), there was a positive circumferential resection margin. Over a median follow up of 32 months, 20 patients developed recurrence of any type. Local recurrence occurred in five patients (two of which also had distant recurrence), of whom two had a positive circumferential resection margin ($P = 0.10$). Actuarial two-year local only recurrence was 3.4% and any recurrence was 17.7%. Overall five-year cancer specific survival was 77%.

CONCLUSIONS In this series we found low rates of local recurrence after standard abdominoperineal resection even with a circumferential margin rate positivity of 16.6%. Performing an ELAPE in selected cases may improve these results further but is not necessarily required for all patients.

KEYWORDS

Rectal cancer – Abdominoperineal excision – Circumferential resection margin – Local recurrence

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Introduction

Abdominoperineal resection has evolved over the past hundred years. The original procedure described by Miles^{1,2} was employed for the majority of tumours of the rectum but its high cost in terms of mortality and morbidity led to greater use of the sphincter-preserving anterior resection for mid and high rectal cancers. The promotion of total mesorectal excision seemed a perfect solution as it achieved local cure but without major morbidity³ and it became clear that lower rectal tumours were suitable for primary anastomosis without compromising cure.⁴ The pendulum appears to have swung a little too far, as the rate of circumferential margin positivity for abdominoperineal resection then became unacceptably high because surgeons were tempted to dissect along the total mesorectal excision plane right down to the levator ani leading to a ‘waisting’ of the specimen, often at the site of the tumour. Consequently, local recurrence after abdominoperineal resection has often been high.^{5–7}

Holm and colleagues were among the first to promote a return to some of the surgical principles of Miles, achieving a cylindrical specimen by stopping the mesorectal dissection above the pelvic floor and completely excising the levators.⁸ This has now become known as an extralevator abdominoperineal excision (ELAPE). Although the premise of ELAPE is to reduce or eliminate a positive circumferential resection margin, there is conflicting evidence from meta-analyses as to whether ELAPE achieves this reduction.^{9,10} Similarly, there is evidence of both lower and higher local recurrence rates compared with the ‘standard’ abdominoperineal resection (sAPR).^{9,11} Clearly ELAPE has not eliminated circumferential resection margin positivity or local recurrence and carries with it potentially serious morbidity, such as wound breakdown, urinary retention and impotence.^{5,12,13} In addition, it is a truism that, whatever the magnitude of the local procedure, the risk of leaving distant metastases will not be changed by surgery. Thus, there has been a debate about the best form of surgery for low rectal cancer.^{14,15} Some groups advocate a low anterior resection in almost all cases,¹⁶ while

others recommend abandonment of sAPR in favour of ELAPE.¹⁷ Further uncertainty about the best approach is added with the increasing sophistication of neoadjuvant chemotherapy and radiotherapy and the advent of novel technological platforms. After successful treatment, a proportion of patients have a complete pathological response so may avoid surgery altogether.^{18,19} It is still not clear whether those patients with a partial response require an excision plane determined by their pre- or post-treatment imaging.

At Addenbrooke’s Hospital, we have recently adopted ELAPE for some locally advanced tumours invading the levator ani but we consider that there is still a place for sAPR. Our institutional policy has been to achieve clear circumferential margins with a tailored approach, taking a wider margin where it is thought that the circumferential margin is at risk. We wished to examine the results of our tailored sAPR policy to assess and improve our outcomes.

Materials and Methods

A consecutive series of sAPR for rectal cancer performed in a single colorectal unit between June 2002 and December 2011 was identified from electronic and paper records and data were collected retrospectively. Data extracted included the use of neoadjuvant chemotherapy and radiotherapy, circumferential resection margin status, local recurrence, distant recurrence and survival. Neoadjuvant treatment was defined as short course radiotherapy (25 Gy in 5 fractions); long-course radiotherapy (45 Gy in 25 fractions) and chemoradiotherapy (3 months of chemotherapy followed by long-course chemoradiotherapy); surgery was usually undertaken within a week of short course radiotherapy and at least six weeks after long-course chemoradiotherapy. The circumferential margin was defined as positive when tumour cells were present at a distance equal to or less than 1 mm from the inked radial resection margin. Local recurrence was defined as recurrence within the pelvis and distant recurrence as any recurrence outside the pelvis, confirmed histologically or, where this was not possible, based on the multidisciplinary team decision on the summation of the available evidence.

All patients had clinical evaluation including colonic assessment, staging rectal magnetic resonance imaging and computed tomography (CT) of the chest, abdomen and pelvis, and were discussed in the multidisciplinary meeting prior to surgery.

Surgery was performed by one of four consultant surgeons or a senior trainee under supervision. Abdominoperineal resection was performed in the modified Lloyd-Davies position with an open abdominal dissection. The perineal dissection was performed after the abdominal dissection with division of the levators at the level of puborectalis muscles but was sometimes tailored to take a wider margin where necessary at a threatened circumferential resection margin. Even with a wider margin this does not become an extralevator resection because the bulk of the levator plate remains in situ. The specimen was delivered through the perineal wound with subsequent washout of the pelvis. No plastic surgical reconstruction of the perineum was performed.

Patients were entered into a surveillance programme of annual CT scan of the chest, abdomen and pelvis for three years and colonoscopy at one or three years and then five-yearly. After the first follow-up appointment at six weeks there were no routine clinic appointments. All patients, however, had access to a specialist nurse telephone hotline and were encouraged to make contact if they had any worrying symptoms that might suggest recurrence, which were then investigated appropriately. Death certificates were scrutinised to ascertain whether the death was considered to be related to rectal cancer or not.

Statistical analysis

Statistical analyses were performed using Stata® version 12.1.²⁰ Survival time was defined as the time from surgery to recurrence or to death from colorectal cancer. Kaplan–Meier survival of different subgroups was compared by the log-rank test.²¹

Results

Data were collected from 119 patients in the cohort; 17 were excluded from analysis: 4 had recurrent rectal cancer, 10 underwent a palliative abdominoperineal resection because of metastatic disease at presentation and 3 had a planned ELAPE. The remaining 102 had a primary rectal adenocarcinoma and underwent sAPR with curative intent. The median age was 71.5 years (range 32–95 years). The median length of hospital stay was 9 days (range 5–70 days).

Sex distribution, median age at the time of the surgery, preoperative clinical data and preoperative treatment, median length of stay, 30-day mortality and median follow-up are shown in Table 1. Pathological staging data according to the TNM staging system version 6, median number of lymph nodes retrieved, median number of positive nodes,

Table 1 Patient and demographic data.		
Demographic	Patients	
	(n)	(%)
Age (median years, range)	71.5 (32–95)	
Gender:		
Male	69	67.6
Female	33	32.4
Preoperative treatment:		
Long-course radiotherapy	9	0.9
Short-course radiotherapy	42	41.1
Chemoradiotherapy	32	31.4
None	19	18.6
Length of stay (median days, range)	9 (5–70)	
Follow up (median months, range)	32 1–120)	
30 day mortality	4	3.9

Table 2 Pathologic data.		
Pathologic data	Patients	
	(n)	(%)
T category:		
0	5	4.9
1	5	4.9
2	30	29.4
3	54	52.9
4	5	4.9
Unknown	3	2.9
N category:		
0	68	66.6
1	22	21.5
2	11	10.7
Unknown	1	0.9
Lymph nodes retrieved (median, range)	13 (1–35)	
Circumferential resection margin:		
Positive	17	16.6
Negative	85	83.4
Quality of operation:		
G3	56	54.9
G2	29	28.5
G1	1	0.9
Unknown	16	15.6
Postoperative Dukes staging:		
A	32	31.4
B	30	29.4
C	33	32.3
No residual tumor	7	6.9

quality of mesorectal dissection and circumferential resection margin involvement are shown in Table 2.

Circumferential resection margin involvement and intraoperative perforation

All patients were considered to have had a resection with curative intent; 17 (16.6%) had a positive circumferential resection margin. Of these, six had direct tumour spread to within 1 mm of the circumferential resection margin, while the rest had discontinuous spread. The circumferential resection margin was positive anteriorly in seven patients, posteriorly in five, laterally in three and information was missing from the other two patients.

One patient required en-bloc vaginectomy and another needed en-bloc hysterectomy. There was only one patient with advanced T stage that experienced intraoperative perforation (0.98%). The quality of the specimen was assessed by the pathologist according to the integrity of the

mesorectal fascia, with 56 (54.9%) having an intact mesorectal fascia, 29 (28.5%) having partial breach of the fascia and 1 (0.9%) with a major defect on the mesorectal fascia (Table 2). For 16 (15.7%) patients, the above information could not be obtained from the pathology report.

Recurrence rates

Over a median follow-up of 32 months (range 1–120 months), 20 patients had detectable recurrent disease: 3 local only, 2 mixed local and distant, and 15 distant disease only. Thirty-day mortality was 3.9% (*n* = 4). Actuarial five-year local-only recurrence was 3.4% and any recurrence was 25.6% (Fig 1). Overall local recurrence (with or without distant recurrence) was 5.9% at five years. Five-year cancer specific survival was 77% with no cancer related deaths occurring after five years.

Figure 1 Overall recurrence.

Figure 2 Any local recurrence in circumferential resection margin negative and positive patients.

A positive circumferential resection margin did not predict local recurrence ($P = 0.1$; Fig 2), recurrence of any nature ($P = 0.47$; Figure 3) or cancer-specific survival ($P = 0.29$; results not shown) and there was no difference in the overall survival between the two groups ($P = 0.76$). The five-year overall (all-cause) survival was 70.6% with 95% confidence limits (60.0%, 79.1%; Fig 4).

Discussion

Clinical research into rectal cancer in the last 20 years has led to an evidence-based approach to treatment of rectal cancer amenable to resection and primary anastomosis. The optimal approach to low rectal cancers, however, continues to evolve. The results of pelvic surgery for cancer may be as

much dependent on local factors (such as radiological assessment, the technical skills of the surgeon, the oncologist and preoperative care) as the type of operation that is performed but these factors are hard to evaluate. It thus behoves each unit to audit its own results before adopting major changes in policy.

Our study reveals a relatively high circumferential resection margin positive rate of 16.6%. However, this is similar to the 15.7% reported from another tertiary centre performing sAPR.²² Circumferential resection margin positive rates for ELAPE have been reported as high as 20.3% in a multi-centre setting,⁵ although single-centre outcomes can be as good as 7%.⁸ A Chinese prospective multicentre study reported a circumferential resection margin involvement of only 5.9%.²⁵ A meta-analysis of six trials indicated that ELAPE had an odds ratio of 0.36 for positive circumferential resection margin compared with abdominoperineal resection⁹ but only one of the included studies was a prospective randomised controlled trial.²⁴ A further meta-analysis, however, showed no difference in circumferential resection margin positivity between abdominoperineal resection and ELAPE.¹⁰ It is unclear from these data whether differences in circumferential resection margin involvement are due to the choice of operation, different patient populations or different surgical technique.

Circumferential resection margin positivity is commonly used as a surrogate marker for local recurrence or possibly good surgical technique. Our investigation shows a non-significant difference (Fig 2) but with the small number of events this might represent a type II error. Nevertheless, it is clear that many patients with a positive circumferential resection margin still have a local cure, in the same way that local recurrence can still occur after a clear circumferential resection margin has been obtained. Our local recurrence rates of 5.9% overall at five years and 3.4% local-only recurrence are similar to other studies of abdominoperineal resection and ELAPE.^{22,25}

We acknowledge that this study is open to criticism. While it is a consecutive series of patients, the data have been collected retrospectively and our specific follow-up regimen does not include routine clinic visits or surveillance scans after three years. Nevertheless, we have encouraged patients to phone in with any problems and many of them have come back to the hospital for other reasons allowing follow-up data to be gathered. Nearly 16% patients did not have a documented assessment of margins and so the rate of circumferential resection margin positivity could be underestimated. There are insufficient data about height of tumour from the anal verge but our impression is that abdominoperineal resection was performed for oncological, not practical, reasons in all cases. Finally, the nature of the 'tailoring' required to achieve a better clearance was not specifically documented and is therefore unquantifiable.

Conclusions

Outcomes from rectal cancer surgery depend on multiple factors. The multidisciplinary assessment of each patient is crucial to ensure optimisation of neoadjuvant therapy and

Figure 3 Any recurrence in circumferential resection margin negative and positive patients.

Figure 4 Overall survival.

selection of operative technique to achieve the best oncological and functional outcomes. Choice of sAPR or ELAPE is just one aspect of this complex decision making process. Our study suggests that sAPR, tailored where necessary to take a wider margin, is adequate for most patients with low rectal cancer requiring sphincter excision. ELAPE has theoretical oncological advantages over sAPR but its exact role in the treatment of low rectal cancer has not been proven; there are also concerns over the increased morbidity and how best to deal with a larger perineal defect.

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