Subspecialisation and its effect on the management of rectal cancer

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ABSTRACT

INTRODUCTION To assess the impact of subspecialisation on surgical and oncological outcomes after rectal cancer surgery in a single surgical unit within a district general hospital.

PATIENTS AND METHODS A total of 207 patients with rectal cancer treated surgically by two colorectal surgeons and four experienced general surgeons at the Royal Berkshire Hospital, Reading, England between January 1995 and December 1999 were studied. A retrospective case-note review of each patient's personal details, operative and histological findings, their subsequent clinical progress and oncological outcomes, including 5-year survival were recorded.

RESULTS In the study group, 127 patients were treated by a colorectal surgeon and 80 by general surgeons. Pre-operative radiotherapy was more likely to be given to patients treated by a colorectal surgeon. Fewer permanent stomas were performed by colorectal surgeons. Postoperative morbidity, transfusion requirements, anastomotic leak rates and 30-day mortality were not significantly different. Tumour-involved circumferential resection margins, local recurrence rates and risk of distant metastases were similar between the two groups of surgeons.

CONCLUSIONS Colorectal subspecialisation has resulted in an increased use of pre-operative radiotherapy and fewer permanent stomas. No significant improvement in surgical or oncological outcomes after rectal cancer surgery have been observed.

KEYWORDS

Rectal cancer – Outcomes after surgery – Subspecialisation

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Surgical subspecialisation is intended to improve surgical- and oncology-related outcomes in the treatment of cancer. The evidence to support the hypothesis that colorectal surgeons have improved surgical outcomes and long-term survival in patients with colorectal cancer when compared to their general surgical colleagues is inconclusive.^{1–3}

Following surgery, rectal cancer can recur locally with reported recurrence rates of 3–32%.^{4–6} Local recurrence rates vary from surgeon to surgeon⁵ and may be stage related. Total mesorectal excision (TME) is considered the gold standard for the surgical treatment of rectal cancer, with reduced local recurrence rates.⁷ TME is a more technically demanding than previous techniques of rectal excision. Postoperative mortality and morbidity may be increased, with higher anastomotic leak rates leading many surgeons to recommend a defunctioning stoma.^{8–10}

In this study, we have investigated the effect of surgical subspecialisation over a 5-year period. The surgical outcomes and local recurrence rates following elective resection of rectal cancer by two colorectal surgeons were

compared with the results of four general surgeons with an interest in gastrointestinal surgery.

Patients and Methods

A rectal cancer for the purpose of this study was defined as being 15 cm or less from the anal verge on rigid sigmoidoscopy. The case records of 232 consecutive patients presenting with a rectal cancer between January 1995 and December 1999 were examined. Of these, 207 (89%) [76 women; median age 64 (range, 24–90) years] underwent elective resection of their rectal cancer and formed the study group.

Forty-eight (38%) of the 128 patients with a low or mid-rectal cancer received short-course pre-operative radiotherapy of 22.5 Gy in 5 fractions over 5 days followed by surgery within 7 days. Twenty-seven were treated by surgery followed by 45 Gy of postoperative radiotherapy over 6 weeks. Fifty-three patients were treated by surgery alone.

Patients' personal details, the nature of the operation, the surgeon performing the operative procedure, length of stay,

Table 1 Operation type and Dukes' stage of 207 patients undergoing resection of rectal cancer

	Modified Dukes' stage			
	A	B	C	D
Colorectal surgeons (total = 127 patients)				
Abdominoperineal resection	2	12	10	3
Low anterior resection	12	22	20	2
Anterior resection	1	16	23	4
General surgeons (total = 80 patients)				
Abdominoperineal resection	2	8	11	0
Low anterior resection	5	7	10	2
Anterior resection	6	11	12	4
Hartmann's procedure	0	0	2	0

complications within 30 days, postoperative transfusion requirements, histopathology of the resected specimen, details of peri-operative adjuvant therapy, sites of disease recurrence, the date of death and findings at postmortem examination where relevant were recorded. Histology data were recorded according to The Royal College of Surgeons of England national guidelines.¹¹ Complications were recorded under the broad categories of cardiovascular, respiratory, urinary and metabolic, wound complications and 'other'. Patients were considered to have undergone a 'curative resection' if there was no radiological or intra-operative evidence of disseminated disease combined with histological confirmation of the circumferential resection margin being clear of tumour by more than 1 mm.

Clinic follow-up assessments were performed 3-monthly for the first 2 years and 6-monthly for the subsequent 3 years. The duration of follow-up was calculated from the date of surgery to the date of last review or death. Routine

colonoscopy was performed 18 months and 5 years after surgery. Radiological investigations consisted of 6-monthly ultrasonography for 2.5 years combined with serial carcino-embryonic antigen levels. A computed tomography scan was obtained if there was suspicion of recurrent disease.

Statistical analysis was performed by the Department of Applied Statistics, University of Reading using Minitab (Coventry, UK).

Results

Colorectal surgeons performed 22 rectal resections per year compared with general surgeons who performed 5 annually. The median follow-up was 96 months (range, 60–120 months). An analysis of patients treated by surgical specialty is summarised according to tumour stage and type of operation performed in Table 1.

There were 128 patients with a mid or low rectal cancer. Colorectal surgeons were less likely to form a permanent stoma although this did not reach significance (colorectal surgeons = 27 of 83 patients [33%] versus general surgeons = 21 of 45 patients [47%]; $P = 0.12$, Fisher's exact test). Postoperative mortality, morbidity, anastomotic leak rates and blood transfusion requirements were similar between colorectal surgeons and general surgeons (Table 2). Short-course pre-operative radiotherapy was associated with a significantly greater transfusion requirement compared with patients who did not receive radiotherapy and those who received postoperative radiotherapy (Table 3).

The incidence of tumour-positive circumferential resection margins and local recurrence was comparable between colorectal surgeons and general surgeons (Table 3). At the time of last follow-up, 51 of 80 patients (64%) operated on by a general surgeon were alive compared to 88 of 127 (70%) patients treated by a colorectal surgeon. The odds ratio of developing disseminated disease comparing colorectal surgeons and general surgeons was 0.72 (95% confidence interval 0.37–1.41; $P = 0.38$, Fisher's exact test).

Table 2 A comparison of surgical- and oncology-related outcomes between colorectal surgeons and general surgeons in rectal cancer

	Colorectal surgeons	General surgeons	P-value	Odds ratio	95% confidence interval
Mortality	6 (5%)	5 (6%)	0.75	0.75	0.22–2.5
Morbidity	55 (43%)	28 (35%)	0.47	1.24	0.7–2.2
Anastomotic leak rate	9 (9%)	3 (5%)	0.51	1.2	0.43–2.1
Transfusion requirement	50 (40%)	26 (33%)	0.65	1.2	0.66–2.1
Permanent stoma rate	27 (21%)	23 (29%)	0.5	0.76	0.4–1.47
Histologically positive circumferential margins	26 (20%)	16 (20%)	1	0.97	0.49–1.9
Local recurrence rate	11 (9%)	12 (15%)	0.68	0.83	0.37–1.88

Table 3 A comparison of surgical outcomes between patients receiving pre-operative radiotherapy and those who received postoperative radiotherapy

	Pre-op. DXT <i>n</i> = 48	Postop. DXT <i>n</i> = 27	<i>P</i> - value
Mortality	4%	0%	1
Morbidity	47%	33%	0.21
Anastomotic leak rate	10%	10%	1
Transfusion requirement	61%	34%	0.001

Similarity in long-term outcomes is reflected in crude survival analysis using a Kaplan-Maier analysis (Fig. 1).

Discussion

Surgical subspecialisation for cancer is intended to improve both surgical- and oncology-related outcomes. This study compared surgical- and cancer-related outcomes in patients with rectal cancer treated by colorectal surgeons compared with general surgeons. The study was retrospective and incorporated a period where there was a transition in the use of radiotherapy from the postoperative to the pre-operative period. It would be expected that all

patients at risk of disease relapse would have been identified with a minimum follow-up period of 60 months and a median of 96 months.¹²

Following subspecialisation in September 1997, there was a tendency for colorectal surgeons to operate on a greater proportion of low rectal cancers with a lower incidence of abdominoperineal resection although this did not reach statistical significance. Surgical outcomes (mortality, morbidity, anastomotic leak rate and blood transfusion requirements) and oncological outcomes (involved circumferential resection margins, local recurrence rates and risk of developing disseminated disease) were similar between colorectal surgeons and general surgeons.

These data do not support the hypothesis of improving surgical and oncological outcomes with surgical subspecialisation. A reduction of postoperative morbidity and mortality has previously been reported in patients with rectal cancer following the introduction of a colorectal unit¹⁵ although patients were not standardised using risk-analysis models. Previous comparisons of morbidity and mortality between surgical units with apparent differences in surgical outcomes were found on analysis using POSSUM, which standardises for patient case-mix, to have the same observed:expected ratios for morbidity and mortality.¹⁴

Others who have studied the influence of volume of work on oncological outcomes^{1,2} have not found an association between increased workload and improved patient outcome, although these studies included colonic resections,

Figure 1 Kaplan-Maier survival curve for crude survival following surgery.

which are technically less demanding than rectal resection.¹⁵ Hermanek³ found that when rectal cancers were analysed alone, surgeons with a 'high volume' had better oncological results. The relationship between volume and surgical outcomes was not proven in this study. Similar surgical and oncological results between colorectal surgeons and general surgeons may be explained by the uniform use of TME for mid and distal rectal cancer.

Conclusions

Surgical outcomes and survival following elective resection of rectal cancer by experienced general surgeons with an interest in gastrointestinal surgery were comparable to those of dedicated colorectal surgeons.

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