Original article

Surgical specialist registrars can safely perform resections for carcinoma of the rectum

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Aim: To assess morbidity, mortality and cancer-related outcomes after supervised rectal resection for cancer by surgical specialist registrars (SpRs).

Patients: A total of 205 consecutive patients (115 male; median age 64 years [range, 24–90 years]) under the care of six consultant surgeons, who underwent elective rectal resection of their rectal cancer between 1995–1999 were studied. The modified Dukes' stages were A in 28 patients (13%), B in 47 (21%), C in 103 (51%), and D in 30 (15%).

Results: Sixty-eight patients (35 males) of mean age 64 years (range, 38–82 years) underwent supervised resection (60 anterior resections, 8 abdomino-perineal resections) by a SpR. Of these, 7 (10%) were modified Dukes' stage A, 16 (22%) stage B, 37 (54%) stage C, and 8 (13%) stage D. Postoperative morbidity (SpRs 32% versus consultants 41%; $P = 0.25$) and mortality (SpRs 3% versus consultants 6%; $P = 0.1$) were comparable with consultant outcomes. Local recurrence rates (SpRs 9% versus consultants 9%; $P = 0.5$) and crude survival (SpRs 64% versus consultants 61%; $P = 0.31$) were also comparable after a median follow-up of 48 months (range, 24–72 months).

Conclusion: Operative and cancer-related outcomes are not compromised by supervised SpR resections of rectal cancer in selected patients.

Key words: Surgical specialist registrars – Supervised rectal resection – Carcinoma

Considerable concern exists that shortened training times combined with the restriction on hours of work will result in trainees being short of the necessary depth and breadth of experience for independent surgical practice.^{1–3} The need to train is challenged by the separate pressures of service requirements and clinical governance.⁴

The aim of this study was to determine whether immediate surgical outcomes and long-term survival after supervised rectal cancer surgery by trainees are being compromised.

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. Tumour location was measured by the surgeon at the time of diagnosis. A resection was performed with 5 cm distal clearance.⁵ For distal rectal cancer, this necessitated complete excision of the rectum with an anastomosis at the level of the pelvic floor (defined as a low anterior resection) or an abdomino-perineal resection. A supervised operation consisted of

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the consultant being scrubbed for the operation and assisting. The surgeon who resected the cancer was considered to be the principal surgeon.

Consecutive patients under the care of six consultant surgeons who underwent elective resection of their rectal cancer at the Royal Berkshire Hospital, Reading, UK between January 1995 and December 1999 were reviewed. Patients who underwent urgent or emergency surgery were excluded. Patient's personal details, the nature of the operation, the seniority of the surgeon and assistance available, peri-operative transfusion details, length of stay, complications within 30 days of surgery, histopathology of the resected tumour using UKCCR guidelines,⁶ details of peri-operative adjuvant treatment, sites of disease recurrence, the date of death and findings at post mortem examination where relevant were recorded. Risk of morbidity and mortality was calculated for each patient using the POSSUM scoring system⁷ (RAJIS software, Hyperhelp, Cheshire, UK).

Operative procedures were curative if all macroscopic disease was removed at the time of operation without histological evidence of positive resection margins and radiological evidence of metastatic disease. Postoperative mortality was defined as any death occurring in hospital or within 30 days of the primary operative procedure. In-hospital complications were defined as those complications occurring during hospital stay for the primary treatment.

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 (CEA) levels. A computed tomography scan was obtained if there was suspicion of recurrent disease.

Table 1: A summary of patients' details and their operations

	Performed by	
	Supervised SpRs (68 patients)	Consultants (126 patients)
Female:male	33:35	56:70
Mean age (range) in years	64 (38–82)	64 (24–90)
Modified Dukes' stage		
A	7 (11%)	13 (10%)
B	15 (23%)	28 (22%)
C	38 (54%)	64 (51%)
D	8 (12%)	21 (17%)
Operation performed		
Anterior resection	29	35
Low anterior resection	31	56
Abdomino-perineal resection	8	35
Defunctioning stoma	22 (36%)	41 (40%)

The end-points of the study were survival and recurrence at final follow-up. The criteria for establishing recurrent disease were by histological confirmation: palpable disease or disease evident on radiographic studies with subsequent clinical progression and supportive CEA data. A patient was labelled as having local recurrence when it was confined to the rectum, pelvis or adjacent organs. Otherwise, the recurrence was labelled as distant.

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

Results

Between January 1995 and December 1999, 205 patients underwent elective resection of a rectal cancer under the care of six consultant surgeons at the Royal Berkshire Hospital, Reading. Patient demographics and operative details are summarised in Table 1. Of these, 68 patients underwent a resection by six supervised specialist registrars (SpRs). Five of these registrars were in the fourth year of their training and one was in the third year. Eleven other patients underwent a resection by an unsupervised SpR. These patients have not been included in the analysis.

The proportion of patients operated on according to their tumour stage was similar between SpRs and consultants (Table 1). Of patients treated by a trainee, 71% underwent a curative resection based upon the criteria of resection of all macroscopic disease with the absence of residual disease based on histology and radiological assessment. This compared with a curative resection rate of 76% among consultants. Eighteen patients (26%) treated by an SpR were treated with pre-operative radiotherapy compared with 31 (24%) treated by a consultant; 56 patients received post-operative adjuvant chemoradiotherapy.

Immediate outcomes

Observed morbidity is summarised in Table 2. The observed: expected ratio for morbidity using POSSUM was 0.9 for registrars and 1.0 for consultants ($P > 0.5$; Fisher's

Table 2 Summary of the morbidity/mortality rates after surgery

	Surgery performed by	
	Supervised SpRs (68 patients)	Consultants (126 patients)
Wound complication	5 (7%)	15 (12%)
Urine retention/infection	5 (7%)	9 (7%)
Cardiorespiratory	5 (7%)	11 (9%)
Anastomotic leak (clinical)	2 (3%)	6 (7%)
Other	4 (6%)	11 (9%)
30-day mortality	2 (3%)	8 (6%)

Table 3 The hazard or odds ratio for consultants:registrars

	Ratio	95% Confidence interval	P value
Survival	1.3	—	0.31
Postoperative complications	1.4	0.7–2.6	0.25
The need to transfuse	1.3	0.7–2.3	0.45
Anastomotic leak	2.1	0.4–20.6	0.5
Postoperative mortality	5.3	0.73–23.5	0.1

Exact test). The observed:expected ratio for mortality using POSSUM was 0.46 for registrars and 0.6 for consultants ($P > 0.1$; Fisher's Exact test).

There was no statistical evidence that the type of surgeon influenced the incidence of postoperative complications (Tables 2 and 3). The odds ratio for consultants to SpRs was always greater than unity, but not significantly so (Table 3).

Patient gender was a significant prognostic variable for the risk of developing a postoperative complication with males 3 times more likely to suffer a complication than females ($P = 0.001$). Patient age was not a significant prognostic variable for the development of a postoperative complication ($P = 0.13$) or mortality ($P = 0.23$).

Resection margins

The median number of lymph nodes harvested from resected specimens was 14 (range, 8–21) for SpRs and 15 (range, 8–36) for consultants (odds ratio 0.8; $P = 0.5$). The median distal resection margin from the tumour was 5.5 cm (range, 2–8 cm) for SpRs and 5 cm (range, 2–6 cm) for consultants (odds ratio 0.5, $P = 0.7$). The median circumferential margin from the resected tumours was 5 mm

(range, 0–15 mm) for SpRs and 5 mm (range, 0–17 mm) for consultants (odds ratio 0.9; $P = 0.8$).

Local recurrence

After a median follow-up of 48 months (range, 24–72 months), there have been 7 patients with a Dukes' C and 2 with Dukes' B tumour who have suffered from an isolated local recurrence. Three patients developed a local recurrence after surgery by a registrar ($P = 0.5$, Fisher's Exact test compared to consultants). The overall local recurrence rates for all patients was, therefore, 9% after curative surgery.

Distant recurrence

Of those studied, 34 patients (16%) suffered distant metastases (Dukes' B, 7 patients; Dukes' C, 24 patients), 10 of whom also had a pelvic recurrence (consultant:SpR hazard ratio = 1.1).

Survival

Patient gender ($P = 0.12$) and age ($P = 0.41$) were not significant prognostic factors in the survival analysis. There was no significant difference in patient survival between patients operated on by registrars compared to consultants ($P = 0.31$; hazard ratio = 1.3; Fig. 1).

Discussion

The publication of minimum quality assurance data on the management of colorectal cancer from The Royal College of Surgeons of England and the Association of

Figure 1 Kaplan-Meier survival curves comparing patients treated by registrars with those treated by consultants.

Coloproctology of Great Britain and Ireland have focused attention on surgeon-related outcomes after surgery.⁸ Operative training of suitable quality and quantity will be essential if intersurgeon variation in outcomes are to be reduced.

A previous audit⁹ found that a surgical trainee would undertake 4–7 elective anterior resections per year with a consultant assisting in less than two cases per year. Consultants supervised a fifth of colorectal resections performed by trainees and were present at less than two-thirds the number of operations.⁹ A separate analysis found that consultants assisted their trainees in 11% of colorectal resections in 1993 and in 21% of cases in 1994.¹⁰

A study of 187 consecutive deaths after colorectal surgery in south-eastern Scotland found that 43% of patients had been operated by a trainee, some of whom were unsupervised and inexperienced.¹¹ Such lack of supervision and paucity of experience of colorectal cancer surgery for trainees can result in deficiencies of patient management many of which are identifiable in cases of death following colorectal surgery.¹¹

Nevertheless, Singh and Aitken¹² found that patient outcomes after colorectal resection by surgical trainees were comparable to those of consultants although the study contained a significant number of elective colonic resections which are technically less demanding.¹³ However, trainees require 50–70% more time than consultants to perform a procedure.¹⁴

Calman trainees may have similar exposure to the number of operative procedures compared to their pre-Calman peers.¹⁵ There is evidence, however, of increased consultant input in both elective and emergency cases performed by Calman trainees.¹⁵ This perhaps reflects reduced trainee operative experience,¹⁵ although the recommendations of the National Confidential Enquiry of Postoperative Deaths (NCEPOD) may also be responsible.¹⁶

This study assessed outcomes based on where a trainee has been allowed to operate according to their experience. Morbidity, 30-day mortality and local recurrence rates were within published requirements,⁸ and comparable with other studies.¹⁷ Local recurrence was primarily influenced by disease stage, as previously described.^{5,18} The length of time taken to perform a resection by a supervised trainee was not prospectively audited. The reason to allow a trainee to operate in individual patients was not identifiable from case-note review.

The POSSUM scores and observed:predicted ratios were similar between consultants and registrars. Fewer abdominoperineal resections were performed by registrars. Overall results were slightly worse in operations performed by consultants, although not significantly so. These observations suggest a degree of patient selection despite the age of patients and POSSUM scores being similar. The median length of follow-up was 48 months with a minimum of 24 months. Not all patients with disease relapse would have been identified,

although at least 80% of those who may have recurred would have done so.¹⁹ With this in mind, surgery and cancer-related outcomes were not compromised by an SpR performing rectal cancer surgery.

Conclusion

Where registrars were allowed to undertake supervised rectal resection in accordance with their level of experience, surgical and cancer-related outcomes were not compromised.

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