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Physician leadership

Understanding variation in the management of rectal cancer: the potential of a surgeon-initiated database

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Abstract

Background: Administrative databases oversimplify the relationship of factors such as volume or training on surgical outcomes.

Methods: A prospective statewide surgeon-initiated database was queried to obtain incident cases of rectal cancer in Vermont from April 1999 to June 2001. Demographics, procedure performed, method of detection, American Society of Anesthesiologists classification, blood transfusions, length of stay, complications, stage, and use of adjuvant therapy were recorded by the operating surgeon. A post hoc analysis was performed on patients operated on for rectal cancer to define the specific impact of specialty training on care patterns.

Results: There was a marked difference in the distribution of surgical procedures, with colorectal surgeons using local excision and coloanal anastomosis in addition to anterior and abdominoperineal resection. Although the overall use of adjuvant therapy was similar, patients in the colorectal group were more likely to receive preoperative then postoperative radiation therapy (91% vs 17%, $P < .0001$) and more likely to receive radiation therapy when stage appropriate (98% vs 67%, $P < .001$).

Conclusions: Colorectal specialty training in this population was a surrogate for a wider array of surgical options and preoperative radiation. Failure to use radiation when stage-appropriate was related to patient comorbidities and/or refusal and not related to failure of the surgeon to offer adjuvant therapy. Prospective, surgeon-initiated databases provide an excellent opportunity to identify and understand practice variability.

Keywords: Rectal cancer; Outcome; Variability

Little doubt remains that a marked variability exists in surgical outcomes for rectal cancer [1–3]. Specialty training [4–6], surgical volume [7,8], and hospital volume [8,9] all have been implicated as factors that have a significant impact on outcomes. However, these conclusions have virtually always been based on retrospective reviews of administrative databases, which tend to oversimplify or neglect key issues on the cutting edge of patient care. More recent analyses have questioned the validity of these studies [10,11], which may have a significant impact on shaping healthcare policy. More importantly, these quality surrogates do not necessarily inform us about the specific practices that are associated with better outcomes. Alternative approaches are needed if we are to better understand variations in patient care.

The purpose of this study was to assess the feasibility and potential value of using a prospective registry with data provided only by the operating surgeon to define specific variations in the care of patients with rectal cancer.

Methods

The Vermont Colorectal Cancer Project Registry [12], a prospective voluntary statewide surgeon-initiated database developed and implemented by the Vermont Chapter of the American College of Surgeons, was queried to obtain incident cases of rectal cancer undergoing elective surgery in the State of Vermont from April 1999 to June 2001. Rectal cancer was defined as a tumor occurring less than 12 cm from the anal verge and/or below the posterior peritoneal reflection.

Patient demographics, distance of the tumor from the anal verge, procedure performed, method of detection (ie, symptomatic vs screening), American Society of Anesthe-

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siologists (ASA) classification, length of surgery, and the need for blood transfusions were recorded by the operating surgeon on an initial datasheet. A follow-up form, sent approximately 30 days later, recorded length of stay, specific preselected complications, tumor-node-metastasis (TNM) stage, whether oncology consultation was requested, and details of adjuvant therapy, if administered. If adjuvant therapy was not administered, then the reason was recorded by the surgeon (not indicated by stage, patient refusal, or medical comorbidities). A copy of the pathology report was also provided and reviewed by a board certified colorectal surgeon not involved in the study to verify accurate staging.

A post hoc analysis was performed on patients operated on for rectal cancer. The practice pattern of the State's 2 fellowship trained colon and rectal surgeons (CRS) was compared to patients operated on by the State's general surgeons (GS). The study was approved by the Institutional Review Board of the University of Vermont College of Medicine.

Statistical analysis

Patient age, surgical times, tumor location, and length of stay were compared using the Student *t* test. A chi-square analysis was used to compare gender and the distribution of colon and rectal cancers. Fisher exact test was used to assess for differences in the incidence of symptomatic presentation, choice of surgical procedures, complication rates, and the use of adjuvant therapy. The Wilcoxon rank sum test was used to compare ASA classification and tumor stage between the 2 groups.

Results

During the study period, 409 cases of colon and rectal cancer were entered into the registry. Calculated case entry compliance during the study period was 78% [12]. Of these patients, 109 (26.6%) had rectal cancer and were included in this study. Seven patients (6.4%) had a synchronous malignancy in the colon. Of the 109 patients with rectal cancer, 75 (68.8%) were operated on by 1 of the 2 CRS at the University of Vermont/Fletcher Allen Health Care, Vermont's only tertiary care hospital. The other 34 patients were operated on by 1 of 31 GS at 11 community hospitals/regional referral centers in Vermont, or a tertiary care medical center beyond the Vermont State line in New Hampshire. In contrast, 170 of 300 (56.6%) of the colectomies for colon cancer were performed by a GS ($P < .0001$, χ^2 test).

Demographic data and tumor characteristics are recorded in Table 1. Patient demographics were similar except for a trend for the CRS patients to be male ($P = .09$). Tumors in the CRS group were significantly lower in the rectum ($P = .001$). The choice of surgical procedure (Table 2) differed vastly between the 2 groups ($P < .0001$). Patients in the GS group were treated by either anterior resection or abdominoperineal resection. The CRS group had a relatively even distribution among anterior resection, coloanal anastomosis (usually with colonic J-pouch), local excision, and abdominoperineal resection. The distance from the anal verge for the 20 patients undergoing abdominoperineal resection was 2.9 ± 2.2 cm in the CRS group versus 5.4 ± 5.3 cm in the GS group; this difference did not achieve statistical significance ($P = .19$). Similar findings were noted for anterior resection (9.8 ± 2.2 cm CRS vs 11.3 ± 3.8 cm GS; $P = .11$).

There was no difference in the overall use of adjuvant therapy (60.5% CRS vs 59.4% GS; $P = .99$). However, a more comprehensive analysis yields some striking differences (Table 3). Patients in the CRS group were far more likely to receive preoperative radiation therapy (91% vs 17%; $P < .0001$) and to receive radiation therapy when stage-appropriate (98% vs 67%; $P < .001$). However, this was always related to patient refusal or comorbidity (Table 4); 100% of patients with stage 2 or 3 rectal cancer were considered for adjuvant chemoradiation. Only 2 surgeons performed endorectal ultrasound, both colorectal surgeons. Endoscopic or rectal ultrasonography (TRUS) was unavailable elsewhere in Vermont hospitals during the study period. Three-year cancer-free survival was 76.3% in the CRS group and the local recurrence rate was 5.3%. Similar data were not obtained from the GS group owing to Health Information Privacy and Portability Act restrictions.

Table 1
Patient demographics and tumor characteristics

	CRS	GS	*P* value
Age (y)	66.1 ± 13.7	65.6 ± 13.6	.87
Gender (% male)	63%	45%	.09
% Symptomatic	90%	88%	.74
Distance from anal verge (cm)	6.2 ± 3.5	9.6 ± 4.9	.001
ASA classification	2.25 ± .8	2.20 ± .8	.67
Tumor stage	2.1 ± 1.1	2.2 ± 1.0	.57
% Adjuvant therapy	6.5%	59.4%	.99

CRS = colon and rectal surgeon; GS = general surgeon.

Table 2
Distribution of surgical procedures

	CRS	GS
AR	22 (29%)	23 (68%)
CAA	14 (19%)	0 (0%)
LE	19 (25%)	1 (3%)
APR	12 (16%)	8 (24%)
Other*	8 (11%)	2 (5%)

CRS = colon and rectal surgeon; GS = general surgeon; AR = anterior resection; CAA = coloanal anastomosis; LE = local excision; APR = abdominoperineal resection.

* Other includes "low" Hartmann procedure, diverting colostomy or colonic stent.

Comments

The fact that there are rather striking differences in rectal cancer outcomes based on operating surgeon has been

Table 3
Timing of adjuvant radiation therapy

	Preoperative XRT	Postoperative XRT	Neither
CRS	40	5	30
GS	3	15	16

Fisher exact test, $P < .0001$.

CRS = colon surgeon; GS = general surgeon; XRT = radiation therapy.