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ORIGINAL ARTICLE

Clinical information available to oncologists in surgically treated rectal cancer: room to improve

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ABSTRACT

Introduction

In rectal cancer, decisions about the use of adjuvant and neoadjuvant treatment rely on clinical information from a variety of sources. Currently, the quality and accuracy of the aggregate of this clinical information is unclear. The objectives of the present study were to evaluate the completeness and quality of clinical information available to oncologists managing rectal cancer.

Methods

All patients diagnosed with rectal cancer in Nova Scotia between 2001 and 2005 were identified through the provincial cancer registry. The registry was linked to other administrative databases to obtain demographic, diagnostic, and treatment data. Patients undergoing radiation oncology consultation were identified, and a standardized review of the cancer centre chart was performed on a random sample, stratified by year.

Results

For the 222 patients reviewed, the relevant endoscopy report was present in 113 cases (51%). The level of the tumour was documented in 75% of those reports, and colonoscopy completeness, in 81%. The relevant operative report was available in 192 cases (87%). Tumour level was described in 59% of those reports, and local extension, in 73%. Elements of total mesorectal excision were partially described in 97%. In pathology reports (10% of which were synoptic), we observed significant variability in the presence of important elements. Reporting of those elements was significantly better in the synoptic pathology reports.

Conclusions

Clinical information related to adjuvant and neoadjuvant therapy decision-making in rectal cancer is often not available or incomplete. A synoptic reporting system in endoscopy, surgery, and pathology could potentially be a beneficial tool in rectal cancer care.

KEY WORDS

Synoptic reporting, rectal cancer, surgery, pathology, endoscopy, radiotherapy

1. INTRODUCTION

As cancer care becomes increasingly complex and multidisciplinary, the availability of timely and complete clinical information is critical to decision-making. Complete clinical information is particularly relevant in the care of stages I–III rectal cancer: surgery, radiotherapy, and chemotherapy all play a major role, and the selection of such therapies is of utmost importance.

Surgery for nonmetastatic rectal cancer has evolved significantly since the early 1980s, with recognition of the importance of total mesorectal excision (TME), first described by Heald and Ryall in 1986[1]. Notwithstanding the variability in surgical outcomes that have persisted[2,3], TME has been recognized as the standard of care in rectal cancer surgery[4]. Moreover, decisions regarding the use of neoadjuvant or adjuvant radiotherapy in rectal cancer may be—at least in part—influenced by the likelihood of complete resection of non-involved mesorectal fascia with a high-quality TME[5].

Like surgery, neoadjuvant and adjuvant radiotherapy with or without chemotherapy in rectal cancer has also evolved, having been the subject of multiple randomized clinical trials[6,7].

Decisions concerning the use of the foregoing therapies rely on clinical information from a variety of sources. The reality is that most Canadian rectal cancer patients referred for neoadjuvant or adjuvant therapy will undergo medical or radiation oncology consultation (or both) in a tertiary-level hospital-based cancer centre. The source documents from staging and treatment to that point form the cornerstone of decision-making. Examples of this critical information include the endoscopic features of the tumour, the specific operative technique and findings, and specific elements of the rectal cancer pathology specimen. Although initiatives in Canada aim to improve the documentation of individual components of such information (for example, synoptic surgical and pathology reporting)[8,9], the quality and accuracy of the current aggregate of this clinical information is unclear.

The objectives of the present study were to evaluate the completeness and quality of clinical information (endoscopic, surgical, and pathologic) available to oncologists managing stages I–III rectal cancer.

2. METHODS

Within the province of Nova Scotia, a population-based cohort of all patients over the age of 20 diagnosed with colorectal cancer during 2001–2005 was assembled based on linkage of the provincial cancer registry with other administrative health databases, including hospital discharge data, physician billing data, and national census data. This linked dataset, described in detail elsewhere[10], provided clinico-demographic, diagnostic, treatment, and health care utilization data for patients with a diagnosis of colorectal cancer in the province.

From this dataset (n = 3501), 1116 patients with rectal cancer were identified. Of those 1116 patients, 373 with stages I–III disease were referred to radiation oncology, and almost all (95.7%) also received a concomitant medical oncology referral. In Nova Scotia, all such consultations occur at one of two full-service cancer centres in the province, and all require a tissue diagnosis of rectal cancer obtained via endoscopy. Furthermore, standardized collection of all available endoscopy, operative, and pathology reports is performed in advance so that these reports are available in the cancer centre chart at the time of the initial consultation.

A standardized chart review of the cancer centre medical record was conducted for a random sample of 222 patients selected from the identified group of rectal cancer patients and stratified to ensure equal representation by year. The number of patients was based on sample size calculations that aimed to detect a 10% per year increase in a given report element over the time period of the study with 80% power (5% type I error). A chart review for this random sample, rather than for the entire cohort, was chosen because of limitations on the resources required for the comprehensive, time-intensive medical record review. Although temporal changes were not specifically analyzed, the aim was to ensure representation across the time period of the study.

Because the cohort was identified from a linked administrative dataset, the unique study identifiers (IDs) for these anonymized patients were retrieved from the administrative data files and sent to the cancer registry, where an authorized individual (who held the study ID key) located the patients and sent a list of their chart numbers to medical records for chart identification. Once the medical record review was complete, the database was sent back to the cancer registry, and all data were again anonymized using the study ID. This process ensured that only authorized individuals (for example, medical records staff, chart reviewer) saw identifiable patient information.

For this medical record review, a standardized data abstraction form was developed. It listed critical elements of the endoscopy, surgery, and pathology reports that were identified *a priori*. The elements were selected based on their published use as quality indicators[11,12] or on a consensus by the investigators that they were of significant clinical importance from the perspective of an oncologist seeing a rectal cancer patient at initial consultation. The review for the presence or absence of those elements was performed by a single individual.

Because the chart review was intended to represent the expected work flow and processes within a cancer centre, the presence or absence of elements was assessed only from source documentation (endoscopy, operative, and pathology reports) available in the chart at the time of oncology consultation. *A priori,* a complete description of a TME was defined as requiring an explicit statement of such in the operative report, as well as reference to

- identification of autonomic nerves;
- sharp dissection around the mesorectum;
- circumferential dissection to include mesorectal tissue, respecting mesorectal planes; and
- description of the intact mesorectal envelope.

For the purposes of the present study, and consistent with the College of American Pathologists[13], we defined a synoptic report as one in which standardized elements (for example, size) are displayed with their associated response (for example, 4.0 cm), and each such parameter pair is listed on a separate line or in a tabular format to achieve visual separation.

Our study received full approval from the Capital District Health Authority Research Ethics Board (CDHA-RS/2008-049) and the Cape Breton District Health Authority (CB-2008-013), and all required procedures related to patient confidentiality and privacy were maintained. Given the retrospective

administrative database and chart review methodology, no patient-level informed consent was required.

3. RESULTS

Table I shows the clinical characteristics of the 222 patients who were included in the standardized medical record review. Overall, and consistent with practice patterns in 2001–2005, most patients (77%) were seen for consideration of postoperative adjuvant radiotherapy.

3.1 Endoscopy Report

An endoscopy report was available to the oncologist in 113 cases (51%). Of the 113 reports, 102 (90.3%) involved a colonoscopy, and 11 (9.7%), a sigmoidoscopy. Table II summarizes the content of the endoscopy reports. Visualization of the ileocecal valve, an accepted quality indicator in colonoscopy, was described in 81.4% of the reports. The size of the rectal tumour was documented in only 12.4%.

3.2 Operative Reports

Of the 222 patient charts reviewed, 192 (86.5%) contained an operative report. Among the 30 charts that did not contain an operative report, 13 involved patients whose initial radiation consultation had been in the setting of potential neoadjuvant therapy.

TABLE I Clinico-demographic characteristics of 222 patients whose cancer centre charts were reviewed

Characteristic	*Value*	
	(n)	*(%)*
Age group		
20–50 Years	27	12.2
50–64 Years	91	41.0
65–74 Years	65	29.3
75+ Years	39	17.6
Sex		
Women	68	30.6
Men	154	69.4
Surgery		
Emergency	5	2.3
Elective	202	91.0
Unknown	15	6.8
Radiotherapy		
Preoperative	51	23.0
Postoperative	171	77.0
Cancer centre site		
Halifax, NS	170	76.6
Sydney, NS	52	23.4

In the operative reports, documentation of elements varied (Table III) such that the type of operative procedure was reported in 99.5% and the local extent of tumour was reported in 73.4%. The mobility of the tumour (22.9%) and the level of rectal transection during low anterior resection (30.0%) were less commonly reported. At least one of the prespecified elements of TME was articulated in most reports (96.9%), but a complete description of TME was never present.

3.3 Pathology Reports

A surgical pathology report was identified in 197 charts (88.7%). Of the charts containing no pathology report, 13 (52%) related to patients undergoing postoperative adjuvant therapy.

Like the operative reports, the pathology reports showed variability in element documentation (Table IV). For example, selected histologic findings (grade, histologic type) were commonly reported (94.9% and 99.0% respectively), but radial margin status (30.5%) and presence or absence of

TABLE II Presence of selected elements in 113 endoscopy reports within the cancer centre chart

Element	*Value*	
	(n)	*(%)*
Documented location in rectum (high/mid/low)	82	72.6
Documented distance from anal verge (cm)	85	75.2
Documented tumour size (mm)	14	12.4
Documented ileocecal valve identification (if colonoscopy)[a]	83	81.4

[a] Excludes 11 patients undergoing sigmoidoscopy only.

TABLE III Presence of selected elements in 192 operative reports within the cancer centre chart

Element	*Value*	
	(n)	*(%)*
Documented procedure type (SSP vs. APR)	191	99.5
Documented tumour site in rectum (low/mid/high)	113	58.9
Documented tumour mobility (mobile/tethered/fixed)	44	22.9
Documented local extent of tumour	141	73.4
If anterior resection, level of rectal transection[a]	30	30.0
Description of total mesorectal excision (TME)		
Complete	0	0
Partial	186	96.9
Not described	3	1.6
TME not done	3	1.6

[a] Based on 100 patients undergoing low anterior resection.
SSP = sphincter-preserving procedure; APR = abdominoperineal resection.

lymphovascular invasion (59.4%) were less commonly reported.

Among all pathology reports, 20 (10.2%) were synoptic reports. Several elements (radial margin, lymphovascular invasion, and summary TNM stage) were more commonly reported when a synoptic report rather than a narrative report was used (Table V).

4. DISCUSSION

In the present study, we evaluated the presence and quality of critical elements of clinical information from the perspective of an oncologist providing consultative service, either neoadjuvant or adjuvant, for a rectal cancer patient in the cancer centre setting. The study demonstrated that reports are often absent, and when present, show significant variability in their completeness with respect to important elements. Although other studies have examined surgical, pathology, or endoscopy reports in isolation, the present study is, to our knowledge, the first to examine the aggregate of all three reports in rectal cancer.

Endoscopy is critical in rectal cancer in terms both of optimally characterizing the rectal lesion and of ruling out other synchronous colorectal pathology. Our findings showed that documentation of full colonoscopy was quite common, suggesting that endoscopists had accepted this standard as important[14]. However, elements related to characterization of the rectal lesion were less commonly described, suggesting a focus for a rectal cancer quality improvement initiative. For example, the height of the tumour in the rectum as seen endoscopically can often be important in determining the need for a total compared with a subtotal mesorectal excision ("high rectal cancer")[15] and also may affect decisions concerning the use of adjuvant radiotherapy, particularly for high rectal cancers[16].

The presence and quality of TME is of the utmost importance in rectal cancer care. There are several ways to document and assess TME, including include real-time or video observation[17], detailed specific pathology examination[18], or retrospective review of operative reports[19]. The latter technique was used in the present study, and it clearly demonstrated that surgeons have accepted the importance of TME, as demonstrated by the 96.9% of reports that at least partially described a TME. Although our *a priori* definition of a complete TME description might be

TABLE IV Presence of documented elements in 197 pathology reports within the cancer centre chart

Element	*Value*	
	(n)	*(%)*
Histologic type	195	99.0
Histologic grade	187	94.9
Lymph nodes (*n*)		
Harvested	181	91.9
Positive	181	91.9
Margin status		
Proximal	165	83.8
Distal	169	85.8
Radial	60	30.5
Presence/absence of lymphovascular invasion	117	59.4
TME assessment	2	1.0
Summary TNM stage	41	20.8

TME = total mesorectal excision.

TABLE V Comparison between narrative and synoptic reports for presence of documented elements in 197 pathology reports within the cancer centre chart

Element	*Reports containing element (%)*		p *Value*
	Narrative (n=177)	*Synoptic (n=20)*	
Histologic type	98.9	100	0.63
Histologic grade	94.4	100	0.28
Lymph nodes (*n*)			
Harvested	91.0	100	0.16
Positive	91.0	100	0.16
Margin status			
Proximal	81.9	100	0.038
Distal	84.2	100	0.055
Radial	24.3	85.0	<0.001
Presence/absence of lymphovascular invasion	55.9	90.0	0.003
Total mesorectal excision assessment	1.1	0	0.63
Summary TNM stage	14.1	80.0	<0.001

considered too stringent, we believe that the identified variability in description of TME strongly supports the need for mechanisms to standardize the reporting of TME for rectal cancer surgery.

There is no doubt that significant advances have occurred in pathology reporting, specifically in colorectal cancer. Deficiencies in elements such as nodal harvest and reporting of radial margins have been identified in several previous studies, with both elements having been proposed as quality indicators for rectal cancer care[10]. In North America, the College of American Pathologists has made a significant investment in the creation and maintenance of checklists for cancer reporting[20]. Those checklists have been endorsed in Canada and other countries[21], and they form the basis for many pathology synoptic reporting initiatives. The checklists were available during the time period covered by the present study; however, few pathology reports in Nova Scotia used them in rectal cancer. The present study also once again demonstrates the heterogeneity of data within narrative pathology reports, given the significant improvement in reporting of several elements seen in the relatively small number of reports done in a synoptic fashion.

Synoptic reporting has been heralded as an important step forward in improving the timeliness and content of clinical reports. Examples of synoptic reporting exist throughout clinical medicine, but with respect to rectal cancer, there are specific initiatives in synoptic reporting for endoscopy[22], operative[8,23], and pathology reporting[9,24]. It is hoped that the content of such reports, and thus their utility, will improve based on those initiatives.

The use of neoadjuvant chemoradiation in our study cohort was low (23%), perhaps reflecting the inclusion of some stage I patients in our cohort and also a slow transition that occurred over the years of our study from postoperative to preoperative radiation as the standard of care for locally advanced rectal cancer. However, it could be argued that this slow transition has persisted and is not unique to Nova Scotia; in 2009, only 49% of stage II and III rectal cancer patients within 7 Canadian provinces received preoperative radiation[25]. A recently published study of stage II and III rectal cancer patients from the Cancer Care Outcomes Research and Surveillance Consortium in the United States demonstrated that 66% of rectal cancer patients received preoperative chemoradiation during 2003–2005[26]. In that study, guideline-supported preoperative chemoradiation was most common when the patient was initially seen by a radiation or medical oncologist, or if seen first by a surgeon, when appropriate preoperative staging was performed. Although not the focus of the current study, those findings suggest that early multidisciplinary evaluation and appropriate staging investigations are important to increase adoption of guideline-recommended rectal cancer care.

Our study has several limitations. Although this was a pan-provincial, population-based study encompassing a full 5 years, only two cancer centres were involved, potentially limiting the generalizability of findings to other settings within and outside Canada. The study cohort comprised stage I–III rectal cancer patients referred for adjuvant or neoadjuvant radiation oncology consideration, and so its results may not apply to patients with metastatic disease. It is possible that our study overestimates the availability of clinical information for all stage I–III rectal cancer patients. The seemingly low rate of radiation oncology consultation over the study period (33%) may indicate that our study cohort represents the "best managed" and that the patients not referred may have less-optimal documentation of their clinical information. The retrospective nature of the document review created difficulties with ascertainment of specific elements. Although *a priori* definitions were used for all document reviews, elements such as the presence or absence of TME and its detail were challenging. In addition, we were unable to assess exactly when the given clinical document was available in the cancer centre charts. It is possible that some of these documents in fact made their way into the chart after the consultation (for example, for the 13 patients who received postoperative radiotherapy without a pathology report being identified in the chart), thus resulting in an overestimation of the proportion of patients for whom such reports existed at the time of the initial consultation when treatment decisions were being made. The small number of synoptic pathology reports limited the power of the comparative analysis with narrative pathology reports, and the lack of synoptic reports in surgery or endoscopy made it impossible to assess the potential impact of that method of reporting. Additionally, our study could not discern whether the presence, absence, or content of a given report was responsible for a decision about adjuvant or neoadjuvant therapy. Finally, our study did not examine all the important clinical information. For example, the presence and quality of imaging reports such at computed tomography and magnetic resonance imaging, which are increasingly used in decision-making for rectal cancer care, were not included.

5. CONCLUSIONS

Our study demonstrated that clinical information related to neoadjuvant and adjuvant therapy decision-making in stage I–III rectal cancer is often not available or incomplete. A synoptic reporting system in endoscopy, surgery, and pathology (or any combination) could potentially be a beneficial tool in rectal cancer care, and current initiatives in this regard should be supported. Assuring timely and complete clinical information relevant to decision-making should be emphasized in our cancer system, because incomplete or missing data likely influence the quality of care.

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7. CONFLICT OF INTEREST DISCLOSURES

The authors have no potential financial conflicts of interest related to this study to declare.

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