Management of primary rectal cancer by surgeons in Atlantic Canada: results of a regional survey

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Accepted for publication
Jul. 7, 2009

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Background: We sought to determine the current practice patterns of general surgeons in Atlantic Canada in the management of primary rectal cancer in relation to surgeon-specific variables.

Methods: We sent mail-out surveys to all practising general surgeons (n =183) in Atlantic Canada to determine screening preferences, preoperative assessment, the use of neoadjuvant and adjuvant therapy, surgical therapy for rectal cancer and surgeon demographics. We analyzed the responses using χ^2 tests.

Results: The response rate was 98 (54%) after 2 mail-outs; there were 82 (49%) eligible responses. Surgeons in practice for 21 years or more were more likely than those with fewer than 21 years of practice to order preoperative ultrasonography of the liver and were less likely to order preoperative computed tomography. Endorectal ultrasonography was ordered routinely by 23% of surgeons, whereas 71% of surgeons would order it if time and resources were available. Surgeons who were not certified by the Royal College of Physicians and Surgeons of Canada were significantly more likely than those who were certified to use neoadjuvant therapy in all patients with rectal cancer (43% v. 12%; p = 0.031). Surgeons who performed more than 10 rectal cancer surgeries per year were significantly more likely than those who performed 10 or fewer surgeries per year to use neoadjuvant treatment for T3 tumours (94% v. 61%; p = 0.007). Surgeons with medical or radiation oncology services in their communities were significantly more likely than those without such services to recommend neoadjuvant treatment in T3 rectal tumours and rectal tumours with pathologic lymph nodes.

Conclusion: We found significant variation in the management of rectal cancer depending on surgeon-specific variables. The implications of these differences on the outcomes of patients with rectal cancer are unknown.

Contexte : Nous voulions déterminer, chez les chirurgiens généraux de la région de l'Atlantique, les tendances de la pratique courante dans la prise en charge du cancer primitif du rectum par rapport à des variables particulières au chirurgien.

Méthodes : Nous avons envoyé des questionnaires par la poste à tous les chirurgiens généraux actifs (n =183) de la région de l'Atlantique afin de déterminer les préférences quant au dépistage, l'évaluation préopératoire, le recours à une thérapie néoadjuvante et adjuvante, le traitement chirurgical du cancer du rectum et les caractéristiques démographiques des chirurgiens. Nous avons analysé les réponses au moyen de tests χ^2.

Résultats : Le taux de réponse s'est établi à 98 (54 %) après 2 envois; 82 (49 %) des réponses étaient admissibles. Les chirurgiens actifs depuis 21 ans ou plus étaient plus susceptibles que ceux qui avaient moins de 21 ans d'expérience de prescrire une échographie préopératoire du foie et moins susceptibles de prescrire une tomodensitométrie préopératoire. L'échographie endorectale était prescrite de routine par 23 % des chirurgiens, tandis que 71 % la prescrivaient si le temps et les ressources le permettaient. Les chirurgiens qui n'étaient pas certifiés par le Collège royal des médecins et chirurgiens du Canada étaient beaucoup plus susceptibles que ceux qui l'étaient de recourir à une thérapie néoadjuvante chez tous les patients atteints de cancer du rectum (43 % c. 12 %; p = 0,031). Les chirurgiens qui pratiquaient plus de 10 interventions chirurgicales par année pour traiter un cancer du rectum étaient beaucoup plus susceptibles que ceux qui en pratiquaient 10 ou moins de recourir à un traitement néoadjuvant pour les tumeurs T3 (94 % c. 61 %; p = 0,007). Les chirurgiens qui disposaient de services d'oncologie médicale ou de radio-oncologie dans leur communauté étaient beaucoup plus susceptibles que ceux qui n'y avaient pas accès de recommander un traitement néoadjuvant contre les tumeurs rectales T3 et les tumeurs rectales conjuguées à des ganglions lymphatiques présentant une pathologie.

Conclusion : Nous avons constaté une variation importante dans la prise en charge du cancer du rectum selon les variables particulières au chirurgien. Les répercussions de ces différences sur les résultats pour les patients atteints d'un cancer du rectum sont inconnues.

Colorectal cancer is a serious health problem in Canada and represents a substantial disease burden. It is the third most common cancer after prostate and lung cancer in terms of incidence.[1] It has the second highest rate of cancer death after lung cancer, and the lifetime risk of colorectal cancer is estimated to be about 7%.[1] However, deaths from colorectal cancer have decreased over the past decade, likely because of increased screening and improved treatment.[1]

General surgeons are actively involved in the management of colorectal cancer and are often the first specialists seen by a patient with colorectal cancer after diagnosis. General surgeons play a crucial role in the management of colorectal cancer.

Previous studies have shown a difference in the management of colorectal cancer according to surgeon-specific variables.[2–4] These include, but are not limited to, differences in the definition of the rectum,[2] the use of transanal local excision for early malignant lesions and the use of neoadjuvant therapy for rectal cancers.[3,4] Identification of these surgeon-specific variables is an important step in the development of evidence-based guidelines aimed at providing the best care to patients in an environment with limited resources.

Our objectives were to determine the surgeon-specific variables associated with differences in rectal cancer staging and treatment. Specifically, we were interested in determining the demographics (age, sex, years of practice, subspecialty training, number of rectal cancer surgeries performed per year) of general surgeons in Atlantic Canada who perform primary rectal cancer surgery. We also sought to determine the current practice patterns in the investigation and treatment of primary rectal cancer by general surgeons in Atlantic Canada and whether the management of primary rectal cancer varies according to surgeon-related variables.

Methods

Inclusion and exclusion criteria

We aimed to survey all surgeons in Atlantic Canada (New Brunswick, Nova Scotia, Prince Edward Island [PEI] and Newfoundland and Labrador) who manage colorectal cancer. We obtained a list of all surgeons with a general surgery specialty practice as of Mar. 1, 2006, from the directory of each province's College of Physicians and Surgeons. Membership and licensure with the province's College of Physicians and Surgeons is mandatory for a physician to practise within that province. The surgeon must also have had a listed address within the province of licensure. We excluded surgeons with an address outside the province in question or with no address listed.

The search identified 193 surgeons in Atlantic Canada with a general surgery specialty and an address within the province of licensure. Specifically, we identified 78 from Nova Scotia, 63 from New Brunswick, 43 from Newfoundland and Labrador and 9 from PEI. Some surgeons were listed as having an additional specialty such as vascular, cardiac, thoracic, pediatric, urologic or plastic surgery. Because general surgery was also listed as their practice or specialty, we included these surgeons in our survey.

Ten of the surgeons in Newfoundland and Labrador who were listed in the province's college directory were known by the study investigators to be either retired or to not perform colorectal cancer surgery (i.e., they performed only cardiac, thoracic, plastic or pediatric surgery). We excluded these surgeons from the survey; thus, only 33 surgeons from Newfoundland and Labrador were included. We mailed surveys to a total of 183 surgeons.

Survey content and distribution

The survey consisted of sections about screening, preoperative assessment, surgery (including total mesorectal excision), postoperative treatment, neoadjuvant treatment, follow-up and demographic data. The questions were mostly in multiple-choice format.

The survey was mailed to the 183 surgeons on May 1, 2006. A cover letter stating the objectives, encouraging the physician's participation and assuring confidentiality accompanied the survey. A postage-paid self-addressed envelope was included.

A second mail-out to the 183 surgeons took place on July 1, 2006. A cover letter and a postage-paid self-addressed envelope accompanied the survey again. However, in this cover letter, surgeons were instructed to ignore the survey if they had responded to the original mail-out. We included surveys received by Oct. 1, 2006, in the analysis.

Statistical analysis

We analyzed the survey data using Microsoft Excel software and SPSS software. We created frequency tables of test and procedure performance, and we used χ^2 tests to determine if patterns of staging and management were associated with particular surgeon-related variables. Surgeon-specific variables analyzed were sex, age, years in practice, certification by the Royal College of Physicians and Surgeons of Canada (RCPSC), university appointment,

number of rectal surgeries performed per year and access to radiation or medical oncology services in their communities.

Results

Response rate

In total, 98 of 183 questionnaires (54%) were completed; 16 were not eligible for the study because the respondents were either retired, had moved or did not perform colorectal cancer surgery. Therefore, we achieved a response rate of 82 out of an eligible 167 surgeons (49%).

Demographics

Most respondents were men (73%), aged younger than 51 years (54%) and had been in practice for fewer than 21 years (56%). Most were certified by the RCPSC (80%), but few had subspecialty training (22%) or held a university appointment (34%; Table 1). Three surgeons (4%) had more than 1 subspecialty. Only 35% of surgeons had access to radiation oncology services within their communities, whereas 48% had access to medical oncology services. Only 22% of surgeons reported performing more than 10 primary rectal cancer sureries per year. The demographic information of nonresponders was unavailable for comparison.

Definition of the rectum

Respondents had different definitions of the rectum: 27 (31%) defined it as at or below the peritoneal reflection, 24 (27%) defined it as at or below the coalescence of the tenia, 23 (26%) defined it as within 15 cm of the anal verge as measured by a rigid sigmoidoscope and 12 (14%) defined it as below the sacral promontory. Some respondents chose more than one answer. We detected no significant differences in the definition of the rectum in relation to the surgeon-specific variables studied.

Screening

For an individual at average risk (those whose only risk factor is age > 50 yr), 44 surgeons (54%) would recommend colonoscopy at age 50, whereas 34 (41%) would recommend fecal occult blood with colonoscopy for a positive result. Only 2 surgeons (2%) would recommend no screening for individuals at average risk. We detected no significant differences in the screening of colorectal cancer in relation to the surgeon-specific variables.

Preoperative investigations

Routine preoperative investigations ordered by respondents included computed tomography (CT) by 77 (94%), ultrasonography of the liver by 10 (12%), magnetic resonance imaging (MRI) of the pelvis by 5 (6%) and endorectal ultrasound by 19 (23%). Sixty-two (76%) respondents reported routinely ordering carcinogenic embryonic antigen.

In an ideal situation, without time or access constraints, 22 respondents (27%) would routinely order an MRI of the pelvis and 58 respondents (71%) would order an endorectal ultrasound.

There were significant differences in the preoperative investigations ordered by surgeons depending on surgeon-specific variables. Surgeons with fewer than 21 years in practice were more likely to order CT scans than were surgeons with 21 or more years in practice (100% v. 88.8%; $p = 0.044$) and less likely to order ultrasonography of the liver (6.5% v. 19.2%; $p = 0.020$; Table 2).

Table 1. Demographic characteristics of survey respondents

Characteristic	No. (%)*
Age, yr	
≥ 51	44 (54)
< 51	30 (37)
Sex	
Female	8 (10)
Male	60 (73)
Years in practice	
≥ 21	46 (56)
< 21	26 (32)
Certification	
RCPSC	66 (80)
ACS	3 (4)
Other†	7 (9)
Subspecialty training‡	
Colorectal	6 (7)
Surgical oncology	2 (2)
Other§	14 (17)
University appointment	
Yes	28 (34)
No	46 (56)
Radiation facility availability	
Home community	29 (35)
< 2 h by road	27 (33)
> 2 h by road	20 (24)
Medical oncology service availability	
Home community	39 (48)
< 2 h by road	22 (27)
> 2 h by road	15 (18)
No. of rectal cancer cases performed per year	
≤ 10	61 (74)
> 10	18 (22)

ACS = American College of Surgeons; RCPSC = Royal College of Physicians and Surgeons of Canada.
*Numbers do not add to 82 respondents because not all respondents answered every question.
†England, Ireland, South Africa.
‡Three surgeons (4%) had more than 1 subspecialty.
§Vascular, thoracic, critical care, trauma, hepatobiliary, transplant.

Neoadjuvant treatment

In practice, neoadjuvant treatment of rectal cancer was used by 8 surgeons (10%) in all patients, 60 surgeons (73%) if the tumour was clinically or radiologically fixed, 31 surgeons (38%) if preoperative staging indicated a T3 lesion and 23 surgeons (28%) if preoperative staging indicated pathological lymph nodes. Four surgeons (5%) would never consider using neoadjuvant treatment in current practice (Table 3).

In an ideal situation, 12 (15%) surgeons would use neoadjuvant treatment of rectal cancer in all cases, 55 surgeons (67%) if the tumour was clinically or radiologically fixed, 54 surgeons (66%) if preoperative staging indicated a T3 lesion and 32 surgeons (39%) if preoperative staging indicated pathologic lymph nodes. No respondents would exclude the use of neoadjuvant treatment in the ideal situation (Table 3).

The most common reasons for not using neoadjuvant treatment for rectal cancer were no easy access to radiation therapy (15%), no easy access to medical oncology (11%) and patients not wanting a delay to surgery (10%). Three surgeons (4%) were not convinced that neoadjuvant therapy improves results, and 3 surgeons (4%) believed that radiation makes surgery more difficult.

Some surgeon-specific variables significantly affected the choice to use neoadjuvant treatment for rectal cancers in the ideal situation. Surgeons who were not certified by the RCPSC were significantly more likely than those who were certified to use neoadjuvant therapy in all cases of rectal cancer (43% v. 12%; $p = 0.031$). As a consequence, surgeons without certification were significantly less likely overall than those who were certified to use neoadjuvant therapy in fixed rectal cancers (14% v. 73%; $p = 0.002$) and T3 tumours (29% v. 73%; $p = 0.017$).

Surgeons who perform more than 10 rectal cancer surgeries per year were significantly more likely than those who perform 10 or fewer surgeries to use neoadjuvant treatment for T3 tumours (94% v. 61%; $p = 0.007$). In patients with T3 rectal tumours and rectal tumours with pathologic lymph nodes, surgeons with medical oncology services in their home communities were significantly more likely than those without such services to recommend neoadjuvant treatment in the ideal situation (80% v. 33%; $p = 0.005$ for T3 tumours; 54% v. 18%; $p = 0.017$ for tumours with pathologic lymph nodes). This likelihood held true for surgeons with radiation oncology services in their home communities (86% v. 40%; $p = 0.003$ for T3 tumours; 55% v. 20%; $p = 0.044$ for tumours with pathologic lymph nodes; Table 4).

Use of neoadjuvant therapy in rectal cancer (current practice)

Surgeons aged 51 years and older were more likely than those younger than 51 to use neoadjuvant therapy for T3 rectal cancers (57% v. 27%; $p = 0.011$). This was reflected by surgeons with 21 or more years of practice being more likely than those with fewer than 21 years of practice to use neoadjuvant therapy for T3 rectal cancers (54% v. 30%; $p = 0.05$).

Higher-volume rectal surgeons used neoadjuvant therapy for T3 rectal cancers more often than lower-volume surgeons (61% v. 33%; $p = 0.031$). Surgeons with a university appointment were significantly more likely than those with no appointment to use neoadjuvant therapy in all patints with rectal cancer (25% v. 0%; $p = 0.001$). Surgeons who were certified by the RCPSC were significantly more likely than those who were not to use neoadjuvant therapy in fixed rectal cancer patients (80% v. 29%; $p = 0.003$). Surgeons with medical oncology services in their home communities were significantly more likely to use neoadjuvant therapy versus surgeons without medical oncology services in their home communities (Table 5).

Abdominoperineal resection

In all, 29 respondents (35%) would perform abdominoperineal resection if the tumour was palpable on rectal examination. Surgeons reported that they would perform abdominoperineal resection (APR) if the lower border of the tumour, as measured by a rigid sigmoidoscopy, was on average 5 cm from the anal verge in women and 6 cm from the anal verge in men. Interestingly, female surgeons were significantly more likely than male surgeons to perform APR if the tumour was palpable on rectal examination (7/8 [88%] v. 17/60 [28%]; $p = 0.002$).

Total mesorectal excision

Total mesorectal excision (TME) was described in the

Table 2. Analysis of surgeon-specific variables in the treatment of rectal cancer

Preoperative investigation	Surgeon-specific variable, %*											
	Age			Practice			University appointment			No. rectal surgeries/yr		
	≥ 51 yr	< 51 yr	*p* value	≥ 21 yr	< 21 yr	*p* value	Yes	No	*p* value	> 10	≤ 10	*p* value
Computed tomography	90.0	97.7	0.149	88.8	100.0	0.044	96.4	91.3	0.39	94.4	93.4	0.88
Liver ultrasonography	10.7	6.8	0.18	19.2	6.5	0.020	3.6	17.4	0.08	5.6	14.8	0.30

*Unless otherwise indicated.

questionnaire as "excision of the entire rectum with blood vessels and surrounding lymph nodes within an intact visceral fascial envelope" and "the distal margin is through the bare distal rectal tube past the mesorectum."

In all, 73 surgeons (89%) believed that there is strong evidence that TME improves the results of rectal cancer treatment. Seventy-one surgeons (87%) believed that the principles and technique of TME should be followed in all surgical resections of the lower third of the rectum, 74 (90%) in the middle third of the rectum and 53 (65%) in the upper third of the rectum. Surgeons with a higher volume of rectal cancer patients were significantly less likely to believe that the principles and technique of TME should be followed in the upper third of the rectum (50% v. 71%; $p = 0.016$).

The preferred methods of proximal diversion in TME surgery were loop ileostomy by 58 surgeons (71%) loop colostomy by 19 surgeons (23%).

Table 3. Surgeons' responses regarding neoadjuvant treatment for rectal cancer

Indication for treatment	Setting, no. (%)	
	Ideal situation	Current practice
In all patients	12 (15)	8 (10)
If the tumour is clinically or radiologically fixed	55 (67)	60 (73)
If preoperative staging indicates a T3 lesion	54 (66)	31 (38)
If preoperative staging indicates pathologic lymph nodes	32 (39)	23 (28)
Never	0 (0)	4 (5)
Other (specify)	2 (2)	3 (4)
No reply	4 (5)	6 (7)

Local excision

The survey included a case example of a well differentiated tumour 2 cm in diameter in the lower third of the rectum. The example referred to "good risk" and "poor risk" patients; however, we did not specifically define these terms. The interpretation was left to the respondents. In all, 46 surgeons (56%) would consider local excision in a T1 lesion in a good risk patient, 67 (82%) in a T1 lesion in a poor risk patient, 8 (10%) in a T2 lesion in a good risk patient, 52 (63%) in a T2 lesion in a poor risk patient, 3 (4%) in a T3 lesion in a good risk patient and 22 (27%) in a T3 lesion in a poor risk patient.

Postoperative treatment

In all, 13 surgeons (16%) would recommend adjuvant chemoradiation for stage 1 cancers, 63 (77%) for stage 2 cancers and 62 (76%) for stage 3 cancers.

Table 4. Analysis of surgeon-specific variables in the use of neoadjuvant treatment for rectal cancer in ideal practice

Surgeon-specific variable	Indication for treatment							
	All		Fixed		T3		Pathologic lymph nodes	
	%	*p* value	%	*p* value	%	*p* value	%	*p* value
Age		0.76		0.57		0.38		0.17
≥ 51 yr	13		70		73		50	
< 51 yr	16		64		64		34	
Years in practice		0.48		0.99		0.72		0.81
≥ 21 yr	19		65		65		39	
< 21 yr	13		65		70		41	
Rectal surgery volume		0.58		0.76		0.007		0.14
> 10	11		67		94		56	
≤ 10	16		71		61		36	
University appointment		0.06		0.97		0.46		0.14
Yes	25		68		71		50	
No	9		67		63		33	
RCPSC certification		0.031		0.002		0.017		0.15
Yes	12		73		73		42	
No	43		14		29		14	
Medical oncology service		0.07		0.43		0.005		0.017
Home community	10		69		80		54	
< 2 h by road	9		73		68		32	
> 2 h by road	33		53		33		18	
Radiation facility		0.24		0.37		0.003		0.044
Home community	14		69		86		55	
< 2 h by road	7		74		67		37	
> 2 h by road	25		55		40		20	

RCPSC = Royal College of Physicians and Surgeons of Canada.

Discussion

Previous studies have shown differences in the practice patterns of surgeons based on variables such as subspecialty training and years of practice.[2–4] Recent graduates were more likely to order routine CT scans and less likely to order abdominal ultrasonography than surgeons with more than 5 years of experience, and surgeons with surgical oncology or colorectal surgery training were more likely to order endorectal ultrasonography routinely if available.[2] Differences in decision-making in rectal cancer management have been found for colorectal cancer surgeons in colorectal residency programs.[3] These differences included the use of preoperative investigations, neoadjuvant therapy, surgical therapy and follow-up.[3] Fellowship-trained colorectal surgeons have been shown to be more likely to use preoperative radiation, when appropriate, as compared with surgeons without fellowship colorectal surgery training.[4]

The present study confirms that there are significant differences in the practice patterns of surgeons in the management of rectal cancer in Atlantic Canada based on surgeon-specific variables. We found that surgeons with 21 or more years of practice were less likely to routinely order CT scans and more likely to order ultrasonography of the liver compared with surgeons with fewer than 21 years of practice. This significant difference was not seen when we controlled for surgeons' age and could be explained by the small sample size. Surgeons who were not certified by the RCPSC were significantly more likely than those who were certified to use neoadjuvant therapy in all patients with rectal cancer. These differences could be explained by the temporal and geographical differences in surgeon training. It is unknown if these differences in practice patterns affect the outcomes of patients with rectal cancer.

Total mesorectal excision of rectal cancer has been shown to improve local recurrence rates,[5–7] yet not all surgeons in our study believed in or used the principles of TME. Preoperative radiation has also been shown to improve local recurrence and may even have survival benefits.[8–11] In our study, there was surgeon-based variability in the use of neoadjuvant radiation. The variation in the management of rectal cancer, including the use of neoadjuvant radiation and TME by surgeons likely affects the outcomes of these patients.

Some surgeons in Atlantic Canada do not have timely access to or availability of equipment or services such as MRI, endorectal ultrasonography, medical oncology or radiation oncology. This lack of availability partly influences the differences in practice patterns. This can be seen by only 5 (6%) surgeons reporting routinely ordering pelvic MRI. In the ideal situation, without time or access constraints,

Table 5. Analysis of surgeon-specific variables in the use of neoadjuvant treatment for rectal cancer in current practice

	Indication for treatment							
	All		Fixed		T3		Pathologic lymph nodes	
Surgeon-specific variable	%	*p* value	%	*p* value	%	*p* value	%	*p* value
Age		0.50		0.87		0.011		0.11
≥ 51 yr	7		73		57		40	
< 51 yr	11		75		27		23	
Years in practice		0.66		0.94		0.05		0.44
≥ 21 yr	8		73		54		35	
< 21 yr	11		74		30		26	
Rectal surgery volume		0.88		0.84		0.031		0.10
> 10	11		78		61		44	
≤ 10	10		75		33		25	
University appointment		0.001		0.51		0.42		0.72
Yes	25		71		46		32	
No	0		78		37		28	
RCPSC certification		0.07		0.003		0.15		0.37
Yes	8		80		42		30	
No	29		29		14		14	
Medical oncology service		0.63		0.87		0.028		0.06
Home community	10		74		54		41	
< 2 h by road	4		73		27		18	
> 2 h by road	13		80		20		13	
Radiation facility		0.42		0.99		0.16		0.22
Home community	14		76		52		38	
< 2 h by road	4		74		37		30	
> 2 h by road	10		75		25		15	

RCPSC = Royal College of Physicians and Surgeons of Canada.

22 surgeons (27%) would routinely obtain a pelvic MRI. Endorectal ultrasonography was ordered routinely by 19 surgeons (23%), but it would be ordered by 58 surgeons (71%) in the ideal situation. These differences also extended to neoadjuvant treatment, as surgeons with access to radiation and medical oncology services were more likely to use neoadjuvant therapy, specifically as it relates to T3 tumours and those with pathologic lymph nodes. However, even if these resources were readily available, not all surgeons would routinely order pelvic MRI or endorectal ultrasonography or use neoadjuvant therapy in the management of rectal cancer.

Limitations

This study is limited by its survey design. There is an inherent bias in surveys because people less interested in the subject of the survey are less likely to respond than those who are interested. This nonresponder bias will lead to a result that is not reflective of the entire target population of interest. Survey answers may also not truly reflect the actual practice of the respondents. Our response rate of 49% could be improved with repeat survey mail-outs or direct telephone contact with surgeons. Some surgeons were mailed surveys even though they were unlikely to practise general surgery. This was because they had general surgery certification as well as another specialty certification (i.e., cardiac surgery, plastic surgery, pediatric surgery). This will therefore lead to an underestimation of the true response rate of general surgeons who manage rectal cancer. Owing to the multiple univariate analyses used in this study, some of the statistically significant results could be because of chance alone (1 in 20). We did not perform multivariate analyses because of the small sample size and the multiple dependent variables involved.

Differences in the treatment of rectal adenocarcinoma have been shown to potentially lead to differences in outcomes.[12,13] Although it was not the focus of this study, the differences in the management of rectal cancer associated with surgeon-specific variables as well as the lack of resources shown in this study could potentially translate into differences in outcomes. Evidence-based guidelines with continuing medical education paralleled with efforts at providing real-time compliance measures and feedback may lead to decreased variability in the treatment of rectal adenocarcinoma according to best available evidence.[14–16]

Conclusion

This study has shown that there are differences in the practice patterns of surgeons in Atlantic Canada in the management of rectal adenocarcinoma. These differences are because of surgeon-specific variables as well as access to resources, with significant differences between what surgeons actually do and what they would do in an ideal situation. This information should be strongly considered in the development of evidence-based guidelines for the staging and treatment of rectal adenocarcinoma that could ultimately affect patient outcomes.

Competing interests: None declared.

Contributors: Drs. Wirtzfeld and Pollett designed the study. Drs. Chuah and Wirtzfeld acquired the data and wrote the article. Drs. Lee, Wirtzfeld and Pollett reviewed the article. All authors analyzed the data and approved the final version submitted for publication.

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