



Original article

Surgeons' knowledge of quality indicators for gastric cancer surgery

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Abstract

Background. Gastric cancer survival in the West is inferior to that achieved in Asian centers. While differences in tumor biology may play a role, poor quality surgery likely contributes to understaging. We hypothesize that the majority of surgeons performing gastric cancer surgery in North America are unaware of the recommended standards.

Methods. Using the Ontario College of Physicians and Surgeons registry, surgeons who potentially included gastric cancer surgery in their scope of practice were identified. A questionnaire was mailed to 559; of those, 206 surgeons reported managing gastric cancer. Results were evaluated by χ^2 and logistic regression; $P < 0.05$ was considered significant.

Results. Eighty-six percent of respondents were male and 53% practiced in an urban nonacademic setting. Forty percent reported operating on two to five cases of gastric cancer per year, and 42% on fewer than two cases per year. One-third of surgeons identified 4 cm or less to be the desired gross proximal margin. Half used frozen section to evaluate margin status. Twenty percent of surgeons were unsure of the number of lymph nodes (LN) needed to accurately stage gastric cancer, and the median number reported by the remainder was 10 (range, 0–30). Only 16 of 206 identified both a proximal margin of 5 cm or less and 15 or more LN as desired targets. Those performing more than five gastric resections per year were more likely to report a D2 resection ($P = 0.008$).

Conclusion. The majority of surgeons operating on gastric cancer in Ontario did not identify recommended quality indicators of gastric cancer surgery. A continuing medical education program should be designed to address this knowledge gap to improve the quality of surgery and patient outcomes.

Key words Gastric cancer · Surgery · Quality · Margin · Lymphadenectomy

Introduction

Surgery is the foundation of gastric cancer therapy [1], and complete resection with microscopically clear margins (R0) and adequate lymphadenectomy is the standard of care worldwide. A population-based Canadian study showed that over 60% of patients taken to the operating theater for the purpose of resection had stage III or IV disease, with median survivals of 12 or 3 months, respectively [2]. Similar survival data have subsequently been reported from the United States [3–5].

Long-term follow-up of patients in a prospectively collected database at Memorial Sloan-Kettering Cancer Center indicates that margin status is strongly correlated with survival [6, 7]. From this large experience, it is clear that patients with R1 status had inferior survival to those in whom R0 status was achieved. Subgroup analysis of the Dutch randomized control trial of D2 versus D1 lymphadenectomy also illustrated the negative effect of R1 status on prognosis [8]. The ability to achieve an R0 resection is affected by the intramural spread typical of gastric and esophageal cancer. The extent of intramural spread found on final pathology is dependent on the level of wall invasion [9]. Bozzetti and colleagues [9] found that final margins were always clear if gross margins of 6 cm were obtained for tumors penetrating to/beyond the serosa, and gross margins of 3 cm were obtained for tumors with penetration up to/into the muscularis propria. Given the preponderance of T3 tumors in the North American population [10], a gross margin of at least 5 cm is felt to be appropriate, where anatomically feasible. In 1997, the American Joint Commission on Cancer/Union International Contre le Cancer (AJCC/UICC) staging systems changed the nodal (N) staging of gastric cancer to reflect the importance of the number of lymph nodes involved (N1, 1–6; N2, 7–14; N3, >15) and an adequate lymphadenectomy was defined as examining 15 or more lymph nodes (LN)

for pathologic assessment [11]. Prior to that, nodal staging was based on distance from the primary tumor [11–13].

Quality gastric cancer surgery, defined as an R0 resection with a lymphadenectomy to include assessment of 15 or more LN, is an uncommon phenomenon in North America [3–5, 14–16]. Inadequate LN assessment is directly correlated with poor long-term survival [3, 17]. There are many proposed explanations for the poor quality of gastric cancer surgery recently documented in North America. These include a low volume of cases per surgeon [2, 18], inadequate operative exposure during residency, late presentation typically seen in a nonscreened population [10], a nihilistic approach to patients with gastric cancer, and published evidence that the extent of surgery does not correlate with survival [8, 19]. We speculated that many surgeons are unaware of the quality indicators for gastric cancer surgery. The objective of this study was to examine the knowledge of practicing general surgeons in the province of Ontario, Canada, regarding gastric cancer surgery and to determine whether their operative goals are consistent with the achievement of a good quality resection.

Methods

We developed a questionnaire to ascertain the demographics of surgeons in the province of Ontario, Canada, who manage gastric cancer, and to probe their attitudes and knowledge regarding elective management of patients with gastric cancer. The questionnaire was designed for ease of completion, which was estimated to take less than 5 min. The questionnaire was pilot-tested on a cohort of practicing surgeons to ensure clarity and feasibility, and contained questions on demographics, preoperative workup of patients with gastric cancer, intraoperative decision-making, postoperative management, and palliative surgical options (Appendix 1). Some questions were answered by choosing more than one response. Surgeons were asked to complete the questionnaire as it pertained to their typical gastric cancer patient.

General surgeons in the province of Ontario, Canada, were identified by searching the registry of the Ontario College of Physician and Surgeons for 2005. Surgeons were excluded if they had retired or were otherwise not engaged in clinical practice in Ontario. All surgeons with subspecialty practices, including predominantly pediatric, vascular, urologic, or plastic surgical cases, and those without hospital privileges were also excluded. The remaining surgeons, who were apparently engaged in the active practice of general surgery ($n = 559$), were contacted with a letter of invitation to participate in the

study, accompanied by the questionnaire. Nonrespondents received an office call and a second questionnaire was faxed. Those not completing the questionnaire after two attempts to elicit participation were classified as nonrespondents. All surgeons surveyed were assigned a unique identifying number to maintain confidentiality during analysis of the completed questionnaires.

The following definitions were used in the survey: D0, an operative dissection in which no intentional lymphadenectomy is performed; D1, a dissection in which the omentum and perigastric LN are removed en bloc with the gastrectomy specimen; D2, as for D1, plus resection of LN along the left gastric, celiac, common hepatic, and splenic arteries. Specimen LN dissection is traditionally performed in Ontario by pathologists and not the surgeon.

Statistical analysis was performed using SAS9 (SAS Institute, Cary, NC, USA). Basic demographic variables were compared by χ^2 test. Statistical significance was set at $P < 0.05$ (two-sided).

Results

Response rate, demographics, case volume

Of the 559 general surgeons practicing in Ontario in 2005 identified from the College of Physicians and Surgeons registry, 307 (55%) returned a completed questionnaire. Of these, 206 (67%) reported that they performed elective operations for gastric cancer.

The majority of respondents were male (86%), and 50% were between the ages of 40 and 49 years, with a median time in practice of 15 years (range, 1–41 years). Those who reported operating electively on gastric cancer ($n = 206$) were similar to those who did not ($n = 101$) in terms of sex, age, time in practice, practice profile, and location of practice (Table 1). Of all respondents, 13% reported practicing in rural areas, while 9% of surgeons operating on gastric cancer were rurally based. Overall, 34% of respondents worked in an urban academic practice, and similarly 31% of those performing gastric cancer surgery practiced in this setting. Thus, the group of surgeons who operate on gastric cancer reflects the demographics of general surgeons in Ontario overall, at least based on those who responded to the questionnaire.

Only 37 (18%) surgeons reported that they operated on more than five cases of gastric cancer per year, 83 (42%) reported an average of one or fewer cases per year, while the remainder (40%) reported between two and five cases per year (Fig. 1). The rest of the results presented below are based on the responses from surgeons who electively operate on gastric cancer ($n = 206$).

Table 1. Demographics of Ontarian surgeons who completed the questionnaire

	All respondents <i>n</i> (%)	No gastric cancer surgery <i>n</i> (%)	Gastric cancer surgery <i>n</i> (%)
Total	307	101	206
Sex—male	264 (86)	87 (86)	177 (86)
Age (years)			
30–39	57 (19)	11 (11)	46 (22)
40–49	115 (38)	35 (35)	80 (39)
50–59	77 (25)	23 (23)	54 (26)
60–69	42 (13)	22 (22)	20 (10)
70+	16 (5)	10 (9)	6 (3)
Practice location			
Rural	40 (13)	20 (20)	20 (9)
Urban nonacademic	163 (53)	40 (40)	123 (60)
Urban academic	104 (34)	41(41)	63 (31)
Practice profile ^a			
Colorectal	233 (76)	56 (55)	177 (86)
Breast	209 (68)	54 (53)	155 (75)
Hepato-biliary	138 (45)	25 (25)	113 (55)
Thoracic	40 (13)	7 (7)	33 (16)
Endocrine	83 (27)	11 (11)	72 (35)
Trauma	117 (38)	26 (26)	91 (44)
Upper GI	175 (57)	20 (20)	155 (75)

^aMultiple areas of practice could be selected

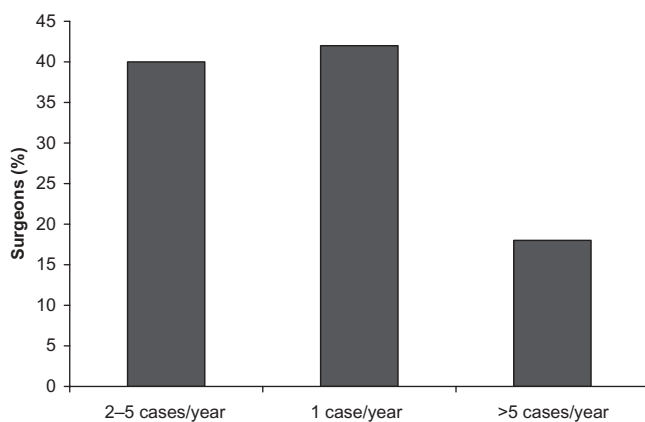


Fig. 1. Self-reported volume of gastric cancer cases operated on each year by individual surgeons in the province of Ontario

Preoperative investigations and operative management

Ninety-nine percent of surgeons reported using preoperative endoscopy. By contrast, only 5% of surgeons reported the use of endoscopic ultrasound (EUS) to gauge tumor stage. Laparoscopy was utilized by 19% as part of routine workup prior to resection. Locoregional disease extent and the presence of distant intraabdominal metastases were assessed by abdominopelvic computed tomography (CT) by 98%, and abdominal ultrasound was also used by 36%. Pulmonary metastases were assessed using plain X-ray by 74%, and CT scan by 64% (Table 2).

Table 2. Preoperative investigations used by Ontario surgeons who operate on gastric cancer (*n* = 206)

	Investigation used ^a <i>n</i> (%)
OEGD	205 (99)
Endoscopic ultrasound	10 (5)
Laparoscopy	39 (19)
CT Abdo/Pelvis	201 (98)
Ultrasound Abdo/Pelvis	74 (36)
Chest X-ray	152 (74)
CT Chest	132 (64)

^aSurgeons were able to choose more than one answer

Almost all surgeons (99.5%) reported that they aimed for a margin of grossly normal tissue beyond the tumor. However, the potential degree of intramural spread did not appear to be recognized by all surgeons, because 2 cm or less was selected as a desirable gross margin by 17% (Fig. 2A). Half of the surgeons aimed for 5 cm of grossly normal tissue as a margin. Routine use of intraoperative frozen-section analysis was reported by 52% of surgeons for the proximal margin of resection, and by 35% for the distal margin (Table 3). Some surgeons commented that frozen section was not available at their institution, but this did not appear to be a major reason for its nonuse. Eighty-three percent of surgeons reported using feeding tubes to facilitate postoperative nutrition. Feeding tubes were routinely placed in all patients by 54% (92), while 46% (78) reported using

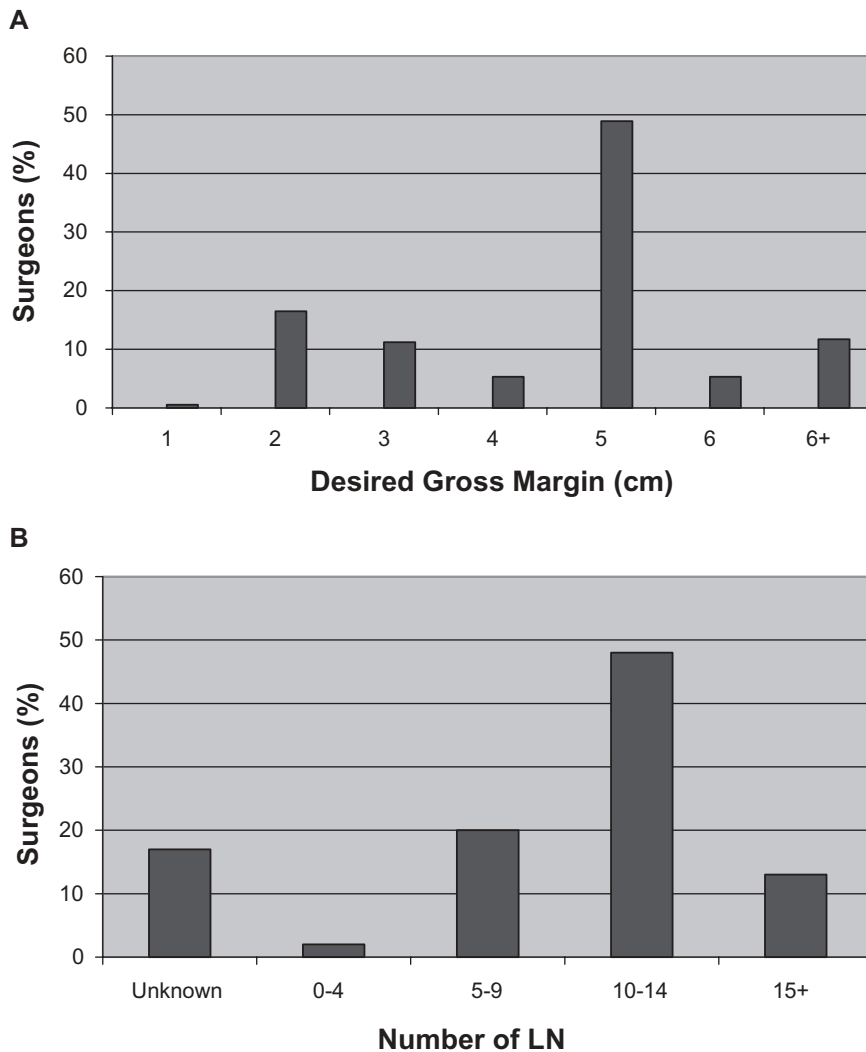


Fig. 2A,B. Operative objectives during surgery for gastric cancer. **A** Desired distance between gross cancer and resection margin; **B** number of lymph nodes (LN) required to accurately stage gastric cancer

Table 3. Routine operative practice reported by surgeons who operate on gastric cancer ($n = 206$)

Lymphadenectomy ^a	D0	17 (8)
	D1	170 (78)
	D2	29 (14)
Frozen section	Proximal	107 (52)
	Distal	72 (35)
Feeding tube ^b	Always	92 (54)
	Only with total gastrectomy	78 (46)

Figures in parentheses are percentages

^aSurgeons were able to choose more than one answer

^b $n = 170$

them routinely only for those patients undergoing a total gastrectomy (Table 3).

At the time of resection for curative intent, 83% of respondents said they routinely performed a D1 dissection, as defined in the “Methods” section. No formal lymphadenectomy was performed by 9% of surgeons. A D2 dissection was reported by 14% of respondents and was more likely to be performed by those surgeons

doing five or more cases per year, with an odds ratio (OD) of 3.3 [95% confidence interval (CI), 1.4–8.1; $P = 0.0008$]. Our questionnaire sought to determine knowledge of the minimum requirement for assessment of 15 LN for accurate staging. Twenty percent of respondents were unsure of the number required or did not respond to the question. The other 80% quoted a number that ranged from 0 to 30 LN, with a median of 10 (Fig. 2B).

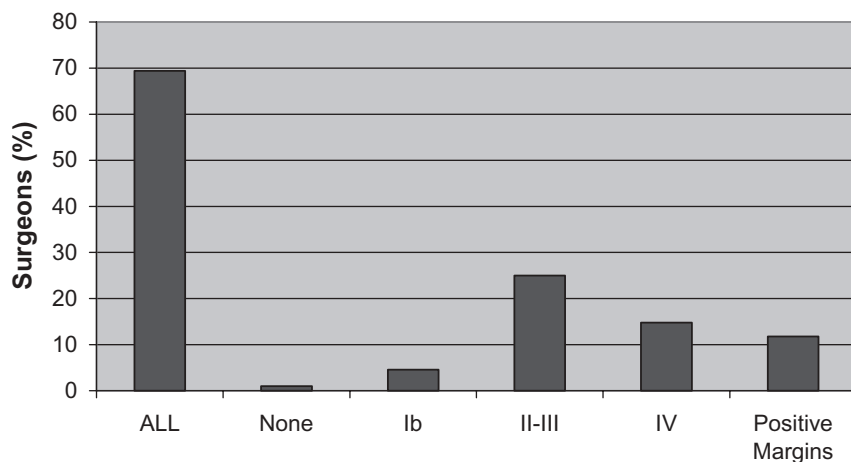


Fig. 3. Indications for referral for postoperative chemoradiation therapy reported by surgeons performing gastric cancer surgery. Percentages of surgeons who refer all or no patients, or patients with the indicated stage of disease or margin status are shown

Only 18 (9%) specified that a minimum of 15 LN were needed for accurate assessment of the nodal status. Overall, only 16 surgeons (8%) identified the need for examining 15 LN or more and resecting a gross margin of at least 5 cm; however, there was no statistically significant association of this and volume of resections performed, location of practice, or academic status.

Adjuvant therapy

In the province of Ontario, the adjuvant therapy practice guidelines enunciated under the auspices of Cancer Care Ontario in 2003 suggest that adjuvant chemoradiation be considered for all patients with tumor penetrating the muscularis propria or involving regional lymph nodes [20]. Referral for consideration of postoperative chemoradiation therapy is standard practice for 70% of surgeons, regardless of pathologic stage. Only 1% of surgeons reported referring no patients for consideration of adjuvant therapy. Stage-specific consultation was chosen by 27% of respondents (Fig. 3). Patients' general medical status or operative findings modified this decision. Young age, bulky lymph nodes, and locally extensive disease were perceived as strong indicators for adjuvant referral, while older age, poor nutritional status, and poor medical condition were factors militating against referral.

Palliative therapy

As in much of North America and Europe, gastric cancer in Canada often presents at an advanced stage [2, 21]. As a result, trying to choose the best treatment/palliation for patients with incurable disease is a common and difficult dilemma faced by general surgeons. For patients with incurable disease, 3% of surgeons said they offer either no treatment of any modality or a palliative bypass/feeding tube insertion only. The remaining 97% offered palliative resection where fea-

sible, and/or chemotherapy \pm radiation therapy referral, or some other palliative but active option.

Education

The majority of respondents (90%) were interested in participating in a continuing medical education event focusing on surgery for gastric cancer.

Discussion

Defining and then attaining a high quality of care are important components of a program designed to improve outcomes of patients undergoing cancer treatment. The field of quality assurance has been promulgated to improve outcomes by ensuring specific elements deemed to constitute and indicate quality care. To measure quality of medical care, it is first necessary to define a feasible and acceptable minimal standard of care, which must allow acceptable levels of variation in treatment outcomes as well as critical determinant variables [22, 23]. For example, recent trials of adjuvant therapy for rectal cancer incorporated these concepts by training and auditing surgeons performing total mesorectal excisions [24]. Though there were individual breaches in operative protocol, these trials demonstrated that surgical quality standards could be implemented on a large scale and that surgical technique can affect local control and thus overall survival. By analogy, we speculate that optimization of surgical approach and technique in gastric cancer treatment will allow patients to be better staged and treated by a multidisciplinary team.

Although the incidence of gastric cancer in Europe and North America has fallen over the past 50 years, overall survival remains static [25, 26]. The cornerstone of curative gastric cancer therapy is complete resection of the cancer; the surgeon's goal should be a margin-

negative resection with appropriate (≥ 15 LN) lymphadenectomy in the elective setting [6, 17]. Due to the submucosal spread of gastric cancer, prediction of a grossly normal margin of resection to ensure pathologic clearance is often difficult; consequently, resection of 5–6 cm of grossly normal adjacent tissue has been recommended when technically feasible [9]. Surgeons in Ontario recognized the need for negative margins but generally underestimated the potential extent of intramural spread. Assessment with intraoperative frozen section can identify those tumors with extensive submucosal/intramural spread and allow for intraoperative margin revision to attain an R0 resection [6]. However, this approach also appears to be underutilized by Ontario surgeons.

The Intergroup 0116 trial of adjuvant chemoradiation eloquently demonstrated that less than half of recruited patients had adequate lymphadenectomies, meaning that the minority of patients had a resection that met minimal quality standards [15]. Further studies suggest that adequate LN assessment may be a marker for quality surgery, as it is strongly linked to patient survival [3, 5, 27]. Assessment of 15 LN provides sufficient information for accurate staging [13, 28], which is important in selecting patients for adjuvant therapy [15]. In this regard, we identified a clear knowledge gap among Ontario surgeons. Twenty percent did not identify a minimum number of LN that needed to be assessed, and the median number stated by the remaining 80% was 10. In a recent analysis of pathology reports from gastrectomies performed in Ontario from January 2000 to September 2004, we found that a median of 9 LN had been assessed (Helyer et al., unpublished observations, 2006). It appears that the views reported by surgeons who completed the present questionnaire are reflected in their practice. Although LN retrieval from gastric cancer specimens is performed by pathologists, re-examination of the specimen for more LN can be requested by the astute surgeon who recognizes the disparity between the number of expected and the number of examined LNs. Compliance with the AJCC staging requirements (assessment of ≥ 15 LN) is slowly evolving in the United States. Data from the Surveillance Epidemiology and End Result (SEER) database, a population-based registry sponsored by the National Cancer Institute that collects information on cancer incidence and survival from 11 population-based cancer registries, including approximately 14% of the United States population, showed that between 1998 and 2001, 32% of patients had an adequate lymphadenectomy [4, 5]. This was an improvement from 18% in the 1980s [3, 4, 14].

The ideal extent of lymphadenectomy continues to represent an international controversy. Two well-designed European randomized controlled trials failed to find a benefit with D2 vs D1 dissection, while showing

alarming rates of mortality and morbidity in the D2 group [8, 19]. Several recent trials from Japan, Taiwan, and Italy report that extended resections (D2 or D3 versus D1) provide a survival advantage and can be achieved with comparable low complication rates in both arms [29, 30, 31]. Large single-institution case series also show achievable impressive overall survival rates in specialized units where the D2 dissection is routine, without undue morbidity or mortality [32, 33]. We detected a lack of consensus among Ontarian surgeons in their response to the question: “What extent of lymphadenectomy do you perform?” Although most surgeons plan to remove all perigastric nodal tissue (D1), 9% say they do not plan to remove any nodes (D0). Surgeons performing five or more resections per year were more likely to report D2 resection as their routine approach. Performing a D2 resection was not related to surgeon age, practice location, or being affiliated with an academic institution. In fact, surgeon knowledge regarding parameters of quality gastric surgery was unrelated to volume of cases per year (≥ 5 versus < 5), or practice location (academic or nonacademic).

EUS is established as a superior preoperative staging modality for gastric cancer [34]. Although user-dependent, it has a T-stage accuracy between 65% and 92% and N stage accuracy of 50%–80% [34, 35]. In the present survey, only 5% of respondents used EUS as part of their routine preoperative workup. Although this is likely due to its general lack of availability in Ontario, it is clear from this survey that the majority of patients are not receiving pretreatment planning that is standard in other jurisdictions. Prospective studies have also demonstrated the usefulness of diagnostic laparoscopy in detecting small-volume peritoneal disease not appreciated on cross-sectional imaging, while at the same time allowing for peritoneal lavage for cytologic examination [36–38]. Staging laparoscopy was employed by only 19% of Ontario survey respondents. This may reflect limited access to the operating theater, lack of knowledge, or a belief that surgical management of gastric cancer is always an exercise in palliation. A laparoscopic approach to gastric cancer resection was rare in Ontario in 2005. The surgeons performing laparoscopic gastric resection may not perform a prior separate diagnostic laparoscopy for staging; however, due to the small number of involved surgeons, we believe our results reflect the entire population of Ontario surgeons. Operative strategy was not included as an option in our survey, as the standard approach in Ontario in 2005 was open laparotomy.

The majority of surveyed surgeons recognized the role of adjuvant therapy and the indication for consultation with radiation and medical oncologists. Most endorsed the patient-related inclusion criteria used in

the Intergroup 0116 trial; that is, good medical condition and good nutritional status [15]. In the year 2000, Cancer Care Ontario (CCO) first published a practice guideline strongly advocating use of adjuvant therapy for gastric cancer [20]. Three years later it was modified to indicate that adjuvant therapy should be *considered*, in recognition of the potential for significant morbidity [20, 39, 40]. Neoadjuvant therapy was not endorsed as routine therapy for a resectable gastric cancer in 2005 by CCO and consequently was not included in the questionnaire. It is likely that with the publication of the Medical Research Council Adjuvant Gastric Infusional Chemotherapy (MAGIC) trial, this guideline will be modified [41].

In North America, where screening for gastric cancer is not practiced routinely, a high proportion of patients continue to present with stage IV disease [2, 21]. Often due to a combination of tumor and patient factors, there are limited treatment options. Judging from single-institution case series, patients who are candidates for palliative surgery may have a better overall survival, but with an attendant high operative mortality and morbidity [42]. There are very few studies focusing on quality of life, and it is difficult to advocate aggressive palliative therapy for this patient population. For patients with incurable disease, the majority of surgeons surveyed offer surgery either in the form of palliative resection or bypass in combination with referral to a medical and/or radiation oncologist. There appeared to be a wide variation of practice, reflecting the lack of research in this area.

Our survey reveals multiple factors that compromise the quality of gastric cancer management, including infrequent use of preoperative staging, lack of knowledge of the appropriate targets for LN assessment and gross margins of resection, and limited use of intraoperative frozen section and margin revision. Hundahl and colleagues [40] have described widespread inadequate surgical treatment of gastric cancer in the United States, including in the Intergroup 0116 trial. One of the challenges in addressing this problem is the low volume of gastric cancer surgery experienced by most surgeons and trainees. In 2004, there were 1010 cases of gastric cancer diagnosed in Ontario (Cancer Care Ontario, unpublished data). In the same era, 206 Ontario surgeons reported performing elective gastric cancer surgery. Because many of the incident cases are metastatic or advanced at presentation, many surgeons are operating on less than one case per year for cure (Fig. 1 and Helyer et al., unpublished data, 2006). While there is an argument for centralization in order to concentrate the management of gastric cancer in centers of experience, as has happened in Western Europe and Asia, there are also compelling reasons to keep gastric cancer procedures in the armamentarium of general

community surgeons in North America. These include emergency presentations with hemorrhage or obstruction, and the inability to refer or transport these patients to specialized centers in a timely fashion. For elective cases, however, various sources of data support referral to surgeons with subspecialty training and/or referral to high-volume centers as a mechanism to improve peri-operative mortality and morbidity and long-term overall survival [18, 43, 44, 45].

We acknowledge the limitations of this study. Because we used a survey that asked surgeons to report on their own knowledge and practices, the results may not accurately reflect the real-world management of patients with gastric cancer in Ontario. It is unlikely that the 45% of surgeons who did not respond to the survey included a significant number of individuals who perform a high volume of gastric cancer surgery and/or those with a superior knowledge of quality indicators; indeed, it is more probable that those who responded have more knowledge and experience of gastric cancer. We recognize that although the literature supports the quality indices chosen, there are no formal published guidelines for gastric cancer surgery. Our survey did not enquire about laparoscopic versus open techniques of resection. A laparoscopic approach is appropriate under certain circumstances, and these should be defined as guidelines are developed in Ontario, and in North America generally.

In addition to the development of practice guidelines that define quality standards for gastric cancer surgery, continuing medical education, in the form of needs assessment, small group interactive seminars, and hands-on mentoring are expected to improve the quality of gastric cancer management by surgeons. Recognition of the current suboptimal outcomes in North America and of the existing knowledge gaps among surgeons who perform curative resection of gastric cancer is the first step on the road to achieving better outcomes in patients with gastric cancer.

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Appendix 1

Gastric cancer practice parameters in Ontario

A. Surgeon demographics

1. Age
 1. 30–39
 2. 40–49
 3. 50–59
 4. 60–69
 5. >70
 Years in practice _____
2. Sex
 1. Male
 2. Female
3. Practice
 1. Rural
 2. Urban community
 3. Urban academic
4. Type of practice (check all that apply):
 1. Breast
 2. Colorectal
 3. Hepatobiliary
 4. Endocrine
 5. Thoracic
 6. Trauma
 7. Pediatrics
 8. Upper GI
 9. Vascular
 10. Other – specify: _____
5. Do you do upper GI endoscopy?
 1. Yes
 2. No
6. Do you do gastric surgery?
 1. Yes
 2. No—THANKS FOR COMPLETING THE QUESTIONNAIRE
 About what fraction of your gastric work is for cancer? _____%
7. How many gastric cancer cases per year?
 1. <2/Year
 2. 2–5/Year
 3. >5/Year
8. In my practice, routine **pre-resection** workup of a case of gastric cancer includes: (check all those that apply)
 1. Endoscopy + Bx
 2. US abdomen
 3. CT abdomen
 4. Laparoscopy
 5. CXR
 6. CT chest
 7. Endoscopic U/S

B. What is your current routine practice intraoperatively?

1. Macroscopic proximal margin aimed for:
 1. 1 cm
 2. 2 cm
 3. 3 cm
 4. 4 cm
 5. 5 cm
 6. 6 cm
 7. >6 cm
2. Frozen section proximal margin?
 1. Yes
 2. No
3. Frozen section distal margin?
 1. Yes
 2. No
4. Lymphadenectomy (check those that apply)
 1. All perigastric nodes (D1)
 2. Spleno-pancreatic, celiac, hepatic (D2)
 3. No formal lymphadenectomy (D0)
5. Do you insert a feeding tube?
 1. Yes
 2. No
 3. For total gastrectomy
 4. Other indication: _____

C. Decision for adjuvant treatment

1. Who do you refer for postoperative adjuvant chemoradiation (check all that apply)?
 1. All
 2. None
 3. Stage Ib
 4. Stage II-III
 5. Stage IV, no distant disease
 6. Positive margins
 2. Factors that negatively influence your decision to refer for adjuvant chemoradiation:
 1. Age > 70
 2. Poor nutritional status
 3. Poor medical condition
 4. Other, specify _____
 3. Factors that positively influence your decision to refer for adjuvant chemoradiation:
 1. Young age
 2. Bulky lymph nodes
 3. Extension to adjacent organ
 4. Other, specify _____
 4. Number of lymph nodes that the pathologist should assess for accurate staging: _____
 5. Usual management of locally advanced gastric cancer (check all that apply):
 1. Do nothing
 2. Refer for chemoradiation
 3. Bypass/G-tube
 4. Palliative resection
- * Would you be interested in a CME on management of gastric cancer?
1. Yes
 2. No

Comments: