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Management and outcomes of localized esophageal and gastroesophageal junction cancer in older patients

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ABSTRACT

Background Older patients are commonly excluded from clinical trials in esophageal and gastroesophageal junction (GEJ) cancer. High-level evidence to guide management in this group is lacking. In the present study, we compared outcomes and described tolerance for curative- and noncurative-intent treatments among patients 70 years of age and older.

Methods We retrospectively reviewed all patients 70 years of age and older diagnosed with localized esophageal and GEJ cancer at our centre between 2005 and 2012.

Results The 74 patients identified had a median age of 77 years. Of those patients, 62% received curative-intent treatment, consisting mostly of concomitant chemoradiation therapy (n = 43, 93%). Median overall survival for patients receiving curative-intent treatment was 18.6 months [95% confidence interval (CI): 13.0 to 28.0 months], with 23% being long-term survivors (95% CI: 11.3% to 36.7%). In contrast, patients receiving noncurative-intent treatment had a median overall survival of 8.8 months (95% CI: 6.7 to 11.9 months), with none being long-term survivors (p < 0.0001). Improvement of dysphagia was seen after curative (81%) or palliative radiotherapy (78%) in symptomatic patients, and toxicities were manageable. The odds of not receiving curative treatment was higher by a factor of 8.5 among patients 80 years of age or older compared with those 70–79 years of age (95% CI: 2.5 to 28.7).

Conclusions In managing older patients with esophageal and GEJ cancer, curative-intent treatment (compared with noncurative-intent treatment) leads to a significant survival benefit with a reasonable toxicity profile. Informed counselling of patients and their families about a curative treatment approach and efforts to increase awareness among oncology care providers are suggested.

Key Words Older patients, esophageal cancer, chemoradiation therapy

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INTRODUCTION

Published estimates suggested that, in 2014, 2100 patients in Canada would be diagnosed with esophageal cancer, leading to 2000 deaths[1]. The incidence of esophageal adenocarcinoma has doubled since the mid-1990s[2]. Similar increases have been observed in the United States, parts of Europe, and Australia[3–7].

In Canada, 64% of the patients diagnosed with esophageal cancer are 65 years of age or older, and 35% are 75 years of age and older[2]. The 5-year relative survival ratio for patients 75 years of age and older is 10% [95% confidence interval (CI): 8% to 12%] compared with 17% (95% CI: 15% to 20%) for the 55–64 age group[2]. A retrospective analysis of 3538 patients in the U.S. Surveillance, Epidemiology, and End Results database found that older patients were less frequently referred to an oncologist and received less-intensive treatment[8]. The significantly lower relative survival ratio in the older group compared with the younger patients could be a result of less-aggressive management of esophageal cancer in older patients.

Because concerns about toxicity, comorbidities, and poor outcome in general, physicians tend to be conservative in managing older patients[9,10]. A few retrospective reports[9–12] and a single-armed phase II trial[13] showed that chemoradiotherapy (CRT) is feasible and efficacious

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in older patients; however, other reports raise significant concerns about treatment-related toxicities[14].

Good evidence to compare outcomes in patients who receive curative- and noncurative-intent treatments is lacking. In addition, the underlying reasons for not undergoing curative-intent treatment have not been addressed. The decision-making process for physicians and patients remains unclear because of controversies in the published literature. At our institution, standard curative treatment is CRT followed by surgery, recognizing that CRT alone does provide long-term survival in a proportion of patients[15].

The lack of good evidence for the management of older patients is related to the exclusion, by most trials [for example, RTOG 0436[16] or the CROSS trial[17]], of patients older than 75 years. The definition of "elderly population" remains controversial in literature, variably using the stated age cut-offs of 65, 70, and 75 years[9–14]. We choose 70 years of age and older to define this group of patients because, historically, patients older than 71 have been excluded from many clinical studies evaluating treatment for esophageal cancer[10]. In the present study, we compare outcomes and describe tolerance for curative- and noncurative-intent treatments in older patients (≥70 years) who presented with localized esophageal or GEJ cancer during a 7-year period at our institution.

METHODS

Study Population

We retrospectively reviewed all patients 70 years of age or older diagnosed with localized esophageal and GEJ cancer at the Cancer Centre of Southeastern Ontario in Kingston General Hospital, Ontario, between January 2005 and March 2012. All eligible patients who were seen at this regional hospital by Medicine, Gastroenterology, Surgical Oncology, Radiation Oncology, Medical Oncology, or other services were included. Patients presenting with small-cell carcinoma or neuroendocrine histology or with distant metastasis were excluded. "Localized disease" was defined as an absence of distant metastasis. Two patients treated using a stomach cancer protocol and 1 patient treated using experimental photodynamic therapy were excluded. The remaining 74 patients were included in the analysis.

CRT Treatment

At our institute, the standard chemotherapy regimen during the period of this study was continuous intravenous infusion of 5-fluorouracil (1000 mg/m^2 per day for 4 days) and cisplatin (75 mg/m^2 at 1 mg/min) administered concomitantly during weeks 1 and 5 of radiotherapy (RT), plus 2 more cycles in weeks 8 and 11 for patients not undergoing surgery[15]. In patients with renal insufficiency or hearing impairment, carboplatin was used instead of cisplatin. In more recent years, we have adopted a regimen of weekly carboplatin (area under the curve 2 mg/mL/min) and paclitaxel (50 mg/m^2) for 5 weeks[17]. Dose adjustments and deferrals or substitutions of a chemotherapy agent were used at the treating physician's discretion. The concurrent RT typically delivered consists of 50 Gy in 25 fractions (5 days/week) using 3-dimensional conformal RT.

Data Collection

Based on the initial oncology consultation and clinic notes for each patient, we retrospectively collected demographics, details of the cancer diagnosis, symptoms, medical comorbidities, score on the Charlson comorbidity index (CCI)[18], and Eastern Cooperative Oncology Group (ECOG) performance status[19]. Treatment details, toxicities, response, recurrence, and survival outcomes were obtained for various time points during treatment and follow-up.

We assessed the degree of dysphagia using the Mellow–Pinkas score, which has been widely used in assessing dysphagia, including in the retrospective setting[20–23]. The pre-treatment score was extracted from the first oncology consultation, and the post-treatment score was obtained from the first follow-up visit (usually 1–2 months after RT). Dysphagia relief was defined as an improvement of at least 1 point in the Mellow–Pinkas score.

Reasons for not undergoing curative-intent treatment were retrospectively collected from clinic notes. Patients who were offered curative-intent treatment, but who declined, were classified as "patient's decision." Patients who received a physician recommendation against curative-intent treatment because of comorbidities or concerns about performance status were classified as "physician's recommendation" regardless of patient preference. Other reasons (such as infeasibility for RT because of earlier RT or other contraindication to treatment) were separately classified.

Statistical Analysis

Overall survival (OS) was defined as the time from pathology diagnosis to death. Disease-free survival (DFS) was defined as the time from pathology diagnosis to first event (such as recurrence or death from any cause). Patients who had residual disease on first endoscopic biopsy after completion of treatment were excluded from the DFS analysis. Distant metastasis-free survival was defined as the time from pathology diagnosis to a distant recurrence or death from any cause. Patients without documented evidence of an event were censored at the date of last follow-up.

The Kaplan–Meier method was used for the survival analysis. Log-rank testing was used to compare differences in outcome between the treatment groups. The reverse Kaplan–Meier method was used to estimate median follow-up. Multivariate Cox proportional hazard models were fitted to obtain adjusted hazard ratios for treatment effect. For face validity, age was pre-selected as a confounder. The additional covariates considered in the multivariate model were tumour stage, score on the CCI, sex, ECOG performance status, and histology. A multivariate logistic regression model was fitted to identify factors affecting the decision for curative treatment. Two-sided p values less than 0.05 were considered statically significant. Data were analyzed using the SAS software application (version 9.3: SAS Institute, Cary, NC, U.S.A.).

The study was approved by the Queen's University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board.

RESULTS

Patient Characteristics

Median age at diagnosis was 77 years (range: 70–96 years), and most patients ($n = 54$, 73%) were men. At presentation, 64% of the patients ($n = 47$) had an ECOG performance status of 0 or 1, and 61% of patients ($n = 45$) had a score of 0 or 1 on the CCI. Table I lists the comorbidities commonly reported by patients. Adenocarcinoma was the most common histology ($n = 47$, 63%), followed by squamous cell carcinoma ($n = 24$, 32%). Most patients ($n = 53$, 72%) had lower-third or GEJ cancer. Compared with the curative-intent group, the noncurative-intent group contained a larger proportion of patients with a poor ECOG performance status and a higher score on the CCI. Dysphagia was the most common presenting symptom ($n = 68$, 92%).

Treatment Characteristics and Tolerability

Table II lists the treatment details for the curative- and noncurative-intent groups. Of this patient cohort, 62% ($n = 46$) underwent curative-intent treatment, with most ($n = 43$, 93%) receiving concomitant CRT; 3 patients received RT alone. Of the 46 patients who received high-dose RT, most ($n = 44$, 96%) received 50 Gy in 25 fractions over 5 weeks delivered as 3-dimensional conformal RT. Most patients ($n = 44$, 96%) completed at least 95% of the prescribed RT dose; only 2 patients required a short break during treatment. The 2 patients who did not complete RT (both in the CRT group) were recorded as deaths during treatment (cause of death not available). High-dose RT alone was given in 3 patients, 2 of whom declined chemotherapy; the remaining patient was considered unfit for chemotherapy because of comorbidities.

Among the 43 patients who underwent concomitant CRT, 53% ($n = 23$) received 5-fluorouracil and cisplatin; carboplatin was substituted for cisplatin in 35% ($n = 15$) because of nephrotoxicity or ototoxicity. Of the 43 patients, 38 patients (88%) completed concomitant chemotherapy as planned. Only 23% patients ($n = 8$) received an additional 1–2 cycles of post-CRT chemotherapy. In the 1st cycle, 37% ($n = 16$) had a baseline dose reduction (range: 15%–25%), and in the 2nd cycle, 49% had a dose reduction (range: 15%–40%). The common reasons for dose reduction at the start were elevated creatinine ($n = 6$, 38%) and age ($n = 5$, 31%).

Three patients underwent surgery. The surgery was aborted in 1 patient because of severe fibrosis, and 1 patient died intraoperatively before resection, secondary to ventricular tachycardia followed by cardiac arrest. One patient underwent esophagectomy and gastric pull-through surgery without complication.

Of the 28 patients who did not undergo curative treatment, 20 (71%) received palliative external-beam RT ($n = 19$; median dose: 20 Gy in 5 fractions) or brachytherapy ($n = 1$; 18 Gy in 3 fractions). A stent was placed in 5 patients (18%). One patient received epirubicin, cisplatin, and 5-fluorouracil–based chemotherapy.

Treatment Toxicities

Table III lists the acute treatment-related toxicities that occurred. One third of the patients ($n = 14$) experienced grade 3 or greater toxicities, and 12% ($n = 5$) experienced grade 4 or greater toxicities. Two patients (5%) died during treatment (cause of death not available).

TABLE I Patient and disease characteristics at diagnosis

Characteristic	Treatment group	
	Curative	Noncurative
Age (years)		
Median	74.5	81.5
Range	70–88	70–96
Sex [*n* (%)]		
Women	11 (23.9)	9 (32.1)
Men	35 (76.1)	19 (67.9)
Histology [*n* (%)]		
Adenocarcinoma	31 (67.4)	16 (57.1)
Squamous cell carcinoma	13 (28.3)	11 (39.3)
Undifferentiated carcinoma	2 (4.3)	0
No tissue diagnosis	0	1 (3.6)
Stage [*n* (%)]		
I	4 (8.7)	1 (3.6)
II	26 (56.5)	17 (60.7)
III	16 (34.8)	10 (35.7)
Primary tumour site [*n* (%)]		
Upper, middle, or overlap	10 (21.7)	11 (39.3)
Distal or GEJ	36 (78.3)	17 (60.7)
ECOG PS [*n* (%)]		
0	8 (17.4)	0 (0.0)
1	28 (60.9)	11 (39.3)
2	9 (19.6)	11 (39.3)
≥3	1 (2.1)	6 (21.4)
Score on the CCI [*n* (%)]		
0	17 (37.0)	8 (28.6)
1	13 (28.2)	7 (25.0)
≥2	16 (34.8)	13 (46.4)
Comorbidity [*n* (%)]		
Hypertension	28 (60.9)	10 (35.7)
Diabetes	15 (32.6)	9 (32.1)
COPD	9 (19.6)	11 (39.3)
Atrial fibrillation	6 (13.0)	2 (7.1)
Myocardial infarction	7 (15.2)	2 (7.1)
Renal impairment	9 (19.6)	4 (14.3)
Peripheral vascular disease	2 (4.3)	5 (17.9)
GERD	16 (34.8)	5 (17.9)
Initial presentation [*n* (%)]		
Dysphagia	44 (95.7)	24 (85.7)
Bleeding	7 (15.2)	11 (39.3)
Odynophagia	15 (32.6)	8 (28.6)

GEJ = gastroesophageal junction; ECOG PS = Eastern Cooperative Oncology Group performance status; CCI = Charlson comorbidity index; COPD = chronic obstructive pulmonary disease; GERD = gastroesophageal reflux disease.

Morbidities included hospital admission (n = 9, 21%), febrile neutropenia (n = 2,5%), and emergency room visits (n = 3, 7%). Median weight loss during curative treatment (weeks 1–5) was 3.5% (range: –9.8% to +1.4%). A gastrostomy (G-tube) was placed in 6 patients (14%: 5 before treatment, 1 during treatment). One patient required the G-tube for more than 3 months after treatment. Strictures requiring dilatation developed in 8 patients (18%). Patients who were still alive at 6 months and 1 year experienced a median weight loss of, respectively, 5.1% (range: –16.5% to +13.4%) and 3.8% (range: –15.6% to +5.5%) compared with pre-treatment baseline. No other late toxicities were documented.

On chart review, no toxicities and no strictures were documented for patients who underwent palliative RT.

Treatment Outcomes

Of patients who presented with dysphagia, 81% (n = 55) experienced an improvement of at least 1 point in Mellow–Pinkas score at 1–2 months after treatment. Similarly, 78% of patients who presented with dysphagia and who underwent palliative RT (n = 14) improved after treatment. Of the patients who completed curative CRT, 71% (n = 29) underwent a post-treatment upper-gastrointestinal endoscopy and biopsy. No residual disease was evident in 86% of those patients (n = 25).

TABLE II Treatment characteristics

Variable	Value
Curative intent treatment group (n=*46*)	
Treatment [*n* (%)]	
Chemoradiotherapy	40 (87.0)
Radiotherapy (RT) alone	3 (6.5)
Chemoradiotherapy plus surgery	3 (6.5)
Delivered RT dose (Gy)	50 (50–50.4)
Received ≥95% prescribed RT dose [*n* (%)]	44 (95.6)
Chemotherapy regimen [*n* (%)]	
Fluorouracil–cisplatin	23 (53.5)
Fluorouracil–carboplatin	15 (34.9)
Paclitaxel–carboplatin	3 (7.0)
Fluorouracil–mitomycin	1 (2.3)
Clinical trial	1 (2.3)
Cycles of chemotherapy [*n* (%)]	
≥2 Cycles of fluorouracil or 5 weeks of paclitaxel	38 (88.4)
Additional cycles [*n* (%)][a]	8 (22.9)
Chemotherapy dose reduction	
Cycle 1 (*n*=39)	
Dose reduction	14 (35.9)
Reason for dose reduction	
Age	4 (28.6)
Comorbidity	1 (7.1)
Elevated creatinine	5 (35.7)
Unknown	4 (28.6)
Discontinued cycle 2	3 (7.7)
Cycle 2 (*n*=35)	
Dose reduction	17 (45.6)
Change cisplatin to carboplatin	2 (5.7)
Delayed cycle 2	4 (11.4)
Paclitaxel–carboplatin (*n*=3)	
Dose reduction	2 (66.7%)
Reason for dose reduction	
Age	1 (50.0)
Elevated creatinine	1 (50.0)
Non-curative intent treatment group (n=*28*)	
Palliative RT	20 (71.4)
Stenting	5 (17.9)

[a] After concomitant chemoradiotherapy.

TABLE III Acute toxicity during curative-intent treatment[a]

Toxicity	Frequency
Any grade 2 or greater [*n* (%)]	25 (59.5)
Any grade 3 or greater [*n* (%)]	12 (28.6)
Any grade 4 or greater [*n* (%)]	3 (7.1)
Esophagitis [*n* (%)]	
Grade 2	8 (19.1)
Grade 3	1 (2.4)
Mucositis [*n* (%)]	
Grade 2	5 (11.9)
Grade 3	1 (2.4)
Diarrhea [*n* (%)]	
Grade 2	1 (2.4)
Vomiting [*n* (%)]	
Grade 2	2 (4.8)
Grade 3	3 (7.1)
Weight change	
Median (%)	–3.5
Range (%)	–9.8 to +1.4
≥5% loss [*n* (%)]	5 (11.9)
Infection [*n* (%)]	
Grade 3	4 (9.5)
Neutropenia [*n* (%)]	
Grade 2	6 (14.3)
Grade 3	3 (7.1)
Grade 4	2 (4.8)
Thrombocytopenia [*n* (%)]	
Grade 2	1 (2.4)
Grade 3	2 (4.8)
Grade 4	2 (4.8)
Anemia [*n* (%)]	
Grade 2	3 (7.1)

[a] In 42 patients (excludes 1 patient who received treatment elsewhere, and 3 patients who received radiation alone).

Survival and Recurrence

Median follow-up was 61.6 months. At the time of analysis, 8 patients remained alive, and 2 had been lost to follow-up. The 5-year OS for patients who underwent curative-intent treatment was 22.8% (95% CI: 11.3% to 36.7%). Median OS in that group was 18.6 months (95% CI: 13.0 to 28.0 months), significantly longer than in the patients who did not undergo curative-intent treatment (median OS: 8.8 months; 95% CI: 6.7 to 11.9 months; $p < 0.0001$; Figure 1). Neither age (<80 years vs. ≥80 years, $p = 0.412$), sex ($p = 0.975$), nor histology ($p = 0.927$) was found to be significantly associated with OS by the log-rank test. The median distant metastasis-free survival for patients who received curative-intent treatment was 16.3 months (95% CI: 12.8 to 27.1 months), which was significantly better than that for the noncurative-intent group (8.0 months; 95% CI: 6.7 to 11.7 months; $p < 0.0001$) by the log-rank test (Figure 2).

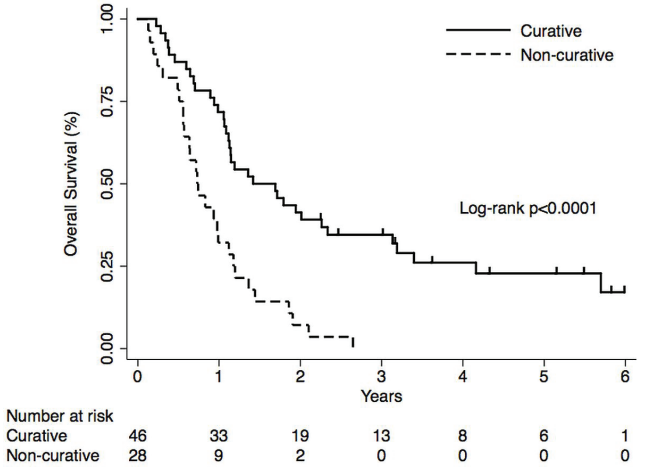

FIGURE 1 Overall survival for patients with esophageal or esophageal junction cancer receiving or not receiving curative treatment.

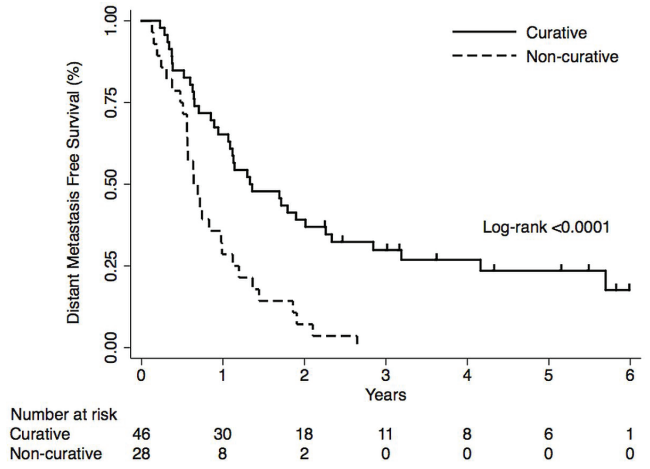

FIGURE 2 Distant metastasis-free survival for patients with esophageal or esophageal junction cancer receiving or not receiving curative treatment.

For the 39 patients who survived after curative-intent treatment and who had no persistent disease after treatment, the median DFS was 20.6 months (95% CI: 11.3 to 32.8 months) with a DFS at 1 and 5 years of 66.7% (95% CI: 49.6% to 79.1%) and 25.9% (95% CI: 13.0% to 41.0%) respectively. Recurrence developed in 16 of the 39 patients (41%), and of those recurrences, 88% ($n = 14$) developed within 2 years. Patterns of failure were local ($n = 5$, 31%), distant ($n = 5$, 31%), and both regional and distant ($n = 6$, 38%).

Multivariate analysis revealed that, after adjustment for age, tumour stage, score on the CCI, and ECOG performance status, patients who received curative-intent treatment—compared with those who did not undergo such treatment—experienced a significant survival benefit (hazard ratio: 0.35; 95% CI: 0.18 to 0.69; $p = 0.0024$). Age, stage, score on the CCI, and ECOG performance status had no significant associations with OS in the multivariate analysis (Table IV).

Factors Affecting Treatment Decision

The reasons commonly recorded for not receiving curative treatment were patient's decision ($n = 13$, 46%) and physician recommendation because of comorbidities or inadequate performance status, or both ($n = 13$, 46%). In 1 patient (4%), curative-intent CRT was not offered because of concerns with the presence of tracheoesophageal fistula, and in 1 patient, the reason was unknown. Of patients 70–79 years of age, 78% received curative treatment; in contrast, only 32% of patients 80 years of age and older received curative treatment. After adjustment for ECOG performance status and score on the CCI, the odds of not receiving curative treatment was higher by a factor of 8.5 (95% CI: 2.5 to 28.7; $p < 0.0001$) for the patients 80 years of age and older than for those 70–79 years of age. Eastern Cooperative Oncology Group performance status (ECOG 2–4 vs. ECOG 0–1) was found to be a significant independent predictor for receipt of curative-intent treatment (odds ratio: 6.8; 95% CI: 2.0 to 22.4; $p = 0.0018$); score on the CCI (1 vs. 0) was not a significant predictor (odds ratio: 1.4; 95% CI: 0.4 to 5.1; $p = 0.58$).

TABLE IV Adjusted treatment effect on overall survival by multivariate Cox proportional hazards model

Variable	HR	95% CI	*p* Value
Curative vs. noncurative	0.353	0.184 to 0.692	0.0024
AJCC stage			
I	0.486	0.147 to 1.606	0.236
II	Reference		
III	1.037	0.609 to 1.765	0.894
ECOG PS 2–4 vs. 0–1	1.598	0.902 to 2.830	0.108
Score on the CCI ≥1 vs. 0	1.500	0.866 to 2.600	0.148
Age	0.981	0.933 to 1.031	0.738

HR = hazard ratio; CI = confidence interval; AJCC = American Joint Committee on Cancer (7th edition); ECOG PS = Eastern Cooperative Oncology Group; CCI = Charlson comorbidity index.

DISCUSSION

Here, we share our experience of a cohort of older patients presenting with esophageal or GEJ cancer who were treated at a Canadian cancer centre. To our knowledge, our series is the first to compare outcomes for older patients presenting with localized disease depending on whether they underwent curative or noncurative treatment—a situation that is representative of real-life practice patterns. Previous reports have generally been limited in terms of inclusion of older patients with good performance status and limited comorbidities[9,13].

A few small studies have demonstrated that CRT is feasible, with a reasonable toxicity profile, in geriatric patients[9–13]. However, substantial morbidity from curative treatment for esophageal and GEJ cancer remains a concern[14]. We report a high completion rate for planned CRT. For older patients, other authors have reported completion rates for prescribed RT in the range 78%–100% and for chemotherapy in the range 58%–97%[9,10,12–14].

Despite advances in management options and supportive care, esophageal and GEJ cancer continue to be associated with a poor prognosis. Earlier studies reported a median OS ranging between 12 and 15.2 months for older patients receiving curative treatment[10–14]; an exception is the 22-patient series reported by Anderson *et al.*[9], who reported a median OS of 35 months. In our study, the median 5-year OS for patients receiving curative-intent treatment was 19 months, comparable to the durations found in well-conducted clinical trials evaluating curative treatment approaches in younger patients (median OS: 12.5–18.1 months)[15,24,25].

Based on multivariate analysis, a single-institute experience reported by Takeuchi *et al.*[10] suggested that the efficacy of definitive CRT was decreased in patients more than 71 years of age compared with younger patients. Tougeron *et al.*[12] reported that, by multivariate analysis, OS was not significantly different for patients 70–75 of age and those more than 75 years of age. In our study, age was not found to be significantly associated with OS on either univariate or multivariate analysis. Some studies have also suggested that, after careful adjustment for comorbidities, age itself has no effect on survival in patients with esophageal cancer[26,27].

Based on data from Canada and the United States, older patients are less frequently referred to cancer specialists, and outcomes in such patients are poorer[2,8]. In the present study, we observed that fewer than one third of the patients 80 years of age and older underwent curative-intent treatment. The odds of not receiving curative treatment were higher by a factor of 8.5 in the older group than in patients 70–79 after adjustment for performance status and comorbidities. That pattern of practice reflects the dilemma in managing older patients with esophageal and GEJ cancer. In our study, approximately half the noncurative-intent group were deemed fit enough for curative treatment by physicians, but declined treatment. Our small sample precluded our ability to compare outcomes for the patients who were fit but declined treatment with those for the curative-intent group. Exploring the understanding that patients have about their disease, probing for their values and beliefs, and counselling them based on all treatment options should be encouraged for this group of patients.

Interestingly, on multivariate analysis, the comorbidity score on the CCI was not found to be an independent predictor for receipt of curative-intent treatment, and yet clinic notes showed that 46% of patients did not receive curative-intent treatment because of comorbidities or poor performance status (or both). That observation is likely attributable to instrumental limitations of the CCI score to assess comorbidities, the retrospective nature of our review, and the small sample size.

Our study is limited by its retrospective nature and by some heterogeneity in treatment, reflecting varied and evolving evidence influencing practice patterns during a 7-year period at our centre. Staging was often based on endoscopy with a biopsy, followed by computed tomography and positron-emission tomography imaging. Intraluminal ultrasonography was not routinely performed for staging purposes at our institute. We had no systematic oncogeriatric assessment, and performance status was collected retrospectively based on clinical parameters. Despite careful adjustment, residual confounding by indications might remain.

Attempting a radical surgical approach among older patients remains controversial because of a potentially higher postoperative complication rate, morbidity, and mortality. The overall morbidity for esophagectomy is estimated to range between 25% and 50%[28]. Although some surgical series suggest that medical comorbidities, rather than actual age, are the most important factors in predicting perioperative morbidity and mortality[26,27,29], advanced age appears to be an independent risk factor for perioperative mortality in other reports[8,30].

Trimodality therapy using CRT followed by surgery has been shown to be associated with the best outcomes for patients with localized esophageal and GEJ cancer[17]. However, based on the U.S. Surveillance, Epidemiology, and End Results database study and on single-institute reviews[11,12,14,31], only a small proportion of older patients (5%–18%) actually underwent surgery after CRT. The low number of surgical patients in our study is consistent with the general pattern of practice in this age group. Most patients in younger age groups at our centre underwent trimodality treatment, with a perioperative mortality of 2.2% during the relevant time period (data not shown).

Quality of life after CRT has been shown to be somewhat worse at 6 weeks and mostly restored by 3 months[13]. In our study, 81% of patients receiving curative-intent treatment experienced dysphagia relief 1–2 months after completion of RT. We defined dysphagia relief as an improvement of at least 1 point in the Mellow–Pinkas score, which is well-described in the literature and has been adopted in cost-effectiveness analyses[32,33]. However, a significant proportion of the patients (18%) developed an esophageal stricture that required endoscopic dilatation. Only a small proportion of our patients (13%) required temporary feeding tubes. A similar observation was reported by Anderson *et al.*[9], none of whose 25 patients required a feeding tube. We do not recommend prophylactic G-tube placement for all older patients undergoing

curative CRT. Survival results and clinical remission rates from our experience with curative-intent treatment indicate that aggressive therapy can be appropriate for older patients when selection is appropriately carried out.

Although local recurrence is a significant concern, most of our relapsing patients experienced a distant relapse. Only 23% of the patients received additional chemotherapy after completion of concomitant CRT. Further research into effective systemic agents and the role of additional chemotherapy cycles is warranted. Most relapses (88%) occurred within 2 years, and closer follow-up is suggested for that period of time.

CONCLUSIONS

In our cohort of patients 70 years of age and older, curative-intent treatment for esophageal and GEJ cancer was associated with a clinically significant survival benefit. An encouraging 23% long-term survivorship was observed in this group, which is comparable to that in younger patients participating in previously published randomized controlled trials. Curative treatment for patients 70 years of age and older has tolerable toxicity, with significant symptomatic benefit. Nevertheless, after adjustment for performance status and comorbidities, far fewer of the patients 80 years of age and older, compared with those 70–79 years of age, underwent curative treatment. Curative-intent treatment for esophageal and GEJ cancer should be considered in older patients with a reasonable performance status. We recommend that all patients with esophageal and GEJ cancer be considered for multidisciplinary discussion and consultations. Informed counselling of patients and their families concerning a curative treatment approach and efforts to increase the awareness of oncology care providers are suggested.

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CONFLICT OF INTEREST DISCLOSURES

We have read and understood *Current Oncology*'s policy on disclosing conflicts of interest, and we declare that we have none.

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