Symptoms, investigations and management of patients with cancer of the oesophagus and gastro-oesophageal junction in Australia

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ABSTRACT

Objective: To document presenting symptoms, investigations and management for Australian patients with oesophageal adenocarcinoma (OAC), gastro-oesophageal junction adenocarcinoma (GOJAC) and oesophageal squamous cell carcinoma (OSCC).

Design, setting and participants: Cross-sectional study of a population-based sample of 1100 Australian patients aged 18–79 years with histologically confirmed oesophageal cancer diagnosed in 2002–2005, using data from cancer registries and treatment centres, supplemented with clinical information collected through medical record review in 2006–2007 and mortality information collected in 2008.

Main outcome measures: Prevalence of primary symptoms, and staging investigations and treatment modalities used.

Results: The primary presenting symptom was dysphagia, which was self-reported by 41%, 39% and 48% of patients with OAC, GOJAC and OSCC, respectively. Less common symptoms were reflux, chest pain, bleeding and weight loss. All patients underwent endoscopy, most had a staging computed tomography scan (OAC 93%, GOJAC 95% and OSCC 93%), and about half had positron emission tomography scans (OAC 51%, GOJAC 44% and OSCC 42%). Pretreatment tumour stage was reported in 25% of records, and could be derived from results of investigations in a further 23%, but the remaining half lacked sufficient information to ascribe a pretreatment stage. Curative treatments were attempted for 60% of OAC, 88% of GOJAC and 65% of OSCC patients. Surgery was performed on 52% of OAC, 83% of GOJAC and 41% of OSCC patients. About two-thirds of surgical patients received additional therapies.

Conclusions: With anticipated increases in oesophageal cancer incidence, the resources required to diagnose and manage patients with oesphageal cancer are also likely to rise. Our data provide a baseline from which to plan for the future care of patients with cancers of the oesophagus.

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In Australia, oesophageal cancer represents 1.2% of all cancers and is responsible for 2.1% of cancer deaths. Recently, there has been a striking increase in oesophageal adenocarcinoma (OAC) incidence, estimated at 4.2% per year in New South Wales,[1] whereas the incidence of oesophageal squamous cell carcinoma (OSCC) has declined. Almost all of the increase in OAC incidence has occurred in males, contributing to a male–female ratio approaching 8 to 1.[1] Gastro-oesophageal junction adenocarcinoma (GOJAC) has also increased in incidence. The incidence patterns for OAC and GOJAC contrast with those for OSCC. This parallels trends observed in other Western countries[2,3] and is not due to changes in diagnostic criteria.[4] The principal causes of the increase in OAC (and probably GOJAC) are thought to be increased prevalence of gastro-oesophageal acid reflux and obesity in Western populations.[5-11] Changing patterns of obesity appear to be driving the rising incidence of OAC, with particular attention focusing on "male pattern" central adiposity, which is postulated to increase the production of mitogenic, obesity-related hormones.[12,13] Falling rates of *Helicobacter pylori* infection may also play a role, as chronic infection causes hypochlorhydria and thus protects against reflux-mediated carcinogenesis.[14]

The prognosis for patients diagnosed with these cancers is poor; 1-year survival for patients with OAC in a NSW study was 49% for localised cancer, 43% for cancers with regional spread and 12% for disseminated cancers.[1] Yet despite the rapid increases in incidence and the poor survival from oesophageal cancers, relatively little is known about the patterns of care for patients with these diseases. Here we report the findings of an investigation into the presentation and clinical management of a cohort of patients with carcinomas of the oesophagus or gastro-oesophageal junction.

METHODS

Our study was based on a cohort of patients previously enrolled in the Australian Cancer Study (ACS), a population-based, case–control study undertaken to investigate risk factors for oesophageal cancer.[6] For our study (the ACS Clinical Follow-up Study), we collected clinical information and outcome data on ACS patients. We collected data on the presenting symptoms of patients, investigations and treatment pathways.

Patients

For the ACS, all patients aged 18–79 years with a histologically confirmed primary invasive cancer of the oesophagus or gastro-oesophageal junction diagnosed between 1 July 2002 (1 July 2001 in Queensland) and 30 June 2005 in mainland Australia were identified. Full details of recruitment of patients into the ACS have been described elsewhere.[6] Briefly, patients were ascertained principally via systematic review of admissions and clinic registers at major treatment centres throughout Australia; additional cases were identified by cancer registries (cancer notification is mandatory in all states). Histological details were abstracted from pathology reports. Anatomical sites of adenocarcinoma tumours were categorised according to the World Health Organization classification into "oesophageal" and "oesophago-gastric junction" tumours.[15] For analysis, we compared patients with OAC, GOJAC and OSCC.

Our study was approved by the Human Research Ethics Committee of the Queensland Institute of Medical Research and the ethics committees of participating hospitals. All participants gave their informed consent to take part.

Data collection

Two sources of data were used: prediagnostic symptom information self-reported by patients at the time of their recruitment into the ACS, and clinical and treatment information obtained from each patient's medical records.

Thus, patients self-completed a questionnaire on recruitment into the ACS (2002–2005), followed shortly after by a standardised interview to elicit details of symptom history, presentation, and pathway to diagnosis. Case–control analyses to identify risk factors for oesophageal cancer have been reported separately.[5-7]

Clinical data were abstracted from each patient's medical records by trained nurses in 2006–2007 and entered on standardised case report forms. Medical records included hospital files and reports from private practitioners and pathology, radiology, and other imaging services. Information was collected on presenting symptoms, diagnostic and staging investigations, clinical stage of disease, and management. For the latter, details were recorded regarding chemotherapy, radiotherapy, other endoscopic treatments and surgery that the patient received. Outcome information was also collected, including details of dates of admission, discharge (or death) for each episode of treatment, date of last recorded outpatient attendance, and disease status.

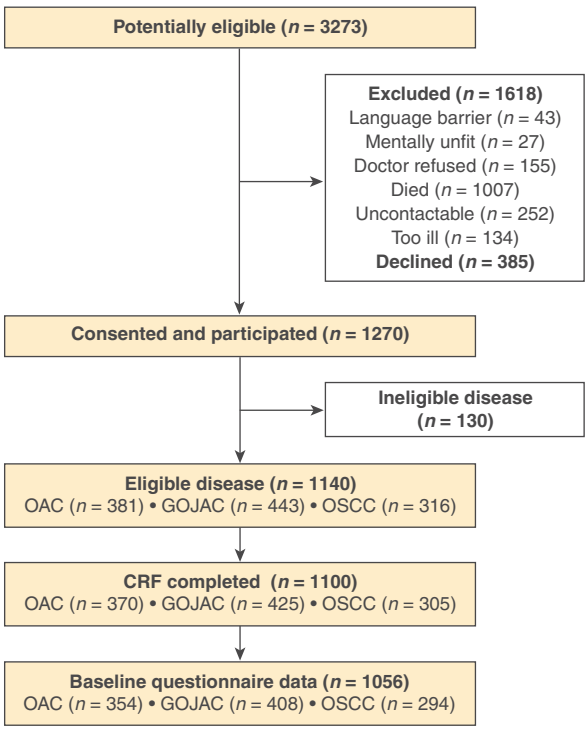
Case report forms were returned to the Queensland Institute of Medical Research for data coding and checking. Summary variables were derived from primary variables for analysis. We used the American Joint Committee on Cancer (AJCC) tumour stage classification for oesophageal cancer, when reported. For cases with missing stage data, we attempted to impute the stage using available information.

We assigned each participant an index of remoteness and accessibility to services based on their residential postcode using the 2006 Accessibility/Remoteness Index of Australia codes from the Australian Government Department of Health and Ageing (http://www9.health.gov.au/aria/ariainpt.cfm).

Data analysis

We compared age distributions across subtypes using one-way analysis of variance. For categorical variables, we used the χ^2 test. Analyses were performed using SAS version 9.2 (SAS Institute Inc, Cary, NC, USA), statistical significance was assumed at the 5% level, and no adjustments were made for multiple comparisons.

1 Recruitment of patients into the ACS Clinical Follow-up Study



ACS = Australian Cancer Study. CRF = case report form. GOJAC = gastro-oesophageal junction adenocarcinoma. OAC = oesophageal adenocarcinoma. OSCC = oesophageal squamous cell carcinoma. ◆

RESULTS

We identified 3273 potentially eligible patients with oesophageal cancer, of whom 1618 were excluded for various reasons and 385 declined to participate (Box 1). Of the remaining 1270, 1140 patients had histologically confirmed oesophageal cancer and gave consent for access to their medical records. Completed case report forms were available for 1100 patients (370 OAC, 425 GOJAC and 305 OSCC) and linked questionnaire data were available for 1056 patients.

Patient demographics are shown in Box 2. Notably, age distributions were similar for the three patient groups, whereas sex distributions were markedly different for OSCC patients compared with OAC and GOJAC patients. Eighty-seven per cent of patients resided in cities and towns, 11% lived in moderately accessible regional locations, and 2% were from remote or very remote locations.

Presenting symptoms

Interview data describing medical presentation and symptom history were available for 831 patients. The primary symptom for which the patient sought medical attention, the prevalence of all symptoms volunteered by the patient, and the prevalence of symptoms as elicited and recorded by the doctor are shown in Box 3. Dysphagia, the most frequent primary symptom, was self-reported by 41%–48% of patients. Gastro-oesophageal acid reflux was self-reported by 7%–9% of patients as the primary reason for presentation but elicited by a doctor in 46% of OAC and 44% of GOJAC patients. As recorded by the doctor, OSCC patients had a higher prevalence of odynophagia than OAC or GOJAC patients, but less reflux. Odynophagia, epigastric pain, chest pain and weight loss were all uncommon reasons for presentation, but were commonly found to be present on direct questioning. Eight per cent and 3% of OAC and GOJAC patients, respectively, were diagnosed through Barrett's oesophagus surveillance programs, and 2%–4% of OAC, GOJAC and OSCC diagnoses were incidental findings from routine health checks.

Investigations

All patients had undergone upper gastrointestinal endoscopy as an eligibility criterion for our study (Box 4). A computed tomography (CT) scan was performed in 93%–95% of patients, a fluorodeoxyglucose positron emission tomography (FDG-PET) scan in 42%–51% of patients, and endoscopic ultrasound (EUS) in 20%–21% of patients. Laparoscopy was more commonly performed in the GOJAC group than the OAC and OSCC groups.

Pretreatment staging

An AJCC stage was reported in 7% of patient records (range, 5%–10%) (Box 5); converting tumour–node–metastasis (TNM) codes into AJCC tumour stages increased the overall proportion of patients with stage data to 25% (range, 23%–27%). Imputation using the FDG-PET scan result for M status and EUS for T and N status increased the overall proportion of patients with stage data to

2 Demographic characteristics of patients in the ACS Clinical Follow-up Study*

Characteristic	OAC (*n* = 370)	GOJAC (*n* = 425)	OSCC (*n* = 305)	*P*
Mean age (SD) at diagnosis, years	63.5 (9.6)	63.3 (9.7)	64.7 (9.3)	0.14
Men	334 (90%)	370 (87%)	172 (56%)	< 0.001
Education†				< 0.001
School only	167 (47%)	167 (41%)	165 (56%)	
Technical college or diploma	165 (47%)	198 (49%)	103 (35%)	
University degree	22 (6%)	43 (11%)	26 (9%)	
Location‡				0.14
Highly accessible or accessible	304 (85%)	365 (88%)	248 (86%)	
Moderately accessible	40 (11%)	44 (11%)	35 (12%)	
Remote or very remote	13 (4%)	4 (1%)	6 (2%)	

ACS = Australian Cancer Study. GOJAC = gastro-oesophageal junction adenocarcinoma. OAC = oesophageal adenocarcinoma. OSCC = oesophageal squamous cell carcinoma. * Data are number (%) except where otherwise specified. † Education self-reported in questionnaires returned by 354 OAC, 408 GOJAC and 294 OSCC patients. ‡ Based on residential postcodes using the 2006 Accessibility/Remoteness Index of Australia. Data were missing for 41 patients. ◆

49% (range, 47%–50%). However, for about half of the patients, there were insufficient data to estimate pretreatment cancer stage.

Treatment

Curative treatments were attempted for 60% (222/370) of OAC, 88% (372/425) of GOJAC, and 65% (197/305) of OSCC patients. Overall, 72% of patients were treated with curative intent, of whom the majority (61%) had surgical resection (Box 6). Of patients offered curative therapy, those with OAC or GOJAC were more likely to have surgery than those with OSCC. Among surgical patients, preoperative (neoadjuvant) therapy was performed on similar proportions of patients with OAC, GOJAC and OSCC. Preoperative chemoradiotherapy (CRT) was used more commonly than preoperative chemotherapy alone. Postoperative therapy was performed most frequently for patients with GOJAC followed by patients with OSCC and those with OAC.

The most common palliative therapy was CRT. Stents were used for 168 patients (for 98 patients as immediate palliative treatment, and for 70 patients after initial attempts at curative treatment). No patient who had a resection had a stent inserted.

DISCUSSION

Our study provides the first comprehensive description of the presentation and management of Australian patients with oesophageal cancer. The cohort is not entirely representative, as enrolment into the study required a number of time-limiting steps, which meant that records for some potentially eligible patients could not be reviewed. For example, patients with late-stage disease (AJCC stages III or IV) were less likely to be enrolled, and we could not access files for patients who died before written consent could be obtained. This means that we may have underestimated the prevalence of such tumours, and thus probably overestimated the proportions of patients offered curative therapies.

Nonetheless, our study provides the first overall "snapshot" of these cancers and their management in Australia. The sample was also large, comprising an estimated 35% of all people in mainland Australia diagnosed with oesophageal cancer during the study period.

In a country defined by large distances and a dispersed population, the issue of access is important. Reassuringly, we found the geographical distribution of this cohort was similar to that of the 2001 census.

The most common presenting symptom was dysphagia, which on direct questioning was found to be present in over 70% of patients, a proportion similar to that found in other studies.[16,17] Dysphagia occurs when the oesophageal circumference has been reduced by two-thirds,[18] which is sufficient to compromise the lumen. The United Kingdom guidelines for managing oesophageal cancer outline a number of "alarm symptoms", of which dysphagia is the first, and for which referral for endoscopy is recommended within 2 weeks of presentation.[19] Our data suggest most patients do not recognise the importance of dysphagia as an alarm symptom. Only 7%–9% of patients reported reflux as their primary symptom, a similar proportion to that reported in a

3 ACS Clinical Follow-up Study: reasons for presentation self-reported by patient* and recorded by doctor in clinical files

	Primary reason self-reported by patient			All reasons self-reported by patient				All reasons recorded by doctor†			
Symptom	OAC (*n* = 291)	GOJAC (*n* = 317)	OSCC (*n* = 223)	OAC (*n* = 291)	GOJAC (*n* = 317)	OSCC (*n* = 223)	*P*	OAC (*n* = 370)	GOJAC (*n* = 425)	OSCC (*n* = 305)	*P*
Odynophagia	11 (4%)	16 (5%)	12 (5%)	29 (10%)	31 (10%)	26 (12%)	0.752	62 (17%)	93 (22%)	107 (35%)	< 0.001
Dysphagia	119 (41%)	125 (39%)	106 (48%)	156 (54%)	169 (53%)	138 (62%)	0.095	261 (71%)	294 (69%)	255 (84%)	< 0.001
Epigastric pain	9 (3%)	6 (2%)	5 (2%)	15 (5%)	12 (4%)	10 (4%)	0.716	87 (24%)	100 (24%)	82 (27%)	0.567
Reflux‡	23 (8%)	30 (9%)	16 (7%)	36 (12%)	45 (14%)	28 (13%)	0.768	170 (46%)	188 (44%)	85 (28%)	< 0.001
Weight loss	3 (1%)	7 (2%)	7 (3%)	17 (6%)	24 (8%)	22 (10%)	0.233	184 (50%)	184 (43%)	157 (51%)	0.062
Bleeding	15 (5%)	9 (3%)	3 (1%)	18 (6%)	14 (4%)	6 (3%)	0.168	25 (7%)	25 (6%)	6 (2%)	0.012
Chest pain	13 (4%)	15 (5%)	8 (4%)	27 (9%)	23 (7%)	15 (7%)	0.505	19 (5%)	21 (5%)	19 (6%)	0.727
Other	64 (22%)	81 (26%)	52 (23%)	85 (29%)	128 (40%)	80 (36%)	0.015	88 (24%)	112 (26%)	73 (24%)	0.645

ACS = Australian Cancer Study. GOJAC = gastro-oesophageal junction adenocarcinoma. OAC = oesophageal adenocarcinoma. OSCC = oesophageal squamous cell carcinoma. * Symptoms self-reported by patient at telephone interview. † Number of patients with missing data in each category: odynophagia (26), dysphagia (25), epigastric pain (27), reflux (28) and weight loss (25). ‡ Gastro-oesophageal acid reflux. ◆

4 ACS Clinical Follow-up Study: investigations

Pretreatment	OAC ($n = 370$)	GOJAC ($n = 425$)	OSCC ($n = 305$)	*P*
Endoscopy	370 (100%)	425 (100%)	305 (100%)	
CT scan	344 (93%)	402 (95%)	284 (93%)	0.589
FDG-PET scan	187 (51%)	187 (44%)	127 (42%)	0.050
EUS	74 (20%)	91 (21%)	61 (20%)	0.853
Laparoscopy	57 (15%)	123 (29%)	31 (10%)	< 0.001
Barium swallow	46 (12%)	50 (12%)	55 (18%)	0.035
Bronchoscopy	4 (1%)	6 (1%)	24 (8%)	< 0.001
Other investigation	151 (41%)	169 (40%)	130 (43%)	0.740

ACS = Australian Cancer Study. CT = computed tomography. EUS = endoscopic ultrasound. FDG-PET = fluorodeoxyglucose positron emission tomography. GOJAC = gastro-oesophageal junction adenocarcinoma. OAC = oesophageal adenocarcinoma. OSCC = oesophageal squamous cell carcinoma. ◆

previous study.[16] The underlying precipitant for these patients may have been a change, likely worsening, of previous reflux symptoms or the development of new symptoms.

A key finding was the infrequent recording of AJCC pretreatment tumour stage (7%), and although stage could be imputed for a further 42%, for about half of the patients it was impossible to determine the extent of their cancer. Of the staging investigations employed, CT scans were the most common, being used in more than 90% of patients in our study. The major benefit of CT is the ability to rapidly identify patients with distant metastases. Staging information is improved by also performing an EUS to assess local infiltration and local nodal status. Relatively few Australian centres were performing EUS at the time of our study, hence the low usage we observed. Compared with conventional staging modalities, FDG-PET scanning has been shown to detect distant metastases in 4%–28% of oesophageal cancer patients and to change management in 3%–40% of patients.[20] Although fewer centres were performing FDG-PET than EUS in Australia at the time of our study, FDG-PET scans were reported for 42%–51% of the patients. Thus, despite limited availability, both FDG-PET scanning and EUS were performed on sizeable numbers of patients, suggesting rapid uptake for these modalities.

Putting aside the extent of incomplete reporting, our study differs from others in having relatively fewer patients with stage IV cancers. For example, a United States study reported stage IV disease in 48% of OAC patients and 52% of GOJAC patients[21] — considerably higher than the proportions we observed. Reporting of cancer stage is not mandatory in Australia, hence there are no reliable population-based data for comparison. Instead, estimates of the distribution of cancer stage must be derived from chart reviews. As the use of chart reviews requires patient consent, and because consent is less likely among patients with late-stage disease, it is likely that all studies based on chart review will underestimate the incidence of late-stage disease.

We identified apparent differences in the surgical management of OAC and GOJAC. Specifically, our data suggest that patients with GOJAC are more likely to undergo surgery alone than OAC or OSCC patients. A similar finding was reported in an Irish study.[22] Information bias may partly explain these differences, as the location of a tumour can be identified more precisely from surgical resection specimens than from endoscopy. Thus, patients who have undergone surgery are more likely to have the anatomical location of their tumour classed as gastro-oesophageal junction than patients who have not received surgery.

The proportion of surgical patients undergoing preoperative (neoadjuvant) therapy in our study was lower than the proportion in the US study[21] but higher than that found in the Irish study.[22] At the time that the patients in our study were being treated, there had been one international report of benefit from neoadjuvant CRT in patients with OAC,[23] and one account of benefit from preoperative chemotherapy in both OAC and OSCC patients.[24] An Australian phase II study assessing the role of neoadjuvant CRT and CRT alone for cure and palliation of OAC and OSCC had

5 ACS Clinical Follow-up Study: pretreatment staging

Pretreatment AJCC tumour stage	OAC ($n = 370$)	GOJAC ($n = 425$)	OSCC ($n = 305$)
Recorded by doctor			
Total available*	36 (10%)	21 (5%)	19 (6%)
Imputed from doctor's record of TNM codes			
T-stage (T1, T2, T3, T4) recorded by doctor	105 (28%)	129 (30%)	100 (33%)
N-stage (N0, N1) recorded by doctor	106 (29%)	126 (30%)	102 (33%)
M-stage (M0, M1) recorded by doctor	83 (22%)	99 (23%)	83 (27%)
Total available†	99 (27%)	99 (23%)	80 (26%)
Imputed from doctor's record of TNM codes and clinical test results			
T-score from EUS	67 (18%)	84 (20%)	54 (18%)
N-score from EUS	68 (18%)	81 (19%)	53 (17%)
M-score from FDG-PET scan	178 (48%)	177 (42%)	123 (40%)
Total available‡	186 (50%)	208 (49%)	142 (47%)
Stage	($n = 186$)	($n = 208$)	($n = 142$)
I	20 (11%)	26 (13%)	15 (11%)
II	53 (28%)	79 (38%)	51 (35%)
III	43 (23%)	74 (36%)	43 (30%)
IV	70 (38%)	29 (14%)	33 (23%)
Total	186 (100%)	208 (100%)	142 (100%)

ACS = Australian Cancer Study. AJCC = American Joint Committee on Cancer. EUS = endoscopic ultrasound. FDG-PET = fluorodeoxyglucose positron emission tomography. GOJAC = gastro-oesophageal junction adenocarcinoma. OAC = oesophageal adenocarcinoma. OSCC = oesophageal squamous cell carcinoma. TNM = tumour–node–metastasis. * At least AJCC stage I, II, III or IV. † Doctor's record of AJCC stage augmented by doctor's record of TNM code where available. ‡ Doctor's record of AJCC stage augmented by doctor's record of TNM code and endoscopic ultrasound and FDG-PET findings where available. ◆

6 ACS Clinical Follow-up Study: treatment

Treatment	OAC* (*n* = 370)	GOJAC (*n* = 425)	OSCC (*n* = 305)	*P*
No surgery	175 (48%)	72 (17%)	180 (59%)	< 0.001
Surgery	193 (52%)	353 (83%)	125 (41%)	
Treated with curative intent†				< 0.001‡
Definitive chemotherapy and radiotherapy§	29 (13%)	19 (5%)	72 (37%)	
Resection alone	72 (32%)	150 (40%)	48 (24%)	
Resection and neoadjuvant therapy				
Resection and preoperative radiotherapy	0	0	1 (< 1%)	
Resection and preoperative chemotherapy	22 (10%)	32 (9%)	5 (3%)	
Resection and preoperative chemotherapy and radiotherapy	48 (22%)	49 (13%)	27 (14%)	
Resection and adjuvant therapy				
Resection and postoperative radiotherapy	6 (3%)	11 (3%)	13 (7%)	
Resection and postoperative chemotherapy	7 (3%)	41 (11%)	3 (2%)	
Resection and postoperative chemotherapy and radiotherapy	17 (8%)	48 (13%)	14 (7%)	
Resection and combined therapy				
Resection and preoperative and postoperative chemotherapy	3 (1%)	7 (2%)	2 (1%)	
Resection and other combinations	18 (8%)	15 (4%)	12 (6%)	
Total	*222 (100%)*	*372 (100%)*	*197 (100%)*	
Not treated or treated without curative intent§				
No treatment	24 (17%)	3 (6%)	6 (6%)	
Radiotherapy alone	19 (13%)	5 (10%)	16 (15%)	
Chemotherapy alone	24 (17%)	17 (34%)	4 (4%)	
Chemotherapy and non-curative radiotherapy¶	76 (53%)	25 (50%)	80 (75%)	
Total	*143 (100%)*	*50 (100%)*	*106 (100%)*	

ACS = Australian Cancer Study. OAC = oesophageal adenocarcinoma. GOJAC = gastro-oesophageal junction adenocarcinoma. OSCC = oesophageal squamous cell carcinoma. * Two patients in OAC group had missing data on surgery. † Data missing on whether curative or not for three patients in OAC group, three in GOJAC group, and two in OSCC group. ‡ Comparison of curative versus non-curative treatment. § Curative radiotherapy (≥ 50 Gy) targeting the oesophagus. ¶ Non-curative radiotherapy (< 50 Gy) or not targeted at oesophagus. ◆

also been reported before our assessment.[25] It is likely that these publications, along with an active Australian trial of preoperative CRT,[26] raised awareness among Australian clinicians who treat such patients. This could explain the high prevalence of neoadjuvant therapy for OAC and OSCC, and may also explain why 10% of patients in our study were also enrolled in trials. While there is no evidence from trials that routine postoperative therapy improves survival, we observed reasonably high proportions of patients undergoing postoperative therapy. The reasons for this were not clear from the records.

We found that use of definitive CRT in our study was markedly higher for patients with OSCC (37%) than for patients with OAC (13%) or GOJAC (5%). In comparison, the Irish study observed proportions of patients undergoing definitive CRT as 12% for OAC, 6% for GOJAC and 12% for OSCC.[22] A possible explanation for the difference may be a widespread perception among clinicians that adenocarcinomas are less sensitive to radiation than squamous cell carcinomas. There are limited data to determine the validity of this perception; however, there are more publications reporting benefits for CRT as an alternative to resection for OSCC[27,28] than as a treatment for OAC.

From our observation, most patients present with late-stage disease, although precise staging information is infrequently recorded. We encourage efforts to increase the reporting of tumour stage for these cancers. Although dysphagia is common, it is not apparently recognised as an alarm symptom; education to rectify this deficiency may be warranted. Many patients are managed by teams comprising surgeons and medical and radiation oncologists. With the increasing use of combined modality treatment, and the need to use technologies such as EUS and FDG-PET scanning, it would seem that optimal patient management will be through specialist centres with a suitable caseload and interest in the disease. The incidence of OAC and GOJAC is rising rapidly in Australia, a factor which must be considered when planning for future health service needs. Finally, given the high proportion of patients with late-stage disease, and the acknowledged poor survival rates for these cancers, we need to continue to explore ways to reduce the disease burden through primary prevention and early detection.

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COMPETING INTERESTS

None identified.

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