Staging the tumour and staging the host: tumour and host factors and survival of patients undergoing palliative stent insertion for oesophago-gastric cancer

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Abstract

Objectives

Palliative self-expandable metallic stent (SEMS) insertion is common in patients not suitable for resection of oesophago-gastric (OG) cancer. Factors which may determine survival however are not clear. The present study examined the relationship between tumour and host factors, including the systemic inflammatory response, and survival of patients undergoing palliative SEMS insertion.

Methods

Patients with a diagnosis of OG cancer who were considered suitable for palliative SEMS only without systemic therapy were identified. Patient characteristics including Eastern Cooperative Oncology Group performance status, radiological stage and modified Glasgow Prognostic Score (mGPS: 0-CRP≤10mg/L, 1-CRP>10mg/L, 2-CRP>10mg/L, albumin<35g/L) were recorded prospectively. The relationship between such characteristics and three-month survival was examined.

Results

203 patients were included in the final analysis. All patients died during follow-up, with median survival from diagnosis 75 days (interquartile range 47-157). 78% of patients were systemically inflamed (mGPS>1). On multivariate analysis, only poor performance status (HR 1.23, P=0.025), metastatic disease (HR 2.27, P<0.001) and mGPS (HR 1.25, P=0.021) were associated with shorter survival. The combination of performance status and mGPS stratified three-month survival of patients without metastatic disease from 88% to 20% (P<0.001) and patients with metastases from 43% to 6% (P=0.059). Similar results were

observed when analysis was restricted to patients with oesophageal and junctional cancer (M0: 83% to 20%, *P*=0.008; M1: 33% to 8%, *P*=0.082).

Conclusion

Performance status, metastatic disease and mGPS are independent predictors of survival in patients with OG cancer undergoing palliative SEMS insertion. These routinely available markers provide a rational system on which to base decisions regarding prognosis and treatment.

Keywords: Gastrointestinal (upper); prognosis; dysphagia. Self-expandable metallic stent; systemic inflammation

INTRODUCTION

Several modalities have now been established for the palliation of patients with advanced or inoperable oesophago-gastric (OG) cancer. Although maximal survival benefit can be obtained from the use of systemic palliative chemotherapy,[1] patient frailty and comorbidity may preclude its use. Furthermore, significant symptoms, such as dysphagia and vomiting secondary to gastric outlet obstruction, may necessitate more urgent and direct palliation. Insertion of a self-expandable metallic stent (SEMS) is a feasible option for palliation, and is effective in the rapid alleviation of significant dysphagia, a distressing symptom.[1-3] Given that the procedure may be performed with only a brief hospital stay, SEMS insertion is a useful adjunct in the management of a patient group with limited life expectancy.[1, 4, 5]

Stent insertion may be effective in the short term, however may be associated with a high risk of morbidity and re-intervention.[6] Other modalities, such as brachytherapy may have similar long-term efficacy with less risk of morbidity but with a slower resolution of dysphagia.[1, 7, 8] Although of limited benefit in patients with extremely poor prognosis, such treatments may be more appropriate for patients with a reasonable life expectancy.[1, 9] Identifying tumour and host characteristics which may guide prognosis in this patient group would be of use in differentiating between such different treatment options.

Previous studies have reported the presence of metastatic disease and poor performance status as predictors of poor survival and therefore indications for urgent SEMS insertion.[9, 10] Similarly, markers of poor nutrition are common in patients with OG cancer,[11] and predict short-term survival; indeed, need for intensive nutritional therapy, low BMI and low serum albumin concentrations have all previously been associated with mortality at 30 days.[10, 12]

However, albumin is a negative acute phase reactant, and declining serum concentrations may be more reflective of the magnitude of the systemic inflammatory response rather than nutritional status.[13] Systemic inflammation is an important determinant of disease progression and survival in patients with cancer,[14] and various prognostic scores incorporating routine measures of the systemic inflammatory response have been proposed for use in advanced cancer.[15, 16] One such score, the modified Glasgow Prognostic Score (mGPS), is based on the combination of serum C-reactive protein (CRP) and albumin concentrations and has been shown to hold prognostic value not only across several solid organ cancers, but also across patients undergoing treatment with both curative and palliative intent.[17, 18]

As such, the systemic inflammatory response, and the mGPS appears a rational and easily measurable characteristic on which to base a prognostic scoring system for patients with advanced OG cancer. Therefore, the aim of the present study was to examine the prognostic value of the mGPS in addition to other host and tumour characteristics in patients undergoing palliative SEMS insertion for OG cancer.

PATIENTS AND METHODS

Patients were identified from a prospectively maintained database of OG cancers discussed at the regional West of Scotland Upper Gastrointestinal Cancer multidisciplinary meeting (MDM). For the purposes of the present study, patients with incident, biopsy-proven adenocarcinoma and squamous carcinoma arising from the upper third of oesophagus to pylorus, and who were considered suitable for palliative SEMS insertion only without systemic palliative chemotherapy between January 2009 and December 2013 were included. The decision to proceed with SEMS insertion only was based on several factors which would preclude curative or systemic palliative therapy, including patient symptoms and preferences, age, comorbidities and performance status, and the presence of locally advanced or metastatic disease on staging thoracoabdominal computed tomography (CT) staging. No specific criteria or thresholds for performance status or co-morbidities were utilised in determining eligibility for SEMS insertion; rather, the decision was made on the basis of each individual patient. No formal dysphagia scoring system was used either prior to or following SEMS insertion. In addition, formal assessment of nutritional status or requirements was not routinely performed or recorded prospectively.

Clinical characteristics, including tumour site, were recorded prospectively at time of diagnosis. For the purposes of analysis, tumours arising from the OG junction were considered oesophageal in origin. Performance status was assessed using Eastern Cooperative Oncology Group grade (ECOG), ranging from grade 0 (fully active; able to carry on all pre-disease performance without restriction) to grade 4 (completely disabled; cannot carry on any self-care; totally confined to bed or chair).[19] Radiological TNM stage was determined by CT staging, with metastatic disease considered as evidence of solid organ or peritoneal metastases.

Serum C-reactive protein (CRP) and albumin concentrations were measured at time of diagnosis. The mGPS was calculated as follows: 0 - CRP≤10mg/L, 1 - CRP>10mg/L, and 2 - CRP>10mg/L and albumin<35g/L.

Overall survival was obtained from electronic hospital administration records and measured in days as survival from diagnosis. Follow-up ended at the death of the last patient. Need for repeat endoscopic intervention (manipulation or dilatation of stent, insertion of a further stent, laser ablation or clearance of an obstructing bolus), and complication rate (blockage or migration of stent, perforation) following initial SEMS insertion was identified retrospectively from electronic case notes. NHS Greater Glasgow & Clyde Clinical Governance and West of Scotland Upper Gastrointestinal Cancer Managed Clinical Network provided approval for this study.

Statistical analysis

The relationship between clinicopathological characteristics and survival was examined using univariate Cox proportional hazards regression to calculate hazard ratios (HR) and 95% confidence intervals (95%CI). Variables with a *P*-value<0.1 on univariate analysis were entered into a multivariate model using a backwards conditional method. Patients with data missing for variables were not excluded from analysis. The relationship between variables independently associated with survival and percentage survival rate at three months (standard error) was subsequently examined using Kaplan-Meier curves and log rank survival analysis. A *P*-value≤0.05 was considered statistically significant. All statistical analysis was performed using SPSS version 22.0 for Mac (IBM SPSS, Armonk, NY, USA).

RESULTS

219 patients were considered for palliative stent insertion for OG cancer. Sixteen patients were subsequently excluded: serum CRP at diagnosis was missing for 11 patients, two received systemic chemotherapy, and date of stent insertion and date of death were not available for two patients and one patient respectively. Of the remaining 203 patients included in the study, data were missing on T stage, N stage and M stage for 33, 14 and 9 patients respectively; 9 patients did not undergo staging CT due to frailty and MDM agreement that radiological staging would not alter management. Of the remaining patients, radiological assessment of the primary tumour or presence of regional lymph node metastases was not recorded at the time of MDM. Data on repeat endoscopic intervention and complication rates were missing for 15 patients.

The clinicopathological characteristics of the 203 included patients are displayed in Table 1. Eighty-seven percent of patients were 65 or older at time of diagnosis, 55% were male and 40% of patients were performance status 0-1. Eighty percent of patients were diagnosed with an oesophageal or junctional cancer, with metastatic disease evident in 40% of cases. Median CRP was 29mg/L (interquartile range 13-74), and median albumin was 31g/L (26-35). An elevated CRP (>10mg/L) was present in 78% of patients, and a low albumin (<35g/L) was identified in 75% of patients. Serum CRP and albumin concentrations were inversely correlated (Spearman's rho correlation coefficient: r=-0.484, P<0.001), with a low serum albumin observed in 82% of patients with an elevated CRP (n=129) compared to only 51% of patients with a low CRP (n=23, Chi-square analysis for linear trend P<0.001). Twenty-two percent of patients had mGPS=0, whereas 15% and 64% of patients had mGPS=1 and 2 respectively.

Table 1. Clinicopathological characteristics of patients undergoing palliative insertion of self-expandable metallic stent for oesophago-gastric cancer

Clinicopathological characteristics	***N* (%)**
Age (<65/65-74/≥75)	26 (13)/ 39 (19)/ 138 (68)
Sex (Male/ female)	112 (55)/ 91 (45)
Performance Status (0-1/ 2/ 3/ 4)	81 (40)/ 61 (30)/ 54 (27)/ 7 (3)
Tumour site (Oesophageal-junctional/ gastric)	163 (80)/ 40 (20)
T stage (1/ 2/ 3/ 4) (170)	12 (7)/ 35 (21)/ 77 (45)/ 46 (27)
N stage (0/ 1/ 2/ 3) (189)	54 (29)/ 87 (46)/ 43 (21)/ 5 (3)
Node positive (No/ yes) (189)	54 (29)/ 135 (71)
M stage (0/ 1) (194)	116 (60)/ 78 (40)
mGPS (0/ 1/ 2)	45 (22)/ 29 (15)/ 129 (64)
Median time to stent (days)	19 (10-30)
Median Survival from diagnosis (days)	75 (47-157)
Median Survival from stent (days)	53 (27-129)

(*n*) given when data incomplete. Continuous variables displayed as median (interquartile range). CRP – C-reactive protein, mGPS – modified Glasgow Prognostic Score

All patients died during follow-up, with a median survival from diagnosis of 75 days. The median time from diagnosis to stent insertion was 19 days and median survival following stent insertion was 53 days. Three patients subsequently received palliative radiotherapy. Thirty-seven patients (19%) underwent repeat endoscopic intervention; 28 patients underwent one further intervention, four patients underwent two, whereas three patients and one patient underwent five and seven repeat interventions respectively. Thirty-two patients (16%) had at least one complication, with 8 stent perforations identified.

The relationship between clinicopathological characteristics and survival following diagnosis is displayed in Table 2. On univariate survival analysis, poor performance status (HR 1.15, 95%CI 0.98-1.35, *P*=0.079), advancing T stage (HR 1.23, 95%CI 1.03-1.47, *P*=0.026), lymph node involvement (HR 1.33, 95%CI 0.96-1.83, *P*=0.085), positive M stage (HR 2.13, 95%CI 1.58-2.88, *P*<0.001), and an elevated mGPS (HR 1.32, 95%CI 1.12-1.55, *P*=0.001) were associated with shorter survival, whereas age, sex, tumour site, and N stage were not.

On multivariate analysis, only poor performance status (HR 1.23, 95%CI 1.03-1.48, *P*=0.025), positive M stage (HR 2.27, 95%CI 1.61-3.19, *P*<0.001) and an elevated mGPS (HR 1.25, 95%CI 1.03-1.49, *P*=0.021) were independently associated with shorter survival.

Table 2. Relationship between serum albumin and C-reactive protein concentrations, clinicopathological characteristics and survival following diagnosis of patients with oesophago-gastric cancer undergoing palliative insertion of self-expandable metallic stent

Clinicopathological characteristics		Univariate	*P*	Multivariate	*P*
Age	**<65** **65-74** **≥75**	0.91 (0.75-1.10)	0.308	-	-
Sex	**Male** **Female**	0.97 (0.84-1.29)	0.846	-	-
Performance Status	**0-1** **2** **3** **4**	1.15 (0.98-1.35)	0.079	1.23 (1.03-1.48)	0.025
Tumour site	**OG/J** **Gastric**	0.86 (0.60-1.22)	0.392	-	-
T stage	**1** **2** **3** **4**	1.23 (1.03-1.47)	0.026	-	0.349
N stage	**0** **1** **2** **3**	1.16 (0.97-1.38)	0.103	-	-
Node positive	**No** **Yes**	1.33 (0.96-1.83)	0.085	-	0.438
M stage	**0** **1**	2.13 (1.58-2.88)	<0.001	2.27 (1.61-3.19)	<0.001
mGPS	**0** **1** **2**	1.32 (1.12-1.55)	0.001	1.24 (1.03-1.49)	0.021

CRP – C-reactive protein, mGPS – modified Glasgow Prognostic Score

The relationship between performance status, M stage and mGPS and survival at three months following diagnosis was subsequently examined in patients with oesophago-gastric cancer (*n*=194). For the purposes of further analysis, mGPS was categorised as mGPS 0 (*n*=45) and mGPS 1-2 (*n*=158). Performance status stratified three-month survival from 48%

to 29% (*P*=0.235). M stage stratified three-month survival from 57% to 21% (*P*<0.001), whereas the mGPS stratified survival from 69% to 34% (*P*<0.001) (Figure 1).

When patients without metastases were considered (Table 3), performance status stratified survival from 62% to 33% (*P*=0.164), and mGPS stratified survival from 84% to 47% (*P*=0.003). The combination of performance status and mGPS stratified three-month survival from 88% (M0, ECOG 0/1, mGPS 0, *n*=16) to 20% (M0, ECOG 4, mGPS 1-2, *n*=5) (*P*<0.001). When patients with metastases were considered, performance status stratified survival from 31% to 6% (*P*<0.001), whereas mGPS stratified survival from 38% to 17% (*P*=0.048). The combination of performance status and mGPS stratified three-month survival from 43% (M1, ECOG 0/1, mGPS 0, *n*=7) to 6% (M1, ECOG 4, mGPS 1-2, *n*=16) (*P*=0.059).

Table 3. The relationship between metastatic disease status, performance status and modified Glasgow Prognostic Score and survival rate at three months in patients undergoing palliative self-expandable metallic stent insertion for oesophago-gastric cancer

M status	Performance status	mGPS 0 (*n*=31)	mGPS 1-2 (*n*=85)	mGPS 0-2 (*n*=116)
M0	**ECOG 0/1** (*n*=45)	88% (8) (*n*=16)	48% (9) (*n*=29)	62% (7)
	ECOG 2 (*n*=33)	100% (0) (*n*=7)	54% (10) (*n*=26)	64% (8)
	ECOG 3 (*n*=32)	57% (19) (*n*=7)	44% (10) (*n*=25)	47% (9)
	ECOG 4 (*n*=6)	(*n*=1)	20% (18) (*n*=5)	33% (19)
	ECOG 0-4 (*n*=116)	84% (7)	47% (5)	57% (5)
M1		**mGPS 0 (*n*=13)**	**mGPS 1-2 (*n*=65)**	**mGPS 0-2 (*n*=78)**
	ECOG 0/1 (*n*=36)	43% (19) (*n*=7)	28% (8) (*n*=29)	31% (8)
	ECOG 2 (*n*=25)	33% (19) (*n*=6)	11% (7) (*n*=19)	16% (7)
	ECOG 3 (*n*=16)	(*n*=0)	6% (6) (*n*=16)	6% (6)
	ECOG 4 (*n*=1)	(*n*=0)	(*n*=1)	-
	ECOG 0-4 (*n*=78)	38% (13)	17% (5)	21% (5)

Survival displayed as percentage survival (standard error). Survival not calculated if *n*<5

Analysis was subsequently performed in patients undergoing palliative SEMS insertion for oesophageal and junctional cancer only (Table 4, *n*=154). The combination of performance

status and mGPS stratified three-month survival of patients without metastases from 83% (M0, ECOG 0/1, mGPS 0, *n*=12) to 20% (M0, ECOG 4, mGPS 1-2, *n*=5) (*P*=0.008), and stratified three-month survival of patients with metastases from 33% (M1, ECOG 0/1, mGPS 0. *n*=6) to 8% (M1, ECOG 3, mGPS 1-2, *n*=13) (*P*=0.082).

Table 4. The relationship between metastatic disease status, performance status and modified Glasgow Prognostic Score and survival rate at three months in patients undergoing palliative self-expandable metallic stent insertion for oesophageal cancer

M status	**Performance status**	**mGPS 0 (*n*=24)**	**mGPS 1-2 (*n*=70)**	**mGPS 0-2 (*n*=94)**
M0	**ECOG 0/1** (*n*=37)	83% (11) (*n*=12)	52% (10) (*n*=25)	62% (8)
	ECOG 2 (*n*=25)	100% (0) (*n*=6)	58% (11) (*n*=19)	68% (9)
	ECOG 3 (*n*=26)	60% (2) (*n*=5)	48% (11) (*n*=21)	50% (10)
	ECOG 4 (*n*=6)	(*n*=1)	20% (18) (*n*=5)	33% (19)
	ECOG 0-4 (*n*=94)	83% (8)	50% (6)	59% (5)
M1		**mGPS 0 (*n*=11)**	**mGPS 1-2 (*n*=49)**	**mGPS 0-2 (*n*=60)**
	ECOG 0/1 (*n*=28)	33% (19) (*n*=6)	32% (10) (*n*=22)	32% (9)
	ECOG 2 (*n*=18)	40% (2) (*n*=5)	8% (7) (*n*=13)	17% (9)
	ECOG 3 (*n*=13)	(*n*=0)	8% (7) (*n*=13)	8% (7)
	ECOG 4 (*n*=1)	(*n*=0)	(*n*=1)	-
	ECOG 0-4 (*n*=60)	36% (15)	18% (6)	22% (5)

Includes patients with gastro-oesohageal junctional cancer. Survival displayed as percentage survival (standard error). Survival not calculated if *n*<5

The relationship between performance status, M stage, mGPS and need for repeat endoscopic intervention and complication rates was examined. (Table 5). Thirty-five patients required re-intervention, predominantly for endoscopic laser ablation (*n*=8), re-stenting (*n*=9) or clearance of a food bolus (*n*=5), with the remaining patients requiring stent repositioning, dilatation or NJ tube insertion. Thirty patients developed a SEMS-related complication, with blocked stent (*n*=11), stent migration (*n*=8) and perforation (*n*=7) the most common. Neither performance status nor M stage were associated with rates of reintervention or complications following SEMS insertion. Patients with mGPS 0-1 were more likely to undergo repeat intervention compared to those with mGPS 2 (*P*=0.007). Furthermore, patients with mGPS 2 were less likely to experience a SEMS-related complication (*P*=0.041).

Table 5. The relationship between performance status, metastatic disease and modified Glasgow Prognostic Score and repeat endoscopic intervention and complication rates in patients undergoing palliative self-expandable metallic stent insertion for oesophageal cancer

	Re-intervention			**Complications**		
	No	**Yes**	***P***	**No**	**Yes**	***P***
Performance status			0.679			0.364
0-1	65 (82)	14 (18)		64 (81)	15 (19)	
2	48 (81)	11 (19)		50 (85)	9 (15)	
3	44 (81)	10 (19)		47 (87)	7 (13)	
4	5 (71)	2 (29)		6 (86)	1 (14)	
M stage			0.173			0.286
0	92 (79)	25 (21)		98 (82)	21 (18)	
1	64 (86)	10 (14)		65 (88)	9 (12)	
mGPS			0.007			0.041
0	29 (71)	12 (29)		32 (78)	9 (22)	
1	19 (70)	8 (30)		20 (74)	7 (26)	
2	107 (88)	15 (12)		109 (89)	13 (11)	

DISCUSSION

In the present study, poor performance status, metastatic disease and the presence of elevated systemic inflammatory responses as measured by mGPS were independently associated with survival of patients undergoing palliative SEMS insertion for OG cancer. The combination of these routinely available characteristics provides a framework for determining prognosis and the rational selection of treatment modalities in a patient group with limited treatment options and survival.

The present results are consistent with previous work by Steyerberg and colleagues, whereby assessment of performance status and metastatic disease burden could identify patients likely to benefit from brachytherapy rather than SEMS insertion.[9] Such characteristics are routinely collected at time of diagnosis and staging, and given their well-established value, provide a logical backbone on which to base prognosis.

The mGPS was independently associated with survival, and when compared to performance status, had greater fidelity in stratifying survival. This likely reflects the objective nature of serum markers of inflammation (i.e. high or low), compared to the more subjective nature of assessment of a patient's physical activity and performance status.[20] However, in keeping with previous work,[18] the combination of both measures provided complimentary prognostic information, particularly when further stratified by M stage; indeed, it was possible to identify patients with oesophageal cancer and a relatively good prognosis with expected survival rate at three months of 83% and who may benefit from consideration of other modalities rather than SEMS insertion.[1, 9] Conversely, it was also possible to identify patients with a dismal prognosis and three-months survival of around 8%; this groups would be more likely benefit from immediate palliation by SEMS insertion as well as

accelerated referral to palliative care services. The results of the present study however must be interpreted with caution given the small numbers of patients in each subgroup, and remain to be confirmed in the context of a larger validation study.

Of interest, patients without elevated systemic inflammatory markers at time of diagnosis were more likely to require repeat endoscopic intervention and were more likely to experience complications following SEMS insertion. Rather than being causative, this likely reflects the superior survival of patients with mGPS 0 compared to those with mGPS 2; as patients survive longer, they will more likely require repeated interventions to maintain SEMS patency and adequate oral nutrition. Indeed, consistent with previous work by Steyerberg,[9] the present results would suggest that SEMS insertion should be favoured for patients with extremely poor prognosis, whereas other modalities, such as temporary nasoenteral feeding and palliative radiotherapy or brachytherapy, should be considered in patients with relatively good predicted survival. Further clinical trials predicated upon this premise are warranted.

To our knowledge, only one previous study has examined the prognostic value of the systemic inflammatory response in patients undergoing palliative SEMS insertion for OG cancer.[21] However, a significant proportion of patients were Human Immunodeficiency Virus (HIV) positive, and the study utilised a threshold CRP>150mg/L. In the present study, only 16 patients (7%) had a CRP>150mg/L at diagnosis. Given that the mGPS has been validated globally across a number of cancer-associated clinical scenarios,[17] the present results are more generalisable to a Western population.

Previous work by Lecleire and colleagues identified declining serum albumin concentration as an independent predictor of 30-day mortality in patients undergoing SEMS insertion,[10]

and similarly other groups have reported hypoalbuminaemia as an adverse prognostic factor in a variety of clinical scenarios.[22, 23] However, although these studies have assumed albumin as a marker of nutrition, hypoalbuminaemia is a late manifestation of malnutrition and alone poorly reflects nutritional status.[24, 25] Rather the present results, whereby almost 80% of patients with a low albumin also had an elevated CRP, more accurately reflect our understanding of changes in serum albumin in patients with cancer, where it is more likely to reflect the systemic inflammatory response rather than nutritional status.[26]

Indeed, previous studies have reported continuing nutritional decline and weight loss as an adverse prognostic factor following palliative SEMS insertion.[10, 12] This is likely a manifestation of the cancer cachexia syndrome,[27] of which systemic inflammation is an integral step in patients with oesophageal cancer.[28, 29] If such features were solely a marker of nutrition alone, it would be expected that nutritional status, including serum albumin concentrations, would increase even transiently following SEMS insertion and resolution of dysphagia. To the contrary however, Lecleire et al. reported a continuing decline.[10] Similarly, provision of intensive nutritional support or resolution of dysphagia did not result in improvement in survival or markers of nutrition in reported studies of patients undergoing SEMS insertion.[10, 12] Taken together, these studies, along with the present results, suggest a pertinent role for the systemic inflammatory response in driving nutritional decline and cachexia in patients with advanced OG cancer.

The present results suggest that management of nutrition and cancer cachexia would not only involve intensive nutritional support, but also the use of anti-inflammatory drugs. A targeted role for such agents in improving nutritional status as well as alleviating symptoms of cachexia has been proposed.[29-31] In keeping with this, a multi-modality approach incorporating non-steroidal anti-inflammatory drugs and nutritional support has been shown

to be feasible in patients with advanced cancer.[32] The presently recruiting MENAC trial aims to investigate the effects of such an intervention on body composition and performance status in patients receiving palliative chemotherapy for advanced pancreatic and lung cancer.[33] It would be of interest to examine such an approach in the context of the palliation of oesophago-gastric cancer; indeed, whether the assessment of systemic inflammatory profiles and performance status would not only guide prognosis but also allow for stratification of palliative therapy options remains of interest and warrants further study.

The present study is limited by a lack of robust measures of nutritional status or body composition.[29] Aside from ECOG performance status, no objective measurement of function or physical activity was performed. Assessment of such measures at baseline and and their prognostic value relative to the systemic inflammatory response, as well their changes over time, would be of interest. Furthermore, no formal dysphagia scoring system was applied to decide on appropriateness of SEMS insertion, therefore it cannot be determined if patients were similar with regards to symptom profile. However, the decision to proceed to SEMS insertion in our institution is generally decided upon following MDT agreement.

A strength of the present study is that this was a prospectively collected cohort of patients who were relatively uniform with respect to cancer treatment. As such it provides a pragmatic overview of current clinical practice. However, limitation of the study group to those considered unsuitable for systemic therapy limits the clinical relevance of the present results; only 23 patients fell into the good prognosis group with expected three-month survival rates over 88%. Further study in patients receiving systemic palliative therapy would be of interest, and may allow for greater clinical impact in a larger patient cohort.

In summary, poor performance status, the presence of metastatic disease and the presence of an elevated systemic inflammatory response as measured by the mGPS, are independent predictors of poor survival in patients undergoing palliative SEMS insertion for OG cancer. These routinely available characteristics may aid in not only determining prognosis, but also in the rational selection of appropriate symptom-based treatment of dysphagia and nutrition.

Conflicts of interest disclosure

All authors confirm that there are no potential conflicts of interest.

Contributorship Statement

JHP - Data collection and analysis, Interpretation of data, writing and manuscript preparation, NW - Data collection and analysis, DCM - Study concept, data interpretation and manuscript writing, PG - Study concept, data interpretation and manuscript writing.

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Figure 1. Relationship between (a) performance status (P=0.235), (b) presence of metastatic disease (P<0.001), (c) modified Glasgow Prognostic Score (P<0.001) and survival following diagnosis of patients with oesophago-gastric cancer undergoing palliative self-expandable metallic stent insertion

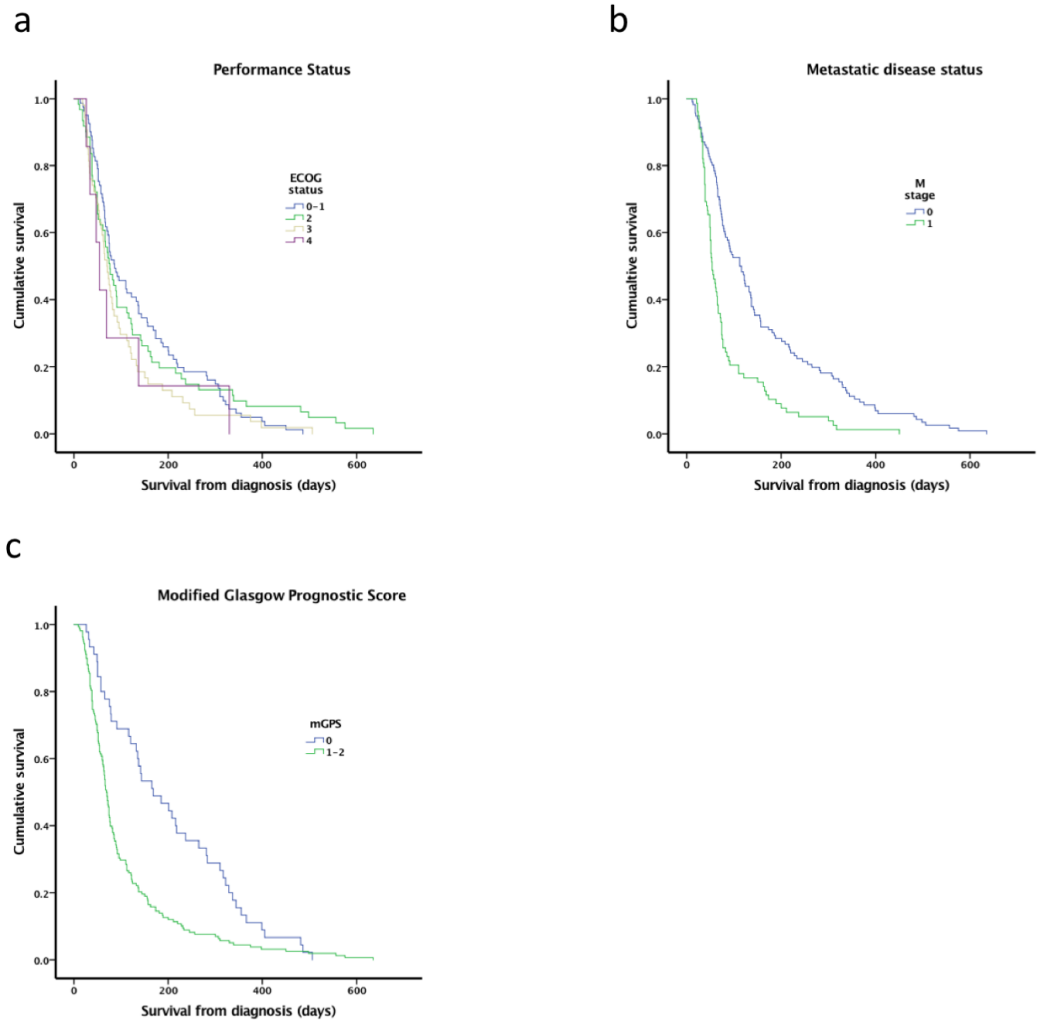

Figure 1. Relationship between (a) performance status (*P*=0.235), (b) presence of metastatic disease (*P*<0.001), (c) modified Glasgow Prognostic Score (*P*<0.001) and survival following diagnosis of patients with oesophago-gastric cancer undergoing palliative self-expandable metallic stent insertion