Original research

Tailoring follow-up endoscopy in patients with severe oesophagitis

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ABSTRACT

Objective We aimed to investigate the clinical utility of follow-up oesophagogastroduodenoscopy (OGD2) in patients with severe oesophagitis (Los Angeles grades C or D) through evaluating the yield of Barrett's oesophagus (BO), cancer, dysplasia and strictures. Second, we aimed to determine if the Clinical Frailty Scale (CFS) may be used to identify patients to undergo OGD2s.

Design/method Patients in NHS Lothian with an index OGD (OGD1) diagnosis of severe oesophagitis between 1 January 2014 and 31 December 2015 were identified. Univariate analysis identified factors associated with grade. Patients were stratified by frailty and a diagnosis of stricture, cancer, dysplasia and BO.

Results In total 964 patients were diagnosed with severe oesophagitis, 61.7% grade C and 38.3% grade D. The diagnostic yield of new pathology at OGD2 was 13.2% (n=51), new strictures (2.3%), dysplasia (0.5%), cancer (0.3%) and BO (10.1%). A total of 140 patients had clinical frailty (CFS score ≥5), 88.6% of which were deceased at review (median of 76 months). In total 16.4% of frail patients underwent OGD2s and five new pathologies were diagnosed, none of which were significantly associated with grade. Among non-frail patients at OGD2, BO was the only pathology more common (p=0.010) in patients with grade D. Rates of cancer, dysplasia and strictures did not vary significantly between grades.

Conclusion Our data demonstrate that OGD2s in patients with severe oesophagitis may be tailored according to clinical frailty and only be offered to non-frail patients. In non-frail patients OGD2s have similar pick-up rates of sinister pathology in both grades of severe oesophagitis.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Current British Society of Gastroenterology guidelines recommend endoscopic follow-up of all patients diagnosed with Los Angeles grade D oesophagitis at index endoscopic procedure, while European guidelines recommend follow-up of both grades C and D. Despite these recommendations, evidence from the literature suggests diagnostic yield of new pathology at follow-up oesophagogastroduodenoscopy (OGD) is low.

WHAT THIS STUDY ADDS

⇒ This is the largest study to consider endoscopic and histological outcomes in patients diagnosed with severe oesophagitis.
⇒ It is the first study to propose the use of the Clinical Frailty Scale to help identify patients suitable for repeat endoscopy.

INTRODUCTION

Gastro-oesophageal reflux disease is common and has a global prevalence of 8%–33%,[1] with an incidence in the UK of five per 1000 person-year.[2] While some patients may experience symptoms (typically heartburn, acid regurgitation and waterbrash) but undergo a macroscopically normal oesophagogastroduodenoscopy (OGD), 30%–50% may develop erosive (reflux) oesophagitis.[3] Approximately 1 in 10 subsequently develop Barrett's oesophagus (BO) with intestinal metaplasia (IM), 1 in 10–20 of which may go on to develop oesophageal cancer within 10–20 years.[3]

The Los Angeles (LA) classification[4] describes the severity of oesophagitis at

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Firstly, we have demonstrated that the clinical benefit of repeat endoscopic procedures for frail patients is low. By avoiding follow-up endoscopy in those who are clinically frail, we propose a personalised approach to care which reduces potential harm to a vulnerable cohort—a central tenet of modern day realistic medicine.

⇒ Secondly, OGD2s may be restricted to non-frail patients with severe oesophagitis (both grades C and D), acknowledging that, even in this case, the clinical benefit of confirming Barrett's oesophagus (most likely of short segment) may be small.

⇒ Thirdly, diagnoses of serious pathology, although of low incidence, do not vary significantly between grade C and grade D oesophagitis in non-frail patients, therefore follow-up of both groups needs to be reconsidered in future guidelines.

OGD from grades A–D, with C and D being 'severe oesophagitis'. The British Society of Gastroenterology (BSG) recommends that all grade D patients undergo a follow-up OGD (OGD2) 6 weeks after the index procedure at which oesophagitis was diagnosed (OGD1) to exclude an underlying malignancy or BO[5]. Prior to these 2017 guidelines, patients with grade C oesophagitis frequently underwent repeat endoscopic procedures and are still recommended to do so by the European Society of Gastrointestinal Endoscopy.[6] There is limited evidence regarding the yield of BO at OGD2 for oesophagitis, with studies reporting 27% (grades B–D),[7] 12% (grades A–D)[8] and 9% (Savary-Miller Classification grades 1–4)[9 10] yields. A small British study reported a combined yield of BO and cancer of 0.3% at OGD2.[11]

Strained endoscopy services are under increasing pressure, and it is appropriate to review the value of follow-up OGDs. We aimed to determine firstly the extent to which new pathology (strictures, BO, dysplasia or cancer) was diagnosed at follow-up and if current BSG recommendations were justified. Secondly, we sought to investigate the role of clinical frailty and whether this can be used to triage patients for follow-up OGD. Severe oesophagitis has been cited to have a greater prevalence in frail elderly patients[12–14] and increased frailty has been associated with adverse events at upper gastrointestinal (GI) endoscopy.[15 16] Therefore, frailty status may have the potential to be a key determinant in identifying appropriateness for endoscopy.

METHODS

Study design

A search of our endoscopy reporting software (Unisoft V.14.66.00) identified patients with an OGD1 diagnosis of reflux oesophagitis in NHS Lothian between 1 January 2014 and 31 December 2015. Inclusion criteria were LA grades C and D oesophagitis at OGD1. Patients with diagnoses of BO, oesophageal cancer, a confirmed stricture or dysplasia prior to OGD1 were excluded. Demographic, clinical and endoscopic results were collected by case record review of endoscopy reports and the local healthcare information system (TrakCare).

Using data available prior to OGD1, patients were attributed a comorbidity score according to the Charlson Comorbidity Index (CCI) using MDCalc[17] and a clinical frailty score using the Rockwood Clinical Frailty Scale (CFS).[18] A sample of patients were independently scored for the CFS to determine inter-rater reliability (two independent reviewers of medical records).

Definitions

'Oesophagitis' refers solely to reflux oesophagitis.

'OGD1' refers to the index OGD at which oesophagitis was first diagnosed. 'OGD2' refers to the follow-up OGD.

'Grade C' and 'Grade D' oesophagitis refer to the LA classification of oesophagitis.

'Barrett's oesophagus' was defined as endoscopically suspected appearances consistent with BO (as defined by British Society of Gastroenterology guidelines[19]) and/or the histological presence of IM.

'Clinical frailty' was defined as a score of≥5 on the CFS.

Statistical analysis

IBM SPSS Statistics Subscription (Build V.1.0.0.1461) was used for statistical analysis. Descriptive statistics are reported as median values and IQRs for continuous variables and as percentages with frequencies for categorical variables. The Mann-Whitney U test compared continuous variables; the χ^2 test compared categorical variables. Data were analysed and stratified according to grade (LA grade C and D) and subsequently by clinical outcome. Univariate analyses were performed on frailty and mortality data. The intraclass correlation coefficient was calculated for a subcohort of independently CFS scored (by two different assessors) patients. P values <0.05 were considered statistically significant.

Ethics

In accordance with NHS Health Research Authority guidelines, specific ethical review and approval was not considered necessary as this research is a retrospective audit using data already obtained as part of regular clinical care.

RESULTS

Patient demographics

In total, 2660 patients with a new diagnosis of oesophagitis were identified between 1 January 2014 and 31 December 2015. Nine hundred and sixty-four (36.2%) patients were identified with a diagnosis of

Table 1 Patient demographics

Variable		Total (n=964)	Grade C (n=595)	Grade D (n=369)	P value
Male, % (N)		54.6 (526)	54.3 (323)	55.0 (203)	0.825
Age at OGD (years), median (IQR)		64.0 (53.0–74.0)	64.0 (53.0–73.0)	63.0 (52.0–77.0)	0.404
Smoking status, % (N)	Non-smoker	48.3 (466/950)	49.5 (291/588)	48.3 (175/362)	0.731
	Current smoker	21.7 (209/950)	18.7 (110/588)	27.3 (99/362)	0.002*
	Ex-smoker	28.5 (275/950)	31.8 (187/588)	24.3 (88/362)	0.013*
History of alcohol excess, % (N)		23.8 (227/953)	21.7 (128/590)	27.3 (99/363)	0.050
Weight (kg), median (IQR)		77.0 (66.0–88.0) (n=813)	78.0 (67.0–90.0) (n=510)	75.0 (64.0–85.0) (n=303)	0.013*
BMI, median (IQR)		27.2 (24.0–30.9) (n=810)	27.4 (24.1–31.5) (n=508)	26.8 (23.7–30.1) (n=302)	0.034*
CCI, median (IQR)		3 (1–4) (n=959)	2 (1–4) (n=593)	3 (1–4) (n=366)	0.128
CFS score ≥5, % (N)		15.9 (140/883)	11.6 (64/552)	23.0 (76/331)	<0.001*
Inpatient, % (N)		30.2 (291)	20.2 (120)	46.3 (171)	<0.001*

*Statistically significant result (p<0.05). The Mann-Whitney U test compared continuous variables; the χ^2 test compared categorical variables.
BMI, Body Mass Index; CCI, Charlson Comorbidity Index; CFS, Clinical Frailty Scale; IM, intestinal metaplasia; OGD1, index endoscopic procedure; OGD2, repeat endoscopic procedure.

severe oesophagitis: grade C, n=595 (22.4%); grade D, n=369 (13.9%). Median age at OGD1 was 64 years (IQR: 53–74 years) and 54.6% (n=526) of patients were male (table 1)

Patients with grade D oesophagitis at OGD1 were more likely to be a current (p=0.002) or ex-smoker (p=0.013) and to have a lower body mass index (p=0.034). They were more likely to be inpatients (p<0.001), to have presented with a GI bleed (p<0.001) or nausea and vomiting (p=0.001) and to have a CFS score ≥5 (p<0.001) (table 1).

Endoscopic and clinical outcomes

OGD1 endoscopic and clinical outcomes are illustrated in table 2.

In total 39.7% of patients with grade C and 40.4% with grade D underwent OGD2 (p=0.825). The reason for an OGD2 not taking place was documented in 43 patients—a scheduled OGD2 appointment was not attended by 3.5% (n=34) of all patients (grade C n=16, grade D n=18); in nine patients the appointment was cancelled by the service and not rescheduled. OGD2 occurred after a median of 10.1 weeks (IQR: 7.8–20.4 weeks). No new cancers were identified at case record review at a median of 76 months (IQR: 72.0–83.0) in patients who did not have an OGD2. A comparison of the baseline characteristics of patients who had an OGD2 versus those who did not is in table 3.

Diagnostic yield at OGD2

As a percentage of OGD2s (n=385), the diagnostic yield of new pathology was 13.2% (n=51) and included new strictures (2.3%, n=9), dysplasia (0.5%, n=2), cancer (0.3%, n=1) and BO (10.1%, n=39) (table 4).

Strictures, dysplasia and cancer

Diagnoses of stricture, dysplasia or cancer at OGD2 were not associated with OGD1 grade (p=0.294, 0.742 and 0.426, respectively) (table 4). No variables were associated with a diagnosis of dysplasia or

Table 2 OGD1 endoscopic outcomes

Variable	Total (n=964)	Grade C (n=595)	Grade D (n=369)	P value
Stricture present at OGD, % (N)	8.3 (80)	6.7 (40)	10.8 (40)	0.024*
Barrett's appearances OGD1, % (N)	9.1 (88)	9.1 (54)	9.2 (34)	0.942
Barrett's appearances OGD1 with IM on biopsies, % (N)	60.3 (35/58)	60.0 (21/35)	60.9 (14/23)	0.947
IM on biopsies with Barrett's appearances not noted OGD1, % (N)	8.1 (25/310)	8.7 (16/184)	7.1 (9/126)	0.622
Combined Barrett's appearances and IM on biopsies OGD1, % (N)	11.6 (112)	11.8 (70)	11.4 (42)	0.857
Prague Classification C OGD1 (cm), median (IQR)	3.5 (1.3–5.8) (n=28)	2.0 (0.5–4.5) (n=17)	6.0 (2.0–10.0) (n=11)	0.006*
Prague Classification M OGD1 (cm), median (IQR)	5.0 (3.0–7.8) (n=28)	4.0 (3.0–5.0) (n=17)	8.0 (5.0–11.0) (n=11)	0.001*
Biopsies taken at OGD1, % (N)	32.4 (312)	31.1 (185)	34.4 (127)	0.284
Cancer OGD1, % (N)	0.6 (6)	0.8 (5)	0.3 (1)	0.275
Atypia OGD1, % (N)	2.0 (19)	1.8 (11)	2.2 (8)	0.729
Dysplasia OGD1, % (N)	0.5 (5)	0.3 (2)	0.8 (3)	0.316
IM OGD1, % (N)	6.2 (60)	6.4 (38)	6.0 (22)	0.791
OGD2, % (N)	39.9 (385)	39.7 (236)	40.4 (149)	0.825

*Statistically significant result (p<0.05). The Mann-Whitney U test compared continuous variables; the χ^2 test compared categorical variables.
IM, intestinal metaplasia; OGD1, index endoscopic procedure; OGD2, repeat endoscopic procedure.

Table 3 Baselines characteristics: OGD2 performed versus OGD2 not performed

Variable		OGD2 performed (n=385)	No OGD2 (n=579)	P value
Male, % (N)		51.9 (200)	56.3 (326)	0.183
Age at OGD1 (years), median (IQR)		63.0 (54.0–71.0)	65.0 (52.0–76.0)	0.147
Smoking status, % (N)	Non-smoker	50.0 (196)	47.8 (270/565)	0.345
	Current smoker	18.2 (70)	24.6 (139/565)	0.019*
	Ex-smoker	30.9 (119)	27.6 (156/565)	0.271
History of alcohol excess, % (N)		19.0 (73)	27.1 (154/568)	0.004*
Weight (kg), median (IQR)		79.0 (69.0–91.0) (n=337)	75.0 (64.0–85.0) (n=476)	<0.001*
BMI, median (IQR)		28.1 (24.7–31.5) (n=335)	26.7 (23.4–30.3) (n=475)	<0.001*
CCI, median (IQR)		2.0 (1.0–4.0)	3.0 (1.0–4.0) (n=574/579)	0.018*
CFS score ≥5, % (N)		6.3 (23/366)	22.6 (117/517)	<0.001*
Inpatient, % (N)		15.1 (58)	40.2 (233)	<0.001*
Grade D oesophagitis at OGD1, % (N)		38.7 (149)	38.0 (220)	0.825
Deceased at time of notes follow-up, % (N)		17.9 (69)	41.5 (240)	<0.001*

*Statistically significant result (p<0.05). The Mann-Whitney U test compared continuous variables; the χ^2 test compared categorical variables.
BMI, Body Mass Index; CCI, Charlson Comorbidity Index; CFS, Clinical Frailty Scale; IM, intestinal metaplasia; OGD1, index endoscopic procedure; OGD2, repeat endoscopic procedure.

cancer at OGD2. A higher CCI was associated with a new stricture on OGD2 (p=0.031). The one patient reported to have a new diagnosis of adenocarcinoma had dysplasia on biopsies when diagnosed with grade C at OGD1.

Barrett's oesophagus

A total of 39 patients were newly diagnosed with BO (grade C n=16, grade D n=23) at OGD2. At OGD2, 3.1% (n=12) of patients had new Barrett's appearances reported which had not been noted at OGD1.

Table 4 Follow-up outcomes

Variable		Total (n=964)	Grade C (n=595)	Grade D (n=369)	P value
Interval oesophagogastroduodenoscopy (OGD1) to OGD2 (weeks), median (IQR)		10.1 (7.8–20.4)	10.2 (7.6–21.3)	10.1 (7.4–19.9)	0.800
Biopsies taken at OGD2, % (N)		34.3 (132/385)	31.8 (75/236)	38.3 (57/149)	0.192
Macroscopic appearance OGD2, % (N)	Completely healed	66.2 (255/385)	69.9 (165/236)	60.4 (90/149)	0.055
	Grade A	6.2 (24/385)	7.2 (17/236)	4.7 (7/149)	0.322
	Grade B	4.9 (19/385)	5.1 (12/236)	4.7 (7/149)	0.865
	Grade C	9.4 (36/385)	7.6 (18/236)	12.1 (18/149)	0.144
	Grade D	3.1 (12/385)	2.1 (5/236)	4.7 (7/149)	0.156
	Grade not specified	10.1 (39/385)	8.1 (19/236)	13.4 (20/149)	0.089
New stricture OGD2, % (N)		2.3 (9/385)	1.7 (4/236)	3.4 (5/149)	0.294
New cancer OGD2, % (N)		0.3 (1/385)	0.4 (1/236)	0 (0/149)	0.426
New atypia OGD2, % (N)		1.8 (7/385)	2.1 (5/236)	1.3 (2/149)	0.579
New dysplasia OGD2, % (N)		0.5 (2/385)	0.4 (1//236)	0.7 (1/149)	0.742
New IM OGD2, % (N)		7.0 (27/385)	4.7 (11/236)	10.7 (16/149)	0.023*
New combined Barrett's appearances and IM on OGD2, % (N)		10.1 (39/385)	6.8 (16/236)	15.4 (23/149)	0.006*
New Barrett's appearances on OGD2, % (N)		3.1 (12/385)	2.1 (5/236)	4.7 (7/149)	0.156
Prague classification C OGD2 (cm), median (IQR)		2.0 (0.8–3.3) (n=36)	2.0 (1.0–3.8) (n=18)	1.0 (0.3–3.0) (n=18)	0.618
Prague classification M OGD2 (cm), median (IQR)		3.0 (2.0–5.0) (n=36)	3.0 (2.0–4.8) (n=18)	3.0 (2.3–5.0) (n=18)	0.521
Notes follow-up time (months), median (IQR)		76.0 (72.0–83.0)	76.0 (73.0–85.0)	75.0 (71.0–80.0)	<0.001*
Deceased at time of notes follow-up, % (N)		32.1 (309)	26.1 (155)	41.7 (154)	<0.001*
Deceased within 6 months of OGD1, % (N)		9.4 (91)	6.9 (41)	13.6 (50)	0.001*
Deceased within 12 months of OGD1, % (N)		11.8 (114)	8.2 (49)	17.6 (65)	<0.001*
Time OGD1 to date of death (months), median (IQR)		24.0 (5.0–50.0)	27.0 (6.0–52.0)	18.5 (3.5–47.5)	0.086

*Statistically significant result (p<0.05). The Mann-Whitney U test compared continuous variables; the χ^2 test compared categorical variables.
IM, intestinal metaplasia; OGD1, index endoscopic procedure; OGD2, repeat endoscopic procedure.

New IM was reported in 7.0% of patients and was significantly more likely in those with grade D at OGD1 (p=0.023) (table 4). Prague classification did not vary significantly between grades.

Sub-analysis: frailty

Clinical data were available to allow CFS scores to be calculated in 881 patients (91.4% of the cohort). A total of 15.9% (n=140) of patients were clinically frail (CFS score≥5); frailty was significantly more common in patients with Grade D oesophagitis (11.6% of grade C vs 23.0% grade D, p<0.001). Inter-rater reliability in generating CFS scores was assessed in this study (two independent scorers reviewing medical records) on review of the records of 308 deceased patients. The intra-class correlation co-efficient was 0.95.

Frailty was significantly associated with being deceased at 6 and 12 months post OGD1 and at a median follow-up time of 76 months (IQR: 72–83 months, p<0.001 throughout). Frail patients were also significantly less likely to have an OGD2 (p<0.001) performed. A total of 8 (10.5%) frail grade D patients had an OGD2, compared with 15 (23.8%) frail grade C patients (p=0.040). Among frail patients, there were no significant differences between grades C and D oesophagitis in the diagnostic yield of BO (p=0.636), strictures (p=0.161), oesophageal cancer (p=0.087) or dysplasia (p=0.455) at OGD2.

Conversely, 741 (84.1%) patients were not considered clinically frail (CFS <5). In this cohort of non-frail patients, 7.1% of grade C patients were diagnosed with BO at OGD2, compared with 15.9% of those with grade D oesophagitis (p=0.010). Among non-frail patients, there were no significant differences between grades C and D oesophagitis in the diagnostic yield of cancer (p=0.427), dysplasia (p=0.745), or strictures (p=0.503) at OGD2.

DISCUSSION

In this study we have reported a total yield of 13.2% of BO, strictures, dysplasia and oesophageal cancer in patients who underwent repeat endoscopy. Furthermore, we have demonstrated high levels of mortality and frailty among the cohort of patients who were found to have severe oesophagitis at index endoscopy. It is necessary to consider the implications that such findings may have regarding the decision to perform follow-up endoscopic procedures.

The relatively low rate of OGD2s which we have reported was most likely due to pragmatic decisions made regarding frailty (46.4% of non-frail patients underwent OGD2, compared with only 16.4% of frail patients), but may also have been due to other factors such as non-attendance and poor adherence to BSG recommendations. It is important, however, to emphasise that no new cancers were identified at case record review at a median of 76 months (IQR 72–83 months) in patients who did not undergo an OGD2.

The yield of BO, strictures, cancer and dysplasia at OGD2 was 13.2% (n=51); 39 patients (10.1% yield) were diagnosed with BO. The reported yield of BO is comparable to that in a previous Italian study.[10] Patients with grade D and C oesophagitis were equally likely to be diagnosed with cancer, dysplasia or a stricture at OGD2 although these were rare events (4.6% for grade C and 5.4% for grade D oesophagitis, cumulatively); BO, however, was more likely to be diagnosed at OGD2 in the grade D cohort irrespective of frailty (p=0.006). This indicates that grade D oesophagitis may prevent the detection of BO in the distal oesophagus at index endoscopy or that BO may develop during healing to replace squamous epithelium. Importantly, median reported Prague classification at OGD1 in grade D was C6M8, compared with C1M3 at OGD2, suggesting over estimation of length of BO presumably due to inflammation at index endoscopy. This finding was also reported by Hanna *et al*,[8] and has been highlighted in subsequent studies[20] as short segments of BO are less likely to progress to malignancy and could be an important factor when considering the appropriateness of repeat endoscopy.

Mortality rates of the entire cohort were high in both oesophagitis grades, in particular in patients with grade D. At median follow-up time of 76 months (IQR: 72–83 months), 41.7% of grade D patients were deceased, compared with 26.1% of grade C (p<0.001). They were also more likely to be deceased at 6 and 12 months post OGD1, indicating a particularly frail population with a short life expectancy. When stratified according to frailty, 94.7% of frail grade D patients were deceased at 76 months post OGD1 and only 8 (10.5%) patients had an OGD2, suggesting that the aforementioned pragmatism may have played a role in the decision to repeat endoscopy. Frail grade D patients were more likely to be older and to be inpatients, characteristics that have been reported to be associated with severe oesophagitis.[13 14 21]

These results illustrate the importance of practicing realistic medicine which moves away from the traditionally paternalistic model and places the patient at the centre of their care and reduces harm by not carrying out interventions that have minimal clinical benefit.

There are certain conclusions from our study that are worthy of further discussion. Firstly, our findings suggest that OGD2s for frail patients with severe oesophagitis may be avoided. Follow-up OGDs provide negligible clinical benefits, subject vulnerable patients to the unnecessary risks of an invasive procedure and can be a distressing test for this group. Secondly, OGD2s could be restricted to patients with severe oesophagitis who are not considered clinically frail, acknowledging that, even in this case, the clinical benefit of diagnosing BO (most likely of short segment) may be small. Thirdly, diagnoses of serious pathology, although of low incidence, do not vary

significantly between grade C and grade D oesophagitis in non-frail patients, therefore follow-up of both groups of patients needs to be reconsidered in future guidelines. Alternative methods to follow-up non-frail patients, such as Cytosponge[22] (which is emerging in clinical practice in the UK), may play a role in the future, however its use still requires prospective validation in severe oesophagitis.

This is the largest study to consider clinical outcomes in severe oesophagitis and to compare demographic features and outcomes between grades. While previous studies[7 8 10] have only considered BO at OGD2, we have also reported data on diagnoses of cancer, strictures and dysplasia. Additionally, it is the first study to consider data on frailty and comorbidities and the role that these results may play in the decision to perform OGD2s.

However, our study has some limitations. It is a retrospective study and prospective studies would increase reliability of the results and would have the potential to assess the proposed care pathway. Subsequent studies may also investigate the relationship between the severity of oesophagitis, use of nasogastric tubes and admissions to intensive care units. We would also acknowledge that there is interobserver variation in grading of oesophagitis. Although the reported OGD2 rates were relatively low, no new cancers were identified at case record review at a median of 76 months (IQR: 72.0–83.0) in patients who did not have an OGD2. The CFS has not been validated in younger patients,[23] however, given that the median age of our cohort was 64, its use was felt appropriate. There is some subjectivity in CFS interpretation, however we independently scored a subcohort of 309 patients (the deceased patients were selected due to potential high levels of frailty) and demonstrated an excellent intraclass correlation coefficient of 0.95. We felt that the CFS was a more appropriate measurement of frailty than the CCI due to its assessment of symptoms of disease and their impact on physical health, and the consideration of care needs. We defined BO as endoscopically suspected and/or confirmed histologically through the presence of IM on biopsies. While IM is a prerequisite in some guidelines,[24] it is not required for a diagnosis of BO in BSG guidelines.[19]

In conclusion, we report that OGD2s could be tailored towards patients diagnosed with severe oesophagitis (both grades C and D) who are not considered clinically frail. Our study demonstrates that frail patients (particularly those with grade D oesophagitis) have been shown to have a significantly reduced life expectancy and that little clinical benefit has been demonstrated in conducting OGD2s in this group. Further studies in other centres are required to determine if similar findings may be replicated.

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Contributors RKG contributed to conception of the work, data collection, statistical analysis and drafted the original manuscript. WMB contributed to conception of the work, data collection and revision of the manuscript. CT contributed to data collection, statistical analysis and revision of the manuscript. EJR, OO, SCM and EFW contributed to data collection and revision of the manuscript. AA, NCM, IDP, NIC, KCT, CLN and JNP critically revised the manuscript. GSMM contributed to conception of the work and critically revised the manuscript. RK was senior author and contributed to conception of the work and critically revised it for important intellectual content. Guarantor: RKG.

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