



### Appropriateness and Diagnostic Yield of Referrals for Oesophagogastroduodenoscopy at the Korle Bu Teaching Hospital

*Pertinence et rendement diagnostique de références pour oesophagogastroduodenoscopy à L'hôpital Korle Bu Enseignement*

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#### ABSTRACT

**BACKGROUND:** Increasing endoscopy workload in open-access services necessitates adoption of appropriateness criteria to check abuse and improve yield.

**OBJECTIVE:** To assess the appropriateness of referrals for oesophagogastroduodenoscopy (OGD) and its relationship to yield at Korle-Bu Teaching Hospital (KBTH), Accra.

**METHODS:** Referrals, signs, and symptoms of 375 consecutive patients for diagnostic oesophagogastroduodenoscopy were evaluated over four months. Indications were categorized as appropriate or inappropriate using the American Society of Gastrointestinal Endoscopy (ASGE) guidelines and endoscopic findings (yield) categorized as positive or negative. The relationship between these was analyzed and the diagnostic accuracy of the guidelines determined.

**RESULTS:** There were 209 (55.7%) females, and 316 (84.3%) open-access procedures. Mean age was 46 ± 17 years. Dyspepsia, 272 (72.5%) and epigastric tenderness, 192 (41.4%) were the commonest symptom and sign respectively. Only 133 (35.5%) reported alarm symptoms. Appropriate referrals constituted 221 (58.9%). Inappropriate referral rate was similar for endoscopists and non-endoscopists. Positive yield was 62.7%. Male sex, age > 45 years, haematemesis, persistent vomiting, gastroenterologists' referrals and epigastric tenderness were the best predictors of positive yield. Gastritis, 121 (32.3%), duodenal ulcer, 48 (12.5%) and oesophagitis, 36 (9.6%) were the leading endoscopy diagnoses. Carcinomas were reported only after 45 years and 18 (81.8%) of the cases had alarm symptoms.

**CONCLUSIONS:** Inappropriate referral for OGD rate is high in Accra. Yield is improved by adherence to the ASGE guidelines but its accuracy as a screening tool for OGD at Korle Bu Teaching Hospital is too low to recommend it for adoption. *WAJM 2011; 30(3): 158–163.*

**Keywords:** Dyspepsia, Gastritis, Duodenal ulcer, Sensitivity, Specificity.

#### RÉSUMÉ

**CONTEXTE:** L'augmentation de la charge de travail endoscopie en libre accès des services nécessite l'adoption de critères de pertinence pour vérifier les abus et améliorer le rendement.

**OBJECTIF:** Pour évaluer la pertinence des références pour oesophagogastroduodenoscopy (AMG) et sa relation avec le rendement à Korle-Bu Teaching Hospital (KBTH), Accra.

**MÉTHODES:** Les références, les signes et les symptômes de 375 patients consécutifs pour oesophagogastroduodenoscopy de diagnostic ont été évalués sur quatre mois. Les indications étaient classés comme approprié ou inapproprié à l'aide de l'American Society of Gastrointestinal Endoscopy (ASGE) des lignes directrices et les résultats endoscopiques (rendement) classés comme positifs ou négatifs. La relation entre ces a été analysée et la précision diagnostique des orientations fixées.

**RÉSULTATS:** Il y avait 209 (55,7%) des femmes, et 316 (84,3%) à accès ouvert des procédures. L'âge moyen était de 46 ± 17 ans. La dyspepsie, 272 (72,5%) et une sensibilité épigastrique, 192 (41,4%) étaient les plus fréquentes des symptômes et de signer respectivement. Seulement 133 (35,5%) ont signalé des symptômes d'alarme. Références appropriées constitué 221 (58,9%). Taux de référence inappropriée a été similaire pour les endoscopistes et les non-endoscopistes. Rendement positif était de 62,7%. Le sexe masculin, âge > 45 ans, hématurie, vomissements persistants, les renvois gastro-entérologues et sensibilité épigastrique étaient les meilleurs prédicteurs de rendement positif. Gastrite, 121 (32,3%), ulcère duodéal, 48 (12,5%) et de l'œsophagite, 36 (9,6%) étaient les diagnostics principaux endoscopie. Carcinomes ont été signalés seulement après 45 années et 18 (81,8%) des cas avaient des symptômes d'alarme.

**CONCLUSIONS:** Les taux de référence inapproprié pour amg est élevé à Accra. Le rendement est amélioré par l'adhésion aux directives ASGE mais son exactitude comme outil de dépistage pour les autres ministères à l'hôpital universitaire de Korle Bu est trop faible pour le recommander pour adoption. *WAJM 2011; 30(3): 158–163.*

**Mots-clés:** dyspepsie, gastrite, ulcère duodéal, sensibilité, spécificité.

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**Abbreviations:** ASGE, American Society of Gastrointestinal Endoscopy; DU, Duodenal Ulcer; GI, Gastrointestinal; GU, Gastric Ulcer; KBTH, Korle Bu Teaching Hospital; OGD, Oesophagogastroduodenoscopy; PPI, Proton pump inhibitor; UGE, Upper Gastrointestinal Endoscopy.

## INTRODUCTION

Concerns about identifying underlying pathology or excluding organic disease for the purposes of reassurance in persons with upper gastrointestinal (GI) symptoms has resulted in an increased use of oesophagogastrroduodenoscopy (OGD) to compliment clinical assessment. To meet the increased demand, many endoscopy service providers now operate an open access service, that is, performance of the procedure without prior gastroenterologist consultation. Unfortunately, such services have been linked to high levels of inappropriate referrals and poor diagnostic yield with resultant increases in overall cost and waiting list.<sup>1-4</sup> Such concerns over abuse prompted calls for screening in open access endoscopy.

The American Society of Gastrointestinal Endoscopy (ASGE) 2000 consensus statement<sup>5</sup> on the appropriate use of gastrointestinal endoscopy is a tool proposed to optimize the use of OGD. However, epidemiological variations in disease patterns could cause universal adherence to these guidelines to have adverse outcomes. Fear of missing serious diagnoses, particularly carcinoma, in persons denied OGD because of an inappropriate indication therefore remains a major concern limiting the widespread adoption of these guidelines as a screening tool. Indeed, a few studies<sup>6</sup> have reported cancers in patients considered as having inappropriate indications for OGD. However, many other studies from different countries, evaluating adherence to these guidelines have reported high levels of appropriateness which are also associated with higher diagnostic yield compared to inappropriate referrals.<sup>6-9</sup>

The Korle Bu Teaching Hospital is a tertiary referral centre in Ghana that provides open access OGD but has no published guidelines to guide referring doctors. After a long break in provision of the service due to malfunctioning equipment the endoscopy unit started operating a new videoscope in June 2007 as an open access service. Already, there are complaints of heavy workload and this is expected to rise with the recently introduced National Health Insurance

Scheme. Normal OGD rate is high; up to 41%<sup>10-12</sup> with previous calls for screening of patients for OGD.<sup>10</sup> However, there have been no studies of the appropriateness of these referrals.

The aim of this study was to determine the appropriateness of referrals for OGD at the Korle Bu Teaching Hospital using the ASGE 2000 guidelines and the relationship between the appropriateness and the yield from these procedures.

## SUBJECTS, MATERIALS, AND METHODS

This was a cross-sectional survey of 375 patients referred for diagnostic OGD at the Endoscopy Unit of the Korle Bu Teaching Hospital, a tertiary referral centre accessed mostly by patients in the Southern sector of Ghana, between 1<sup>st</sup> December 2007 and 30<sup>th</sup> March 2008.

All consecutive patients for diagnostic OGD performed during the study period who consented to be part of the study were included. Patients for elective therapeutic OGD, less than 13 years (cut-off age for adult medicine in KBTH) were excluded. Patients were recruited before OGD examination to limit bias. Those whose procedures were not completed were excluded subsequently. Written informed consent was obtained from all patients who agreed to participate.

Patients' referrals were re-evaluated by history, abdominal examination and where available, additional data was gathered from their medical records. The referral was then classified as appropriate or inappropriate based on the ASGE 2000 appropriate use of gastrointestinal endoscopy consensus statement. Indications listed under 'OGD is generally indicated' and 'sequential or periodic OGD may be indicated' in this guideline statement were considered appropriate. All other indications were categorized as inappropriate. This was done before performing the procedure to limit bias.

Endoscopy was performed using a forward viewing Olympus GIF 0260 videoscope and followed standard protocol. All procedures were done with approval of the Research and Ethics Committee of the University of Ghana Medical School.

Endoscopic findings were reported and categorized as positive (any abnormality that had direct therapeutic or prognostic consequence, e.g. erosive gastritis, duodenal ulcer and carcinoma) or negative (normal or minor abnormality with no direct therapeutic or prognostic consequence e.g. hiatal hernia, non-erosive gastritis).

## Data Management and Statistical Analysis

Data was captured with Microsoft Access 2003 and analyzed with SPSS 16.0.

The extent of association between endoscopic findings and ASGE appropriateness was expressed as the odds ratio (OR) of finding a relevant positive finding in patients with an appropriate indication compared to those with an inappropriate indication. The relationship between patients' clinical characteristics and yield was also expressed as the OR of positive endoscopy in those with the characteristic compared to those without the characteristic. Logistic regression analysis to determine the clinical features that significantly predict positive findings was done.

Using the ASGE guidelines (globally and individual indications) as a diagnostic test (positive for cases of appropriate indication and negative for inappropriate indication) and endoscopy findings as gold standard results, sensitivity, specificity, positive predictive value (PPV) and negative predictive values (NPV) were calculated.

The ability of the ASGE indications to rule in or rule out positive findings was evaluated by calculating the positive and negative likelihood ratios (LR<sup>+ve</sup> and LR<sup>-ve</sup> respectively) both globally and for each separate indication. The test is useless if the LR is equal to 1; a test has a greater value the more the LR<sup>+ve</sup> is greater than 1 and the less LR<sup>-ve</sup> is less than 1.

## RESULTS

Three hundred and seventy-five patients were evaluated in this study. No complications were recorded. Two cases were abandoned because patients were uncooperative during the procedure and these were not included in the analysis.

There were 166 (44.3%) males and 209 (55.7%) females giving a male to female ratio of 1: 1.3. Their ages ranged from 14 – 95 years with a mean of  $46.01 \pm 16.97$ .

Fifty-nine (15.7%) referrals were from endoscopists or gastroenterologist. The remaining 316 (84.3%) were from non-gastroenterologists, i.e. done as open access procedures.

### Symptoms

Endoscopy was performed for 51 (13.6%) patients within one week of onset of symptoms. Eighty eight (23.5%) patients had OGD after 53 or more weeks of their symptoms. The mean and median duration of symptoms were 73.1 and 16.0 weeks respectively. The mean duration of symptoms was significantly longer for young (<45 years) than old (>45 years) patients (79.1 versus 67.0 weeks;  $p=0.046$ ). Also the mean symptom duration in the absence of alarm symptoms was longer than when alarm symptoms were present (87.9 versus 46.1 weeks;  $p=0.012$ ).

Two hundred and twenty-eight (60.8%) patients had only one upper abdominal symptom. Another 98 (26.1%) had 2 symptoms, and 39 (10.4%) and 9 (2.4%) had 3 and 4 symptoms respectively. One patient had 6 symptoms.

Dyspepsia was the major complaint of the majority of patients (Table 1). One hundred and eighty-eight (50.1%) of these were simple dyspepsia, i.e. not associated with alarm symptoms. More females, 163 (80%) than males, 109 (65.7%) reported dyspepsia ( $p=0.008$ ). Also, more young patients, 146 (77.7%)

than old patients had dyspepsia, 126 (67.4%) ( $p=0.026$ ). A total of 133 (35.5%) patients reported alarm symptoms.

### Physical Findings

Abdominal examination was normal in 183 (48.8%) cases. Of the remaining 192, 80.2% had epigastric tenderness, 5.7% had epigastric mass, 5.2% hepatomegaly, 2.1% splenomegaly, 3.6% ascites and another 3.6% uterine mass. Less frequent signs included loin and suprapubic tenderness and abdominal wall obesity.

### Previous Use of Alcohol, NSAID and Previous Treatment

One hundred and twenty (32%) patients admitted to alcohol use and 172 (45.9%) had used NSAIDs up to one month before the procedure. Acute GI bleed presentation was significantly more in alcohol users, 27 (22.5%) than non-users, 28 (11.1%) but did not differ amongst NSAID users, 26 (15.1%) compared to non-NSAID users, 22 (12.6%) ( $p=0.492$ ).

Also, 308 (81.1%) of the patients had received some treatment for their symptoms before the procedure. The distribution of previous treatment types were as follows; PPI monotherapy – 188, *H. pylori* eradication therapy – 81, antacids – 113, H2 blocker – 10, herbs – 17 and others including prokinetics and probiotics – 16. Fifty eight did not know what treatment they had received.

Seventy nine (21.1%) of the patients had undergone previous GI investigation. Forty-nine (12.3%) patients had undergone at least one previous OGD; 4 had undergone it twice and 1 had undergone it three times within the

preceding 2 years. Twenty-six patients (6.9%) had had abdominal ultrasound (USG), 11 (2.9%) had had barium meal or swallow and 3 (0.8%) had had colonoscopy as workup for their symptoms preceding the OGD.

### Appropriateness of Referral and Endoscopy Findings

According to the ASGE, criteria 221 (58.9%) referrals were appropriate and the remaining 154 (41.1%), inappropriate. Twenty-two (37.3%) referrals from gastroenterologist were inappropriate compared to 132 (41.8%) from non-gastroenterologists ( $p=0.520$ ).

Endoscopy was normal or negative in 140 (37.3%) cases. Positive findings were reported in the remaining 235 (62.7%), significantly more in males (69.3%) than in females (58.9%) ( $p=0.018$ , OR=1.672 {1.089–2.568}) and also more in >45 year old patients ( $p<0.001$ ). Gastritis was the most common positive finding reported (Table 2). The ratio of GU:DU was 1:1.5. All carcinomas (gastric and oesophageal;  $n=22$ ) were detected in subjects more than 45 years. Eighteen (81.8%) of these were diagnosed in the presence of alarm symptoms.

Logistic regression analysis of all clinical variables assessed showed that age >45 years, male sex, referral from gastroenterologists, haematemesis, persistent vomiting and epigastric tenderness were the significant predictors of positive findings ( $p<0.05$ ).

Positive findings were reported in 70.1% of appropriate referrals compared to 51.9% of inappropriate referrals. (OR=2.172; CI: 1.416–3.332 { $p<0.001$ }). Similar differences were reported for

**Table 1: The Major Symptoms Reported**

Major Symptom	Frequency N(%)
Dyspepsia	272 (72.5)
Weight loss	69 (18.4)
Persistent vomiting	42 (10.7)
Haematemesis	40 (10.7)
Melaena	31 (8.5)
Dysphagia	13 (3.5)
Heartburn	46 (12.0)
Presumed iron deficiency anaemia	5 (1.3)
Others	44 (11.7)

**Table 2: Relationship between Endoscopic Findings and ASGE Indication Category for Upper Gastrointestinal Endoscopy**

Positive Finding	Total	Number (%)		OR (95% CI)
		Appropriate	Inappropriate	
Gastritis	121	71 (58.7)	50 (41.3)	0.985(0.634–1.528)
Duodenal ulcer	48	30 (62.5)	18 (37.5)	1.187(0.636–2.216)
Gastric ulcer	32	24 (75.0)	8 (25.0)	2.223(0.971–5.090)
Gastric cancer	16	15 (93.8)	1 (6.2)	11.141(1.456–85.254)*
Oesophageal varices	9	8 (88.9)	1 (11.1)	5.746(0.711–46.423)
Oesophageal Cancer	6	5 (83.3)	1 (16.7)	3.542(0.410–30.618)
Oesophagitis	36	23 (63.9)	13 (36.1)	1.260(0.617–2.572)
Duodenitis	24	15 (62.5)	9 (37.5)	1.173(0.500–2.754)

\*, Statistically significant.

**Table 3: Sensitivity, Specificity, Predictive Values and Likelihood Ratios of ASGE Appropriateness Criteria**

ASGE Criteria	+VE OGD	-VE OGD	Sensi. (%)	Spec. (%)	PPV	NPV	LR <sup>+ve</sup>	LR <sup>-ve</sup>
Upper abdominal symptoms persistent despite therapy	113	52	72.9	21.2	68.5	25.0	0.93	1.28
Upper abdominal symptoms associated with signs/symptoms suggesting serious organic disease	143	12	73.3	42.9	92.3		1.27	0.62
Upper abdominal symptoms in patients age > 45 years	82	73	73.9	33.6	52.9	13.6	1.15	0.78
Oesophageal reflux symptoms persistent despite therapy	12	12	7.7	81.8	50.0		0.42	1.13
Dysphagia/Odynophagia persistent vomiting	9	3	5.8	95.5	75.0		1.29	0.99
Active or recent GI bleeding	32	5	20.6	92.4	86.5		2.71	0.86
Presumed chronic blood loss or iron deficiency anaemia	41	8	26.5	87.9	83.7		2.19	0.84
Global ASGE appropriate	1	1	0.60	98.5	50.0		0.40	1.01

+VE, positive; -VE, negative; Sensi, Sensitivity; Spec, Specificity.

specific positive findings but only the OR for finding gastric cancer in an ASGE appropriate referral was statistically significant as shown in Table 2.

### Diagnostic Performance

The diagnostic characteristics of the whole ASGE criteria were as follows: sensitivity – 70.1%; specificity – 48.1%; positive predictive value (PPV) – 66.0%, negative predictive value (NPV) – 52.9%, positive likelihood ratio (LR<sup>+ve</sup>) – 1.35 and negative likelihood ratio (LR<sup>-ve</sup>) – 0.62. Similar diagnostic characteristics of individual ASGE appropriate indications that applied frequently to the patients are summarized in Table 3.

### DISCUSSION

When OGD was first introduced, the decision to perform the procedure was made by the endoscopist after clinically evaluating patients referred to him. This report confirms the popularity of open

access service for clinicians who use KBTH as their referral point and this is consistent with global trend.<sup>3</sup> This may partly account for the earlier referral of patients for OGD. In this study only about a quarter of the patients compared to the majority in a previous study<sup>11</sup> from this hospital reported symptoms of longer than one year. As reported by Wong *et al*,<sup>13</sup> introduction of open access service is associated with a reduction in waiting time as a result of the by-pass of waiting time for specialist consultation.

Like in most reports from the West African sub-region,<sup>14,15</sup> the reason for requesting OGD included evaluation of dyspepsia in the majority of cases. Whilst this might be attributable to the high prevalence of *H. pylori* in the region, it could also be due to the fact that the decision on who and when to refer for OGD is most difficult for clinicians in patients with dyspepsia. Indeed, if *H. pylori* were the major concern then it will

be expected that *H. pylori* eradication therapy will be used frequently. However, only 29.5% of the patients received empirical *H. pylori* eradication therapy whereas PPI monotherapy was used most frequently, even more so than over-the-counter medications such as antacids and H2 receptor blockers. Meanwhile at least among endoscopy patients, there appears to be no change in the prevalence of the typical reflux symptom within the population to warrant such high use of PPI monotherapy. This practice is worrying considering the fact that prior PPI monotherapy can blind endoscopists to some serious diseases including malignancy at subsequent OGD.

The rate of inappropriate referrals can be considered as disturbingly high when compared to rates reported in the literature.<sup>6-9,16</sup> Even more worrying is the finding that this high rate of inappropriate referrals did not differ between referrals from endoscopist or gastroenterologists and those from non-gastroenterologists. This could imply that personal experience with endoscopy and greater knowledge of GI disease in general had little impact on the likelihood of making appropriate referrals.

It could be argued that the ASGE guidelines used for this categorization were intended for the American population with different pattern of diseases and resources for investigating upper GI diseases. Thus in Ghana where there is a relative lack of facilities for non-endoscopic means of investigating *H. pylori*, clinicians have little option than to ‘inappropriately’ request OGD rather than adopt a non-invasive ‘test and treat’ strategy. This is evident in the fact that of the 21.1% of the patients who had prior evaluation of their symptoms, none had received non-invasive *H. pylori* testing.

The ASGE guidelines also appear not to value much the psychological benefit of OGD to patients when indeed factors such as anxiety, depression and fear of malignancy rather than severity of GI symptoms may be the main reason for seeking medical attention. To classify procedures done for their psychological benefit as inappropriate might in itself be inappropriate. It would have been informative if the study had reported the reasons for inappropriate referrals.

Unfortunately, the yield from endoscopy is often regarded as a good measure of effective use of the service and a normal report regarded as a waste of resources. In that respect, the normal endoscopy rate of 37.3% reported compares favourably with the 41.1% recently reported by Aduful *et al*<sup>10</sup> in KBTH and 50% quoted by Duggan<sup>17</sup> from a review of 22 studies that investigated dyspepsia.

The predictors of positive findings reported are similar to those from previous studies.<sup>7,9</sup> The lower rate of positive yield in females may be in support of the knowledge that dyspepsia in females is more likely than in males to be functional.<sup>18</sup> Also, the pattern of endoscopic diagnoses appears not to have changed from that reported recently<sup>10</sup> although there is a considerable increase in the proportion of gastritis.

This study, as in several others<sup>6-9,15</sup> suggests that appropriateness generally optimizes the chance of finding clinically significant lesions. However, only the diagnosis of gastric cancer was statistically significant in appropriate referrals over inappropriate referrals. Indeed, the two cancers that were reported from inappropriate referrals both had radiologically confirmed liver metastasis and therefore OGD was to identify the primary site – an indication not supported by the ASGE guidelines. Admittedly also, most of the other positive findings reported from inappropriate referrals could have been treated successfully with empirical therapy. This should allay the fears that sticking to these guidelines will risk missing serious diagnoses particularly malignancy.

The diagnostic accuracy of the ASGE guidelines as assessed by sensitivity, specificity, and predictive ratios is rather low. Likelihood ratios also assess the value of a test by providing a summary of how many times more likely (for LR<sup>+ve</sup>) or less likely (for LR<sup>-ve</sup>) those with a disease are to have a test result than patients without the disease. The reported LR indicate at best a weak evidence (for 'persistent vomiting' and 'recent or active GI bleed') to rule in or rule out disease with the ASGE guide-

lines. These are consistent with previous reports<sup>6,16</sup> and an indication of the limitations of these guidelines as a screening tool. Clinicians must be aware of this when making decisions based on the guidelines.

In conclusion, most referrals for OGD at the KBTH are for evaluation of dyspepsia and are performed without prior gastroenterologist / endoscopist consultation. The rate of inappropriate referrals from endoscopists and non-endoscopists is high. The yield from OGD is generally good but is improved when referrals satisfy the ASGE guidelines. However, the diagnostic accuracy of the ASGE guidelines is too low to be accepted as an efficient screening tool for patients attending KBTH.

Provision of non-endoscopic means of assessing dyspepsia such as non-invasive *H. pylori* testing and updating the knowledge of clinicians in the management of dyspepsia could prove vital in ensuring efficient use of OGD resources.

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#### CONFLICT OF INTEREST

None.

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