

# Appropriateness of upper gastrointestinal endoscopy referrals from primary health care

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Open-access endoscopy is defined as “the provision of a diagnostic endoscopic procedure by direct request of a general practitioner without prior hospital consultation”.<sup>1</sup> Although open access is needed to meet the increasing demand for endoscopy service, studies suggest there is a link between such a system and inappropriate use of esophagogastroduodenoscopy (EGD), particularly in primary care.<sup>2-8</sup> To ensure the appropriateness of EGD, the American Society for Gastrointestinal Endoscopy (ASGE) has developed criteria to promote safe and responsible endoscopic practice.<sup>9</sup> In Saudi Arabia, gastrointestinal symptoms are common, with normal endoscopic findings ranging from 23.5% to 29%,<sup>10-14</sup> but there is little, if any, application of standard criteria to judge the use of endoscopy. This study examined the appropriateness of EGD referrals from primary health care (PHC) and the association between appropriate use and the presence of significant lesions detected by endoscopy using standard criteria developed by the ASGE.

## Patients and Methods

A retrospective study was performed to assess indications for EGD referrals from primary health care at King Fahad National Guard, King Abdul Aziz Medical City, Riyadh, over a 9-month period (1 February to 30 October 2000). The study population was all patients who were referred to EGD by primary care and family physicians and who underwent upper gastrointestinal endoscopy (UGE) during the study period. The endoscopy unit is staffed by three experienced consultant endoscopists and provides an unrestricted open-access service to the medical staff of the outpatient department and to general practitioners. Data collected from medical records included sociodemographic characteristics, the type and duration of the clinical symptoms, medication, and endoscopic diagnosis. An independent investigator who was unaware of EGD results, according to the revised 1992 ASGE criteria, assessed the appropriateness of EGD referrals. Endoscopic diagnosis was divided into “clinically relevant” and “not clinically relevant” categories. Clinically relevant was defined as an endoscopic diagnosis that generally and directly impacts therapeutic decisions and prognosis (e.g., cancer, esophagitis, peptic ulcer).

To evaluate the association between appropriateness and the presence of clinically relevant endoscopic diagnosis, the yield of endoscopy for appropriate indications was compared with the yield of inappropriate ones and the extent of the association between these two variables was expressed as the odds ratio (OR) of finding a relevant diagnosis in patients with an appropriate indication compared with those with an inappropriate indication. The ability of the ASGE indications to forecast relevant endoscopic diagnosis was evaluated by calculating the likelihood ratio (LR) (positive and negative). The likelihood ratio is the

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likelihood that a given test result (LR+ for a positive result or LR- for a negative test result) would be expected in a patient with a target disorder, compared with the likelihood that the same result would occur in a patient without the target disorder. The sensitivity, specificity, post-test probability of ASGE criteria was calculated. SPSS (statistical package for social science) and Epi Info 2000 were used for data entry and analysis.

**Results**

The 80 patients in this study ranged in age from 15 to 85 years, with a mean age of 38.28 years (SD ±15.07 years). Forty-seven (58.75%) were males. Patients underwent EGD mostly because of dyspepsia (80%), followed by gastroesophageal reflux symptoms (23.8%), while GI bleeding and vomiting represented 2.5% each (Table 1). The indication for EGD was considered appropriate according to ASGE criteria in 72.5% of cases, whereas 27.5% were inappropriate (Table 1). Endoscopy was normal in 11.3% of cases whereas a clinically relevant diagnosis was made in 33.8%. Esophagitis was the most frequent diagnosis in 17.5%, followed by duodenal ulcer in 8.8%, erosive duodenitis in 7.5%, and erosive gastritis in 6.3% (Table 2).

The percentage of EGDs that provided clinically relevant diagnoses was 36.2% when the procedure was performed for an appropriate ASGE indication versus 27.3% of inappropriate ASGE indication (OR: 1.5; 95%CI 0.51-4.46) (Table 3). The diagnostic characteristics of ASGE criteria were as follows: sensitivity 78%, specificity 30%, LR+ 1.11, LR- 0.74.

**Discussion**

In this study, the criteria of the American Society for Gastrointestinal Endoscopy (ASGE) was used to determine the appropriateness of referrals from primary care doctors to an endoscopy unit in the hospital and the association of such criteria with relevant endoscopic findings. EGD was considered appropriate in 72.5% of referrals while 27.5% of referrals were inappropriate. This finding is reassuring in terms of appropriateness, as reports in the literature indicate that up to 49% inappropriate use of EDG.<sup>2</sup>

The ASGE criteria are used as a diagnostic test in our study (positive in case of appropriate ASGE, negative in case of inappropriate ASGE). All the characteristic indices of a diagnostic test were calculated (sensitivity, specificity, likelihood ratio) and we determined how much this test modified the

**Table 1.** Indications for esophagogastroduodenoscopy in the study population.

	Number	%
Dyspepsia	62	77.5
Dyspepsia+anorexia and weight loss	2	2.5
Esophageal reflux symptoms	19	23.8
Upper GI bleeding	2	2.5
Persistent vomiting of unknown origin	2	2.5
Others	1	1.3

**Table 2.** Endoscopic findings in the study population.

	Number	%
Clinically relevant	27	33.8
Erosive gastritis	5	6.3
Erosive duodenitis	6	7.5
Esophagitis	14	17.5
Duodenal ulcer (DU)	7	8.8
Gastric ulcer	1	1.3
Esophageal varices	1	1.3
Not clinically relevant	53	66.3
Nonerosive gastritis	56	70
Hiatal hernia	15	18.8
Normal	9	11.3
Nonerosive duodenitis	5	6.3
Healed DU	1	1.3

\*Sum of percentage is higher than 100% because of more than one endoscopic finding in the same patient.

pretest probability of pathology. The prevalence (pretest probability) of relevant pathologies was 34% of cases and the presence of appropriate indications enhanced the post-test probability of pathology to 36%, whereas the absence of appropriate indications reduced the probability of finding relevant pathology to 27%, which are small changes in post-test probability. Similar results were reported by others.<sup>6</sup> The sensitivity of the present criteria suggest to us that

**Table 3.** Relationship between appropriateness of indications and each endoscopic finding.

	Appropriate No. (%)	Inappropriate No. (%)	OR (95%CI)
Clinically relevant	21 (36.2)	6 (27.3)	1.5 (0.51-4.46)
Erosive gastritis	3 (5.2)	2 (9.1)	0.55 (0.09-3.51)
Erosive duodenitis	2 (3.4)	4 (18.2)	0.16 (0.03-0.95)
Esophagitis	12 (20.7)	2 (9.1)	2.61 (0.53-12.75)
Duodenal ulcer (DU)	7 (12.1)	0	0.00
Gastric ulcer	1 (1.7)	0	0.00
Esophageal varices	1 (1.7)	0	0.00
Not clinically relevant	37 (63.8)	16 (72.7)	0.66 (0.19-2.17)
Nonerosive gastritis	46 (79.3)	10 (45.5)	4.6 (1.61-13.18)
Hiatal hernia	11 (19.0)	4 (18.2)	1.05 (0.29-3.73)
Normal	4 (6.9)	5 (22.7)	0.25 (0.06-1.05)
Nonerosive duodenitis	4 (6.9)	1 (4.5)	1.56 (0.16-14.74)
Healed DU	1 (1.7)	0	0.00
Total	58 (100)	22 (100)	

\*Sum of percentage is higher than 100% because of more than one endoscopic finding in the same patient.

the appropriateness criteria be considered as no more than a screening test to identify care that may be inappropriate, and as an initiative tool for decisions about expected procedure outcomes, while its specificity indicates that the diagnostic performance of ASGE criteria is not high. Moreover, appropriateness, based on ASGE criteria, does not replace the clinical judgment of doctors: “Under no circumstances should the care of individual patients be guided solely by the results of the appropriateness method without additional clinical information”<sup>15</sup>. Appropriateness criteria are not the only factor for decision making in medicine.<sup>16</sup> However, using valid and reliable criteria for referrals reduces

cost and enhances effectiveness. In conclusion, this study shows that most EGD referrals from PHC were appropriate according to ASGE criteria. However, ASGE criteria cannot predict or enhance the probability of finding significant endoscopic pathologies. This means that the ASGE criteria are useful as a screening tool for appropriateness rather than as a diagnostic tool. Further study is needed in this field.

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