

INDICATIONS FOR UPPER GASTRO- INTESTINAL ENDOSCOPY

The Accuracy of the American Society for Gastrointestinal Endoscopy Guidelines in a Portuguese Hospital

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RESUMO

Introduction: The appropriateness of the indications for upper gastro-intestinal endoscopy (EGD) is crucial in assessing quality in endoscopy units, improving cost-effectiveness and providing better patient care. Using the American Society for Gastrointestinal Endoscopy (ASGE) guidelines, the aim of this study was to evaluate the appropriate use of EGD and to measure the local accuracy of these guidelines.

Patients and methods: Over a two year period information was gathered on 2305 consecutive patients – 1146 (50% males) – of whom had an EGD performed at our unit. Patients were referred for EGD by other physicians of the hospital staff or through the gastroenterology out-patient clinic. The appropriateness, sensitivity, specificity and predictive value of the ASGE guidelines were established using EGD diagnosis as gold standard. Atrophic gastritis and hiatus hernia were considered irrelevant diagnosis.

Results: According to the ASGE guidelines the rate of inappropriateness was 20%. No lesions or irrelevant lesions were found in 30.6% EGD. Appropriately indicated endoscopies disclosed significantly more clinically relevant findings (71.3%) than endoscopies performed with indications that were not ASGE listed (61.7%) – $p < 0.01$, OR = 1.55, 95% CI (1.24-1.92) but no significant difference was found between appropriateness and inappropriateness in patients with a diagnosis of gastric cancer: $p = 0.21$, OR = 1.53, 95% CI (0.75-3.21).

The sensitivity of the ASGE criteria was 82.1%, the specificity 25.2%, the positive predictive value 71% and the negative predictive value 38.1%. Gastric cancer was found in 10 (0.4%) of the patients not appropriately indicated.

Conclusions: In this Portuguese population sample, the accuracy of the ASGE guidelines is too low to be confidently acceptable. This suggests that, in Portugal, a country with a high prevalence of gastric cancer, wider criteria must be applied, if useful local guidelines for appropriate referrals are expected.

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SUMMARY

INDICAÇÕES PARA A ENDOSCOPIA DIGESTIVA ALTA

Acuidade das *Guidelines da American Society for Gastrointestinal Endoscopy* num Hospital Português

Introdução: o uso apropriado da endoscopia digestiva alta (EDA) é essencial na avaliação da qualidade das Unidades de Endoscopia Digestiva, permitindo melhorar o custo-benefício e proporcionando melhores cuidados de saúde. Aplicando as indicações da American Society for Gastrointestinal Disease (ASGE), o objectivo deste estudo foi avaliar o uso apropriado da EDA e determinar a acuidade local dessas indicações.

Doentes e métodos: durante um período de dois anos reuniram-se dados de 2305 doentes consecutivos – 1146 (50% homens) – que efectuaram uma endoscopia digestiva alta na nossa Unidade. Esses doentes foram referenciados por médicos de outras especialidades hospitalares ou da consulta externa de gastroenterologia. O uso apropriado, sensibilidade, especificidade e valor preditivo das indicações da ASGE foram estabelecidos usando como *gold standard* os diagnósticos endoscópicos. A gastrite atrófica e a hérnia do hiato foram considerados diagnósticos irrelevantes.

Resultados: De acordo com as indicações da ASGE, a taxa de uso inapropriado de EDA foi de 20%. Não se encontraram lesões ou foram detectados achados irrelevantes em 30.6% das EDA. As endoscopias com indicação apropriada mostraram significativamente mais lesões relevantes (71.3%) do que as EDA cujas indicações não constavam da lista da ASGE (61.7%) – $p < 0.01$ OR = 1.55, IC 95% (1.24-1.92) – mas não se encontrou diferença significativa entre indicações apropriadas e inapropriadas em doentes com o diagnóstico de cancro gástrico: $p = 0.21$, OR = 1.53, IC 95% (0.75-3.21).

A sensibilidade dos critérios da ASGE foi de 82.1%, a especificidade de 25.2%, o valor predictivo positivo de 71% e o valor predictivo negativo de 38.1%. Foi diagnosticado cancro gástrico em 10 doentes (0.4%) com indicação não apropriada.

Conclusões: A acuidade das indicações da ASGE é demasiado baixa para ser aceite com confiança. Os dados sugerem que, em Portugal, um país com elevada prevalência de cancro gástrico, as indicações devem ser alargadas, se se pretende desenvolver um conjunto de critérios para referenciação de EDA com utilidade local.

INTRODUCTION

The increasing demand for costly medical technologies and medical services is causing a crisis in the developed countries health care systems. The goal of maintaining quality of care in the context of cost constraints lies in the ability to determine the appropriateness of care. A procedure is considered appropriate if its health benefit exceeds its health risk by a sufficiently wide margin for the procedure to be worth performing^{1,2}.

EGD is a safe, widely available technique for which demand continues to grow, resulting in an increase in costs and waiting lists for endoscopic procedures^{3,4}. However the procedure is expensive and associated with a small but definite rate of complications^{5,6}. So, the appropriateness of indications for EGD is critical in assessing quality in endoscopy units, improving cost-effectiveness and providing better patient care⁷.

In particular, the practice of open-access endoscopy that allows physicians to schedule EGD without prior con-

sultation increases the need for evaluation, in order to eliminate inappropriate procedures without aggravating under-use.

In 1988 the American Society for Gastrointestinal Endoscopy (ASGE) developed guidelines⁸ to evaluate the relationship between appropriateness of use of EGD and relevant endoscopic findings. However the criteria for ordering an EGD, created under particular circumstances of referral and epidemiological patterns of disease occurrence, do not necessarily apply to different populations.

Based on the ASGE guidelines, the aim of this study was to assess the appropriateness of EGD and to measure the local accuracy of these guidelines using endoscopic findings as gold standard.

PATIENTS AND METHODS

The study design was approved by our hospital's Ethics Committee and was conducted according to Helsinki declaration rules.

From the 2nd January 2002 to 22nd March 2004 information was prospectively gathered for 2305 consecutive patients who had an EGD performed at our unit. Patients were referred to our unit for EGD either directly by other physicians of the hospital staff, mainly internists (20.8%) and general surgeons (33.9%), or through the gastroenterology out-patient clinic (30%).

Demographic data, the speciality of the referring physician, indication of the procedure, and endoscopic diagnosis were registered in a computer data questionnaire.

Clinical indications were classified as appropriate or inappropriate according to the ASGE guidelines published in 2000⁸. The indication was considered appropriate if listed under *Esophago-gastroduodenoscopy (EGD) is generally indicated and Sequential or periodic EGD may be indicated*. Indications outside these lists were classified as inappropriate.

The isolated findings of atrophic gastritis and hiatus hernia were considered irrelevant endoscopic diagnosis.

Sensitivity, specificity and predictive values of these indications were calculated using EGD diagnosis as the gold standard.

Data were analysed by using a two-tailed Chi-square test for comparison of proportions. A *p* value of less than 0.05 was considered statistically significant. The association of variables was expressed as odds ratio with 95% confidence intervals (CI). Statistical analysis was performed using EpiInfo (version 6, Center for Disease Control, Atlanta, Ga).

RESULTS

A total of 2305, 1146 (49.7%) males and 1159 (50.3 %) females was included in our study.

The participants mean age \pm SD was 59 years \pm 17.9, slightly lower in men (58.1 \pm 17.5) than women (59.4 \pm 18.3).

No lesions or irrelevant lesions were found in 705 (30.6%) EGD.

According to the ASGE guidelines the indication was inappropriate in 465 (20%) cases. The difference in the prevalence of inappropriate indications was statistically significant according to age [$p < 0.01$, OR = 3.30, 95% CI (2.58-4.22)] but no statistically significant differences were found between genders ($p = 0.62$) and between gastroenterologists and other speciality of referral ($p = 0.23$) (table 1).

Four hundred and sixty five patients were inappropriately

referred for EGD: 30.3% for dyspepsia in patients aged 45 or under without adequate treatment and no-alarm symptoms, 13.6% for non-iron deficiency anemia, 9.2% for surveillance of benign lesion, 8.8% for research of primitive tumour in patients with adenocarcinoma metastases, 6.9% for post-treatment status of *Helicobacter Pylori* infection and 31.2% for others (table 2).

Table 1 – Predictive factors for inappropriate referrals

Variables	Cases	OR (95% CI)	<i>p</i> value
Gender			
Male	236/1146	1.05 (0.85-1.30)	0.62
Female	229/1159	1	
Age			
< 40 years	151/385	3.30 (2.58-4.22)	< 0.01*
≥ 40 years	314/1920	1	
Speciality of referral			
Gastroenterology	129/692	1	0.23
Others	336/1613	0.87 (0.69-1.10)	

OR – odds ratio; CI – confidence interval

* *p* statistically significant

Table 2 – Inappropriate indications for 465 referrals for EGD

Inappropriate indications	No. (%)
Dyspepsia in patients aged 45 under without adequate treatment and no-alarm symptoms	141 (30.3)
No-iron deficiency anemia	63 (13.6)
Surveillance of healed benign lesion	43 (9.2)
Research of primitive tumour in patients with adenocarcinoma metastases	41 (8.8)
Post-treatment <i>Helicobacter Pylori</i> infection status	32 (6.9)
Others	145 (31.2)

Appropriately indicated endoscopies disclosed significantly more clinically relevant findings (71.3% for 1840) than endoscopies performed with indications that were not ASGE listed (61.7% for 465) – $p < 0.01$, OR = 1.55, 95% CI (1.24-1.92) (figure 1).

All the patients with a diagnosis of oesophageal cancer were appropriately referred but 10 out of 70 patients with a diagnosis of gastric cancer, all aged over 50 years, had inappropriate indication for EGD (research of primitive tumour in patients with adenocarcinoma metastases). There were no significant differences between appropriateness and inappropriateness in patients with a diagnosis

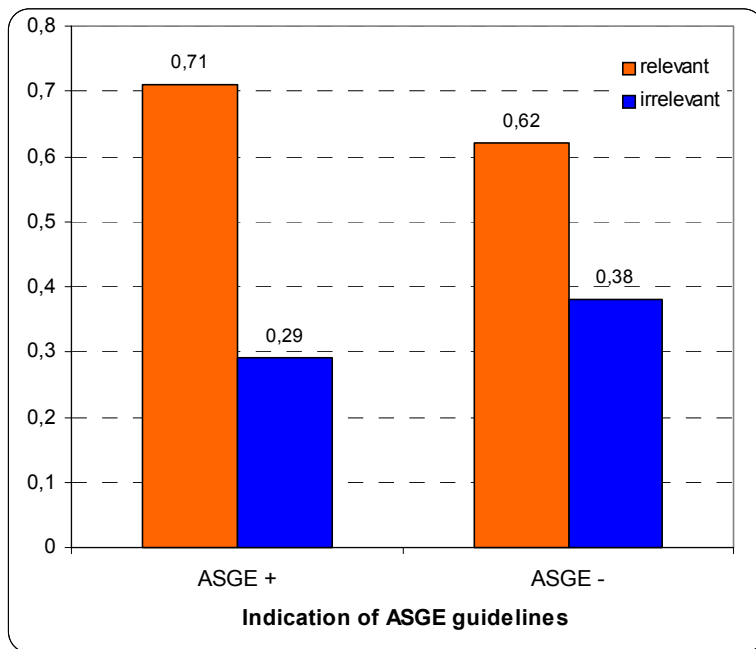


Fig 1 – Relevant endoscopic findings were significantly more frequent in appropriate endoscopies – $p < 0.01$, $OR = 1.55$; 95% CI (1.24-1.92) but 10 out of 70 patients with a diagnosis of gastric cancer were inappropriately referred.

of gastric cancer [$p = 0.21$, $OR = 1.53$, 95% CI (0.75-3.21)].

The sensitivity of the ASGE criteria was 82.1%, the specificity 25.2%, the positive predictive value 71% and the negative predictive value 38.1 % (table 3).

DISCUSSION

This study prospectively investigated the appropriateness and local accuracy of the ASGE guidelines in a sample of the Portuguese population.

The present study reported a high rate of appropriate use of EGD (80%).

The rates of ASGE guidelines appropriate use vary markedly (9-17), from 38.3% to 95%, reported in studies from several geographical areas. Comparisons are difficult

to make due to the heterogeneity of the populations and medical systems.

As Zuccaro et al¹² and Chan et al¹⁶, who also reported high rates of appropriateness in large-scale studies, our endoscopy unit provides services only to hospital-based patients: that is, it works in a closed system with open referral. So, most of the patients referred for EGD by non-gastroenterologists are previously discussed with the gastroenterologist. This informal consultation is perhaps the main reason for our high rate of appropriate indications for EGD (80%).

Opposite to the results of Zuccaro et al¹², Charles et al¹³, and Chan et al¹⁶ and similar to data from Rossi et al¹⁵, the present study reveals no significant differences between appropriate indications for EGD by gastroenterologists and other physicians which can also be explained by the wide use of informal consultation in our hospital and the general feeling that it is important to use guidelines for referring patients for endoscopy. In addition,

although Zuccaro et al¹² reported a statistically significant difference between appropriate referrals by gastroenterologist and other internists they did not consider this difference clinically significant.

We stated that age affects the rate of inappropriate EGD (table 1) with significantly higher rates of inappropriateness in younger patients. The concepts of appropriate and inappropriate use of medical procedures are affected by medical cultural environment and health economic policies.

In the present study, the overall overuse of EGD and the higher prevalence in younger patients may reflect a medical population that is not constrained by internal budgets, capitation, rational utilisation of health resources and without the pressure of second opinion¹⁸.

Table 3 – Comparison of accuracy of ASGE guidelines

ASGE indication	Country	Sample size (n)	Relevant findings No.	Irrelevant findings No.	Sensitivity	Specificity	Predictive Positive value	Predictive Negative value
Present study	Portugal	2305	1313	527	82.1%	25.2%	71%	38.1%
Rossi et al. ¹⁵	Italy	1777	711	788	90%	20%	47%*	71.2%*
Chan et al. ¹⁶	Malaysia	1076	950	126	92.6%*	14.6%*	42.2*	74.6%*
Gonvers et al. ¹¹	Switzerland	450	213	229	59.1%*	45%*	50%*	54.2%*
Charles et al. ¹³	USA	168	49	119	85.7%*	29.4%*	33.3%*	83.3%*

* calculated from the data presented in the study

Similar to several others studies^{9,11,12,16} the most common inappropriate indication was dyspepsia in patients aged 45 or under without adequate treatment and no-alarm symptoms. In Portugal, a country with a high prevalence of gastric cancer, patients frequently fear that their symptoms have malignant origin. So, an «early endoscopy» is important to the management of these patients, as it seems that reassurance of the benign nature of the symptoms in patients with uninvestigated dyspepsia improves their quality of life¹⁹.

In the present and other studies^{9,10,12-17} the ASGE indications disclosed significantly more relevant endoscopic findings than indications not ASGE listed but the frequency of positive findings in inappropriately indicated EGD was very high, ranging from 23% to 61.7%. Gonvers et al¹¹, who reported 46% of positive findings in inappropriate ASGE indications, did not find a statistically significant difference in the probability of finding clinically relevant disease according to the appropriateness of the ASGE guidelines.

Indeed, despite the significant difference in our positive findings between appropriately and inappropriately indicated EGD, the fact that 10 out 70 patients with gastric cancer were inappropriately referred threatens the clinical utility of the ASGE guidelines in our population.

Rossi et al¹⁵ were the first to present similar findings (3 gastric cancer inappropriately referred out of 38) and raise the concern that dogmatic use of the ASGE criteria in high prevalence gastric cancer areas carries the risk of missing highly relevant diagnosis. Portugal has the highest gastric cancer incidence (30.1 per 100 000 men and 15.0 per 100 000 women) in the European Union²⁰.

Besides, as Rossi et al¹⁵ stated, the global performance of the ASGE guidelines is not good: in the present study the sensitivity and positive predictive values are high, 82.1% and 71%, respectively, but the specificity and negative predictive value are unacceptably low, 25.2% and 38.1%, respectively (table 3). The fact that the pre-test probability of normal or irrelevant endoscopic findings in the absence of ASGE guidelines is only 38.1% further enhances the risk of under-detection of clinically relevant disease.

To avoid the risk of missing highly relevant disease, these data confirms that guidelines must be developed according to local epidemiological patterns of disease occurrence.

In conclusion, even if relevant lesions are more frequently found with appropriate than with inappropriate referral the accuracy of the ASGE guidelines is too low to be confidentially acceptable.

Conflito de interesses:

Os autores declaram não ter nenhum conflito de interesses relativamente ao presente artigo.

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REFERENCES

1. BROOK RH, CHASSIN MR, FINK A et al: A method for the detailed assessment of the appropriateness of medical technologies. *Int J Tech Assess Health Care*. 1986;2:53-64
2. PARK RE, FINK A, BROOK RH: Physician ratings of appropriate indications for six medical and surgical procedures. *Am J Public Health* 1986; 76:766-72.
3. AXON ATR: Open access endoscopy in Britain: a service in evolution. *Gastrointest Endosc* 1998;48:655-6
4. SCOTT B: Endoscopic demands in the 90's. *Gut* 1990;31:125-6
5. ARROWSMITH JB, GERSTMAN BB, FLEISCHER DE et al: Results from the American Society for Gastrointestinal Endoscopy/US Food and Drug Administration collaborative study on complication rates and drug use during gastrointestinal endoscopy. *Gastrointest Endosc* 1991;37:421-7
6. BAILLIE J: Complications of endoscopy. *Endoscopy* 1994;26:185-203
7. SCHROEDER KW: Quality assurance in gastrointestinal endoscopy. *Endosc Clin N Am* 1993;3:571-580
8. American Society for Gastrointestinal Endoscopy: Appropriate use of gastrointestinal endoscopy. *Gastrointest Endosc* 2000;52:831-7
9. MINOLI G, PRADA P, GANBETA G et al: The ASGE guidelines for the appropriate use of EGD in an open access system. *Gastrointest Endosc* 1995;42:387-9
10. MAHAJAN RJ, BARTHEL JS, MARSHALL JB: Appropriateness of referrals for open-access endoscopy. How do physicians in different medical specialties do? *Arch Intern Med* 1996;156:2065-9
11. GONVERS JJ, BURNAND B, FROELICH F et al: Appropriateness and diagnostic yield of EGD in an open-access endoscopy unit. *Endoscopy* 1996;28(8):661-6
12. ZUCCARO G, PROVENCHER K: Does an open access system properly utilize endoscopic resources? *Gastrointest Endosc* 1997; 46:15-20
13. CHARLES RJ, CHAK A, COOPER GS, WONG RC, SIVAK MV JR: Use of open access in GI endoscopy at an academical center. *Gastrointest Endosc* 1999;50:480-5
14. TREVISANI L, SARTORI S, GILLI G et al: Appropriateness of upper gastrointestinal endoscopy: a hospital-based study. *Dig Dis Sci* 2001;46:2695-9
15. ROSSI A, BERSANI G, RICCI G et al: ASGE guidelines for the appropriate use of upper endoscopy: association with endoscopic findings. *Gastrointest Endosc* 2002; 56:715-9
16. CHAN YM, GOH KL: Appropriateness and diagnostic yield of EGD: a prospective study in a large Asian hospital. *Gastrointest Endosc* 2004;59:517-524
17. SANCHEZ DEL RIO A, QUINTERO E, ALARCON A: Appropriateness of indications for EGD in open-access endoscopy units. *Gastroenterol Hepatol* 2004; 27:119-124
18. MECHANIC D: Dilemmas in rationing health care services: the case for implicit rationing. *BMJ* 1995;310:1665-69

19. RABENEK L, WRISTERS K, SOUCHEK J, AMBRIZ E: Impact of upper endoscopy on satisfaction in patients with previously uninvestigated dyspepsia. *Gastrointest Endosc* 2003;57:295-9

20. FERLAY J, BRAY F, PISANI P et al: GLOBOCAN 2000: Cancer incidence, mortality and prevalence worldwide. Version 1,0. Lyon: IARC CancerBase No 5. IARC Press 2001