GE J Port Gastrenterol. 2014;**21(3)**:97–101

Jornal Português de Gastrenterologia
Portuguese Journal of Gastroenterology
www.elsevier.pt/ge

ORIGINAL ARTICLE

One day of upper gastrointestinal endoscopy in a southern European country

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Received 3 April 2013; accepted 20 May 2013
Available online 7 January 2014

KEYWORDS
Gastrointestinal endoscopy;
Upper gastrointestinal endoscopy;
Gastritis;
Atrophy;
Intestinal metaplasia

Abstract
Introduction: Upper gastrointestinal (UGI) endoscopic outcomes are seldom described.
Objectives: To assess UGI endoscopy performance in all Portugal's National Health Service hospitals and assess the prevalence of premalignant gastric lesions.
Methods: One randomly assigned day, cross-sectional study of UGI endoscopies.
Results: 28% of the 43 hospitals invited actually participated in the study, reporting a total of 123 UGI endoscopies. Exams were conducted on an outpatient basis in 84% of cases and 78% required no sedation. The commonest indications were presence or suspicion of GI bleeding (20%), abdominal pain or dyspepsia (18%) or reflux (12%). Histological diagnosis of atrophy was found in 19% of cases (95% CI 8–30%), extensive atrophy or intestinal metaplasia in corpus in 15% (5–25%) and positivity for *Helicobacter pylori* in 38% (23–53%). When comparing first-time vs. repeat UGI endoscopies, no differences were found in atrophy (22% vs. 14%, $p = 0.49$) and *H. pylori* (44% vs. 30%, $p = 0.36$) nor did age < vs. ≥ 50 years was relevant (11% vs. 21%, $p = 0.51$ and 63% vs. 31%, $p = 0.10$, respectively).
Conclusions: Most UGI endoscopies carried out in Portugal are safely performed on an outpatient basis without anaesthesia and 15% of patients have extensive atrophy or intestinal metaplasia in the corpus that should be scheduled for endoscopic surveillance according to recent guidelines. Although the participation rate was low, this study is an insight for further decision analysis studies to evaluate UGI endoscopy as a surveillance option for these asymptomatic at-risk patients.

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0872-8178/$ – see front matter
http://dx.doi.org/10.1016/j.jpg.2013.05.004

PALAVRAS-CHAVE
Endoscopia digestiva;
Endoscopia digestiva alta;
Gastrite;
Atrofia;
Metaplasia intestinal

Um dia de endoscopia digestiva alta num país do sul da Europa

Resumo
Introdução: Estudos transversais reportando resultados de Endoscopia Digestiva Alta (EDA) são raramente descritos.
Objetivos: Avaliar o desempenho em termos de EDA em hospitais portugueses do Serviço Nacional de Saúde e a prevalência de lesões gástricas pré-malignas.
Métodos: Estudo transversal multicêntrico, num único dia, definido aleatoriamente.
Resultados: Participaram no estudo 28% dos 43 hospitais convidados, compreendendo um total de 123 EDA. Os exames foram realizados em ambulatório em 84% dos casos e 78% não necessitaram de sedação. As indicações mais frequentes foram presença ou suspeita de hemorragia (20%), dor abdominal ou dispepsia (18%) ou refluxo (12%). Histologicamente foi diagnosticada atrofia gástrica em 19% dos casos (95% IC 8–30%), atrofia extensa ou metaplasia intestinal no corpo em 15% (5–25%) e positividade para o *Helicobacter pylori* (*H. Pylory*) em 38% (23–53%). Comparando o tipo de EDA realizada, primeira vs. repetição não foram encontradas diferenças no diagnóstico de atrofia (22 vs. 14%, p = 0,49) e presença de *H. pylori* (44 vs. 30%, p = 0,36) assim como a idade < vs. ≥50 anos não foi relevante (11 vs. 21%, p = 0,51 e 63 vs. 31%, p = 0,10, respetivamente).
Conclusões: A maioria das EDA em Portugal é realizada com segurança em ambulatório e sem anestesia. Dos pacientes, 15% apresentam atrofia extensa ou metaplasia intestinal no corpo que deve ser orientada para vigilância endoscópica segundo recomendações recentes. Embora com uma taxa de participação baixa, este estudo é um ponto de partida para estudos de análise de decisão que avaliem a EDA como uma opção de vigilância para estes doentes de alto risco assintomáticos.

Introduction

Even though several publications have reported data on colonoscopy, upper gastrointestinal (UGI) endoscopic procedures and outcomes are seldom described.

In Portugal, UGI endoscopic procedures are not quantified by means of prospective or cross-sectional studies and existing data reproduce only hospital databases or the annual reports that Gastroenterology Departments provide to the Portuguese Medical Association. These databases are collected retrospectively and focus more on accountability than clinical decisions.

As Portugal is the European country with the highest incidence of gastric cancer and as this disease's prognosis is highly dependent on the stage at diagnosis (usually in an advanced stage requiring drastic and costly treatment), it is crucial to have data on prevalence of premalignant gastric lesions.[1,2] Furthermore, patient acceptance to undergo a UGI endoscopy and the manner in which these exams are performed in terms of associated techniques, complications and use of sedation, are mandatory to quantify costs that might be relevant in further economic studies that consider UGI endoscopy for population screening or follow-up of asymptomatic at-risk patients in Portugal.

Some reports can be found in the literature on Portuguese patients, but only on specific gastric cancer high-risk groups; to the best of our knowledge, no data have yet been published on the prevalence of gastric cancer precursor lesions at a national level.[3–7]

The primary aim of our study was therefore to assess, for a single day, all the UGI endoscopies performed in all Portugal's National Health Service hospitals. As a secondary objective we aimed to assess the prevalence of gastric precursor lesions at a population basis by means of a national multicentre cross-sectional study.

Materials and methods

All 43 National Health Service Portuguese hospitals with Gastroenterology Departments registered with the Portuguese Society of Digestive Endoscopy were invited to participate in this study by sending all their UGI endoscopy reports from a randomly assigned day. If biopsies were performed, the results of the relevant histopathology diagnosis were also requested.

Invitation letters were sent several months before the date chosen for the study and all Departments were invited to report all UGI endoscopies performed on a single day (November 17th, 2011).

Inclusion criteria were the completion of an already scheduled UGI endoscopy in a National Service Hospital and a signed informed consent, specific to the study. Exclusion criteria were emergency exams, failure to provide informed consent or any contraindication to performing a UGI endoscopy.

The confidentiality of all records was ensured by removing the names of patients, doctors and nurses from the reports before they were sent to the main investigator. Also, permission for compilation of multicenter national data was requested from and granted by the Portuguese Data Protection Authority (Authorisation 4639/2010). As the study

involved the performance of only already-scheduled endoscopic exams, with no additional exams or measures, no Ethics Committee approval was required but prior approval was obtained from the Portuguese Society of Digestive Endoscopy.

Reports included information on the patient's gender and age, exam indications, main endoscopic findings and conclusions, procedures performed (including sedation, biopsies and therapy) and histopathological results, if applicable.

Selection bias was minimised by informing the Departments of the study date only a week beforehand, to prevent major changes in the daily schedule and all Departments were instructed to proceed as usual in their daily practice. No exclusion criteria were defined for gastroenterologist experience, type of endoscope used, indication for exam (but emergency cases were excluded), performance or not of biopsies or minimum number of cases needed to participate.

No sample size was predefined for this study and the results reported for the continuous variables are the means and standard deviations while proportions are reported as percentages with 95% confidence intervals (CI). Comparative statistical analysis used Student's *t*-test for the continuous variables and Pearson's Chi-square test or Fisher's Exact test for the dichotomous variables, as appropriate, with $p = 0.05$ representing statistical significance.

Results

Of all 43 Portuguese National Health Service hospitals with a Gastroenterology Department, 12 (28%) participated in the study. The hospitals were located all over mainland Portugal, representing the north (2 hospitals), centre (2 hospitals), the capital, Lisbon, (4 hospitals), south (2 hospitals), plus the Azores (2 hospitals). The total number of reported UGI endoscopies was 123, providing a median of 10 per Department. No data were collected on eligibility and inclusion rate per centre. The main results of the exams are presented in Table 1.

Most UGI endoscopies were performed as outpatient procedures (84%), most required no type of sedation (78%) and 50% of the participants were undergoing a UGI endoscopy for the first time. Most UGI endoscopies were diagnostic but in 15% of them at least one additional technique was performed (injection, polypectomy, dilation or stent placement). Most of the exams had no complications (98%) with only 3 cases of minor haemorrhage after endoscopic polypectomy, all resolved without any requirement for blood transfusion, surgery or inpatient care.

The most frequent indications were presence or suspicion of haemorrhage (20%), abdominal pain or dyspepsia (18%) or reflux (12%). These indications were the ones reported by the attending endoscopists, even when emergency exams were excluded from the study (probably the haemorrhage cases are related to complaints of anaemia or melaena without haemodynamic instability). The exam was considered abnormal in 77% of cases, with most frequent endoscopic diagnosis being ''gastritis'' (28%), ''gastric atrophy'' (14%) and oesophagitis (11%). When examining the cases that entailed an additional histology report, a histopathological diagnosis of gastritis was found in 56% of patients (95% CI: 42–70%) with atrophy in 19% (95% CI: 8–30%), extensive atrophy or intestinal metaplasia in corpus in 15% (95% CI 5–25%) and positivity for *H. pylori* in 38% (95% CI: 23–53%).

Table 1 Description of UGI endoscopies and patients' main characteristics.

Item	Result[a]
Number of endoscopies (mean per centre ± standard deviation)	123 (10 ± 4)
Previous history of digestive neoplasia	12% (6–18)
Concomitant medication with antiplatelet or anticoagulant agents	15% (9–21)
Outpatients	84% (78–90)
First performance of UGI endoscopy	50% (41–59)
Main indications	
• *Haemorrhage and/or anaemia*	20% (13–27)
• *Abdominal pain or dyspepsia*	18% (11–25)
• *Reflux*	12% (6–18)
Associated techniques	
• *Biopsies*	45% (36–54)
• *Other*	15% (9–21)
• Injection	3.9% (0.5–7.3)
• Polypectomy	3.1% (0.04–6.2)
• Dilation	3.1% (0.04–6.2)
Use of sedation	22% (15–29)
• *By a gastroenterologist (moderate sedation with Midazolam)*	10% (5–15)
• *By a anaesthesiologist (deep sedation with Propofol)*	12% (6–18)
Complications[b]	2% (0.5–4.5)

UGI-upper gastrointestinal.

[a] All results are reported as percentages with 95% confidence intervals except for the number of endoscopies.

[b] Complications were all minor haemorrhage cases associated with polypectomy, managed by endoscopy without any need for blood transfusion, surgery or inpatient care.

When comparing first-time UGI endoscopy cases with a repeated exam, no differences were found in terms of histological diagnosis of gastritis (56% vs. 57%, $p = 0.91$), atrophy (22% vs. 14%, $p = 0.71$), extensive atrophy or intestinal metaplasia (11% vs. 19%, $p = 0.68$) or *H. pylori* positivity (44% vs. 30%, $p = 0.36$) (Table 2). Also, when comparing the influence of age on the same diagnosis (age < vs. ≥ 50 years), the respective proportions were not statistically significant between groups: 56% vs. 56% for gastritis; 21% vs. 11% for atrophy, 11% vs. 15% for extensive atrophy or intestinal metaplasia and 63% vs. 31% for *H. pylori* positivity (Table 3).

Discussion

Outcome assessment in the field of UGI endoscopy is seldom reported in the scientific literature and information is scarce worldwide. With this one-day cross-sectional study we intended to conduct the very first national assessment of UGI endoscopy practice and to assess the prevalence of premalignant gastric conditions or lesions on a multicenter population basis. This is very important to improving

Table 2 Clinical and histological findings according to performance of UGI endoscopy.

	First UGI endoscopy	Follow-up UGI endoscopy	*p*
Age (mean ± standard deviation)	61 ± 18	60 ± 14	0.58*
Male sex	54%	50%	0.65**
Previous GI tract neoplasia	3%	20%	0.004**
Antiplatelet or anticoagulant therapy	17%	12%	0.43**
Use of sedation	18%	26%	0.30**
Performance of biopsies	51%	39%	0.18**
Gastritis (*n* = 48)	56%	57%	0.91**
Atrophy (*n* = 48)	22%	14%	0.71***
Corpus atrophy or intestinal metaplasia (*n* = 48)	11%	19%	0.68***
H. pylori positive (*n* = 40)	44%	30%	0.36**

UGI, upper gastrointestinal; GI, gastrointestinal.
* Student's *t*-test.
** Pearson's Chi-square test.
*** Fisher's Exact test.

knowledge of the actual prevalence of these lesions as the final disease, gastric cancer, is still a health problem in Portugal, due its high incidence and mortality rates.

In our country, where a high prevalence of gastric lesions and *H. pylori* was expected, our results showed that among patients where gastric biopsies were performed, a histopathological diagnosis of atrophy was detected in 19% of cases (95% CI: 9–29%), extensive atrophy or intestinal metaplasia in corpus in 15% (95% CI 5–25%) and positivity for *H. pylori* was present in 38% (95% CI: 25–51%). This means that at least one fifth of the observed population has a premalignant gastric condition and that two fifths are positive for *H. pylori*. Also, 15% of patients, usually aged over 50, presented with atrophy or intestinal metaplasia extending to the corpus and these are the ones that should be scheduled for an endoscopic surveillance according to recent guidelines on evaluating gastric premalignant conditions or lesions.[8]

Considering that UGI endoscopy is the key exam for gastric cancer diagnosis and could prove to be a relevant option for surveillance of asymptomatic high-risk patients, it was very reassuring to conclude that most UGI endoscopies were safely performed, on an outpatient basis (84%), according to correct indications, without any sort of sedation or anaesthesia (used in only 22% of patients), and that most exams were supplemented with biopsies (45%) in accordance with current recommendations.[8–10]

Comparing results for patients undergoing their very first UGI endoscopy versus a repeat exam, the only statistically significant difference was in the presence of a previous history of GI tract neoplasia (as expected) and, although not significant, more first time endoscopies were supplemented with biopsies (again as expected). When comparing results between patients under and over 50 years old, the only statistically relevant difference was the higher prevalence of antiplatelet or anticoagulant medication in the older group and a not significant lower prevalence in this group of *H. pylori*, possibly due to previous eradication treatment (not accessed in this study as already mentioned).

The study was designed to be performed without any disturbance in the participating centres and without any specific requirement beyond the scheduled examination, so that it would not be detrimental to patients. There was no intention to collect additional materials, since it was meant to be as close as possible to real practice. These premises would possibly encourage

Table 3 Clinical and histological findings according to age at UGI endoscopy performance.

	Age < 50 years	Age ≥ 50 years	*p*
Male sex	44%	54%	0.37*
Previous GI tract neoplasia	4%	14%	0.21*
Antiplatelet or anticoagulant therapy	0%	19%	0.02*
Use of sedation	20%	22%	0.79*
Performance of biopsies	44%	45%	0.94*
Gastritis (*n* = 48)	56%	56%	0.96*
Atrophy (*n* = 48)	11%	21%	1.0**
Corpus atrophy or intestinal metaplasia (*n* = 48)	11%	15%	1.0**
H. pylori positive (*n* = 40)	63%	31%	0.13*

UGI, upper gastrointestinal; GI, gastrointestinal;
* Pearson's Chi-square test.
** Fisher's Exact test.

engagement of gastroenterology departments and patients and could provide an unbiased prevalence rate, as opposed to findings from studies on selected populations.

The choice of one-day only collection data, established at fairly short notice (instead of several days or weeks) was chosen to avoid any selection bias by preventing the inclusion of more patients simply because the study was being conducted, which could bias the final results towards a larger number of exams, a higher rate of more serious cases or the introduction of specific therapeutic exams. No significant bias was considered and the final results attained just need to be contextualised due to the small sample size. The very low participation rate of just 24% may obviously partially jeopardise the precision and external validity of the study results. Still, this participation rate is not very different from other survey studies,[11–13] and the methods of the study and the national population basis without restrictive inclusion criteria used can easily be implemented in any country. The rates obtained also need to be contextualised for a European country with a high gastric cancer incidence rate.

In conclusion, most UGI endoscopies are safely performed in our country. About a fifth of the observed population has gastric atrophy, two fifths are positive for *H. pylori* and 15% have extensive atrophy or intestinal metaplasia in the corpus, which should be scheduled for endoscopic surveillance, according to current guidelines. Further decision analysis studies are needed to evaluate UGI endoscopy as a surveillance option for these asymptomatic at-risk patients.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this investigation.

Confidentiality of data. The authors declare that they have followed the protocols of their work centre on the publication of patient data and that all the patients included in the study received sufficient information and gave their written informed consent to participate in the study.

Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

Conflict of interest

The authors have no conflicts of interest to declare.

Acknowledgments

The authors would like to thank all their colleagues and administrative staff who anonymously and uncompromisingly participated in the study, from the following hospitals: Centro Hospitalar de Trás os Montes e Alto Douro (Vila Real), Hospital São João (Porto), Instituto Português de Oncologia de Coimbra (Coimbra), Hospital de Santo André (Leiria), Instituto Português de Oncologia de Lisboa (Lisboa), Centro Hospitalar de Lisboa Ocidental – Hospital de São Francisco Xavier (Lisboa), Centro Hospitalar de Lisboa Ocidental – Hospital Egas Moniz (Lisboa), Hospital da Força Aérea (Lisboa), Hospital do Litoral Alentejano (Santiago do Cacém), Centro Hospitalar do Barlavento Algarvio (Portimão), Hospital do Divino Espírito Santo (Ponta Delgada – Açores) and Hospital do Santo Espírito (Angra do Heroísmo – Açores).

We also would like to thank to Jean Burrows and Ana Cláudia Jorge for the English revision of the manuscript.

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