

Upper Gastrointestinal Endoscopy Quality in Italy: A Nationwide Study

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ABSTRACT

Background & Aims: International guidelines advise improving esophagogastroduodenoscopy (EGD) quality in Western countries, where gastric cancer is still diagnosed in advanced stages. This nationwide study investigated some indicators for the quality of EGD performed in endoscopic centers in Italy.

Methods: Clinical, endoscopic, and procedural data of consecutive EGDs performed in one month in the participating centers were reviewed and collected in a specific database. Some quality indicators before and during endoscopic procedures were evaluated.

Results: A total of 3,219 EGDs performed by 172 endoscopists in 28 centers were reviewed. Data found that some relevant information (family history for GI cancer, smoking habit, use of proton pump inhibitors) were not collected before endoscopy in 58.5-80.7% of patients. Pre-endoscopic preparation for gastric cleaning was routinely performed in only 2 (7.1%) centers. Regarding the procedure, sedation was not performed in 17.6% of patients, and virtual chromoendoscopy was frequently (>75%) used in only one (3.6%) center. An adequate sampling of the gastric mucosa (i.e., antral and gastric body specimens) was heterogeneously performed, and it was routinely performed only by 23% of endoscopists, and in 14.3% centers.

Conclusions: Our analysis showed that the quality of EGD performed in clinical practice in Italy deserves to be urgently improved in different aspects.

Key words: esophagogastroduodenoscopy – quality indicators – biopsies.

Abbreviations: ESD: esophagogastroduodenoscopy; *H. pylori*: *Helicobacter pylori*; PPI: proton pump inhibitor.

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INTRODUCTION

Esophagogastroduodenoscopy (EGD) is largely used in clinical practice in patients with different symptoms for the diagnosis and surveillance of relevant gastroduodenal diseases [1, 2]. More than 2.5 million EGDs were performed in Italy in 2007, mostly as open-access procedures [3]. A recent systematic review estimated a 21.7% inappropriate rate of EGD indications, with values as high as 55%-65% reported in some Italian studies [4]. On the other hand, mirroring colonoscopy,

some international guidelines advise an urgent need for improving EGD quality in Western countries [1, 5-9], where detection of gastric cancer in its early stages still remains disappointingly low [10], with a dismal prognosis for patients. Several actions were advised to improve this endoscopic examination, including pre-, during, and post-procedure measures [1, 5-9]. Among them, taking an adequate sample of gastric mucosa is essential for *Helicobacter pylori* (*H. pylori*) diagnosis as well as for the detection and staging of precancerous lesions and, consequently, to evaluate gastric cancer risk and schedule an appropriate surveillance [1, 11-14]. Indeed, the implementation of different measures able to improve EGD quality were found to increase detection of precancerous lesions on gastric mucosa [15]. As a result, assessing current EGDs practice is critical in identifying potential corrective aspects to implement. With this aim, we designed this multicenter study on EGD practice in endoscopic units of public hospitals through Italy.

METHODS

Patients

For the purpose of this study, we have chosen a retrospective design to avoid the ‘Hawthorne effect’ in reporting data and to unaffectedly describe the real setting [16]. Clinical, endoscopic, and histological data of consecutive patients referred for EGD in the participating centers between October 1 and October 31, 2022, were anonymously reviewed and collected in a specific Excel database. We investigated whether information on some risk factors for gastric cancer (first-degree family history and smoking habit) and ongoing proton pump inhibitor (PPI) therapy were systematically recorded. Furthermore, we explored if gastric cleaning was adopted before endoscopy and if chromoendoscopy and adequate biopsy sampling were performed during the examination. An adequate gastric mucosa sampling was considered to be accomplished when at least two antral and two gastric body biopsies were collected in two different vials beyond those on endoscopic lesions, as suggested in guidelines [11-14]. Only data from patients referred by their general practitioners were collected to better describe routine clinical practice. Data from in-patients or EGDs performed in an emergency, as well as incomplete examinations for any reason, were excluded. For the main considered parameters, the comparisons among different endoscopists were restricted to those who performed at least 15 EGDs during the study period. This cut-off was arbitrarily chosen to limit the probability of a potential selection bias (β -type error). Since no identification of patients was allowed, no experimental drugs were administered, no additional costs or procedures for the patients were required, and no funds were received, the Investigational Review Boards waived formal approval for this retrospective analysis.

Statistical Analysis

Frequencies and means or medians with their 95% confidence intervals (CI) were calculated for the main observations. Comparison among subgroups was performed using the Chi-square test or Fisher’s exact test, as appropriate. A P value less than 0.05 was considered statistically significant

RESULTS

A total of 3,219 patients (males 1,387; mean age: 58.9 ± 16.2 years) who underwent EGD in the 28 participating centers

meet inclusion criteria. The EGD was the first examination in 1,431 (44.4%) patients, a successive control in 1,258 (39.1%), and information was lacking for the remaining 530 (16.5%) cases. There were 172 endoscopists involved in the centers (median: 6; range: 2-16), and the median number of endoscopic examinations performed per center was 102 (range: 49-245). In detail, there were 87 endoscopists who executed >15 EGDs during the study period. At endoscopy, there were 16 esophageal cancers (15 adenocarcinomas, 1 squamous), 27 gastric neoplasia (25 cancers, 1 lymphoma, 1 neuroendocrine tumor), and 2 duodenal tumors (1 adenocarcinoma, 1 lymphoma). At histological assessment of patients with adequate gastric biopsies sampling, a precancerous lesion was detected in 362 (22.3%) patients, including 193 cases with atrophic/metaplastic gastritis confined in the antrum, 144 with atrophic pangastritis, and 25 with corpus-restricted atrophic gastritis.

Regarding the pre-procedure data, information on first-degree upper gastrointestinal cancers was lacking in 2,160 (67.1%) cases, and smoking habit (current or previous) was uninvestigated in 2,598 (80.7%) cases. Data on previous *H. pylori* eradication, ongoing proton pump inhibitor (PPI) therapy, and ongoing anti-thrombotic therapy were not collected in 1,886 (58.5%), 1,281 (39.8%), and 1,213 (37.7%) patients, respectively. Before endoscopy, gastric cleaning preparation was routinely given in only 2 (7.1%) centers, and sedation was not performed in 568 (17.6%) patients. Concerning the intra-procedure phase, an image-enhanced endoscopy technique was overall applied in 498 (15.5%) EGDs, being used in >75% of cases in only one center, between 50% and 25% in 4, between 25% and 5% in 10, and less than 5% in the remaining 13 centers.

Overall, adequate biopsy sampling of gastric mucosa (i.e., antral and gastric body specimens) was achieved in 1,625 (50.5%) cases, at least one biopsy in further in 540 (16.8%), while no biopsy at all was performed in 1,054 (32.7%) EGDs. By considering data of only the 87 endoscopists who performed at least 15 EGDs, an adequate biopsy sampling was heterogeneously performed, and only 20 (23%) operators accomplished this procedure in more than 75% of their consecutive endoscopic examinations, with 6 (6.9%) endoscopists taking adequate biopsies in less than 10% of procedures (Fig. 1A). Moreover, in only 4 (14.3%) centres all the operators routinely were taking both antral and gastric

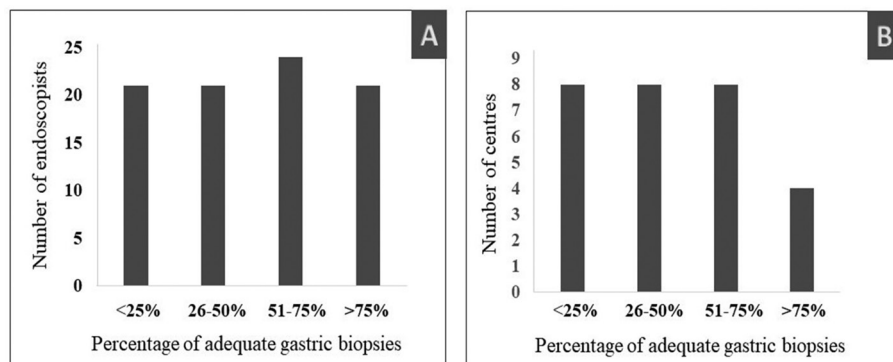


Fig. 1. Rates of adequate (2 antral plus 2 gastric body) gastric mucosa sampling performed by different gastroenterologists (A), and in different centers (B).

Table I. Rate of adequate sampling of gastric mucosa in different settings

Setting	Comparison (n, %)	P
Examination; (first vs successive)	812/1431 (56.7) vs 571/1,258 (45.3)	<0.0001
Age; (<50 vs >50 years)	476/856 (55.6) vs 1149/2,363 (48.6)	<0.001
Family history of GI cancer; (yes vs not)	72/101 (71.2) vs 486/ 958 (50.7)	<0.001
Current smoking habit; (yes vs not)	44/131 (33.5) vs 180/490 (36.7)	0.5
Ongoing PPI therapy; (yes vs not)	487/1,042 (46.7) vs 418/896 (46.6)	1
Previous <i>H. pylori</i> therapy; (yes vs not)	122/217 (56.2) vs 574/1,116 (51.4)	0.2

GI: gastrointestinal; PPI: Proton pump inhibitor; *H. pylori*: *Helicobacter pylori*.

body biopsies in >75% of their performed procedures (Fig. 1B). The rate of adequate gastric biopsy sampling according patients' age, first-degree family history for cancer, smoking habits, ongoing PPI therapy, previous *H. pylori* therapy and type of examination were provided in Table I. The main results of the study were summarized in Fig. 2.

DISCUSSION

The implementation of organized gastric cancer screening in Western countries is largely prevented by unfavorable cost-efficacy profiles [17]. Therefore, improving EGD quality is the only practicable way to reduce gastric cancer mortality through the detection of early-stage lesions. Several indicators were suggested for the assessment of EGD quality in the different international consensus [1, 5-9]. For the present study, we evaluated whether data on some pre-procedure quality indicators (indication, family history, smoking habit, previous examinations, administration of gastric preparation) were collected, as well as whether sedation, use of virtual chromoendoscopy, and standard sampling of gastric mucosa were performed during the procedure.

Overall, our investigation revealed some relevant gaps in both the pre-procedure phase and the endoscopic examination. In as many as 67.1%-80% of patients, no information was gathered on both first-degree family history of upper GI cancers and smoking habits, which are two independent factors that

significantly increase the risk of gastric precancerous lesions and cancer onset [18-20]. Moreover, information on therapy with PPIs was not enquired in more than 1 every 3 patients, even though it was highlighted that their current use reduces the detection of both *H. pylori* infection and endoscopic lesions [21, 22], and delayed gastric cancer diagnosis [23]. Information on previous therapy for *H. pylori* (namely the pathogen involved in the majority of gastric diseases) was not investigated in more than half patients. All these observations suggest that prior to EGD, some clinical information was not collected in a significant percentage of patients. This easily obtained and free information – including family history, smoking habits, and ongoing PPI therapy – could be used as 'red flags' alerting the operator about a higher pre-test likelihood of upper gastrointestinal lesions.

Another relevant finding from our study was that sedation is not performed in 1 every 5 patients who undergo EGD in clinical practice. The use of sedation is recommended to achieve greater collaboration by the patient during EGD, higher satisfaction with the procedure and willingness to repeat it in the future, and higher diagnostic yield [1]. We also found that gastric cleaning preparation was routinely used in only 2 (7%) out of the participating centers. It has been found that administration of a solution with acetylcysteine and simethicone before EGD significantly improves the visualization of gastric mucosa, allowing better detection of subtle mucosal lesions, that may be missed in the stomach at standard examination [24]. Indeed, a

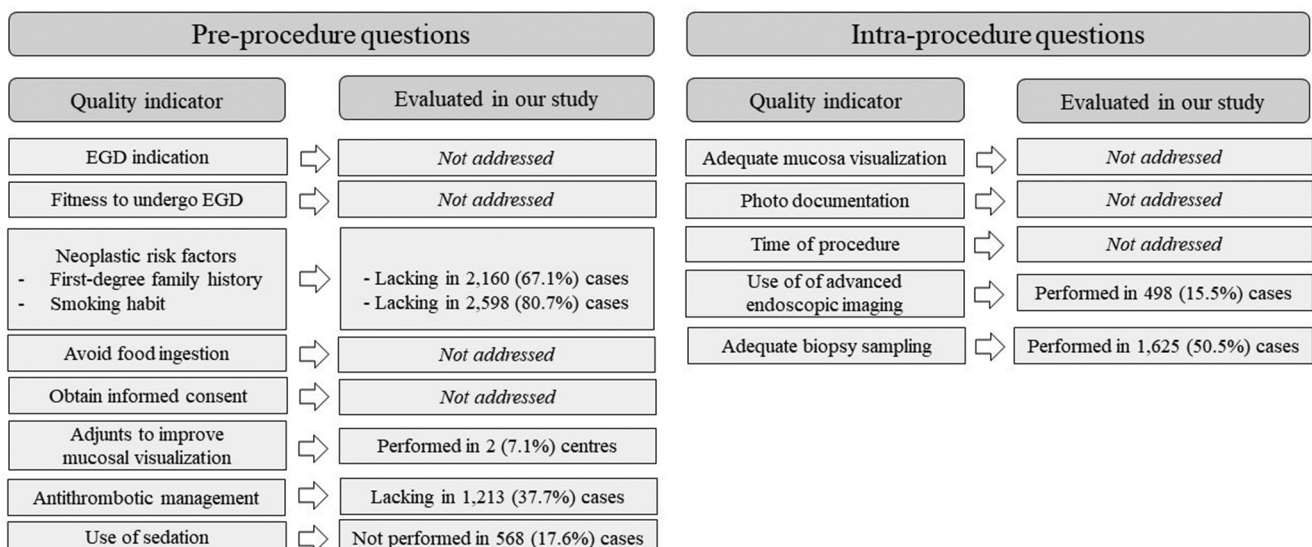


Fig. 2. The main results of the study according to current Italian guidelines on esophagogastroscopy quality [1].

systematic review found a 10% missing rate for gastric cancer, so that a more rigorous protocol for endoscopy and biopsy should be implemented worldwide [25]. In detail, an adequate sampling of gastric mucosa, i.e. both antral and gastric body specimens, should be consistently performed during EGD, according to several guidelines [1, 11-14]. Overall, our data found that an adequate biopsy sampling was achieved in 50% of EGDs, but it was routinely performed by only a minority of operators and centers involved in the study, with 23% of endoscopists taking adequate gastric biopsies in <25% of their EGDs. In detail, we found that the endoscopists distinctly increased the rate of correct gastric sampling only when facing with patients with a family history of upper GI cancers (approaching 70%), whilst the role current smoking was not considered. However, previous Italian studies found an 1.8-2.6 increased risk in first-degree relatives of gastric cancer patients [18], a value largely overlapping with 1.5-2.5 increased risk reported in smoking subjects [20, 26]. Disappointingly, the role of patient's age was less considered by endoscopists, with adequate gastric biopsy sampling performed even less frequently in more aged patients, despite the probability of finding both *H. pylori* infection and precancerous lesions in the stomach increases in the over 50-old years subjects [27]. As compared to standard biopsy sampling, taking only 1 to 3 specimens was found to significantly reduce the probability of finding both atrophy and intestinal metaplasia in the gastric mucosa [28]. All these observations indicate that endoscopists can miss important factors (i.e., smoking habits, patient's age) that increase the possibility of both diagnosing *H. pylori* infection and finding precancerous lesions in the stomach, so that a correct endoscopic follow-up may be scheduled in high-risk patients [13].

Another concern emerged in the present study was the scanty use of image-enhanced endoscopy, despite its efficacy in detection and staging of intestinal metaplasia on gastric mucosa, namely the main precancerous lesion in the stomach [29], and the identification of subtle mucosal lesions. When considering that gastric cancer is missed in up to 10% of cases [29], the detection of both early neoplastic lesions and precancerous lesions should be urgently implemented in clinical practice.

This study has some limitations. We have chosen to evaluate only some of the quality indicators for EGD suggested in guidelines [1, 5-9], so that no information on procedure duration, Vater's papilla visualization, and photo-documentation were evaluated. Moreover, histological data were not analyzed for this study.

CONCLUSIONS

Our study showed that the quality of EGD in Italian centers deserves to be improved in different aspects. The adoption of fundamental key performance indicators could allow this endoscopic examination to play a better preventive, and not merely diagnostic, role.

Conflicts of interest: None to declare.

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Author's contribution: A.Z. and V. De F. conceived the study and design the methodology. All the authors collected data. A.Z. and V. De F. analyzed the data and drafted the manuscript. R.M. critically revised the manuscript. All the authors approved the final version.

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