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ORIGINAL ARTICLE

Evaluation of Intraprocedure Quality Indicators in Esophagogastroduodenoscopy in Federal University of Pelotas Hospital School

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ABSTRACT

AIM: to evaluate the quality of the esophagogastroduodenoscopy offered at Pelotas Federal University Hospital School, focusing on intraprocedure quality indicators.

MATERIAL AND METHODS: A cross-sectional study was carried out, with a retrospective analysis of the reports of all esophagogastroduodenoscopies performed between March and December 2020.

RESULTS: 793 reports were analyzed, 59.3% of the sample were female patients. The median age was 59 years. The overall rate of complete exams was 96.4%. Regarding the diagnoses, among patients with Barrett's esophagus, 58.3% had the measures

adequately described. 91.7% underwent biopsies from the area of the suspected metaplastic epithelium, esophageal varices were present in 6.8% of the exams. The prevalence of erosive esophagitis was 20.7%. The prevalence of hiatal hernia was 14.9%, and out of them, 56.5% had its measurement adequately described. The prevalence of neoplasms in the reports was 3.7%. Peptic ulcers in 7.4% and in 93% of the cases at least one of the following characteristics was adequately described: active bleeding, visible non-bleeding vessel, adhered clot, hematin remains or clean base; which allows use of the Forrest classification.

CONCLUSION: It's important to evaluate the quality of the service to carry out specific planning to improve the points to be corrected. In addition, it is essential to highlight the indicators that surpassed the recommended targets, which should be treated as achievements of the endoscopy team, serving as a motivation for the professionals seeking correction of the identified flaws, aiming to reach an even higher level of excellence in patient care.

Key words: Endoscopy; Quality; Health care

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INTRODUCTION

Esophagogastroduodenoscopy (EGD) is a procedure widely indicated around the world for the diagnosis and treatment of diseases of the upper digestive tract, evaluating the mucosa and endoscopic anatomy of the esophagus, stomach and duodenum, up to its second portion. The exam indications are diverse, including different kinds of clinical conditions that affect the organs of the upper digestive tract^[1]. In addition to allowing biopsies of possible variations found, therapeutic interventions can be performed, such as resection of mucosal lesions, obtaining hemostasis in cases of bleeding, removal of foreign bodies

and dilation of areas of stenosis^[1].

The concern with patient safety and the quality of services provided in healthcare are growing topics in the medical field over the years. To assess and quantify the quality of a service provided, measurable criteria are needed to identify and address specific deficits, which, when undergoing interventions, could lead to better outcomes for patients^[2]. These criteria are called quality indicators and should be evidence-based. In addition, they should be, ideally: clear, objective, reproducible and realistic^[3].

In this context, the quality assessment of endoscopic exams has become the target of several studies with the aim of improving patient safety, establishing the concept of a high-quality endoscopic exam that contribute to an adequate indication, confirm or rule out a clinically relevant diagnosis, enabling the provision of endoscopic treatment when indicated and always with the lowest possible risk for the patient^[4].

Great advances in the definition of quality indicators in colonoscopy have already been achieved, with indicators based on robust evidence and important clinical repercussions on patient outcomes, such as the adenoma detection rate^[3]. However, there is still little evidence about the ideal quality indicators for EGD and whether the indicators with the greatest impact on the clinical outcomes of patients are still being sought^[2].

Searching for those indicators, in 2015 the second recommendation of the American Society of Digestive Endoscopy (ASGE) on definition and quality measurement in EGD was published, followed by other international publications on the same topic, such as the guideline of the European Society of Digestive Endoscopy (ESGE) in 2016^[1,3]. There are no Brazilian recommendations on quality in EGD yet. Based on these international recommendations and on an extensive literature review, this study seeks to assess the quality of the EGD offered at the UFPel Hospital School, focusing on intraprocedure quality indicators, through analysis retrospective of the examination reports.

METHODS

The UFPel Hospital School endoscopy service is located in Rio Grande do Sul southern region, and belongs to the network of federal hospitals of the Brazilian Hospital Services Company (EBSERH) and exclusively serves patients from the public health service (SUS). The demand for care from the endoscopy service comes from requests from the municipal health department, including tests requested from the basic health network and medical specialties ambulatory, especially patients from the oncology and gastroenterology/hepatology clinics. The endoscopy service still meets the demand for all endoscopic exams requested for hospitalized patients, offering EGD, colonoscopy and bronchoscopy. The endoscope used to perform the EGDs submitted to the study provides a high-definition image and has advanced imaging features such as digital magnification and chromoendoscopy.

A cross-sectional study was carried out, with retrospective analysis of the reports of all EGD carried out between March and December 2020 at UFPel hospital School. The study was carried out with its own funding and there are no conflicts of interest.

The reports were evaluated regarding the technical aspects of the examination, such as the adequate description of the esophagus, stomach and duodenum; including visualization of the second duodenal portion and performing a retrovision maneuver. Diagnoses and treatments performed through the EGD were also evaluated, which determine other quality indicators. Data obtained from the

evaluation of the reports were used to describe the demographic aspects of patients undergoing EGD.

The database was created in Excel software, and the analysis was performed using STATA version 15.0 (StataCorp College Station, Texas, USA). The analysis is descriptive and presents the absolute and relative frequencies of the variables.

The research project was approved by the Research Ethics Committee of the UFPel Hospital School, in compliance with Resolution 510/2016 of the National Health Council (CNS) and the ethical principles of the Guidelines and Regulations for Research Involving Human Beings.

The following information was obtained from the reports: Age and gender of the patient, residence location, date of examination, complete esophageal examination, complete stomach examination, including the performance of the retrovision maneuver, complete examination from the duodenum to its second portion, presence or suspicion of Barrett's esophagus, adequate description of the extent of Barrett's esophagus (according to the Prague classification), performance of biopsies in Barrett's esophagus, performance of a specific protocol of biopsies in Barrett's esophagus (Seattle Protocol), presence of hiatus hernia, measurement of hiatus hernia, presence of esophageal varices, description of esophageal varices caliber, therapy offered for esophageal varices, presence of peptic ulcer, peptic ulcer location, adequate description of the peptic ulcer allowing the accomplishment of Forrest classification, carrying out peptic ulcer biopsies, therapy offered in ulcers, presence or suspicion of celiac disease, biopsies performed for celiac disease, presence of erosive esophagitis, adequate description of erosive esophagitis, to perform the Sakita classification, presence of neoplasm and neoplasm location.

The primary objective of the research was to assess the quality of EGD offered at UFPel Hospital School, focusing on intraprocedure quality indicators. In addition, the objective of the study was to describe the demographic profile of patients who undergo EGD, determine the prevalence of different endoscopic diagnoses and evaluate the endoscopic approaches in view of the different diagnoses made in EGD.

RESULTS

A total of 793 EGD reports performed between March and December 2020 were analyzed. Most examinations were performed in female patients, totaling 59.3% of the sample, as shown in Table 1. The median age was 59 years (interquartile range 49-68), with the youngest patient at 1 year-old and the oldest at 93 years-old. All patients undergoing EGD were residents of the Rio Grande do Sul southern region, a total of 716 residents of Pelotas (90.4%) and the others were distributed in 14 other cities. All EGD that examined the esophagus, stomach and duodenum up to their second portion, were considered complete, in addition to performing a retrovision maneuver in the gastric cavity. The reasons why a segment was not examined and why the retrovision maneuver was not performed were evaluated. The overall rate of complete exams was 91.6%, as can be seen in Table 2. Also in Table 2, other quality indicators, that can be evaluated by retrospective EGD report analysis, are shown with their respective targets, when defined in the literature.

The reasons for not performing the examination of any segment or not performing a retrovision maneuver are described in Table 3. The reasons that constituted real impediments to the proper performance of the examination were selected, such as surgical alterations, neoplasms and stenosis. Calculating the complete exams rate,

removing from the denominator those exams with strong reasons for not examining some segment or not performing a retrovision, a complete exam rate of 96.4% was found.

Regarding esophageal pathologies, 12 patients with suspicious findings or previous diagnosis of Barrett's esophagus were identified. Of these patients, 7 (58.3%) had their measurements adequately described, with the circumferential measurement and the extension of the maximum projection being informed that allowing the Prague classification to be carried out. Also, in relation to this group of patients, 11 (91.7%) underwent biopsies from the area of the suspected metaplastic epithelium, but only two (18.2%) of those had their biopsies described according to the Seattle protocol.

Diagnosis of esophageal varices was performed in 6.8% of the exams, in all cases properly classified in relation to caliber, with the majority being medium (47.2%), followed by small (33.9%) and large caliber (18.9%). Among patients with medium and large caliber esophageal varices, 52.8% received therapeutic intervention, this intervention was rubber band ligation in all cases.

Still addressing esophageal pathologies, the prevalence of erosive esophagitis was 20.7%, totaling 161 cases. All cases of esophagitis were classified according to the Los Angeles classification, with the highest prevalence being 61.5% for classification A, followed by 21.1% for B, 9.9% for C and 7.5% for D.

The prevalence of hiatal hernia was 14.9%, and 56.5% of the time the hernia had its measurement adequately described. Out of these, 36.9% had measurements of up to 2 cm, and 21.5% of 5 cm or more.

Three cases (0.4%) of endoscopic suspicion or previous diagnosis of celiac disease were identified; in all cases biopsies were performed, but in none of them the number of biopsies was described.

The prevalence of neoplasms described in the EGD reports was 3.7%, with the esophageal neoplasm being the most prevalent (51.7%), followed by gastric neoplasm (41.4%).

The presence of peptic ulcers was described in 57 exams (7.4%), being the most common location in the gastric antrum (54.4%), followed by duodenal ulcers (31.6%). In 93% of cases, at least one of the following characteristics was adequately described: active bleeding, visible non-bleeding vessel, adhered clot, remnants of hematin or clean base; which allows the use of the Forrest classification. Among patients with the Forrest classification described, 79.2% had Forrest III and during the period analyzed, no patients with Forrest Ia and Ib ulcers were identified. In only one case was identified a non-bleeding ulcer with a visible vessel (Forrest IIa), which received intervention therapy with dual therapy. Considering patients with non-bleeding gastric ulcers, biopsies were performed in 84.6% of cases. Out of patients with duodenal ulcer, research for *Helicobacter pylori* (HP) was performed in 77.8% of the cases; the overall rate of research for HP in the endoscopy service of Hospital Escola UFPel was 79.4%.

CONCLUSION

This study was the first one to assess intraprocedure EGD quality indicators in this service and identified suboptimal performance, which can generate intervention measures to improve the care provided to patients and increase the safety of the service provided, in addition to reinforcing and encourage the perpetuation of behaviors already adopted in the service that meet the measures recommended by current medical literature.

The frequency with which a complete examination of the esophagus, stomach and duodenum is performed, including the retrovision of the stomach, is a common quality indicator of the main guidelines and can be considered a basic condition for performing a

Table 1 Population description accordingly demographic and endoscopic variables. Endoscopy Service of UFPel School Hospital, 2020.

Demographic variables	N	%
Sex		
women	470	59.3
men	323	40.7
Age		
0-20 years	12	1.5
21-40 years	90	11.3
41-60 years	318	40.1
61-80 years	352	44.4
81 or more	21	2.7
City		
Pelotas	716	90.4
Other	76	9.6
Endoscopic Variables		
Suspicion or diagnostic of Barrett Esophagus	12	1.5
Esophagus Varices	53	6.8
Caliber		
Fine	18	33.9
Medium	25	47.2
Large	10	18.9
Erosive Esophagitis	161	20.7
Los Angeles		
A	99	61.5
B	34	21.1
C	16	9.9
D	12	7.5
Hiatus Hernia	116	14.9
Measure (N=50)		
< 2 cm	24	36.9
3-4 cm	27	41.5
5 cm or mores	14	21.5
Suspicion or diagnostic of Celiac Disease	3	0.4
Neoplasm	29	3.7
Localization		
Pharynx	1	3.5
Esophagus	15	51.7
Stomach	12	41.4
Ulcer presence	57	7.4
Localization		
Not described	2	3.5
Gastric Fundus	1	1.7
Gastric body	5	8.8
Gastric antrum	31	54.4
Duodeno	18	31.6
Forrest Classification (N=54)		
Ia	0	0
Ib	0	0
IIa	1	1.9
IIb	3	5.7
IIc	7	13.2
III	42	79.2
Biopsies for HP		
Yes	609	79.4
No	158	20.6

Table 2 Quality indicators in esophagogastroduodenoscopy. Endoscopy Service of UFPel School Hospital, 2020.

Variables	N	%	Target (%)
Complete exam rate – General (N=793)	726	91.6	>98
Complete exam rate – Excluding Strong reasons for not examining a segment or not performing retroview maneuver (N=753)	726	96.41	>98
Frequency with which Barrett's esophagus is adequately measured when present (N=12)	7	58.3	>98
Frequency with which biopsies are performed in cases of Barrett's esophagus (N=12)	11	91.7	>90
Frequency with band ligation is used as endoscopic treatment of esophageal varices (N=19)	19	100	>98
Frequency with which esophageal varices were adequately described (N=53)	53	100	-
Frequency with which hiatus hernia is measured when present (N=115)	65	56.5	-
Frequency with which, during EGD revealing peptic ulcer, at least one of the characteristics is described: active bleeding, visible non-bleeding vessel, adhered clot, hematin remains, clean base (N=57)	53	93	>98
Frequency of endoscopic treatment for bleeding ulcers or ulcers with visible vessels (N=1)	1	100	>98
Frequency with which a second treatment modality is offered, when epinephrine injection is used, for the treatment of ulcers with active bleeding or visible vessel (N=1)	1	100	>98
Gastric Preparation (N=777)			-
Not Described	753	96.9	
Adequate	1	0.1	
Inappropriate	23	3	

high-quality examination, regardless of its indication or diagnoses found^[1,3,4,5,6]. The findings of the study indicate a rate of 91.6% for complete examination, regardless of the reason that prevented it from being performed as expected. However, it is necessary a detailed analysis of the reasons that did not allow a complete exam so that the quality indicator translates the real quality offered in exams.

As shown in Table 3, many of the reasons for not performing the examination of some segment or retrovision constitute a technical impossibility, such as the presence of stenosis, neoplasms or post-surgical anatomical changes, including: total gastrectomy, esophagectomy with gastric pull-up, gastroplasty and gastric bypass, among others. Therefore, it is necessary to exclude incomplete exams for reasons such as those described above from the denominator of the complete exams rate in order to obtain a quality indicator that better reflects the quality of the service provided. This done, a complete examination rate of 96.4% was obtained, still below the 98% target established by ASGE in its guideline published in 2015^[1]. So, there is a need for intervention measures seeking to improve this indicator, reinforcing to endoscopists the importance of performing a complete examination regardless of the EGD indication or the performance of an endoscopic intervention in the same procedure, such as inserting a nasogastric feeding tube, performing a percutaneous endoscopic gastrostomy or removing a foreign body, for example. Performing a complete examination decreases the chance that a diagnosis will not be made and avoids the possibility that a second examination will be needed to assess areas not previously examined.

Other quality indicators evaluated in the present study are specific for some diseases, directly related to the adequate assessment, description and management of those diagnoses. In relation to Barrett's esophagus, two indicators were evaluated. The first, was the measurement of Barrett's esophagus, an extremely important factor in patient follow-up, as it is known that the risk of progression to dysplasia or cancer is directly related to the extension of Barrett's epithelium^[1]. Such measurement was properly performed in 58.3% of the cases, with adequate descriptions being those that allowed the performance of the Prague classification, which considers the circumferential measurement and the extension of the maximum projection of the metaplastic epithelium^[3]. The target established by the ASGE for this indicator was at least 98%, which indicates the need for intervention, with possible training of endoscopists to standardize the way to assess and describe this pathology^[1].

Table 3 Reasons for not performing the examination of a segment or not performing a retrovision. Endoscopy Service of UFPel School Hospital, 2020.

Variables	N	%
Esophagus (N=14)	9	64.3
Esophageal/pharyngeal tumor*	4	28.6
Esophageal stenosis*	1	7.1
Upper esophageal sphincter hypertonia*		
Stomach (N=8)	2	25
not described	3	37.5
Total gastrectomy*	3	37.5
Presence of waste		
Retrovision (N=30)	17	56.7
not described	10	33.3
Surgical changes*	3	10
Presence of waste		
Duodenum (N=30)	15	50
not described	10	33.3
Surgical changes*	3	10
Gastric neoplasm*	2	6.7

* Strong reasons, considered real impediments to the exam completion

The other quality indicator evaluated in relation to Barrett's esophagus was the rate of biopsies performed in these cases, which reached 91.7%, surpassing the target determined by the ASGE (above 90%)^[1]. Although the endoscopic aspect can be highly suggestive, it is only possible to establish the diagnosis of Barrett's esophagus by histological analysis determining intestinal metaplasia^[1]. Furthermore, biopsies are essential in detecting dysplastic or neoplastic areas. Aiming to improve the performance of biopsies in detecting these areas, the Seattle protocol was created, which consists of conducting guided biopsies in mucosal changes and then random biopsies in the 4 quadrants every 2 cm, in the entire segment of Barrett's epithelium^[3,4,5,6].

In the present study, the use of the Seattle protocol was described in only two cases (18.2% of patients biopsied for Barrett's esophagus), with a rate of 90% considered the minimum standard by the British Society of Endoscopy in its guideline^[7].

In the evaluation of patients with esophageal varices, two quality indicators were measured. Adequate description of the varices

was performed in all cases, with information being offered that allowed their classification into grades 1, 2 or 3 (small, medium or large caliber, respectively), according to the portal hypertension consensus published by the European Association for Study of the Liver (EASL), especially the last Baveno VI consensus published in 2015, the main reference in the literature on the subject^[8].

The other indicator evaluated in this context was the frequency with which rubber band ligation was used as an endoscopic treatment for esophageal varices, also obtaining a rate of 100% in this indicator, whose target determined by ASGE is above 98%^[1]. These indicators show the expertise of the endoscopy service in the management of patients with portal hypertension, probably related to the direct link with the gastroenterology/hepatology clinic and the presence of a well-established rubber band ligation program for esophageal varices, which remained active in the period of the study despite the restrictions imposed by the COVID-19 pandemic.

In relation to peptic ulcer disease, three quality indicators were evaluated, two of them related to therapeutic interventions and one related to the adequate description of the lesions. The frequency with which at least one of the characteristics necessary to carry out the Forrest classification was described was evaluated, obtaining a rate of 93%, a value also below the target established by the ASGE (above 98%)^[1].

It is also observed that the prevalence of lesions without signs of bleeding found in the present study is much higher than that described in the literature (79.2% versus 36%)^[9]. This difference can be explained by the fact that our service is not directly linked to an urgent and emergency service; thus, most tests are performed on an outpatient basis or after the initial pharmacological treatment, later in the disease evolution, in most cases.

In the only case with indication for endoscopic therapy, with a Forrest IIA classification, dual therapy was performed as recommended in the literature^[1]. Thus, the two indicators related to peptic ulcer therapy ("Frequency with which endoscopic treatment was performed for bleeding ulcers or with visible vessels" and "Frequency with which a second treatment modality is offered, when adrenaline injection is used, to treatment of ulcers with active bleeding or visible vessel") reached a rate of 100%, as recommended by the ASGE (> 98%)^[1].

As this is a retrospective study, in which data were obtained by reviewing EGD reports, some of the intraprocedure quality indicators proposed by the main guidelines could not be evaluated. Among these, the indicators related to the examination time, currently not registered in the report, and photo documentation, not attached to the descriptive report, stand out as an important deficiency in relation to the quality of the service provided, as it is a key factor in the demonstration of milestones anatomical and pathological alterations found in the exam^[10,11].

Despite the potential limitations inherent in this study, it was possible, through this first evaluation of the quality of the EGD in the UFPel School Hospital, to identify performance points below those recommended in the medical literature, and it is now possible to carry out specific planning to improve these points. In addition, it is essential to highlight the indicators that surpassed the recommended targets, which should be valued as achievements of the endoscopy team, serving as a motivation for the professionals searching for

correction of the identified flaws, aiming to reach an even higher level of excellence in care offered to the patient.

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