SPECIAL ARTICLE

Quality indicators in gastroscopy. Gastroscopy procedure

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ABSTRACT

Within the project "Quality indicators in digestive endoscopy", pioneered by the Spanish Society for Digestive Diseases (SEPD), the objective of this research is to suggest the structure, process, and results procedures and indicators necessary to implement and assess quality in the gastroscopy setting.

First, a chart was designed with the steps to be followed during a gastroscopy procedure. Secondly, a team of experts in care quality and/or endoscopy performed a qualitative review of the literature searching for quality indicators for endoscopic procedures, including gastroscopies. Finally, using a paired analysis approach, a selection of the literature obtained was undertaken.

For gastroscopy, a total of nine process indicators were identified (one preprocedure, eight intraprocedure). Evidence quality was assessed with the Grading of Recommendations Assessment, Development and Evaluation (GRADE) classification scale.

Key words: Indicators. Gastroscopy. Endoscopy. Technique.

INTRODUCCIÓN

Attempts at care quality improvement have been ongoing for over 30 years, and are presently focused on the assessment of structure, process, and outcome indicators, as well as on the use of appropriate tools to offer enhanced services. Patient safety has increasingly become a focus of interest over the past few years because of adverse events and their impact on patient morbidity and mortality (1). Thus, as healthcare managers focus on improving patient safety, physicians participate in safety committees to analyze adverse events and design safer systems (2).

This need to provide safer, high-quality health care is never alien to endoscopy services. A quality endoscopic examination guarantees an appropriately indicated procedure to correctly achieve or rule out a clinically relevant diagnosis. When appropriate, the right endoscopic treatment is offered, always with the lowest risk possible. Meeting these standards implies awareness of the quality of the procedures involved, aiming at their improvement. Patient benefits increase with quality level as more procedures are performed with a correct indication and, therefore, a decrease in associated morbidity and mortality, costs are constrained, and a better service may be afforded (3).

According to this, it is crucial that continuous quality improvement programs be implemented, which require valid, reliable, evidence-based indicators. Consistent with this approach, the Sociedad Española de Patología Digestiva (SEPD) developed a project dealing with digestive endoscopy indicators that bore fruit in three prior reports, now rounded out with the present issue (4-6).

Under this perspective, the present study dealt with quality procedures and indicators for gastroduodenoscopy. The aim of this research was to propose both procedures and structure, process and outcome indicators in order to provide and assess quality in the gastroscopy setting.

METHODS

The study had two stages. The first stage involved gathering a multidisciplinary team based on the Hospital Clínico Universitario Virgen de la Arrixaca (HCUVA), which reviewed the literature and designed procedures for diag-

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nostic gastroscopy, colonoscopy, and ERCP. In the second stage, team proposals were reviewed and analyzed by a panel of SEPD-selected experts until a final version was ready. Then fact sheets were developed for each of the indicators proposed.

Literature review and study selection strategies

Two literature review strategies were used: one for clinical practice guidelines (CPGs) and one for original papers and reviews. Digestive endoscopy CPGs were collected from three international sources (Agency for Healthcare Research and Quality [AHRQ], National Institute for Health and Care Excellence [NICE], Scottish Intercollegiate Guidelines Network [SIGN]) and one Spanish source (GuíaSalud), and also from reviews in the websites of major endoscopy and gastroenterology societies (American Society for Gastrointestinal Endoscopy [ASGE], American Gastroenterological Association [AGA], European Society of Gastrointestinal Endoscopy [ESGE], Spanish Society for Gastrointestinal Endoscopy [SEED], SEPD and Spanish Association of Gastroenterology [AEG]). Original articles were sought in the Web of Knowledge (WoK), PubMed, and Cochrane databases using the following search strategy: all documents dated between January 1, 2006 and August 10, 2016 containing any of the following descriptors: [Digestive endoscop*, Gastrointestinal Endoscopy, Gastroscop*, Oesophagoscop*] together with [informed consent, quality, safety, (security), assessment, assurance, indicators, criteria]. Active filters included: clinical trial, controlled clinical trial, meta-analysis, randomized controlled trial, review, guideline, practice guideline, publication date from 2006/01/01 to 2016/08/10; humans; adults; language: English, Spanish). Furthermore, a literature review was undertaken of the original studies selected and included in the analysis, and of reported clinical guidelines and meta-analyses, with references previously unidentified but deemed of interest being selected. Once the search protocol was completed, all articles selected were separately reviewed and analyzed by two reviewers. Each reviewer screened studies using the following criteria: a) the document includes recommendations on appropriate preparation, performance, and follow-up; and b) the document includes or suggests structure, process or outcome quality indicators. The studies selected by one reviewer were collated by the rest in order to decide on their definite selection or otherwise. In order to homogeneously assess every selected document, a table was constructed to include data on structure, process or outcome association, and whether such data were explicit. The table also included type of study (clinical trial, observational study, meta-analysis, etc.), identified as referring to gastroscopy.

Gastroscopy procedure design

Based on the literature selected and the authors' experience, activities required for each procedure were collected and sorted out. Regarding procedures common to any endoscopic study, the logical structural, functional and organizational differences between different digestive endoscopy units restricted their development to a minimum. Similarly, a description of specific techniques to be applied in specific scenarios was excluded, as it fell outside the scope of the intended goal. Results were charted as flow or parallel lines charts. Team proposals were reviewed and analyzed by a SEPD-appointed expert panel until a definite version was completed.

Indicator design

In order to obtain valid indicators, the quality of the available knowledge on the activities included in the procedures and the documents collected was assessed. This was carried out using the knowledge quality grading approach provided by the GRADE model. In the GRADE system, the quality of evidence is initially classified as high or low according to its origin in experimental or observational studies. Then, according to a number of considerations regarding items liable to increase or decrease baseline quality, a high, moderate, low or very low grade is assigned. In order to ensure reliability and facilitate estimations for the indicators selected in clinical units, each of them is accompanied by a fact sheet including: application setting (procedure[s] where it applies); designation; calculation formula; type of indicator according to Donabedian's model (7); temporal relationship with procedure (pre-procedure, intra-procedure, post-procedure); quality dimension involved; rationale, exclusions and clarifications; and supporting level of evidence.

RESULTS AND DISCUSSION

Search results

Selection started up by suppressing duplications; on analyzing title and/or abstract, studies were excluded when: poorly referenced; only in abstract form; unavailable; older than 2006; dealing with pediatric or veterinary subjects or non-digestive endoscopy; published in a language other than Spanish or English.

A total of 253 studies were included in the pairwise analysis; 117 underwent full-text assessment, including both randomized and nonrandomized clinical trials, as well as high-quality case series, reviews and meta-analyses. Of these, 41 studies on gastroduodenoscopy were reviewed.

Esophagogastroduodenoscopy procedure

This has been shown in figure 1, where correlative steps may be described as follows:

1. Place patient in the appropriate position.
   - Left lateral decubitus.
   - Head in the neutral position, aided by a pillow.
   - When a venous access is required, the right arm should be preferably used.
   - Put a bite block in place.
2. Check that the endoscope is working properly.
   - Adequate, high-quality view.
   - Tip angulation.
   - Air and water.
   - Suction.
3. Lubricate the endoscope.
4. Hold tube at 30 cm.

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5. Angulate tip to go over the tongue until the epiglottis is visualized.
6. Move tube to the side in order to reach the pharyngeal esophagus.
7. Advance past the cricopharyngeal sphincter (push, insufflate, swallow).
   - If the patient is asleep, perform under direct vision using mild pressure and holding the endoscope by the insertion tube.
8. Advance to the esophagogastric junction.
   - Memorize findings without stopping tube advancement, leaving detailed exploration for the withdrawal phase.
9. Rotate tube counterclockwise.
10. Insufflate, aspirate until the greater curvature fold is visualized.
11. Angulate tip and advance with clockwise rotation at 90° until the antrum is seen.

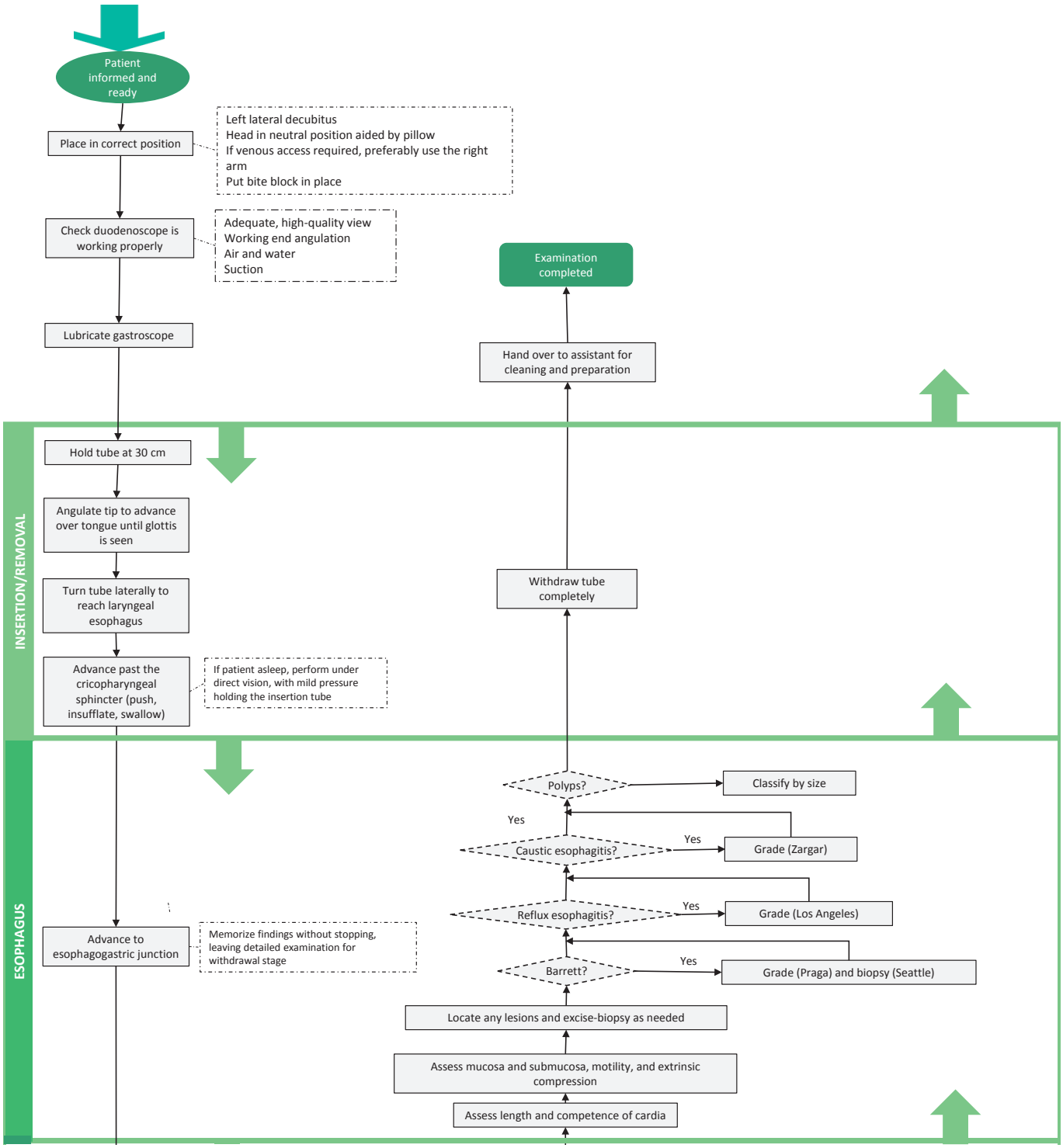

Fig. 1. *Esophagogastroduodenoscopy procedure.*

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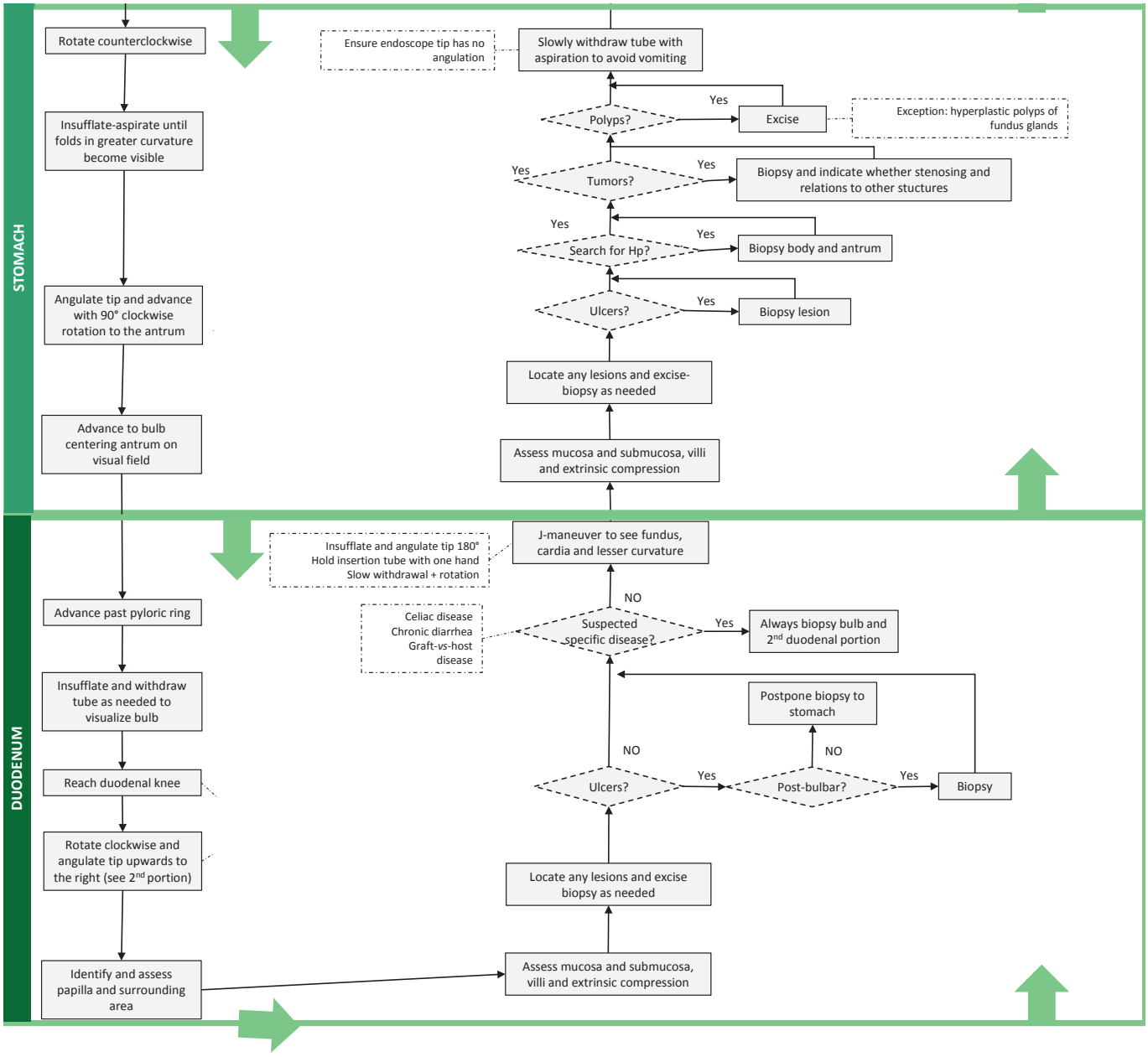

Fig. 1 (Cont.). *Esophagogastroduodenoscopy procedure.*

- Memorize findings without stopping tube advancement, leaving detailed exploration for the withdrawal phase.

12. Advance towards the bulb with the antrum centered on the visual field.
13. Go past the pyloric ring.
14. Insufflate and withdraw as needed to visualize the bulb.
15. Reach the duodenal knee.
16. Rotate clockwise and angulate tip upwards to the right (see 2nd portion).
17. Identify and assess the papilla and surrounding area.
18. Assess the mucosa and submucosa, villi, and extrinsic compressions.
19. Locate any lesions and excise/biopsy as needed.
    - Ulcers:
      – Postbulbar: biopsy.
      – Non-postbulbar: postpone biopsy to stomach.
    - Suspicion of specific disease:
      – Always biopsy the bulb and 2nd duodenal portion.
20. J-maneuver to visualize the fundus, cardia and lesser curvature.
    - Insufflate and angulate tip 180°.
    - Hold the endoscope by the insertion tube.
    - Slow withdrawal + rotation.
21. Assess mucosa and submucosa, villi, and extrinsic compressions.
22. Locate any lesions and excise/biopsy as needed.
    - Ulcers:
      – Biopsy lesion.
    - Search for *Helicobacter pylori:*
      – Biopsy body and antrum.
    - Tumors:
      – Biopsy and record whether they are stenosing, as well as their relationships with other structures.

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- Polyps:
  – Excise.

23. Slowly withdraw tube while aspirating to avoid vomiting.
    - Ensure that the endoscope's tip has no angulation.
24. Assess length and competence of the cardia.
25. Assess mucosa and submucosa, motility and extrinsic compressions.
26. Locate any lesions, and excise/biopsy as needed.
    - Barrett:
      – Grade: Prague protocol.
      – Biopsy: Seattle protocol.
    - Reflux esophagitis:
      – Grade: Los Angeles classification.
    - Caustic esophagitis:
      – Grade: Zargar classification.
    - Varices:
      – Classify by size.
27. Withdraw tube completely.
28. Hand over to assistant for cleaning and preparation.

Indicators

In order to direct ongoing efforts towards improving quality in endoscopy units, the present paper suggests a number of indicators that are deemed critical according to their clinical relevance, which is based on the fact that they vary significantly in clinical practice, and their measurement is feasible. A useful approach for endoscopists would be an initial assessment of their performance. Thus, efforts at quality improvement might be oriented according to the results obtained with these indicators, and appropriate corrective measures might be implemented (8).

We need to remember that, within the GRADE system used to assess the evidence supporting these indicators, a "high" quality of evidence corresponds to well-designed randomized studies, which are scarce in this setting. As a consequence, evidence quality is polarized towards both extremes ("very high" or "low"), with high quality being primarily obtained from clinical guidelines. Thus, many selected indicators are consistent with them. Randomized studies with moderate quality of evidence, as well as other designs, are few.

Table 1 lists the indicators defined for gastroscopy.

B-09. Drug prophylaxis

Definition and formula
Percentage of cases where appropriate drug prophylaxis is indicated
Numerator: 100 · cases with confirmed appropriate prophylaxis
Denominator: total cases with prophylaxis indication
Type, temporal relationship, quality dimension
Process - Pre-procedure - Safety
Evidence
High

As in our study, other recommendations (8) agree that the use of prophylactic drugs should be included in the pre-procedure assessment (9).

Table 1. *Quality indicators in esophagogastroduodenoscopy (in italics those elaborated upon in the text)*

A. Structure
01. Valid informed consent*
02. Antithrombotic medication management plan*
03. Experienced endoscopist*
04. Discharge plan*
05. Discharge report quality*
06. Endoscopy equipment disinfection procedure
07. Structural and functional endoscopy unit characteristics*
B. Process - pre-procedure
01. Correct indication*
02. Informed consent form signing*
03. Clinical assessment *
04. Planned sedation*
05. Antithrombotic medication management*
06. Appropriate follow-up of patients with adenoma, serrated polyps†
07. Antibiotic prophylaxis‡
08. Procedure degree of difficulty (Schutz grade)‡
09. *Drug prophylaxis§*
10. Fasting instructions for gastroscopy§
C. Process - intra-procedure
01. Graphic documentation*
02. Sedated patient monitoring*
03. Recording of immediate adverse events*
04. Colon preparation†
05. Complete colonoscopy†
06. All polyps smaller than 20 mm removed†
07. All polyps smaller than 20 mm removed in single fragment†
08. Withdrawal time†
09. *Biopsy taking in patients with chronic diarrhea†*
10. *Number and distribution of biopsy samples in patients with chronic inflammatory bowel disease†*
11. Deep cannulation of intended duct in native papilla‡
12. Choledocholithiasis removal‡
13. Stricture resolution‡
14. Radiation estimation‡
15. *Complete exam§*
16. *Gastroscopy duration§*
17. *Biopsy taking§*
18. *Measurement of Barrett's esophagus§*
19. *Description and location of bleeding lesions§*
20. *Approach to peptic ulcers§*
21. *Primary endoscopic hemostasis§*
D. Process - post-procedure
01. Patient recovery*
02. Information on discharge*
03. Recording of delayed adverse events*
04. Recording of colon preparation quality†
05. Withdrawal time†
06. *Recommendations following peptic esophageal stricture dilation§*
07. *Recommendations for identified ulcers§*
E. Outcome
01. Incidence of adverse events*
02. Perceived quality and patient satisfaction*
03. Percentage of colonoscopies with adenoma†
04. Mean number of adenomas per colonoscopy†
05. Incidence of interval cancer†

*General indicators (4). †Colonoscopy-specific indicators (5). ‡Endoscopic retrograde cholangiopancreatography-specific indicators (6). §Gastroscopy-specific indicators.

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Drug prophylaxis is warranted in the following situations:

1. *Cirrhotic patients with acute upper GI bleeding:* according to a Cochrane review of 12 studies, antibiotic prophylaxis reduces in these patients the risk of death, bacterial infection and rebleeding (10). Fluoroquinolones are currently recommended, but IV ceftriaxone may be of choice for patients with advanced cirrhosis in areas with high levels of resistance to quinolones (11-14).
2. *Use of percutaneous endoscopic gastrostomy (PEG) tube:* according to a Cochrane review of ten clinical trials, stoma infection rates decrease with prophylaxis (15). The antibiotic used should cover infection by skin bacteria (e.g., IV cefazolin) and be administered 30 minutes before the procedure (16,17).
3. *Use of proton pump inhibitors in bleeding peptic ulcer:* therapy with IV PPIs prior to the procedure decreases the proportion of high-risk stigmata and the need for endoscopic treatment. Although a Cochrane review of six trials found no differences in mortality (18), its use is recommended since it improves lesion identification and endoscopic treatment (11).
4. *Use of vasoactive drugs for bleeding varices:* according to a meta-analysis of 30 clinical trials, the use of vasoactive medication is associated with lower mortality rates at one week and significant hemostasis improvements (19). No differences in effectiveness exist between vasoactive drugs (somatostatin, terlipressin, octeotride) (20).

The reference, goal or standard for this indicator in its various indications should be 100%.

B-10. Percentage of patients receiving fasting instructions prior to endoscopy

Definition and formula
Percentage of cases where patients are instructed to fast prior to endoscopy Numerator: 100 · cases correctly instructed on the fasting period before endoscopy Denominator: total non-emergency cases (including procedures not performed because of lack of fasting)
Type, temporal relationship, quality dimension
Process - Pre-procedure - Effectiveness and safety
Evidence
Very low

Fasting should last for six hours regarding solids and two hours regarding water (21).

Emergency settings are excluded.

The reference, goal or standard for this indicator in its various indications should be 95%.

C-15. Complete examination

Definition and formula
Percentage of cases undergoing a complete examination Numerator: 100 · cases where complete examination is documented Denominator: total assessed cases
Type, temporal relationship, quality dimension
Process - Effectiveness
Evidence
Low

The exploration should include written texts describing the complete visualization of all organs from the upper esophageal sphincter to the second portion of the duodenum (esophagus, stomach, duodenum) (8). However, there is no agreement on the final point to be explored for an examination to be considered as complete, albeit the greater papilla has been suggested for that role (21). Given the increased incidence of cardia cancer, gastric retroflexion should also be included in the examination (22-24).

Presence of esophageal or gastric outlet obstruction is an exception for this indicator.

Its reference is 100%.

C-16. Procedure duration

Definition and formula
Duration of the entire endoscopic procedure from entry to exit through the mouth. Numerator: 100 · cases where a duration longer than seven minutes is reported Denominator: total assessed cases (with and without duration data)
Type, temporal relationship, quality dimension
Process - Effectiveness
Evidence
Very low

Seven minutes have been considered as the time necessary for appropriate gastroscopic assessment based on indirect studies (21,25).

Gastric ulcers: while the optimum number of samples and their type remain unclear (some authors suggest at least seven samples from the borders and the base) (26), biopsies are needed to assess potential malignity (27). An isolated biopsy may yield false negative results in up to

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C-17. Biopsy taking

Definition and formula
Percentage of cases where biopsy samples are taken in patients with gastric ulcer, gastric precancerous lesions, Barrett's esophagus or suspected celiac disease Numerator: 100 · cases where required biopsy samples are taken Denominator: total assessed cases with gastric ulcer, gastric precancerous lesions, Barrett's esophagus or suspected celiac disease
Type, temporal relationship, quality dimension
Process - Effectiveness
Evidence
Moderate

30% of cases. Biopsy may be delayed until a subsequent exploration in case of acute GI bleeding, provided this is accurately recorded in the report (8).

Gastric precancerous lesions (intestinal metaplasia and atrophic gastritis): for appropriate staging and follow-up, at least four biopsy samples are recommended from the greater and lesser curvatures at the antrum and body (in separate jars), as well as from visible lesions (28).

Barrett's esophagus: although endoscopy may suggest this condition, a positive diagnosis requires confirmation by pathology, which is also key to identify dysplasia (29) even though imaging tests play an increasingly important role in its identification. The optimum number of biopsies to monitor dysplasia and diagnose Barrett's esophagus remains unclear, but it is recommended that biopsy samples be collected from all four quadrants every 1-2 cm along the extension of the suspect tissue, identifying each quadrant (Seattle protocol) and the specific samples obtained from suspect lesions (30-32).

Suspected celiac disease: small-bowel biopsies are useful for the diagnosis. They also may inform on the response to therapy. Given the patchy nature of this disease, 4-6 biopsy samples should be collected, including the duodenal bulb, in case of suspicion (33,34). Traditionally, samples were oriented on blotting paper to help pathologists measure villous atrophy, but this factor has lost significance *versus* intraepithelial lymphocytosis in terms of diagnostic value (35,36).

Tests performed for other types of patients are exceptions for this indicator, as are the potential revisions of previous cases within reasonable time limits.

Its reference, goal or standard is 100%.

C-18. Barrett's esophagus measurement

Definition and formula
Percentage of cases where Barrett's esophagus extension is measured using the Prague classification Numerator: 100 · cases with documented circumferential and maximal length measurement using the Prague classification Denominator: total cases with Barrett's esophagus
Type, temporal relationship, quality dimension
Structure - Effectiveness
Evidence
Moderate

The risk of progression to dysplasia or cancer is related to the length of Barrett's esophagus. In this respect, the Prague classification (a validated, ubiquitous tool) considers the circumferential length (C) and maximal length (M) of the Barrett's segment (8,24,37-41).

Its reference, goal or standard is 100%.

C-19. Description and location of bleeding lesions

Definition and formula
Percentage of cases where all identified bleeding lesions are described and located Numerator: 100 · cases where all identified bleeding lesions are described and located Denominator: total cases with identified bleeding lesions
Type, temporal relationship, quality dimension
Process - Effectiveness
Evidence
Low

The first thing an endoscopist must do is find and define the bleeding site (8). In most patients, this may be located with a more or less careful examination (11), and should be described with sufficient detail as to facilitate its location in a subsequent endoscopic procedure. A detailed description of the lesion is also required (42), including information on signs associated with re-bleeding risk (43,44). Furthermore, re-bleeding risk has been associated with ulcer size and location on the posterior aspect of the bulb or lesser curvature of the stomach (45).

Several useful approaches have been suggested to better visualize bleeding sites, including use of prokinetics like erythromycin (46), proton pump inhibitors (18,47) and endoscopic movilization and removal of clots (11); however, gastric lavage before the procedure is ineffective (48). Erythromycin in a single 250-mg dose at least 30 minutes before endoscopy has proven cost-effective for improving endoscopic diagnosis (49).

Reference, goal or standard > 80%.

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C-20. Approach to peptic ulcer

Definition and formula
Percentage of cases with a proper approach to peptic ulcer Numerator: 100 · cases where lesion aspect is classified, and action is taken accordingly Denominator: total cases with identified peptic ulcer(s)
Type, temporal relationship, quality dimension
Process - Effectiveness
Evidence
High

The aspect of all ulcers must be categorized according to the Forrest classification (Table 2) (8,50), which seeks to relate endoscopic findings to bleeding risk (51).

Table 2. *Forrest classification*

Type	Characteristics	% rebleed
IA	Spurting hemorrhage	90%
IB	Oozing hemorrhage	20-30%
IIA	Visible non-bleeding vessel	30-51%
IIB	Adherent clot	25-41%
IIC	Hematin-covered ulcer bed	0-5%
III	Clean ulcer	0-2%

These signs provide prognostic information on the likeliness of re-bleeding, hence on the need for intervention and treatment approaches. Thus:

- Endoscopic hemostasis should be attempted for active bleeding ulcers (IA (jet) or IB (oozing)), and non-bleeding ulcers with visible vessels (IIA).
- In patients with adherent clots (IIB), vigorous irrigation with or without aspiration may identify underlying bleeding. When clots cannot be removed in this manner, the lesion may be re-categorized.
- Patients with hematin (IIB) and no bleeding lesions (III) are not treated and may be discharged.

In eligible patients, endoscopic hemostasis must be performed. Injected epinephrine is not enough and needs to be combined with other therapies (coagulation, clipping, etc.) in order to obtain better results (51-53). The fact that some sort of combined therapy was used must be recorded in the medical file. A meta-analysis of multiple trials (54) demonstrated that endoscopic treatment for these lesions dramatically reduced bleeding risk and need for surgery subsequently.

Reference, goal, or standard: 100%.

Prognosis in a patient with active bleeding partly depends upon the success of the initial intervention (8,45). Patients

C-21. Primary endoscopic hemostasis

Definition and formula
Percentage of cases where primary hemostasis is attempted after finding active bleeding Numerator: 100 · cases where attemps at primary endoscopic hemostasis and outcomes have been recorded Denominator: total cases with active bleeding
Type, temporal relationship, quality dimension
Outcome - Effectiveness
Evidence
Low

where hemostasis fails are more apt to require interventional radiology or surgery later, and also have higher mortality rates (55,56).

No standards are currently endorsed on the proportion of attempts required to provide hemostasis in clinical practice. However, recording and monitoring this rate, and its comparison to reference data, may be useful to improve digestive bleeding management with endoscopy. This indicator is proposed to guarantee that this data be available.

In esophageal varices, given their good response to treatment, initial management with band ligation is key, leaving sclerosis as second option in case of band ligation failure (11).

Its reference, goal, or standard should be 100%.

D-04. Recommendations following dilation for esophageal peptic stricture

Definition and formula
Percentage of cases where proton pump inhibitors (PPIs) are indicated following dilation for a benign esophageal stricture Numerator: 100 · cases where PPI indication is recorded Denominator: total cases with dilation for esophageal peptic stricture
Type, temporal relationship, quality dimension
Outcome - Effectiveness
Evidence
High

When used in patients having suffered from peptic stricture, PPIs reduce the need for future dilations (8,24,57,58).

Its reference, goal or standard should be 100%.

Antisecretory therapy is indicated for patients with newly identified gastric or duodenal ulcer (59,60).

H. pylori is a common cause of gastric and duodenal ulcer. Its eradication dramatically reduces ulcer recurrence.

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D-05. Recommendations following ulcer identification

Definition and formula
Percentage of cases where proton pump inhibitors (PPIs) or H2 antihistamines are indicated and *Helicobacter* testing is indicated if previously not performed, when gastric or duodenal ulcers are found Numerator: 100 · cases where prior PPI indication and Helicobacter testing indication was recorded, or the indication is established and testing performed after the procedure Denominator: total cases where a gastric or duodenal ulcer was found
Type, temporal relationship, quality dimension
Outcome - Effectiveness
Evidence
High

The ASGE (8) recommends that all patients with gastric or duodenal ulcers identified during endoscopy should undergo *Helicobacter* testing (24,61,62).

Its reference, goal, or standard should be 100%.

CONCLUSIONS

In this article, we recommend a number of indicators to be included in quality improvement programs for gastroscopy. It is important that we focus only on some key indicators. Various scientific societies agree on the importance of routinely measuring some indicators. However, if an endoscopy unit performs above standard during continuous monitoring of a given indicator, and sustains this long-term, such monitoring will be an unnecessary task failing to identify any opportunities for improvement. As this flexibility is advisable for each unit, and indicator monitoring should be adapted in each one to their improvement needs. For other quality-related tasks, as in implementing an improvement cycle or redesigning a care activity, quality assessment using the highest possible number of indicators is to be preferred.

Another aspect worth considering is reliability when measuring indicators. This aspect is particularly important in selected situations, including those involving performance comparisons between endoscopy units, or when different evaluators participate in a continuous quality improvement program.

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