American Journal of Gastroenterology
ISSN 0002-9270

doi: 10.1111/j.1572-0241.2006.00676.x
Published by Blackwell Publishing

# Quality Indicators for Esophagogastroduodenoscopy

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(Am J Gastroenterol 2006;101:886–891)

Esophagogastroduodenoscopy (EGD) is one of the most commonly performed endoscopic procedures. Properly performed, it provides valuable information in patients with upper gastrointestinal (GI) conditions. Additionally, therapeutic EGD forms the mainstay of treatment for upper GI bleeding and for dilation or stenting of benign and malignant strictures. In this article, the task force has identified a set of quality indicators that are particular to diagnostic EGD and to therapeutic maneuvers that may be carried out during this procedure. The levels of evidence supporting these quality indicators were graded according to Table 1.

## PREPROCEDURE QUALITY INDICATORS

The preprocedure period includes all contacts between the endoscopist, the endoscopy nurse, and the unit staff with the patient before administration of sedation or insertion of the endoscope. Common issues for all endoscopic procedures during this period include proper indication, patient consent for the procedure, patient clinical status and risk assessment, steps to reduce risk such as through the use of prophylactic antibiotics, management of anticoagulants, and timeliness in the performance of the procedure.

Preprocedure indicators and discussion specific to the performance of EGD include the following:

1. Accepted indication(s) are provided before performance of EGD.

**Discussion.** The indications for EGD are covered in detail in a separate publication (Table 2) (1). It has been demonstrated that there is a statistically higher rate of significant pathologic findings when GI endoscopy is performed for indications listed in the American Society for Gastrointestinal Endoscopy (ASGE) guidelines for GI endoscopy (2, 3).

2. Informed consent is obtained, including specific discussions of risks associated with EGD.

**Discussion.** As with all other endoscopic procedures, consent must be obtained before the procedure from the patient or guardian on the same day (or as required by local law or per policy of the institution) as the procedure. Consent may be obtained in the procedure room. It must include a discussion of the risks, benefits, and alternatives to the procedure. The risks of endoscopy include bleeding, perforation, infection, sedation adverse events, missed diagnosis, missed lesions, and intravenous site complications. In upper endoscopy, specific risks include chest pains, sore throat, aspiration, and reaction to local anesthetic spray (4).

3. Prophylactic antibiotics are given to patients with cirrhosis with acute upper GI bleeding who undergo EGD.

**Discussion.** Outcomes studies have shown both a decreased infection rate and a decreased mortality rate when prophylactic antibiotics are given to cirrhotic patients with GI bleeding (5).

4. Prophylactic antibiotics are given before placement of a percutaneous endoscopically placed gastrostomy (PEG).

**Discussion.** Several well-designed randomized controlled trials have demonstrated decreased local skin infections when appropriate prophylactic antibiotics are administered (e.g., first-generation cephalosporin). For this reason, antibiotics are recommended before PEG placement (5).

### Research Questions

- What proportion of EGD procedures are performed for indications apart from those specified in published guidelines?
- Do existing guidelines concerning indications for EGD represent best clinical practice?
- What proportion of patients with cirrhosis undergoing EGD for upper GI bleeding receives indicated antibiotics?

## INTRAPROCEDURE QUALITY INDICATORS

The intraprocedure interval begins with the administration of sedation and ends with removal of the endoscope. This period includes all the technical aspects of the procedure, including completion of the examination and of any therapeutic maneuvers. Minimum performance elements that are generic to all GI procedures performed with the patient sedated include

**Table 1.** Grades of Recommendation*

| Grade of Recommendation | Clarity of Benefit | Methodologic Strength/Supporting Evidence | Implications |
|---|---|---|---|
| 1A | Clear | Randomized trials without important limitations | Strong recommendation; can be applied to most clinical settings |
| 1B | Clear | Randomized trials with important limitations (inconsistent results, nonfatal methodologic flaws) | Strong recommendation; likely to apply to most practice settings |
| 1C+ | Clear | Overwhelming evidence from observational studies | Strong recommendation; can apply to most practice settings in most situations |
| 1C | Clear | Observational studies | Intermediate-strength recommendation; may change when stronger evidence is available |
| 2A | Unclear | Randomized trials without important limitations | Intermediate-strength recommendation; best action may differ depending on circumstances or patients' or societal values |
| 2B | Unclear | Randomized trials with important limitations (inconsistent results, nonfatal methodologic flaws) | Weak recommendation; alternative approaches may be better under some circumstances |
| 2C | Unclear | Observational studies | Very weak recommendation; alternative approaches likely to be better under some circumstances |
| 3 | Unclear | Expert opinion only | Weak recommendation; likely to change as data become available |

*Adapted from Guyatt G, Sinclair J, Cook D, Jaeschke R, Schunemann H, Pauker S. Moving from evidence to action: grading recommendations—a qualitative approach. In: Guyatt G, Rennie D, eds. Users' guides to the medical literature. Chicago: AMA Press; 2002. pp. 599-608.

attention to patient monitoring, medication administration, reversal or resuscitative efforts, and photo documentation of pertinent landmarks or pathologic conditions. Both procedures and disease-specific quality indicators can be proposed for EGD practice, as follows:

5. Complete examination of the esophagus, stomach and duodenum, including retroflexion in the stomach.

**Discussion.** Except in cases of esophageal or gastric outlet obstruction, every EGD should include a complete visualization of all the organs of interest from the upper esophageal sphincter to the second portion of the duodenum. This may entail efforts to clear material from the fundus, as in assessment for the source of upper GI hemorrhage. Written documentation should confirm the extent of the examination. If an abnormality is encountered, photo documentation is necessary. In studies of the learning curve of EGD, more than 90% of trainees successfully perform technically complete EGD after 100 cases (6). It is reasonable to expect that any practicing endoscopist be capable of visualizing the organs of interest with rare exception. This should include retroflexion in the stomach in all cases.

6. Biopsy specimens are taken of gastric ulcers.

**Discussion.** Careful attention to the presence of mucosal abnormalities during EGD is crucial. Adequate and appropriate samples demonstrate an understanding of the importance of a complete and thorough examination. Biopsy specimens from gastric ulcers are required to assess for the possibility of malignancy. The optimal number and type (maximum capacity vs standard) has not been determined. In the setting of acute GI bleeding, it is acceptable not to perform biopsy of the ulcer provided that a subsequent repeat endoscopy is planned.

7. Barrett's esophagus is measured when present; with the location of the gastroesophageal junction and squamocolumnar junction in centimeters from the incisors being documented.

**Discussion.** Barrett's esophagus may be present in up to 5% of high-risk patients with gastroesophageal reflux disease (e.g., older white men) undergoing upper endoscopy. The risk of progression to dysplasia or cancer may be related to the length of Barrett's epithelium (7). Therefore, it is important to characterize and document the length and location of the salmon-colored mucosa during EGD. On the other hand, intestinal metaplasia of the Z line may occur in up to 18% of individuals without sufficient evidence that this significantly increases the risk of cancer to warrant surveillance programs when this is diagnosed. Accordingly, it is important that, when the presence of Barrett's tissue is suspected, these landmarks are clearly documented (8).

8. Biopsy specimens are obtained in all cases of suspected Barrett's esophagus.

**Discussion.** The diagnosis of Barrett's esophagus requires demonstration of specialized intestinal metaplasia (SIM) on a biopsy specimen. Only those with SIM are at increased risk for development of adenocarcinoma and are candidates for surveillance protocols. Although the endoscopic appearance may suggest Barrett's esophagus, a definitive diagnosis cannot be made without pathologic confirmation. For patients with known Barrett's esophagus undergoing EGD, an adequate number of biopsy specimens should be obtained to exclude dysplasia (9).

9. Type of upper GI bleeding lesion is described and location is documented.

**Table 2.** Indications and Contraindications for EGD

| | |
|---|---|
| EGD is generally indicated for evaluating | A. Upper abdominal symptoms that persist despite an appropriate trial of therapy |
| | B. Upper abdominal symptoms associated with other symptoms or signs suggesting serious organic disease (e.g., anorexia and weight loss) or in patients >45 years old |
| | C. Dysphagia or odynophagia |
| | D. Esophageal reflux symptoms that are persistent or recurrent despite appropriate therapy |
| | E. Persistent vomiting of unknown cause |
| | F. Other diseases in which the presence of upper GI pathologic conditions might modify other planned management (examples include patients who have a history of ulcer or GI bleeding who are scheduled for organ transplantation, long-term anticoagulation, or long-term nonsteroidal anti-inflammatory drug therapy for arthritis, and those with cancer of the head and neck) |
| | G. Familial adenomatous polyposis syndromes |
| | H. For confirmation and specific histologic diagnosis of radiologically demonstrated lesions |
| | 1. Suspected neoplastic lesion |
| | 2. Gastric or esophageal ulcer |
| | 3. Upper tract stricture or obstruction |
| | I. GI bleeding |
| | 1. In patients with active or recent bleeding |
| | 2. For presumed chronic blood loss and for iron deficiency anemia when the clinical situation suggests an upper GI source or when colonoscopy results are negative |
| | J. When sampling of tissue or fluid is indicated |
| | K. In patients with suspected portal hypertension to document or treat esophageal varices |
| | L. To assess acute injury after caustic ingestion |
| | M. Treatment of bleeding lesions such as ulcers, tumors, vascular abnormalities (e.g., electrocoagulation, heater probe, laser photocoagulation, or injection therapy) |
| | N. Banding or sclerotherapy of varices |
| | O. Removal of foreign bodies |
| | P. Removal of selected polypoid lesions |
| | Q. Placement of feeding or drainage tubes (peroral, percutaneous endoscopic gastrostomy, percutaneous endoscopic jejunostomy) |
| | R. Dilation of stenotic lesions (e.g., with transendoscopic balloon dilators or dilation systems using guidewires) |
| | S. Management of achalasia (e.g., botulinum toxin, balloon dilation) |
| | T. Palliative treatment of stenosing neoplasms (e.g., laser, multipolar electrocoagulation, stent placement) |
| EGD is generally not indicated for evaluating | A. Symptoms that are considered functional in origin (there are exceptions in which an endoscopic examination may be done once to rule out organic disease, especially if symptoms are unresponsive to therapy) |
| | B. Metastatic adenocarcinoma of unknown primary site when the results will not alter management |
| | C. Radiographic findings of |
| | 1. Asymptomatic or uncomplicated sliding hiatal hernia |
| | 2. Uncomplicated duodenal ulcer that has responded to therapy |
| | 3. Deformed duodenal bulb when symptoms are absent or respond adequately to ulcer therapy |
| Sequential or periodic EGD may be indicated | A. Surveillance for malignancy in patients with premalignant conditions (ie, Barrett's esophagus) |
| Sequential or periodic EGD is generally not indicated for | A. Surveillance for malignancy in patients with gastric atrophy, pernicious anemia, or prior gastric operations for benign disease |
| | B. Surveillance of healed benign disease such as esophagitis or gastric or duodenal ulcer |
| | C. Surveillance during repeated dilations of benign strictures unless there is a change in status |

**Discussion.** For peptic ulcers, at least one of the following stigmata is noted: active bleeding, nonbleeding visible vessels (pigmented protuberance), adherent clot, flat spot, clean based.

10. Unless contraindicated, endoscopic treatment is given to ulcers with active bleeding or with nonbleeding visible vessels.

**Discussion.** A basic characteristic of a quality endoscopy is the completion of therapeutic procedures. It is impossible to define prospectively all potential therapeutic maneuvers in upper endoscopy for the purpose of quality monitoring. Nonetheless, given the clinical importance of the management of GI bleeding, monitoring these issues ought to be representative of the mastery of endoscopic therapy and overall clinical care. In general, practitioners performing EGD to diagnose the source of upper GI bleeding should be trained, equipped, and prepared to therapeutically manage the bleeding source when it is found.

The first function of the therapeutic endoscopist is to find and define the location of the bleeding site. The site's description should be detailed enough to allow a subsequent

endoscopist to find the site. A detailed description of the lesion is also necessary, including documentation of stigmata associated with different risks of rebleeding (10–13).

This requires knowledge of not only the stigmata but also of their different rates of rebleeding in various clinical scenarios. The cause for failure to identify the bleeding site should be clearly stated, if this occurs.

11. In cases of attempted hemostasis of upper GI bleeding lesions, whether hemostasis has been achieved is clearly documented.

**Discussion.** In many prospective series evaluating various modalities for managing actively bleeding upper GI bleeding lesions, immediate hemostasis rates from 90% to 100% have been achieved (14). To gauge and track successful hemostasis, it will be necessary for endoscopists to clearly record whether their efforts to stop actively bleeding lesions are successful.

12. When epinephrine injection is used to treat nonvariceal upper GI bleeding or nonbleeding visible vessels, a second treatment modality is used (e.g., coagulation or clipping).

**Discussion.** Multiple treatment modalities may be used in the treatment of nonvariceal GI bleeding. Current practices include the use of injection in conjunction with multipolar coagulation, heater probe thermal coagulation, endoscopic clipping, argon plasma coagulator, or various laser therapies in the exceptional case. The success or failure of such treatments should be photo documented when practical or clearly described. Epinephrine injection alone should not be considered adequate because studies have documented the superiority of combined modality therapy over epinephrine alone (15). In general, immediate hemostasis should be achieved in more than 90% of cases (16).

Treating these lesions has been shown to significantly reduce rebleeding rates and should therefore be attempted in most instances. There are good supportive data for the endoscopic removal of adherent clots and subsequent treatment of underlying stigmata (17–20) However, because this is not yet standard practice, it would be premature at this time to include attempts to remove and treat clots in this quality measure.

13. For the endoscopic treatment of esophageal varices, variceal ligation is used as the preferred modality in the majority of cases.

**Discussion.** In bleeding from esophageal varices, banding is preferred over sclerotherapy for safety and efficacy (21, 22) Medical treatment with octreotide or ($\beta$-blockers should be considered (23, 24) After the initial treatment, follow-up plans should include a short interval, repeat endoscopy and repeated treatment until varices are eradicated. Postprocedure plans should also include some recommendation concerning the use of ($\beta$-blockers for prevention of recurrent bleeding or a statement about why they are contraindicated (25).

### Research Questions

- Do endoscopists in all specialties who perform EGD document a complete examination of all organs with retroflexion in the stomach with similar frequency?
- What is the frequency of Barrett's diagnosis on EGD performed by different groups of providers?
- What is the mean number of biopsy specimens taken in clinical practice to investigate for celiac disease? For *Helicobacter pylori*? For Barrett's esophagus? And for exclusion of malignancy in gastric ulcers?
- How often do endoscopists perform hemostasis procedures and does case volume affect immediate hemostasis or delayed rebleeding rates?

## POSTPROCEDURE QUALITY INDICATORS

Minimum postprocedure performance elements common to all procedures include completion of a procedure report, provision of patient instructions, plans for pathology follow-up, determination of patient satisfaction, and communication to other care providers. Postprocedure quality indicators specific to performance of EGD include the following:

14. Written instructions provided to the patient on discharge include particular signs and symptoms relevant to EGD.

**Discussion.** In upper endoscopy, patients should be informed to contact the physician if abdominal or chest pain, fever, chills, abdominal distention, or signs of gastrointestinal bleeding such as vomiting blood or passage of black, tarry, or bloody stools develops. Patients should also be notified about how they will be informed of any biopsy results.

15. In patients undergoing dilation for peptic esophageal strictures, proton pump inhibitor (PPI) therapy is recommended.
16. Patients diagnosed with gastric or duodenal ulcers are instructed to take PPI medication or an $H_2$ antagonist.

**Discussion.** PPIs, when used in patients who have had peptic strictures, reduce the need for future dilations (26, 27). Patients diagnosed with gastric or duodenal ulcers are instructed to take PPI medication or an $H_2$ antagonist.

17. Patients diagnosed with gastric or duodenal ulcers have documented plans to test for the presence of *H pylori* infection.

**Discussion.** *H pylori* is a common cause of gastric and duodenal ulcer disease. Successful eradication of this organism results in dramatically reduced rates of ulcer recurrence (28). Patients will only benefit from this therapy if a diagnosis of *H pylori* infection is made. Although nonsteroidal anti-inflammatory drugs (NSAIDs) may also cause ulcerations, it is not possible on the basis of clinical and endoscopic criteria alone to distinguish NSAID- from *H pylori*–caused ulcers (29). Therefore, all patients with gastric or duodenal ulcers should be assessed for this infection. Testing may include gastric biopsy for rapid urease testing or histologic examination, culture, urea breath test, or stool testing.

**Table 3.** Summary of Proposed Quality Indicators for EGD*

| Quality Indicator | Grade of Recommendation |
|---|---|
| 1. Accepted indication(s) is provided before performance of EGD. | 1C + |
| 2. Informed consent is obtained, including specific discussion of risks associated with EGD. | 3 |
| 3. Prophylactic antibiotics are given in patients with cirrhosis with acute upper GI bleeding who undergo EGD. | 1A |
| 4. Prophylactic antibiotics are given before placement of a PEG. | 1A |
| 5. Complete examination of the esophagus stomach and duodenum, including retroflexion in the stomach. | 2C |
| 6. Biopsy specimens are taken of gastric ulcers. | 1C |
| 7. Barrett's esophagus is measured when present, with the location of the gastroesophageal junction and squamocolumnar junction in centimeters from the incisors being documented. | 3 |
| 8. Biopsy specimens are obtained in all cases of suspected Barrett's esophagus. | 3 |
| 9. Type of upper GI bleeding lesion is described and location is documented. For peptic ulcers, at least one of the following stigmata is noted: active bleeding, nonbleeding, nonbleeding visible vessels (pigmented protuberance), adherent clot, flat spot, cleaned based. | 3 |
| 10. Unless contraindicated, endoscopic treatment is given to ulcers with active bleeding or with nonbleeding visible vessels. | 1A |
| 11. In cases of attempted hemostasis of upper GI bleeding lesions, whether hemostasis has been achieved is clearly documented. | 3 |
| 12. When epinephrine injection is used to treat nonvariceal upper GI bleeding or nonbleeding visible vessels, a second treatment modality is used (e.g., coagulation or clipping). | 1A |
| 13. Variceal ligation is used for endoscopic treatment of esophageal varices. | 1A |
| 14. Written instructions, which include particular signs and symptoms to watch for after EGD, are provided to the patient on discharge. | 3 |
| 15. In patients undergoing dilation for peptic esophageal strictures, PPI therapy is recommended. | 1A |
| 16. Patients diagnosed with gastric or duodenal ulcers are instructed to take PPI medication or an $H_2$ antagonist. | 1A |
| 17. Patients diagnosed with gastric or duodenal ulcers have documented plans to test for the presence of *H pylori* infection. | 1A |
| 18. Rebleeding rates after endoscopic hemostasis are measured. | 1C+ |

*This list of potential quality indicators was meant to be a comprehensive listing of measurable end points. It is not the intention of the task force that all end points be measured in every practice setting. In most cases, validation may be required before a given end point may be universally adopted.

18. Efforts to track rebleeding rates after hemostasis are included in endoscopy unit protocol for the reporting of adverse events.

**Discussion.** Beyond the usual tracking of postprocedure data recommended for all endoscopic procedures, it is particularly important to ascertain the rates of re-bleeding when the quality of endoscopy performed to diagnose and treat upper GI hemorrhage is assessed.

## Research Questions

- How often do patient instructions specify symptoms after an EGD that should prompt an immediate call to the physician for evaluation?
- What are the observed clinically important aspiration rates after EGD in practice?
- Do instructions to follow up with the endoscopist lead to differences in outcome (recurrent bleeding, *H pylori* eradication rates, Barrett's surveillance intervals) compared with instructions for follow-up of results with the referring physician alone?

## CONCLUSION

To define what constitutes a high-quality EGD, this article first identified the key components of the examination, including preprocedural, intraprocedural, and postprocedure metrics (Table 3). Those quality indicators important for EGD but applicable to all endoscopic procedures appear in an accompanying article (30). The task force has attempted to create a comprehensive list of potential quality indicators. We recognize that not every indicator will be applicable to every practice setting. Facilities should select the subset most appropriate to their individual needs.

More prospective performance data will be required to validate the indicators outlined in this article. Further, we have identified a few specific areas for future investigation to ensure that adherence to these benchmarks leads to safe, effective, and well-indicated procedures with high patient satisfaction. We hope that, by establishing these guidelines and by urging practitioners to track their performance with these measures, this effort will promote excellence among endoscopists and enable them to provide the highest possible quality of patient care.

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