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A comparison of the endoscopic and laparoscopic view of the gastroesophageal junction in the use of transoral fundoplication



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Abstract

BACKGROUND: Endoscopic fundoplication requires accurate evaluation of the gastroesophageal junction (GJ) to determine if hiatal hernia repair is necessary before fundoplication. We compared the endoscopic and laparoscopic evaluations of the GJ.

METHODS: A total of 53 patients with gastroesophageal reflux disease underwent a laparoscopic repair of a hiatal defect before endoscopic fundoplication. The video of the preoperative endoscopic evaluation was compared with the laparoscopic video (n = 44). Nine patients were excluded because both endoscopic and laparoscopic videos were not available. A 2-tailed paired *t* test was used to assess the difference between the 2 study groups.

RESULTS: The greatest transverse dimension of the hiatus assessed endoscopically was 3.30 cm ± 1.00 vs 3.88 cm ± 1.03 assessed laparoscopically, *P* < .001. In 22.8%, the average endoscopic Hill grade was lower than the estimated Hill grade when viewed laparoscopically. In 11.1% (range, 6% to 15%) of cases, the endoscopic view indicated a hiatal hernia repair was unnecessary when the matching laparoscopic view indicated hiatal repair would be needed.

CONCLUSIONS: Endoscopic evaluation of the GJ may underestimate the radial size of the hiatal defect.

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Endoscopic reflux procedures have undergone multiple studies in the setting of a normal or minimally dilated esophageal hiatus. Using the Hill criteria to guide its application, most practitioners will limit the application of endoscopic fundoplication alone to Hill I or Hill II gastroesophageal junctions (GJs).¹⁻⁴ Hill III GJs may require laparoscopic hiatal hernia repair before endoscopic reflux treatments, as study has shown that these patients can

have a higher early failure of symptom control.² We have previously shown that consistency among different providers in reliably evaluating the GJ using Hill criteria has been poor.⁵ In addition, the setting in which an evaluation is performed can influence the grading of the GJ.⁶ This study further evaluates the use of endoscopy in assessing hiatal defects in patients undergoing laparoscopic hiatal repair before endoscopic fundoplication.

Methods

Patients

A total of 53 patients were studied prospectively after approval by the institutional review board. These patients initially underwent evaluation for gastroesophageal reflux disease and were found to be appropriate candidates for surgical antireflux therapy. At the time of laparoscopy, the GJ was evaluated before dissection.

All patients underwent evaluation and treatment by a single investigator (Glenn Ihde [GI]) with 14 years of experience in the evaluation and treatment of gastroesophageal reflux. Patients found to be candidates for surgical therapy of their gastroesophageal reflux disease underwent laparoscopic hiatal hernia repair and transoral fundoplication. Adult patients (>18 years) with proven gastroesophageal reflux disease of greater than 1 year duration, history of proton pump inhibitor use greater than 6 months, moderate-to-severe typical or atypical gastroesophageal reflux symptoms off proton pump inhibitors were included. Patients were only included if they received surgical treatment for their gastroesophageal reflux disease. These patients were asked to consent to both still and video documentation of their endoscopic and laparoscopic interventions and review of their medical and surgical evaluation and treatment of gastroesophageal disease. Exclusion criteria include inability to record video due to technical considerations of both preoperative and presurgical endoscopy, prior gastric or esophageal surgery, Los Angeles class D esophagitis on their presurgical endoscopy, a body mass index greater than 35 kg/m², portal hypertension or esophageal varices, esophageal ulcer, fixed esophageal stricture or narrowing, intestinal metaplasia of the esophagus greater than 2 cm, gastroparesis confirmed by solid-phase gastric emptying study, active gastroduodenal ulcer disease, gastric outlet obstruction or stenosis, any coagulation disorder, esophageal motility disorder, pregnancy or plans for pregnancy in the next 12 months, or enrollment in another study.

Preoperative assessment

Patients were evaluated for gastroesophageal reflux disease by obtaining an extensive medical history, physical evaluation, and use of medications to treat their reflux symptoms. Patients were also evaluated as indicated with

endoscopy with biopsy, barium swallow, manometry, solid-phase gastric emptying study, laboratory studies, and cholescintigraphy. All patients clinically determined to have gastroesophageal reflux underwent esophagogastroduodenoscopy with biopsy, to evaluate their anatomy and the presence of any other pathology. Hiatal hernia was evaluated by mucosal junction (Z line) position, measurement of length from incisors to diaphragmatic impression, the axial displacement of the Z-line position, an estimation of the greatest transverse diameter of the hiatal opening, and a Hill criteria assignment. Video recordings were made of their preoperative evaluation endoscopy performed under intravenous sedation and then at the time of laparoscopy.

Endoscopy

Endoscopy was performed by a single provider (GI) using standard video endoscopy equipment with recording of each procedure. The patient's upper gastrointestinal tract was inflated with air while the endoscope was advanced through the esophagus, body, antrum, and into the duodenum to allow initial distension of the gastric pouch. The endoscope was withdrawn to perform antral biopsies as indicated, and then, a retroflex view was used to evaluate the body, fundus, and cardia of the stomach. In the retroflex view, insufflation was continued until gastric rugal folds were flattened and then continued another 60 seconds to fully distend the cardia into any hiatal defect. The endoscope was then withdrawn to evaluate the position of the gastroesophageal mucosal junction in relation to the diaphragmatic impression and measure the distance from the gastroesophageal mucosal junction to the incisors. Biopsies were taken of the distal esophagus as indicated.

Intraoperative assessment

All patients in the study underwent laparoscopic hiatal hernia repair by a single provider (GI). After induction of general endotracheal anesthesia, including paralytic, a 5-mm trocar was entered into the right subxiphoid position. An 11-mm trocar was placed in the left subxiphoid position. A 5-mm port was placed in the lateral right and lateral left subcostal positions. The camera was moved to the left subcostal incision, and a snake liver retractor was used to elevate the left lobe of the liver, exposing the GJ for evaluation. A video recording of the appearance of the GJ was obtained.

Video assessment

A group of 8 general surgeons, averaging 11 years in private practice, experienced in the treatment of reflux disease, and averaging 6 endoscopies per week were asked to review the videos. All the evaluators use Hill grading in their practice. Videos were edited down to representative 30 seconds or less segments. Computer randomized

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