The concordance of endoscopic and histologic findings of 1000 pediatric EGDs

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Background: Pediatric gastroenterologists frequently perform routine endoscopic biopsies despite normal-appearing mucosa during EGD. Older small studies have supported this practice.

Objective: To re-evaluate the concordance between endoscopic appearance and histology in the era of high-definition endoscopy.

Design: Retrospective cohort study.

Setting: Single tertiary care center.

Patients: A total of 1000 pediatric patients undergoing initial EGD.

Main Outcome Measurements: Endoscopic and histologic findings.

Results: The overall rate of an endoscopic finding was 34.7%, which was 40.4% of a histologic finding. Concordance between the presence of any endoscopic finding and any histologic finding in all locations was 69.9% (Cohen's κ coefficient = 0.32). In the esophagus, the concordance between any endoscopic finding and any histologic finding was 82.6% (κ = 0.45). The stomach was 73.2% concordant (κ = 0.18), and the duodenum was 89.3% concordant (κ = 0.42). The κ coefficient decreased when comparing specific findings in each location; it was 0.34 in the esophagus, 0.17 in the stomach, and 0.34 in the duodenum. If biopsy specimens had only been obtained when the endoscopist identified abnormal mucosa, 48.5% of the pathologic findings would have been missed. In patients with histology consistent with eosinophilic esophagitis, 30.2% had normal-appearing mucosa. For celiac disease, 43% had normal-appearing mucosa. In the stomach, an abnormal endoscopic appearance was more likely to have normal histology.

Limitations: The single-center, retrospective nature and more endoscopists than pathologists.

Conclusions: These data support the routine collection of biopsy specimens in the duodenum, stomach, and esophagus during EGD in pediatric patients. (Gastrointest Endosc 2015;81:1385-91.)

The concordance between endoscopic findings and histologic findings during EGD is important in the practice of pediatric gastroenterology. Immediately after the endoscopy, the endoscopist reviews the findings of the endoscopy with the family. Being able to give them accurate information is crucial. Families can become confused when they are told that the endoscopic appearance was abnormal, but then the biopsy specimens were normal. An accurate prediction of the likelihood of a histologic finding in the setting of a visually normal endoscopy can help prepare families for unanticipated results. Second, physicians can be tempted to change clinical management

Abbreviations: EoE, eosinophilic esophagitis; NPV, negative predictive value; PPV, positive predictive value.

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based on the endoscopic appearance, such as starting a proton pump inhibitor when the stomach appears to have gastritis. Physicians would be more likely to avoid this behavior if they knew that the endoscopic appearance of gastritis is not predictive of histologic gastritis. Additionally, pathologists usually review the endoscopic findings during the review of the histology. Knowing that there tends to be low concordance would be important for the interpretation of the histology. Finally, depending on the pattern of results, low concordance would also justify routine biopsies in the context of a normal endoscopic appearance despite the increased cost and potentially increased procedural risk.

BACKGROUND

During EGD, adult gastroenterologists tend to perform biopsy only when they notice an endoscopic abnormality, whereas pediatric gastroenterologists frequently perform biopsy, even in the setting of a normal endoscopic appearance. Some adult studies have supported routine biopsies because of low correlation between endoscopic and histologic findings. Carr et al[1] found concordance in endoscopic and histologic diagnoses of gastritis in 66% of 400 cases and argued that accurate diagnosis of gastritis necessitates biopsies. Other adult studies argued for routine duodenal biopsies.[2,3]

Previous studies in children have encouraged routine endoscopic biopsies.[4-6] The few available pediatric studies have found low rates of concordance between endoscopic and histologic findings for EGDs. Dahshan and Rabah[5] reviewed 204 esophageal biopsy specimens and 59 gastric biopsy specimens and found overall agreement with histology to be 63.8% with low specificity and sensitivity of endoscopy. In another study of 94 patients, the endoscopic sensitivity and specificity were 82% and 27%, respectively, in the duodenum and 57% and 47%, respectively, in the gastric body.[7] In an Italian study, endoscopy often underestimated the severity of histologic findings.[8] Oderda et al[9] found a concordance of only 13.8% when comparing 32 biopsies with duodenal damage with their endoscopic findings. Other studies have begun to compare specific endoscopic findings with histologic findings, which also have poor concordance. In a study that evaluated the association between gastric nodularity and *Helicobacter pylori*, it found that gastric nodularity had a sensitivity of 61% for *H pylori*, arguing for routine biopsies.[10]

Because of the small numbers of patients in these studies and their lack of temporal proximity, a current review of the practice of routine endoscopic biopsies is warranted. The availability of higher-definition endoscopes in the past several years may affect the concordance between endoscopic and histologic findings in children. This study was designed to evaluate the concordance of endoscopic findings with EGD compared with histologic findings among a large cohort of patients in the pediatric setting. We hypothesized that despite advancements in endoscopic technology, concordance between endoscopic and histologic findings would remain low.

METHODS

This retrospective cohort study was performed at Children's Hospital Colorado, a large tertiary freestanding hospital, and was approved by the Colorado Multiple Institutional Review Board (protocol number 10-1247, approved November 17, 2010). By reviewing 1642 sequential EGDs between January 2009 and March 2010, we identified 1000 eligible patients undergoing initial diagnostic endoscopy. For the endoscopy to be considered an initial diagnostic endoscopy, patients could not have undergone EGD with biopsy within the previous 5 years. They also had to have had at least 1 biopsy specimen taken from any location in the upper GI tract. Exclusion criteria included patient age of younger than 1 month or older than 18 years and whether or not the EGD was performed to follow a known GI condition. This excluded 9 additional cases with Peutz-Jeghers syndrome, tracheoesophageal fistula, or inflammatory bowel disease.

A single researcher (M.S.) performed all data collection. The cases were initially identified by review of the records of EGDs performed within the time period. The cases were then found in the electronic medical record, and inclusion and exclusion criteria were reviewed for each patient. The electronic medical record was fully implemented in 2004, which allowed us to track previous EGDs. Clinic notes were also reviewed for a history of EGD, and then patient age, sex, physician referring the patient for endoscopy, the top 3 indications for endoscopy, the endoscopist, endoscopic findings, pathologist, and histologic findings were recorded. Three pathologists made the initial histologic determination, and 10 endoscopists had performed the EGDs. The endoscopes that were available during that time period in the endoscopy suite included the Olympus GIF 160, Q180, N180, H180, Q160, XP180N, and XP160 (Olympus America, Center Valley, Pa). The particular endoscope that was used for each procedure was not recorded in this study. The XP endoscopes were used for patients weighing less than 10 kg. Endoscopies were performed with white light, and narrow-band imaging was used at the discretion of the endoscopist. In our practice, we rarely use narrow-band imaging. We did not use postendoscopy image enhancement technology. Our standard practice was to take 2 biopsy specimens from the duodenum, 2 specimens from the stomach (usually from the antrum and body), 2 specimens from the proximal esophagus, and 2 specimens from the distal esophagus. Endoscopists typically performed additional biopsies at the sites of