

Retrospective Study

Low yield of routine duodenal biopsies for evaluation of abdominal pain

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Abstract

AIM: To determine the yield of biopsying normal duodenal mucosa for investigation of abdominal pain.

METHODS: This is a retrospective chart review of consecutive patients who underwent esophagogastroduodenoscopy (EGD) with duodenal biopsies of normal appearing duodenal mucosa for an indication that included abdominal pain. All the patients in this study were identified from an electronic endoscopy database at a single academic medical center and had an EGD with duodenal biopsies performed over a 4-year period. New diagnoses that were made as a direct result of duodenal biopsies were identified. All duodenal pathology reports and endoscopy records were reviewed for indications to perform the examination as well as the findings; all the medical records were reviewed. Exclusion criteria included age less than 18 years, duodenal mass, nodule, or polyp, endoscopic duodenitis, duodenal scalloping, known celiac disease, positive celiac serology, Crohns disease, or history of bone marrow transplant. Information was collected in a de-identified database with pertinent demographic information including human immunodeficiency virus (HIV) status, and descriptive statistics were performed.

RESULTS: About 300 patients underwent EGD with biopsies of benign appearing or normal appearing duodenal mucosa. The mean age of patients was 44.1 ± 16.8 years; 189 of 300 (63%) were female. A mean of 4.3 duodenal biopsies were performed in each

patient. In the subgroup of patients with abdominal pain without anemia, diarrhea, or weight loss the mean age was 43.4 ± 16.3 years. Duodenal biopsies performed for an indication that included abdominal pain resulting in 4 new diagnoses (3 celiac disease and 1 giardiasis) for an overall yield of 1.3%. 183 patients with abdominal pain without anemia, diarrhea, or weight loss (out of the total 300 patients) underwent duodenal biopsy of duodenal mucosa resulting in three new diagnoses (two cases of celiac disease and one giardiasis) for a yield of 1.6%. Duodenal biopsies of 19 HIV patients presenting for evaluation of abdominal pain did not reveal any new diagnoses. Information pertaining to new diagnoses is provided.

CONCLUSION: Routine biopsy of normal appearing duodena in patients with abdominal pain should be reserved for those with a high pre-test probability given its low diagnostic yield.

Key words: Duodenum; Celiac disease; Esophagogastro-duodenoscopy; Abdominal pain; Anemia; Iron deficiency anemia; Diarrhea

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Core tip: Duodenal biopsy is commonly performed, yet the diagnostic yield of routine duodenal biopsy of normal appearing duodenal mucosa for the evaluation of abdominal pain is unclear. This retrospective chart review of 300 consecutive patients with duodenal biopsy of normal appearing mucosa performed for evaluation of abdominal pain found a diagnostic yield of 1.3%. There were 3 new diagnoses of celiac disease and one of giardiasis. Routine biopsy of normal appearing duodenal mucosa during esophagogastroduodenoscopy should be reserved for patients with a high pretest probability of duodenal pathology given a low diagnostic yield.

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INTRODUCTION

Duodenal biopsies are performed in approximately 10%-12% of all esophagogastroduodenoscopies (EGDs) which contribute significantly to added costs of endoscopy^[1]. EGD with duodenal biopsies of benign appearing mucosa is commonly performed in the evaluation of many gastrointestinal (GI) symptoms including abdominal pain, iron deficiency anemia, weight loss, or diarrhea^[2-5]. A review of a national endoscopy database containing 13091 patients found a duodenal biopsy rate of 43% on normal appearing

mucosa for indications of diarrhea, anemia, iron deficiency, or weight loss^[6]. Potential pathology which can exist despite a normal endoscopic appearance of duodenal includes celiac disease which has an estimated prevalence of 0.71%^[7], giardiasis with rates of 7.6 per 100000^[8] and eosinophilic gastroenteritis with a rate of 28 per 100000^[5]. However, the diagnostic yield and subsequent changes in management due to duodenal biopsy of normal appearing mucosa have not been well studied in adults. In the pediatric population, a 1.1% diagnostic yield for celiac disease has been reported for duodenal biopsy performed for investigation of abdominal pain but prior studies included both benign and abnormal appearing mucosa^[9]. Among adults with abdominal pain, random duodenal biopsy of benign, normal mucosa diagnosed celiac disease in 0%-1.6% of patients^[10,11]. A prior study has examined rates of abnormal duodenal biopsies from a large pathology database but clinical data including positive celiac serologies, previously diagnosed celiac or Crohn's disease, or history of bone marrow transplantation was lacking^[1]. In addition, the rate of biopsies that led to changes in clinical management could not be determined. The purpose of this study was to examine the yield of biopsying normal appearing duodenal mucosa for investigation of abdominal pain and other GI symptoms with particular attention to biopsy results that lead to a new diagnosis and therefore changes in clinical management.

MATERIALS AND METHODS

We conducted a retrospective review of clinical and endoscopic data obtained from electronic medical records and an electronic endoscopy database. Patients who underwent EGD with biopsies of benign or normal appearing duodenal mucosa for an indication that included abdominal pain were identified from an endoscopy database at a single academic medical center (University of California San Diego) over a four-year period between May 2009 to October 2013. Duodenal biopsies were performed with standard technique using 2.8 mm biopsy forceps generally from both the bulb and second portion of the duodenum. Histological assessment was performed by board certified pathologists at the University of California San Diego.

Exclusion criteria included age less than 18 years, duodenal mass, nodule, or polyp, endoscopic duodenitis, duodenal scalloping, known celiac disease, positive celiac serology, Crohn's disease, or history of bone marrow transplant. Retrospective chart review identified indications for duodenal biopsy and pathologic diagnosis as a result of duodenal biopsy results. Descriptive statistics were performed.

RESULTS

300 patients underwent EGD with biopsies of benign

Table 1 Diagnostic yield of biopsies of endoscopically normal duodenal mucosa

	<i>n</i>	New diagnosis	Diagnostic yield	Abnormal findings
Abdominal pain	183	3	1.6%	2 celiac disease 1 giardiasis
+ Weight Loss	27	1	3.7%	1 celiac disease
+ Diarrhea	2	0	0.0%	
+ IDA	2	0	0.0%	
+ Diarrhea	63	0	0.0%	
+ IDA	3	0	0.0%	
+ IDA	20	0	0.0%	
All patients	300	4	1.3%	3 celiac disease 1 giardiasis

IDA: Iron deficiency anemia.

appearing or normal appearing duodenal mucosa. The mean age of patients was 44.1 ± 16.8 years; 189 of 300 (63%) were female. A mean of 4.3 duodenal biopsies were performed in each patient. In the subgroup of patients with abdominal pain without anemia, diarrhea, or weight loss the mean age was 43.4 ± 16.3 years.

Duodenal biopsies performed for an indication that included abdominal pain resulting in 4 new diagnoses (3 celiac disease and 1 giardiasis) for an overall yield of 1.3% (Table 1). 183 patients with abdominal pain without anemia, diarrhea, or weight loss (out of the total 300 patients) underwent duodenal biopsy of duodenal mucosa resulting in three new diagnoses (two cases of celiac disease and one giardiasis) for a yield of 1.6%. Duodenal biopsies of 19 human immunodeficiency virus (HIV) patients presenting for evaluation of abdominal pain did not reveal any new diagnoses.

Information pertaining to new diagnoses is provided

Case 1: Forty-two-year-old male with abdominal pain and bloating and a sister with celiac disease. Intraepithelial lymphocytes without villous blunting seen and no celiac serologies were drawn. A diagnosis of possible celiac disease was made.

Case 2: Sixty-seven-year-old female with abdominal pain and weight loss. A Marsh-Oberhuber 3A lesion was noted. Celiac serologies were not drawn and the patient was lost to follow-up. A diagnosis of probable celiac disease was made.

Case 3: Forty-nine-year-old male with abdominal pain. A Marsh 3A lesion was noted. Celiac serologies showed a tissue-transglutaminase antibody IgA at the upper limit of normal. A diagnosis of probable celiac disease was made.

Case 4: Forty-three-year-old female with abdominal pain, nausea, and vomiting. A diagnosis of giardiasis was made.

DISCUSSION

Investigation of nonspecific gastrointestinal symptoms

including abdominal pain, weight loss, diarrhea, and anemia often includes an EGD. The addition of a biopsy to a frequently performed procedure contributes significant costs from pathology interpretation, processing, and the biopsy forceps. 10%-12% of all EGDs result in duodenal biopsies with rates of duodenal biopsy that are likely highly variable among different endoscopists, institutions, and settings (academic vs private practice). The high rates of duodenal biopsy are likely the result of uncertainty regarding the yield of duodenal biopsy for various indications, and also the difficulty in identifying the etiology of nonspecific symptoms attributed to the upper GI tract. Prior studies examining the utility of duodenal biopsy have focused on the yield of diagnosing celiac disease which is approximately 1%, which is similar to the prevalence of celiac disease in the general population. However, the yield of biopsying normal appearing duodenal biopsy in identifying a clinically significant diagnosis remains largely unclear.

The results of this study indicate that biopsies of normal appearing duodenal mucosa rarely led to a new GI diagnosis. Only 4 patients out of 300 (1.3%) had new diagnoses which included three new diagnoses of celiac disease and one diagnosis of giardiasis. Although the overall diagnostic yield for all biopsies of normal appearing duodenal mucosa was 1.3%, the diagnostic yields for individual indications of anemia, weight loss, and abdominal pain were even lower. There was one new diagnosis of celiac among the 27 patients with both abdominal pain and diarrhea (yield 3.7%).

Bone marrow transplant recipients were excluded from our initial analysis as they represent a distinct patient population at high risk for a specific complication - graft versus host disease. Duodenal biopsies of 19 HIV patients presenting for evaluation of abdominal pain, another immunosuppressed population, did not result in any changes in management or a new diagnosis and therefore do not necessitate special consideration for duodenal biopsy compared to the general population.

Recent American College of Gastroenterology (ACG) guidelines regarding diagnosis and management of celiac disease^[3] recommend only serological evaluation with TTG IgA for patients with low probability (< 5%)

of having celiac disease^[12,13]. Based on the current study, patients with anemia, weight loss, abdominal pain and diarrhea would all have less than a 5% probability of having celiac disease and therefore a duodenal biopsy of normal or benign duodenal mucosa is likely not indicated to evaluate for celiac disease. The preferred approach would be to check a TTG IgA prior to endoscopy for nonspecific GI symptoms which if negative would obviate the need for a duodenal biopsy^[14]. However, in patients felt to have a high probability of celiac disease (defined as > 5% by the ACG), duodenal biopsy is recommended based on guidelines^[15-22]. This group may include patients with type 1 diabetes mellitus, a first-degree family member with celiac disease in the presence of clinical symptoms, or a positive or equivocal celiac serology for confirmation^[23-30].

The limitations of this study include the retrospective nature of this study and that of a single center study at an academic medical center. The referral bias associated with an academic medical center may increase the likelihood of diagnosing rare entities such as giardiasis and celiac disease associated with negative serologies. Additionally, the study did not stratify patients based on the severity of clinical symptoms for which they were being evaluated. This study did not assess provider or patient reassurance from a negative biopsy and it did not assess if abdominal pain improved as a result of identifying duodenal pathology. An additional limitation of this study is lack of follow-up to see if abdominal pain or other symptoms resolved after the procedure (either in the cases of discovered pathology or in the cases in which reassurance may have been gleaned from finding no pathology). Therefore, the low yield of duodenal biopsies found in this study may be even lower in the community or private practice setting. However, the 1% diagnostic yield of duodenal biopsy for celiac disease is similar to prior studies.

Future studies to be considered include randomizing patients with various GI symptoms (including diarrhea, bloating, weight loss, anemia, abdominal pain) to a management strategy of pre-endoscopic celiac serology with or without duodenal biopsy at the time of endoscopy to determine if the absence of duodenal biopsy results in inferior outcomes. A cost-effectiveness analysis would also assist in decision making by endoscopists and delineation of the high yield indications for duodenal biopsy in future guidelines.

In summary, biopsies of normal appearing duodenal mucosa rarely leads to a new diagnosis (1.3% of cases). Given that duodenal biopsies are performed in 10%-12% of upper endoscopies^[1], this is an opportunity to significantly reduce the costs associated with endoscopy. Routine biopsy of normal appearing duodenal mucosa during EGD should be reserved with a high pretest probability for duodenal pathology given a very low diagnostic yield.

COMMENTS

Background

Duodenal biopsy is commonly performed, yet the diagnostic yield of routine duodenal biopsy of normal appearing duodenal mucosa for the evaluation of abdominal pain is unclear.

Research frontiers

The current research hotspot is to delineate the diagnostic yield of duodenal biopsy of normal appearing mucosa in the evaluation of abdominal pain.

Innovations and breakthroughs

Most articles that evaluate the diagnostic yield of duodenal biopsies do not focus on patients with normal appearing duodenal mucosa, nor do they distinguish between the diagnostic yield performed on normal appearing mucosa versus abnormal appearing mucosa. In this present study the diagnostic yield of duodenal biopsy performed on normal appearing mucosa for the evaluation of abdominal pain was performed on 300 consecutive patients and new diagnoses resulting from the biopsy are reported.

Applications

The results of this study support that duodenal biopsies performed on normal appearing mucosa in the evaluation of abdominal pain rarely lead to a new diagnosis or change in clinical management.

Terminology

Duodenal biopsies are biopsies of the proximal small intestine. The diagnosis of celiac disease is supported by specific duodenal biopsy results.

Peer-review

This information is helpful in showing that routine duodenal biopsies on normal looking duodenal mucosa without indications are of little diagnostic value.

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