

Histopathological spectrum of duodenal biopsies: Experience at a tertiary care hospital

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A B S T R A C T

Objective: Endoscopic duodenal biopsies constitute a significant load of specimens in the histopathological section of a tertiary care hospital. Most of these diseases comprise non-neoplastic lesions causing significant morbidity. The purpose of this study was to see the frequency of these diseases in our patient population and to compare and analyze our results with similar other studies.

Methods: In this retrospective study records of all duodenal biopsies reported from Feb 2017- Jan 2018 were retrieved. Both non neoplastic and neoplastic conditions along with biopsies with unremarkable findings were included. Various histological parameters like villous blunting, IEL count per 100 enterocytes, crypt hyperplasia, inflammation in lamina propria, and presence of microorganisms, any dysplasia or malignancy were studied. Data was statistically analyzed using SPSS v.23.

Results: A total of 159 duodenal biopsies were included in the study. Normal duodenal morphology was noted in 85 (53.45%) cases while 74 (46.83%) cases revealed abnormal duodenal pathology. There were 46 (28.93%) cases consistent with celiac disease. Twenty eight (17.61%) cases were of other duodenal pathologies of which non-specific duodenitis was most common. There were 22 (13.83%) cases of duodenitis and 2 (1.26%) cases were of duodenal ulcer. One case (0.62%) each was seen of Brunner gland hyperplasia, adenocarcinoma, signet ring carcinoma and one case was of metastatic adenocarcinoma.

Conclusion: In our study we found a significant percentage of 46.83% exhibiting abnormal duodenal pathology. Cases consistent with celiac disease were 28.93% while 13.83% of the cases had duodenitis. The percentage of malignant cases was minimal (1.88%).

Keywords: Duodenal biopsy, Celiac disease, duodenitis

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Introduction

Patients presenting with a wide range of symptoms like epigastric pain, dyspepsia, nausea, vomiting or chronic diarrhea are subject to esophagogastroduodenoscopy (EGD). This method enables the visualization of the internal surface of the endoscoped organ thus enabling pathological sampling from the lesion so that a definitive diagnosis can be made.¹

Some of the common inflammatory conditions affecting duodenal mucosa are celiac disease, refractory and tropical sprue, peptic duodenitis, inflammatory bowel disease and autoimmune enteropathy. These entities have overlapping features including symptomology, serology and histologic findings. The aim of the current retrospective study is to find the prevalence of various diseases of duodenum in our setup and to analyze and

compare the histopathological findings with studies done in other countries.

Microscopic findings like raised intraepithelial lymphocyte (IEL) count with normal villous architecture occur in 1-3% of duodenal biopsies and generate differential diagnosis of numerous duodenal pathologies.^{2,4} Celiac disease is a common cause of malabsorption syndrome. Marsh classification is commonly used to classify it into different stages of severity. Following is the Marsh classification of celiac disease presented in Table 1.^{1,5}

Table 1: Marsh classification of celiac disease

Marsh-Stage	IEL/100 enterocyte / duodenum*	Crypt hyperplasia	Villi
0	<30	Normal	Normal
1	>30	Normal	Normal
2	>30	Increased	Normal
3a	>30	Increased	Mild atrophy
3b	>30	Increased	Moderate atrophy
3c	>30	Increased	Complete atrophy

IEL/100 enterocytes*- Intraepithelial lymphocytes per 100 enterocytes (epithelial cells in duodenum).

The aim of this study is to document the spectrum of duodenal biopsies in our setup.

Material and Methods

In this retrospective study, the records of all duodenal biopsies reported from Feb 2017- Jan 2018 were retrieved. Approval from the internal review board & ethics committee was taken. Both non neoplastic and neoplastic conditions as well as biopsies with unremarkable findings were included. Endoscopic findings and various histological parameters like villous blunting, IEL count per 100 enterocytes, crypt hyperplasia, inflammation in lamina propria, presence of microorganisms, and dysplasia or malignancy were studied. Data was entered and statistically analyzed using in SPSS v.23 (IBM corp., Armonk, NY, USA).

Results

A total of 159 duodenal biopsies were reported from Feb 2017 to Jan 2018. There were 72 male and 87

female patients. The age range was 2-90 years. Normal duodenal morphology was noted in 85 (53.45%) cases while 74 (46.83%) cases revealed abnormal duodenal pathology. There were 46 (28.93%) cases consistent with celiac disease which were further stratified into different stages according to Marsh classification (stage 1, 2 and 3). Marsh 1 stage was assigned to 24 (15.09%) cases and 5 (3%) amongst these had additional finding of the giardia lamblia organism. There were 4 (2.51%) cases of Marsh stage 3a, 15 (9.43%) cases of stage 3b and 3 (1.88%) cases of stage 3c. No case was assigned Marsh stage 2. Twenty eight (17.61%) cases were of other duodenal pathologies of which non-specific duodenitis was the most common. There were 22 (13.83%) cases of duodenitis and 2 (1.26%) cases were of duodenal ulcer. One case (0.62%) each was seen of Brunner gland hyperplasia, adenocarcinoma, signet ring carcinoma and one case was of metastatic adenocarcinoma. Pattern of villous architecture and a comparison of villous architecture with intraepithelial lymphocytes is done in Table 2.

Table 2: Villous architecture and intraepithelial lymphocyte count (IEL) count- Histological evaluation

Villous architecture	No of cases (%)	IELs	
		<30	>30
Normal villi	129 (85.43)	102	27
Mild atrophy	2 (0.013)	1	1
Moderate atrophy	13 (0.086)	2	11
Severe atrophy	7 (0.046)	0	7
Total	151	105	46

Discussion

The age range in our study is from 2 years to 90 years with a mean of 40.01 years and standard deviation of 19.50. Various studies have shown a mean age in the range of 34.3-37.5 years which is comparable to the current study.⁶ Duodenal biopsy findings with raised intraepithelial lymphocytes of 30 or more IEL per 100 enterocytes, some degree of villous blunting and lymphoplasmacytic inflammation in lamina propria were suggestive of celiac disease. Such cases were further advised for serological workup for celiac disease. Cases with raised IEL count and normal villous architecture that is Marsh 1 have a differential of early celiac, tropical

sprue, drug induced, post infectious or autoimmune duodenitis. A mixed inflammatory infiltrate comprising lymphocytes, plasma cells, neutrophils and eosinophils in lamina propria, normal IEL count and normal villous architecture were given a diagnosis of nonspecific duodenitis.

The most common duodenal disease in western population is Celiac disease, Crohn's disease and cystic fibrosis. While in developing countries tropical sprue, parasitic infestations, intestinal tuberculosis and primary immunodeficiency syndromes are common. Tropical sprue forms an important differential diagnosis with celiac disease in a study in India.⁷ Celiac disease is found to be prevalent in areas where wheat and its products are the staple diet. Rapid mobilization of people and consequently changing diet patterns is having a change in spectrum of duodenal pathologies as seen in biopsy specimen.⁸ In our study 46 (28.93%) cases were consistent with celiac disease. This pattern is indicative of quite a significant proportion of our population having gluten sensitive enteropathy. Being a major wheat producing country and wheat being a staple diet it could be very hard to manage a diet plan for these people with gluten sensitivity especially if they belong to lower economic strata.

The Marsh 1 lesion of increased lymphocytosis and normal villus to crypt ratio is Celiac disease of stage Marsh 1 if serology and history have supportive findings. In our study 24 (15.09%) cases had only raised intraepithelial lymphocytes and were assigned type 1 Marsh stage. This histologic feature is shared by many diseases of different etiologies like infections, tropical sprue, drug/food allergies including early Celiac disease and further workup has to be done like serology. A negative serology becomes questionable if the patient has IgA deficiency thus placing a greater emphasis on histologic picture. Antibody titers can be also be low or negative in cases with minimally destructive lesions like Marsh 1. Many cases are assigned a gluten modified diet trial. A study by Wahab et al⁹ showed 37% of the Marsh 1 lesions improve under gluten modified diet. Other most common associated diseases associated with raised intraepithelial lymphocytosis are H pylori gastritis, parasitic infestations like Giardia lamblia, non-steroidal anti-inflammatory drug use, bacterial overgrowth, tropical

sprue and certain autoimmune diseases.^{10,16} These diseases can be further differentiated by doing more specific tests. This relatively subtle histological finding is important to be recognized and reported as it can have important implications for the patient.⁴

Excluding cases suspected of celiac 46 (28.93%), 28 (17.61%) were of other duodenal pathologies of which non-specific duodenitis was most common. There were 22(13.83%) cases of duodenitis and 2 (1.26%) cases were of duodenal ulcer. One case (0.62%) each was seen of Brunner gland hyperplasia, adenocarcinoma, signet ring carcinoma and one case was of metastatic adenocarcinoma. Manjusha had studied 50 duodenal biopsies over a period of one year in a tertiary care hospital and he found 28% celiac disease and 4% tropical sprue cases.¹⁷ The percentage of celiac disease in his study almost exactly corresponds with our figures. A study done by Tariq¹⁸ comprised of 100 cases over a six month duration revealed 46% celiac disease, 38% nonspecific duodenitis and 2% giardiasis with 14% normal cases. In our study there were 5 cases of giardiasis (3%).

The study done by Dutta¹⁹ involved 124 patients presenting with malabsorption. Tropical sprue was the commonest etiology (29%) followed by Celiac and Cohn's (15.3% each). Other important etiologies were parasitic infestations (9.7%) and immune deficiency disorders (5.6%). A comparison of pattern of villous architecture and IEL count is done with some other studies in table 3. Malignant tumors of the duodenum are very uncommon being 0.3% of all gastrointestinal tumors but up to 50% of the small bowel malignancies. Most frequent duodenal tumor is adenocarcinoma followed by other primary malignancies like lymphomas, leiomyosarcomas, carcinoid tumors, gastrinomas and stromal tumors.^{20,21} In our study malignant tumors were few with a single case of adenocarcinoma, signet ring carcinoma and metastatic adenocarcinoma and their percentage was (1.88%).

Table 3: Comparison of villous architecture and IEL of present study with some other studies

Study	Total cases	Villous architecture		IEL	
		Normal	Atrophy	<30	>30
Dutta et al ¹⁷	162	142	20	138	14
Ghoshal U et al ⁶	226	106	120	100	126
Manjusha et al ¹⁶	50	20	23	26	24
Present study	159	129	22	105	46

Conclusion

It can be concluded that the cases included in the current study had a significant percentage of abnormal duodenal pathology (46.83%) consisting mainly of celiac disease (28.93%) and duodenitis (13.83%), while the number of malignant cases was minimal (1.88%).

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