Correlation of Serology and Endoscopic Findings in Patients with Celiac Disease

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ABSTRACT

Background: Celiac disease is an autoimmune disorder that affects the small intestine and is triggered by the consumption of gluten-containing foods. The disease can cause a range of symptoms, including abdominal pain, diarrhea, weight loss, and malnutrition. The diagnosis of celiac disease is typically confirmed by serologic testing and endoscopic evaluation of the small intestine. **Objective:** To determine the correlation of serology and endoscopic findings in patients with celiac disease. **Study Design:** Prospective observational study. **Settings:** This study was conducted in the department of medicine, Rawal General and Dental Hospital, Islamabad Pakistan. **Duration:** Six months form April 2021 to September 2021. **Methods:** Patients with celiac disease between the ages of 14 years to 50 years were included in this study. Known patients with celiac disease who were not willing to be enrolled in this study, limitations to perform endoscopy, and pregnant women were excluded. Study's objectives and risk & benefits of the procedure were explained before data collection. Baseline and clinically relevant data was collected and SPSS v.22.0 was used for data entry and analysis. **Results:** Final analysis was performed on 100 patients. The mean age of patients with celiac disease was 37.19 ± 12.43 years and mean BMI was 22.18 ± 6.21 kg/m². Most of the patients (97%) with celiac disease had positive tTG. Presence of chronic diarrhea was observed in all of the patients with celiac disease. Scalloping of the fold were present in 73% of the patients, mucosal nodularity was present in 37% of the patients, and least common finding was presence of mucosal fissures/cervices/grooves in 7% of the patients with celiac disease. **Conclusion:** Adult celiac disease may present in their late 30s and is most common in females than males. Our study also proves that anti-tTG antibodies has higher diagnostic accuracy. While, hall mark sign of celiac disease (scalloping of folds/mosaic patter) was also most common and observed in 73% of the patients.

Keywords: Diagnostic accuracy, Serological testing, Endoscopic evaluation, Celiac disease, Gluten-free, Pakistan.

INTRODUCTION

Celiac disease is primarily the disease of small intestine caused by the immune-mediated inflammatory response due to gluten, which is why it is also known as gluten-sensitive enteropathy. The overall global prevalence of celiac disease was 1.4% when tested using serology and 0.7% when tested using biopsy.[1] While, the overall burden of celiac disease among people residing in Asian countries was 0.5%.[2] A local study from Pakistan conducted by Rashid M & Rashid H have observed that around 2 million people are currently

lining with celiac disease.[3] Genetic transmission of celiac disease is common and can be seen in first or second degree relatives with a prevalence rate of 5% to 15%.[4] That is why, removing of gluten from the diet results in clinical and histopathological improvement.

The recurrence rate of celiac disease and associated symptoms was observed in 21.8% of the patients.[5] Signs & symptoms of patients with celiac disease may vary depending upon the age at the time of diagnosis, gender, environmental factors, and duration of disease.[6] Most of the patients experience and presents with gastrointestinal

symptoms such as diarrhea, abdominal pain, abdominal distension, and sometimes vomiting. Because of its autoimmune mediated pathology, patients may present with signs & symptoms involving other body organ such as dermatitis herpetiformis, arthritis, anemia, weight loss, migraine, and infertility.[7]

Diagnosis of CD sometimes become challenging due to unconfirmed/misleading serological tests and these patients may require invasive diagnostic procedures such as endoscopic and histological assessment of small intestine to confirm the presence or absence of CD but invasive procedures are costly, time consuming, and put extra burden of stress on patients.[8] That is why, selection of such patients who are true candidates for endoscopy should critically be assessed by the clinicians and only be performed when needed the most. The importance of serological and endoscopic findings in patients with CD is crucial to document so that future studies can highlight preventive measures.

METHODS

This study was conducted on 100 patients diagnosed with celiac disease through a non-probability consecutive sampling technique and prospective observational study design in the Department of Medicine, Rawal Institute of Health Sciences (RIHS), Islamabad Pakistan, during a period of six months form April 2021 to September 2021. Ethical review committee's approval was taken before commencement of the study. Inclusion criteria for this study was; male and females, age more than 14 years to 50 years, diagnosed cases of celiac disease irrespective of severity and duration, and those who consent to participate. Patients with concomitant intestinal disease, outer autoimmune disease, patients in whom endoscopic assessment cannot be performed, and pregnant women were excluded from this study.

Informed and written consent was taken from all patients/accompanied attendants. Patients were labelled confirmed celiac disease if any previous document proving presence of celiac disease and suspected cases were diagnosed using serological examinations such as anti-tTG at initial stage. Enrolled patients were then underwent esophagogastroduodenoscopy (EGD) to document EGD findings in patients with confirmed celiac disease.

Baseline and clinically relevant data were collected sing a structured questionnaire. Baseline data includes patient's age, gender, BMI, area of residence, and marital status. While clinical data includes duration of celiac disease symptoms, modified March grading, clinical manifestations of patients with celiac disease, and endoscopic findings. Data were entered and analyzed using Statistical Package for the Social Sciences (SPSS),

version 22.0. Final results were presented in the form of mean ± SD for quantitative data and frequencies with percentages for qualitative data and displayed as tables and graph.

RESULTS

Most of the study participants were males as compare to females 64% vs. 36%, respectively with a mean age was 37.19 ± 12.43 years and age ranging from 14 years to 50 years. Most of the patients had normal body weight (mean BMI level 22.18 ± 6.21 kg/m²). The mean duration of symptoms associated with celiac disease was 1.91 ± 0.32 weeks before seeking medical attention. Most of the patients (97%) with celiac disease had positive tTG. While majority of the patients (40%) had Modified March Grade 3a at the time of presentation. Table 1.

Patients with celiac disease were further investigated for signs and symptoms led them to seek medical attention. Surprisingly, presence of chronic diarrhea was observed in all of the patients with celiac disease followed by abdominal pain (97%), fatigue (96%), and bloating (95%). While none of the patients experienced blistery skin rashes. Graph 1.

Furthermore, all the enrolled patients with celiac disease were also investigated regarding endoscopic findings. Scalloping of the fold were present in 73% of the patients, mucosal nodularity was present in 37% of the patients, and least common finding was presence of mucosal fissures/cervices/grooves in 7% of the patients with celiac disease. Graph 2.

Table 1: Baseline & clinical characteristics of study subjects (n = 100)

Variables		N	Percentage
Age - years	Mean ± SD	37.19 ± 12.43	
	Range	45	
Gender	Female	64	64%
	Male	36	36%
BMI - kg/m2	Mean ± SD	22.18 ± 6.21	
Area of Residence	Urban	68	68%
	Rural	32	32%
Marital Status	Married	47	47%
	Single	41	41%
	Widowed	12	12%
Duration of symptoms - weeks	Mean ± SD	1.91 ± 0.32	
	Positive tTG	97	97%
Modified March Grade	0	21	21%
	1	3	3%
	2	15	15%
	3a	21	21%
	3b	40	40%

Figure 1: Clinical manifestations of patients with celiac disease (n = 100)
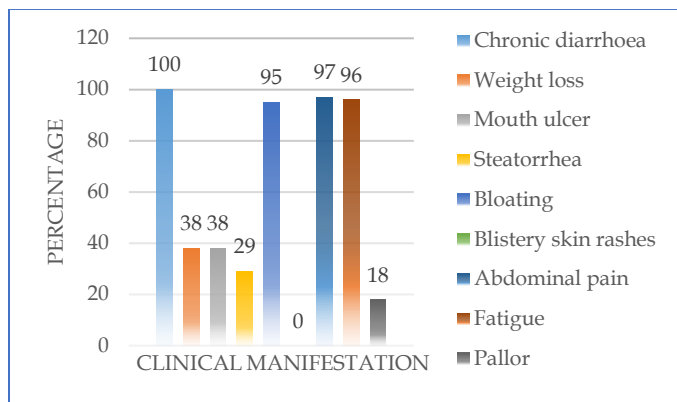
Figure 2: Endoscopic findings in patients with celiac disease (n = 100)
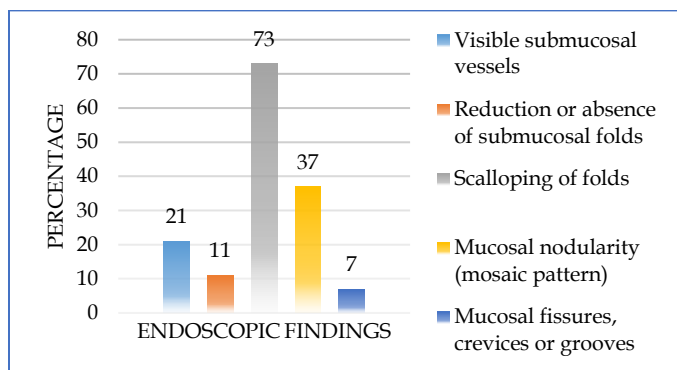
DISCUSSION

In this study, we have observed that celiac disease was most commonly observed in younger age group (37.19 ± 12.43 years). While previously conducted study at same hospital has shown mean age difference of 6.05 ± 6.36 years. This age difference could be due to variation in the geographical areas where disease burden is high in young age group, or availability of advanced health care facilities leading to early diagnosis.[9] The means age in different studies from Pakistan[10,11] and from international studies[12,13] ranging between 30 years to 40 years at the time of diagnosis. While studies published previously also observed that celiac disease may occur at any age but children are at higher risk particularly in low-middle income countries including Pakistan.[14]

In general, women are more prone for autoimmune diseases including celiac disease. The same finding is observed in our study and the female to male ratio was 3:1. Majority of the previously conducted data have observed female predominance as compare to males.[1,2,15,16]

Serological testing (presence of anti-tTG antibodies) and endoscopic evaluation are the two gold standard methods used for confirmation of celiac disease in suspected patients. On the other hands, previously conducted studies document high sensitivity (93.2%) and specificity (96.5%) of serological testing as compare to endoscopic, 89% and 95%, respectively.[17] The diagnostic accuracy of anti tTG antibodies is quite high (97%) in our study. This shows that patients with high risk and typical symptoms are more likely to have positive anti tTG antibodies. The non-invasiveness of the test and readily availability, this test plays a pivot role in people residing at low-middle income countries. Our findings can be compared with previously conducted study by Leo LD and colleagues[18] in which authors have observed that the sensitivity of anti-tTG antibodies in patients with classical symptoms was 100% and in patients with potential celiac disease was 99%.

Signs & symptoms of patients with celiac disease widely depend upon the age, area of residence, and severity of the disease. Children with celiac disease usually presents with typical symptoms while adult patients diagnose late due to non-specific symptoms.[19] Duodenum is the most commonly affected area in patients with celiac disease and for that patients usually complains of gastrointestinal signs & symptoms, as we have observed in our study. Presence of chronic diarrhea was present in all patients presented with celiac disease. Same observation was observed in an international study conducted by the Barker JM *et al*.[20] that chronic diarrhea was the most common clinical presentation of patients with celiac disease but the frequency in their study was 50% while in our study it was 100%. While some of the international studies are in contrast with our study's findings as observed by the Jones and colleagues in his study that iron deficiency anemia was the most prevalent sign present in patients with celiac disease.[21] On the other hands, in our study, iron deficiency anemia was found in 18% of the patients with celiac disease. Another international study also mentioned chronic diarrhea and abdominal pain were the most prevalent findings in patients with celiac disease at the time of presentation.[20]

With the advances in medical sciences, most of the hospitals are already equipped with endoscopy facility but this facility should be kept for those patients in which serological tests can't be performed or serological tests unremarkable and/or determination of disease progression and severity. During endoscopic evaluation of patients with celiac disease, most (73%) of the patients had scalloping of folds and mosaic pattern in 37%. The same findings were observed in previously conducted studies.[22,23,24] While some studies also observed contrary findings such as erosive reflux esophagitis (6.4%), gastric erosion (2.0%), suspicion of esophageal metaplasia (1.2%),[25] and mucosal atrophy (90.9% and 92.3%).[26,27] The difference between the endoscopic findings is not clearly

understood but it is hypothesized that patients with advanced celiac disease with typical clinical presentation related to gastrointestinal tract, the hall mark sign of celiac disease (scalloping of folds/mosaic patter) is more common.

CONCLUSION

Adult celiac disease may present in their late 30s and is most common in females than males. Our study also proves that anti-tTG antibodies has higher diagnostic accuracy. While, hall mark sign of celiac disease (scalloping of folds/mosaic patter) was also most common and observed in 73% of the patients with celiac disease. A multicenter larger scale studies should be conducted in Pakistan on to differentiate between serological and endoscopic findings in patents presented with typical clinical manifestations of celiac disease vs. suspected celiac disease with vague symptoms.

LIMITATIONS

Single center study. Small sample size. Self-administered questionnaire.

SUGGESTIONS / RECOMMENDATIONS

Patients with celiac disease should be evaluated initially with serological testing and endoscopic testing should be reserved for patients highly suspected for celiac disease but serological testing negative or evaluation of severity of celiac disease.

CONFLICT OF INTEREST / DISCLOSURE

None.

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