

# Diagnostic Accuracy of Endoscopic Findings of Patients with Suspected Celiac Disease Taking Histological Features as Gold Standard at Tertiary Care Hospital

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## ABSTRACT

**Objective:** To determine the diagnostic accuracy of endoscopic findings of patients with suspected celiac disease taking histological features as gold standard.

**Study Design:** Descriptive, cross-sectional study

**Place and Duration of Study:** This study was conducted at the Department of Gastroenterology and Department of Histopathology, Nishtar Medical University, Multan, from January 2022 to December 2022.

**Materials and Methods:** A total number of 222 patients with suspected diagnosis of celiac disease were included in this study. All patients underwent upper gastrointestinal endoscopy and features were noted. Biopsies were taken from second part of duodenum and submitted for histopathology. All slides were examined by consultant pathologist and findings were noted. Presence of CD on endoscopy and histopathological examination was noted. Two by Two table was generated to compute sensitivity, specificity, PPV and NPV diagnostic accuracy of endoscopic findings taking histopathological features as gold standard. Statistical analysis was done using SPSS version 17.

**Results:** A total number of two hundred and twenty two (222) suspicious of suffering from celiac disease were included in this study. Mean age of study patients was 41.40±11.90 years. Maximum age was 60 years and minimum age was 20 years. There were more males as compared to females. There were 127 (57.21%) male patients and 95 (42.79%) female patients in this study. Regarding duration of symptoms mean duration of symptoms of study patients was 5.50±4.1 months. Maximum duration of symptoms was 2 years and minimum duration of symptoms was 01 month only. On endoscopic examination, celiac disease was diagnosed in 110 (49.55%) patients while no significant evidence of celiac disease was found in 112 (50.45%) patients. On histologic examination, celiac disease was diagnosed in 133 (59.91%) patients, while 89 (40.09%) were not found of having celiac disease on histologic examination. Regarding accuracy of endoscopy in diagnosing celiac disease taking histopathologic findings as gold standard. The sensitivity of endoscopy was 66.2%, specificity was 75.3%, positive predictive value was 80.0% and negative predictive value was 59.8%.

**Conclusion:** Endoscopy is a good diagnostic tool for suspected cases of celiac disease as it has high level of sensitivity, specificity, positive predictive value and negative predictive value in our study. Hence endoscopy can be easily employed for early diagnosis of celiac disease which will improve disease outcomes followed by timely management of these cases.

**Key Words:** Celiac Disease, Endoscopy, Histopathology

**Citation of article:** Islam N, Khan MZH, Khan MZ, Saadia H, Khan R, Shaukat I. Diagnostic Accuracy of Endoscopic Findings of Patients with Suspected Celiac Disease Taking Histological Features as Gold Standard at Tertiary Care Hospital. Med Forum 2023;34(2):58-61.

## INTRODUCTION

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Received: January, 2023

Accepted: January, 2023

Printed: February, 2023

Celiac disease (CD) is quite prevalent (1:100) autoimmune disease of the small bowel: CD is activated by the intake of gluten in genetically susceptible patients who carry the HLA type II DQ2 and/or DQ8 haplotypes<sup>1-3</sup>. Celiac disease is categorized by extensive variability of symptoms that ranges from high mal-absorption to subclinical or silent pictures as noted in diagnostic modalities<sup>4-5</sup>. The classical type of the illness demonstrated by chronic diarrheal symptoms while weight loss marks only low proportions of subjects and majority of them manifest unusual gastrointestinal indices, extra-intestinal signs or entirely absence of symptoms. Even though celiac disease is highly prevalent in general population i.e. 0.7 % - 20 % and recent advancements in diagnostic modalities, the

definitive diagnosis of celiac disease often remains obscure<sup>6-7</sup>.

The reported data have demonstrated variable findings and it is hypothesized for each new diagnosed case of celiac disease, three to seven may remain undiagnosed<sup>8-10</sup>.

Although the above-mentioned mucosal changes are not entirely characteristic features of CD, histopathology is regarded as the gold standard for the diagnosis of celiac disease, particularly in adults. Hence; the joint collaborative strategies among treating clinicians and pathologists is needed along with provision of a standardized classification for obtaining accurate definitive diagnosis of celiac disease<sup>11</sup>. There is published data on the histopathological findings to diagnosis celiac disease: little data is available through regarding the correlation of histopathological and endoscopic in patients with CD<sup>4,5</sup>. A recent study by Rosa et al<sup>3</sup> showed that there was great variation of symptoms among celiac disease patients. However, study from India by Kalhan<sup>5</sup> reported highly significant results showing Anti-tTG levels, mean baseline Hb levels and results of endoscopy had shown association with increase in severity of mucosal damages ( $P < 0.001$ ) in all these parameters. A study from Egypt by Medhat<sup>6</sup> et al reported that Endoscopic results were suggestive of celiac disease in 75 % of the cases and all these cases of celiac disease showed pathological changes of varying grades in small intestines as per modified Marsh classification.

There is no local study on the subject which is needed as this is an important feature for both the accurate classification of celiac disease as well as related to patient management considering the variety of symptoms patient present with and the widespread use of wheat as staple diet<sup>1,4,5</sup>. Studies differ widely in the level and degree of correlation between histological and endoscopic findings as reported above. A study is needed to determine the correlation between histological and endoscopic features as it will aid in prompt diagnosis and thus timely treatment of patients presenting with suspected celiac disease with endoscopic findings having good histological correlation. It is also important because of the yield and cost of serological markers considering the resource constraints in a developing country. This will also aid in triage and selection of cases that need referral to endoscopy and/or histopathology.

## MATERIALS AND METHODS

Patients of both genders with age 20-60 years with suspected celiac disease were included in the study. Patients with history of inflammatory bowel, chronic liver disease, chronic kidney disease and malignancy as per medical record were excluded from our study. Sample size of 222 cases was calculated by taking 95% confidence interval, prevalence of CD as 10%, and

sensitivity as 60.9%<sup>3</sup> with 17% margin of error, and specificity as 88.2%<sup>3</sup> with 8.0% margin of error. These patients in total (n=222) who fulfilled the inclusion and exclusion criteria from OPD were included in the study after taking informed consent. Information was collected using structured proforma. Demographic data including age, gender was noted. All patients underwent upper gastrointestinal endoscopy and features were noted. Biopsies was taken from second part of duodenum and submitted for histopathology. All slides were examined by consultant pathologist and findings were noted and Marsh score  $\geq 2$  was labeled as celiac disease. All this information was recorded on a pre-designed proforma. Data was analyzed with the help of SPSS version 25. Qualitative data like gender, presence of endoscopic features on endoscopy and histology were presented as frequencies and percentages. Quantitative data i.e., age was presented as means and standard deviations and diagnostic accuracy was calculated using 2x2 tables. Two by Two table was generated to compute sensitivity, specificity, PPV and NPV diagnostic accuracy of endoscopic findings taking histopathological features as gold standard.

## RESULTS

A total number of two hundred and twenty two (222) suspicious of suffering from celiac disease were included in this study. Mean age of study patients was  $41.40 \pm 11.90$  years. Maximum age was 60 years and minimum age was 20 years. There were more males as compared to females. There were 127 (57.21%) male patients and 95 (42.79%) female patients in this study. Regarding duration of symptoms mean duration of symptoms of study patients was  $5.50 \pm 4.1$  months. Maximum duration of symptoms was 2 years and minimum duration of symptoms was 01 month only. On endoscopic examination, celiac disease was diagnosed in 110 (49.55%) patients while no significant evidence of celiac disease was found in 112 (50.45%) patients. On histologic examination, celiac disease was diagnosed in 133 (59.91%) patients, while 89 (40.09%) were not found of having celiac disease on histologic examination. Regarding accuracy of endoscopy in diagnosing celiac disease taking histopathologic findings as gold standard. The sensitivity of endoscopy was 66.2%, specificity was 75.3%, positive predictive value was 80.0% and negative predictive value was 59.8%.

Stratification of age was done, patients were divided into two groups (A) having age 20-40 years and (B) having age 41-60 years. In patients having age 20-40 years, sensitivity of endoscopy in diagnosing celiac disease was 66.7%, specificity 76.1%, PPV 80.7% and NPV was 76.1%. In patients having age 41-60 years, sensitivity of endoscopy was 65.6%, specificity 74.4%, PPV 79.2% and NPV was 74.4%. Stratification of gender was performed, in male patients sensitivity of

endoscopy in diagnosing celiac disease was 62.0%, specificity 67.9%, PPV 71.0% and NPV was 58.5%. In female patients, sensitivity of endoscopy in diagnosing celiac disease was 71.0%, specificity of 61.7%, PPV was 91.7% and NPV was 87.9%. Stratification of duration of symptoms was also performed, in patients with duration of symptoms  $\leq 5$  months, sensitivity of endoscopy was 67.1%, specificity was 68.3%, PPV was 72.6% and NPV was 62.3%. In patients with duration of symptoms  $>5$  months, sensitivity of endoscopy was 64.8%, specificity 92.3%, PPV 94.6% and NPV was 55.8%.

## DISCUSSION

During last decade, significant improvements have been done in increasing diagnostic rates of celiac disease<sup>12,13</sup>. Despite recent advancements in diagnostic modalities, availability of related serological tests and use of case finding strategies, celiac disease is often underreported misdiagnosed and estimated 75 % of celiac disease remain undiagnosed<sup>14</sup>.

In healthcare facilities having facility of open access endoscopies and with higher burden of procedures undergoing for different causes, the findings of suggestive endoscopic characteristics in the duodenum may involve patients with a probability of celiac disease and can help to increase the diagnostic rates of the celiac disease<sup>15</sup>.

A total number of two hundred and twenty two (222) suspicious of suffering from celiac disease were included in this study. There were more males as compared to females. There were 127 (57.21%) male patients and 95 (42.79%) female patients in this study. Abbas et al<sup>16</sup> has reported 53.2% male patients with celiac disease, similar to our results. Iftikhar et al<sup>17</sup> reported 84 % male gender predominance in celiac disease, similar to our results. Shahzad et al<sup>18</sup> from Hyderabad has also reported 57 % male patients with celiac disease, similar to our results. Balaban et al<sup>19</sup> from Romania has reported 56 % female gender predominance in celiac disease which is different from our study results. Almani et al<sup>20</sup> from Hyderabad has reported 53.6 % female gender predominance in celiac disease which is different from our results.

Mean age of study patients was  $41.40 \pm 11.90$  years. Maximum age was 60 years and minimum age was 20 years. Abbas et al<sup>16</sup> has reported similar results. Iftikhar et al<sup>17</sup> reported 34 % patients with celiac disease in second decade of their life and 22 % patients belonging to 41 – 50 years age group, similar to our results. Shahzad et al<sup>18</sup> from Hyderabad has also reported  $37.65 \pm 11.26$  years mean age of the celiac disease patients, similar to our results. Balaban et al<sup>19</sup> from Romania has also reported  $47.6 \pm 13.9$  years mean age in celiac disease patients, similar to our results. Almani et al<sup>20</sup> from Hyderabad has reported  $27.41 \pm 6.84$  years

mean age of celiac disease patients which is quite less than our study results.

Regarding duration of symptoms mean duration of symptoms of study patients was  $5.50 \pm 4.1$  months. Maximum duration of symptoms was 2 years and minimum duration of symptoms was 01 month only. Almani et al<sup>20</sup> from Hyderabad has also reported similar results.

On endoscopic examination, celiac disease was diagnosed in 110 (49.55%) patients while no significant evidence of celiac disease was found in 112 (50.45%) patients. On histologic examination, celiac disease was diagnosed in 133 (59.91%) patients, while 89 (40.09%) were not found of having celiac disease on histologic examination. Regarding accuracy of endoscopy in diagnosing celiac disease taking histopathologic findings as gold standard. The sensitivity of endoscopy was 66.2%, specificity was 75.3%, positive predictive value was 80.0% and negative predictive value was 59.8%. Balaban et al<sup>19</sup> from Romania has also reported 95 % sensitivity of the endoscopy and 98 % positive predictive value, similar to our results. Almani et al<sup>20</sup> from Hyderabad has also reported high diagnostic accuracy of endoscopy with 100 % sensitivity and 24 % specificity, similar to our results. Piazzini et al<sup>21</sup> and Kaiser et al<sup>22</sup> has also reported similar findings which describe good sensitivity and specificity of the endoscopy in diagnosing celiac disease.

## CONCLUSION

Endoscopy is a good diagnostic tool for suspected cases of celiac disease as it has high level of sensitivity, specificity, positive predictive value and negative predictive value in our study. Hence endoscopy can be easily employed for early diagnosis of celiac disease which will improve disease outcomes followed by timely management of these cases.

### Author's Contribution:

Concept & Design of Study:	Naveed Islam
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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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