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ORIGINAL ARTICLE

Efficacy of antitissue transglutaminase antibodies in the diagnosis of celiac disease in children.

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ABSTRACT… Objective: To determine the efficacy of antitissue transglutaminase antibodies in the diagnosis of celiac disease in children. **Study Design:** Observational Study. **Setting:** Department Peadiatric at Indus Medical College Hospital Tando Muhammad Khan. **Period:** July 2020 to December 2020. **Material & Methods:** Thirty five (35) cases were diagnosed to be suffering from celiac out of 50. The mean age at the time of diagnosis was 6.67 years with standard deviation 3.7 years and the male female ratio was 1:1.27. The data was entered, saved and analyzed in SPSS 10.00. **Results:** Main presenting characteristics were as; diarrhea, failure to thrive, and pain of the abdomen, malodour of stool and signs of malnutrition. Thirty five (70%) cases had elevated antitissue transglutaminase antibodies levels and 15 (30%) were negative while 32 cases had total villous atrophy on Jejunal biopsy. **Conclusion:** The antitissue transglutaminase antibody is cheaper and simpler and more sensitive test for mass screening.

Key words: Antitissue Transglutaminase, Celiac, Jejunal Biopsy.

INTRODUCTION

Coeliac illness (celiac sprue) is an immune system issue of the small digestive tract that happens in hereditarily inclined individuals of all ages from center earliest stages forward. Side effects incorporate torment and distress in the digestive tract, ceaseless stoppage and the runs, disappointment to flourish (in kids), paleness and weakness, however these may be missing, and indications in other organ frameworks have been described.[1-4] Upon presentation to gliadin, and particularly to three peptides found in prolamins, the chemical tissue transglutaminase adjusts the protein, and the invulnerable framework cross-responds with the little entrails tissue, bringing about a provocative response. That prompts a truncating of the villi lining the small digestive tract (called villous decay). This meddles with the assimilation of supplements in light of the fact that the intestinal villi are in charge of absorption.[5-7] Formerly it was diagnosed with frequent proximal intestinal biopsies and serological investigations like antigliadin and antiendomysial antibodies which were complicated. Now as medical sciences has advanced for diagnosis of celiac disease the criteria have been revised with investigations including antitissue transglutaminase IgA and IgG anti bodies followed by gold standard proximal intestinal biopsy. Antitissue transglutminase antibodies are cheaper and simpler, more sensitive for mass screening than antiendomysial antibodies assay. Human tissue transgluaminase is more accurate as antigen for specific determination of IgA antitissue transglutaminas antibodies. The sensitivities and specificities of IgA antitissue transglutaminase Enzyme-Linked Immunosorbant Assay have ranged from 85% to 98.1% and 94% to 98% respectively.[8,9] The reason why both IgA and IgG are used in the diagnosis of celiac disease is that, those people who are as a minimum 5 times extra frequently IgA lacking than fit control cases, for screening celiac disease require measurement of both antitissue transglutaminase antibodies and IgA.

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So now it is recommended to do transglutaminase antibodies as the first line serological test for celiac disease. As antitissue transglutaminase antibodies are good tools for screening and monitoring of celiac disease. There is proximal intestinal biopsy, in the suspected cases with celiac disease, having the gold standard of the diagnosis.

MATERIAL & METHODS

The study was carried out in Indus Medical College hospital Tando Muhammad Khan from July 2020 to December 2020, after approval from institutional ethical committee (IMC/ADM/10920) The patients included in the study were those who were clinically suspected to be suffering from celiac disease from out door department and in patients with the history of malabsorption of unknown etiology, malabsorption associated with weaning, weight less than third centile and boys and girls between the ages of 2 years to 15 years they were subjected to a through physical examination and detailed laboratory work up including stool detailed report, complete blood count and antitissue transglutaminase antibodies after informed consent. Those patients who had elevated antitissue transglutaminase antibodies were subjected for jejunal biopsy and Hematoxylin Eosin stain was used in the laboratory. All above steps were clearly discussed with parents. Biopsy was performed at surgical department of civil hospital Hyderabad. Since facility of detection of antitissue transglutaminase antibodies not available in our hospital, the specimen was sent to Civil hospital hyderabad. Those patients who were not willing to be a part of the study, previously diagnosed as a case of celiac disease on the basis of biopsy or other antibodies like antiglidin, antireticulin and anti-endomysial, antibodies and with congenital heart disease, chronic lung, liver, kidney, skeletal or CNS disease as a cause of growth retardation were excluded.

Data was analyzed by using SPSS-10. Mean± SD was computed for quantitative variables like age, height and weight. Frequency and the percentages were computed for all qualitative variables including sex, presenting complaint signs, antitissue transglutamimase antibodies findings, and small bowel biopsy findings. Sensitivity and PPV of antitissue transglutaminase antibodies were calculated by taking small bowel biopsy as gold standard.

RESULTS

Total 50 patients clinically diagnosed of having celiac were integrated in present study. The mean± SD of age was 6.76± 3.7 years (range =2-14 years); most of the children 32 (64%) were diagnosed between ages 2-7 years, these were 28 (56%) male and 22 (44%) female (M: F=1: 1:.3), forty-two (84%) presented with diarrhea, 22 (44%) were presented with failures to thrive 19 (38%) patients, flat buttocks seen in 23 (46%) patients, angular stomatitis was seen in 13 (26%) and sparse and depigmented hairs was seen in 8 (16%) patients (Table-I).

Age Range(2 – 14 years) Mean±SD 6.76±3.7 years	2 – 7	32 (64%)
	8 – 13	15 (30%)
	>13	3 (6%)
Gender M:F = 1:1.3	Male	22 (44%)
	Female	28 (56 %)
Presenting Complain	Diarrhea	42 (84%)
	Failure to thrive	22 (44%)
	Abdominal pain	19 (38 %)
Signs	Muscle wasting	29 (58%)
	Flat buttocks	23 (46%)
	Angular Stomatitis	13 (26%)

Table-I. Epidemiological feature of studied cases n = 50

Sensitivity, specificity, negative predictive value and positive predictive value presented in Table-II. According to the antitissue transglutaminase antibodies report 35(70%) cases out of 50 cases were positive and 15(30%) were negative, and then small bowel biopsy was done and out of 50 positive cases from antitissue transglutaminase antibodies 32 (76%) were detected positive from biopsy. Sensitivity, Specificity, NPV and PPV of antitissue transglutaminase antibodies were calculated by taking biopsy as gold standard were 94.1%, 81.3%, 86.7% and 91.4 % respectively.

Mean height of patients was 100.7 cm with standard deviation 15.7 cms (range77-140cms). Most of patients 13 (26%) were diagnosed

between heights range 90-99cms. out of 13 patients 12(92.3%) were positive in biopsy. Table-III

Antitissue Transglutaminase Antibodies Reports	Jejunal biopsy report findings		Total
	Gold Standard		
	Yes	No	
Yes	32 (TP)	03 (FP)	35
No	2 (FN)	13 (TN)	15
Total	34	16	50

Table-II. Cross tabulation for sensitivity and specificity of antitissue transglutaminase antibodies report n = 50

FN= False Negative, FP= False Positive, TP=True positive, TN= True Negative
Sensitivity = 94.1%
Specificity= 81.3%
PPV (Positive predicted value) =94.1%
NPV (Negative predicted value) =86.7%

Height (In cm)	Jejunal Biopsy Findings		Total
	Positive	Negative	
70 – 79	3	1	4
80 – 89	6	2	8
90 – 99	12	1	13
100 – 109	5	4	9
110 – 119	6	3	9
120 – 129	5	1	6
>39	1	0	1

Table-III. Distribution of height in biopsy findings n = 50

Mean±SD=100.07± 15.7cm
Range=77 – 140 cm

DISCUSSION

Celiac disease is mostly prevalent in places where wheat is the staple diet especially Europe, North America and some parts of Asia and Middle East.

The present study favor the general observation that celiac disease usually manifests in children between the age of 1 to 5 years and the mean age of diagnosis was 6.76 years, which is higher than in western countries where the disease is usually diagnosed in later part of the first years of life but it is very close to another local study of Rashid M, et al[10] (5.79 years). Majority of the affected children were male (56%) in our study although no particular sex predilection for celiac disease has been documented in the literature, still we have found the higher prevalence in male (1.27:1). While Kinos S et al had also quoted a male predominance.[11]

The mean age of introduction of weaning diet was found to be 7.66 months while the clinical feature observed in this study are consistent with the study by Iqbal M et al.[12] However apart from chronic diarrhea, failure to thrive and abdominal pain are the common features of celiac in the current study. Antitissue transglutaminase antibodies were done in all 50 patients and then small bowel biopsy was performed as gold standard and to calculate the sensitivity and PPV of antitissue transglutaminase antibodies, and Hematoxylin Eosin stain was used in the laboratory. According to the antitissue transglutaminase antibodies report 35 cases were positive, and then small bowel biopsy was done and out of 50 cases from antitissue transglutaminase antibodies 34 (68%) were detected positive from biopsy.

Sensitivity, specificity and PPV of antitissue transglutaminase antibodies were 94.1% and 81% and 91.4% respectively whereas it was 85%, 97% and 92% in the study by Lock RJ, et al.[13] The celiac disease is underestimated as a cause of chronic diarrhea and failure to thrive and the delay in diagnosis and decreased awareness of the disease leads to significant growth retardation and severe malnutrition.

CONCLUSION

The antitissue transglutaminase antibody is cheaper and simpler and more sensitive test for mass screening. Antitissue transglutaminase antibodies would be essentially functional for screening that's those are at the genetic threat for illness like Down's syndrome and type-1 diabetes mellitus.

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