ORIGINAL ARTICLE

Effects of Gluten- Free Diet on Immunological Assays in Children with Celiac Disease

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ABSTRACT

Aim: Effects of gluten- free diet on immunological assays in children with celiac disease aging 2-15 years. **Study design:** Descriptive observational study.
Setting: Department of Paediatric Ghurki Trust Teaching Hospital, Lahore.
Sample size: 50 patients.
Methodology: Total 50 cases were included. The immunological assays and proximal bowel biopsy were performed in every case. Results noted on proforma and analyzed.
Results: Majority of biopsy proven cases responded to gluten free diet 80% and showed 73.3% improvement of anti gliadin (IgA) and 60.7% (IgG) while tissue transglutaminase IgA and IgG are improved in 85.3% after 4-6 months of treatment.
Conclusion: There is gradual decline of titers of serum antigliadin and anti tissue transglutaminase. Patients with poor compliance to treatment were mostly early teenagers in whom disease remained unresolved .
Keywords: Anti gliadin antibodies, Gluten- free diet, Celiac disease

INTRODUCTION

Celiac Disease is one of the most common causes of chronic malabsorption[1]. This results from injury to the small intestine with loss of absorptive surface area, reduction of digestive enzymes, and consequential impaired absorption of micronutrients such as fat-soluble vitamins, iron, and potentially B 12 and folic acid. In addition, the inflammation exacerbates symptoms of malabsorption by causing net secretion of fluid that can result in diarrhea. The failure of absorption of adequate calories leads to weight loss, and the malabsorption results in abdominal pain and bloating[2]. Celiac disease remains under diagnosed in the United States[3]. Celiac disease may present in many ways. Currently, active case-finding (serologic testing for celiac disease in patients with symptoms or conditions closely associated with celiac disease) is the favored strategy to increase detection of celiac disease[4,5].

Risk factors for celiac disease include dermatitis herpetiformis, type I diabetes mellitus, autoimmune thyroid disease, selective IgA deficiency, connective-tissue diseases, Down's syndrome, collagenous or lymphocytic colitis, neurological and neuromuscular disorders, and a family history of celiac disease[6]. There are variable modes and age of presentation of celiac disease. Mean age of presentation is between 3 to 5 years with typical disease presenting between 6 to 18 months and atypical between 5 to 6 years of age[7]. Classically children present with chronic diarrhea, failure to thrive, abdominal distension, and anorexia and muscle wasting[8]. Stools are charactristically pale, loose, bulky and highly offensive due to fat malabsorption. A small number of Infants also have severe hypoproteinemia and edema and may present in shock like state that is termed as "celiac crisis" [9].

Serologic studies now are used to further confirm the diagnosis of celic desease. They include the ELISA for IgA antibodies to gliadin and the immunofluorescence test for IgA antibodies to endomysim, a structure of the smooth muscle connective tissue, the presence of which is virtually pathognomonic for celiac disease. In addition, antibodies against tissue transglutaminase (anti-tTG) are also found to be highly sensitive and specific. In one study, for example, the sensitivity and specificity of anti-tTG antibodies for biopsy-proven celiac disease were 98 and 95 percent, respectively.

METHODOLOGY

Fifty patients were included in the study. The study was conducted in Department of Paediatric Ghurki Trust and Teaching Hospital, Lahore. All patients with clinical suspicion of celiac disease between age 2-15 years of either sex, biopsy proven cases of celiac disease and anti-gliadin antibodies and anti-tissue transglutaminase antibodies proven cases were included in the study. All those patients with dysentery, persistent diarrhea, patients who have undergone major intestinal surgery, developmentally

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delayed children, patients with abdominal tuberculosis and in whom weaning has not yet been started were excluded. Qualitative analysis of serum anti gliadin (IgA, IgG) and serum anti tissue transglutaminase (IgA and IgG) along with distal duodenal biopsy was done. Serological parameters were repeated after 4-6 months of treatment to see the improvement and response of gluten free diet.

RESULTS

Details of results are given in tables 1 & 2

Table 1: Immunological assays

Immunological Assay	Patients with raised titer	%age
Antigliadin IgA only (Both IgA & IgG)	41 40	82 80
Tissue transglutaminase (Both IgA & IgG)	49	98

Table 2: Parameters before and after 4-6 months of treatment

Parameters	Raised titer before treatment	Improvement after treatment
Anti-gliadin (IgA only) (Both IgA & IgG)	41(82%) 40(80%)	36(72%) 30(60%)
Tissue transglutaminase (Both IgA& IgG)	49 (980%)	42(84%)

DISCUSSION

We noticed that confirmatory investigations like serum antigliadin (IgG and IgA), serum tissue transglutaminase (IgG and IgA) were raised in all the patients, showing these tests are very helpful in detecting the disease as well as to monitor the response of disease to gluten free diet (Sensitivity of 90% and 98% and specificity of 97% and 95% respectively). Measuring tissue transglutaminase antibody levels is quicker, easier, and quantitative, so has clear advantages over the antiendomysial antibody test. Both tests have superseded the use of antigliadin antibodies, which although of some use have subsequently been shown to have inferior diagnostic accuracy with sensitivity as low as 76%[10,11].

When growth parameters of the children included in the study were drawn on comparative standard growth charts it was found that majority of these patients had failure to thrive. In 76% of patients, height was less than 10th percentile while weight was less than 10th percentile in 70% of patients. Mid parental height was also taken to rule out any constitutional or familial delay which was on 25th percentile in 66% of patients. Pallor, clubbing, edema and muscle wasting were other symptoms to be notified. Abdominal distension and nutritional deficiencies especially of fat soluble vitamins were also seen. This study is consistent with the results of Clemente et al (2003)[11] who also observed these findings.

CONCLUSION

Majority of biopsy proven cases responded to gluten free diet 80% and showed 72% improvement of anti gliadin (IgA) and 60% (IgG) while tissue transglutaminase IgA and IgG are improved in 84% after treatment.

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