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Original Article

Celiac Disease in Different Age Groups and Gender in Pakistan

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Abstract

Background: To examine the gender and age distribution of individuals with celiac disease (CD).

Methods: In this cross sectional study a total of 643 patients with suspicion of CD, belonging to all age groups and both genders were included. Blood sampling done for serologic screening, for tissue transglutaminase (TTG IgA,), Deaminated gliadenpeptide IgA (Anti gliaden IgA) and endomysial antibodies (EMA IgA).Tests were performed by ELISA based on principle of enzyme immunoassay. The quantitative data like age was measured as mean and categorical data like sex, age categories, investigational findings and seasonal variables were analyzed as frequency and percentages. The association of age categories and gender of celiac disease patients was done using chi-square test. A p-value of < 0.05 was considered significant.

Results: Age ranged from 1 to 81 years There was a male predominance. CD was more prevalent in the spring (33.4%) and summer (27.0%) seasons compared to autumn (23.6%) and winter (15.8%) seasons. Tissue Transglutaminase IgA was positive in 11.7% , with predominance in up to 15 years (17.0%), with least in 46-60 years (2.0%). Deaminated Gliadenopeptide IgA was positive in 24.1%. Highest number of positive patients seen in up to 15 years age (29.3%). Anti endomysial Abs were positive in 0.9%. The highest prevalence of CD (53.0%) was found in children and adolescents up to 15 years of age, whereas in older age categories it was less prevalent.

Conclusion: Incidence of celiac disease in childhood is higher in our country. Adults are very less as compared to children. Male gender was predominantly affected.

Key Words: Celiac disease, Anti tissue trasnglutaminase antibody, Antigliadin antibody

Introduction

Celiac disease (CD), affects 0.14 to 4.4% individuals found in different areas of the world. CD is more frequent in children and adolescents. It is represented by allergen to gluten based diet, mainly wheat and its various compositions. Coeliac disease (CD) is a genetic and immune disorder due to intolerance to gliadin and related proteins present in gluten part of diet. [1,2] In the past, CD was considered as disease of western society but data from North Africa ,India and Middle East showed that its incidence ranges from 0.14% to 1.17% in low-risk .Its prevalence ranged from 2.4% to 4.4% in high-risk groups.[3] Middle East, was the first region where cultivation and domestication occurred and then Turkey to Iran.[4]

CD was reported to be same in the Western and non-Western countries. A study compared the Americans and Turkish patients with CD, showed that the mal-absorption was the frequent presenting symptom in Turkish, whereas American patients had atypical symptoms like abdominal pain, fatigue and bloating.[5]

In majority of cases, HLA-DQ2 and DQ8 are major predisposing genes but only about 4% of them develop the disease after introduction of Gluten diets.[6,7] **CD** disease affects the small intestine, and population with a parent, children with CD have a 1 in 10 risk of development of CD. The delay in treatment can lead to anemia, type 1 diabetes, osteoporosis, multiple sclerosis,intestinal cancer, dermatitis herpetiformis, infertility, miscarriage and neurological conditions.The CD Foundation reported around 2.5 million US individuals are not diagnosed and at risk to develop this long term disease.[8,9]

The patients of celiac disease having typical intestinal features i.e. chronic diarrhea, weight loss, etc or with 'atypical'extra intestinal features i.e. type 1 diabetes mellitus, osteoporosis, neurological disturbances, anemia etc. Undiagnosed individuals with atypical features can develop long-term complications, like lymphoma and infertility. A clinically severe condition can arise during pregnancy or during the puerperium

in up to 17% of female patients. The reported female-to-male ratio is 2:1.[10,11]

The CD Foundation recommended tests are the serum IgA tissue transglutaminase antibody (TTG) and the endomysial antibody IgA (EMA). These parameters have a sensitivity and specificity of greater than 90%. The gold standard for diagnosis CD is an intestinal biopsy together with positive serology. Now for diagnosis of CD, highly specific and sensitive tests are available.[12,13]

CD is a permanent genetic disease that needs treatment by the complete elimination of gluten-containing products from the diet. Gluten free diet is the only solution of CD but this diet is not easily available and costly.

Patients and Methods

This cross sectional study was carried out at a private laboratory of Islamabad from January 2017 to November 2017. A total of 643 patients with suspicion of CD referred from treating physicians and from different hospitals (either outpatient or inpatient) from Rawalpindi / Islamabad and periphery, belonging to all age groups and both genders were included. Blood sampling done for serologic screening (as per advised by their physicians) for tissue transglutaminase (TTG IgA,), Deaminated gliadenpeptide IgA (Anti gliaden IgA) and endomysial antibodies (EMA IgA).Tests were performed by ELISA based on principle of enzyme immunoassay. Patients were categorized in to five age categories. The age categories comprised of children up to 15 years, 16-30 years, 31-45 years, 46- 60 years and patients equals to or more than 61 years of age The quantitative data like age was measured as mean and categorical data like sex, age categories, investigational findings and seasonal variables were analyzed as frequency and percentages. The association of age categories and gender of celiac disease patients was done using chi-square test. A p-value of < 0.05 was considered significant.

Results

The age ranged from 1 to 81 years with a mean age of 19.9 years. The gender distribution showed a male predominance 1:16 . CD was more prevalent in the spring (33.4%) and summer (27.0%) seasons compared to autumn (23.6%) and winter (15.8%) seasons. (Table 1). Tissue Transglutaminase IgA was positive in 11.7%, with predominance in up to 15 years (17.0%), with at least in 60-40 years (2.0%).Deaminated Gliadenopeptide IgA was positive in 24.1%. Highest number of positive patients seen were in up to 15 years age (29.3%). Anti endomysial Abs were positive in 0.9%, of these 1.2% were in up to 15 years age group and 1.9% in 31-45 years of age (Table 2).The highest prevalence of CD (53.0%) was found in children and adolescents up to 15 years of age, followed by 16 to 30 years of age (20.2%), whereas in older age categories it

Table 1: Seasonal variation of CD cases

	No. of cases	%age
Spring (Mar – May)	215	33.4%
Summer (Jun - Aug)	174	27.0%
Autumn (Sept - Nov)	152	23.6%
Winter (Dec – Feb)	102	15.8%

Table 2: Variation of investigational findings according to age categories

Parameters (positive findings)	Age Categories (years)				
	<=15 (n=341)	16-30 (n=130)	31-45 (n=105)	46-60 (n=49)	≥61 (n=18)
TTG (IgA)	58 (17.0%)	8 (6.2%)	8 (7.6%)	1 (2.0%)	0 (0.0%)
TTG (IgG)	65 (19.1%)	14 (10.8%)	9 (8.6%)	2 (4.1%)	1 (5.6%)
Anti Gliadin (IgA)	100 (29.3%)	26 (20.0%)	18 (17.1%)	8 (16.3%)	3 (16.7%)
Anti Gliadin (IgG)	209 (61.3%)	57 (43.8%)	22 (21.0%)	11 (22.4%)	3 (16.7%)
Anti Endomy-sial Abs	4 (1.2%)	0 (0.0%)	2 (1.9%)	0(0.0%)	0 (0.0%)

Table 3: Association of age with gender of Celiac Disease patients

Age categories	Sex		p-value*	Total
	Female (n=295)	Male (n=348)		
Up to 15	135 (45.8%)	206 (59.2%)	0.002	341 (53.0%)
16 to 30	71 (24.1%)	59 (17.0%)		130 (20.2%)
31 to 45	55 (18.6%)	50 (14.4%)		105 (16.3%)
46 to 60	29 (9.8%)	20 (5.7%)		49 (7.6%)
61 or above	5 (1.7%)	13 (3.7%)		18 (2.8%)

was less prevalent. Selective analysis was done to see association of gender and age of celiac disease patients. It was witnessed that in up to 15 years of age celiac disease was more common in males (59.2%), whereas in older ages 16-30 years (24.1%), 31-45 years (18.6%) and 46 to 60 years (9.8%) the disease was more prevalent in females (p-value, 0.002). (Table 3)

Discussion

CD was an uncommon malabsorptive disorder in infancy and child age. However, now it is considered a common, multi-system and chronic disease which can affect any age group providing gluten is in diet. Evidence regarding epidemiological data on celiac disease is rare, thus, reports found so far show a similar prevalence from other parts of world. Babies exposed to gluten early in life and get affected by viral infection like cold or flu, have a significant role in body's autoimmune gluten tolerance. [14]

A multicenter study was carried out by Tanpowpong et al, showed a similar incidence i.e. spring (27%), summer (25%), fall (25%), and winter (23%).[15]In their study, on 2,000 people it was monitored that most cases of gluten-intolerance occurred in children born in spring season when compared with other seasons.

A long term study from Sweden included almost 2 million children of up to 15 years of age showed that CD was more common in babies born during the summer months. They found that CD risk was highly likely in children born during spring, summer and autumn as compared to those born during winter.[16] A survey on CD from two referral centers in Italy i.e. Rome and Bari examined retrospectively data of 596 patients, also confirmed that children born in summer were more likely to develop CD than cases born in other seasons.[17] A case control study by Lebwohl B et al concluded that summer birth was significantly associated with increased risk of CD when diagnosed before age of 2 years.[18]

In a local study in which two hundred children were enrolled with suspicion of CD, male to female ratio was 1.6:1, and age ranged from 2 to 14 years of age and there were 40 (20.0%) patients with positive anti-endomysial antibody titers.[19] Others also reported a similar age of presentation, Alvi et al found average age of 3.4 years and a Jordanian study found (3.4 years).[20] Cheema et al had reported a mean age of 6 years in their study and in western countries it is 9-18 months.[21]

When current study's gender distribution was compared, one report also showed male preponderance with 55.8% male and 44.2% females.[22] In another local paper by Babar et al found female preponderance, 60% vs 40% in their study.[23] A study carried out on 21 subjects, found female majority with celiac disease (male/female 1:2.5) and also showed that CD was higher in children (1:71) than in adults .[24]

A high incidence of CD was reported in elderly people by Anitta et al, whereas a Finnish population report witnessed in contrast findings of CD among adolescents (1.5%) or adults (2.0%). [25 -27] The earlier presentation in our country may be attributed to the fact that major part of our diet is wheat based which is started at an early age. Gender distribution revealed slight male preponderance 53% versus 46% females. A Spanish study revealed the same fact that CD is more common in females.[28]

The role of biopsy are debatable as findings of histopathology are nonspecific and are present in other conditions as well. In CD adequate number of biopsy samples with patchy involvement should be taken. Not all cases require biopsy testing in the diagnosis of CD. Positive anti-tissue trans-glutaminase antibody and IgA titers may give suspicion of Celiac disease, and can be used as diagnostic as well prognostic tool where facility for intestinal biopsy is not available but cannot replace small bowel biopsy which is still a gold standard.[29] One should not rely purely on the diagnosis based on clinical assessment and improvement in condition after gluten free diet; it is only helpful in patients living in areas with limited resources. It can lead to misdiagnosis or confusion, making nonspecific diagnosis in non-celiac disease gluten sensitivity.

Conclusions

1.The prevalence of celiac disease in childhood is higher than in adults in our country. Male gender was affected,predominantly.

2.Patients present with wide spectrum of clinical presentation. A delay in diagnosis can lead to a difficulty in proper management .

3.Serological tests may be more significant if they are combined, instead of using single one for diagnosis of Celiac disease.

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