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Original Article

Prevalence of silent celiac disease in adult Egyptian patients with type 1 diabetes mellitus

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ABSTRACT

Background and purpose: Celiac disease is a disorder primarily affecting gastrointestinal tract causing chronic inflammation to the mucosa and a permanent state of intolerance to gluten. A strong association has been observed between celiac disease and type 1 DM. This is important because the treatment of asymptomatic patients with type 1 DM having a gluten-free diet seems to have a positive effect on glycemic control and on the growth. This study was done to detect the prevalence of silent celiac disease in adult patients with type 1 diabetes mellitus by using serological immune-enzymatic tests (anti tissue transglutaminase antibodies).

Study design: case-control study.

Subjects: Ninety adult cases with type 1 DM compared to 48 adult healthy individuals aged between 20 and 40 years.

Place: Internal medicine department, Kasr Al Ainy Hospitals

Method: This is a prospective case-control study conducted on 90 adult cases with type 1DM compared to 48 adult healthy individuals aged between 20 and 40 years. All patients were subjected to routine labs, HbA1c, Anti TTG-IgA and selected Anti TTG-IgG in IgA negative cases.

Assessment: The assessment was carried out by obtaining full medical history and history of diabetes mellitus. Laboratory work was done in the form routine labs, HbA1c and anti-tissue transglutaminase antibody as a predictor marker for celiac disease. The gained measures were analyzed by using SPSS program, t-test and chi-square were used to compare between groups.

Results: The mean age of the cases was 28.2 ± 6.26 years, 47.1 % males and 52.9% females with no statistically significant difference regarding age or sex between cases and controls. Mean duration of diabetes was 10.62 years ±7.13. Mean HbA1c was 8.92 ± 1.5 in cases while in non-diabetic (control) was 5.26 ± 0.6. Anti TTG was (100 %) negative in controls while in diabetics, Anti TTG was positive in (61.1%). Among Anti TTG IgA negative diabetic patients, only 3 cases (5.3%) were weak positive and 2 cases (3.5%) were strong positive for Anti TTG Ig G while the remaining 91.2% were negative.

Conclusion: Celiac disease seems to be under investigated in patients with type 1 diabetes mellitus. There was increased prevalence of anti-tissue transglutaminase antibodies in adult patients with type 1 diabetes mellitus in comparison to a control group.

Keywords: Celiac disease, type 1 DM, Anti-tissue transglutaminase

Introduction

Celiac disease (CD) is an inflammatory small bowel disease caused by intolerance to ingestion of gluten found in cereal grain. Classical symptoms of the disease in adults are abdominal cramps, abdominal distention and chronic diarrhea or constipation or both[1]. A strong association has been observed between celiac disease and autoimmune disorders[2].

The subclinical disease is frequent in the general population, and serological tests such as TTGA can be used as markers for the identification of these asymptomatic individuals[3]. There is increased prevalence of anti-tissue transglutaminase antibodies (11.66 %) in patients with type 1 diabetes mellitus in comparison to general population, which suggests the need to for screening of celiac disease in those patients[4]. This is important because the treatment of asymptomatic patients with T1DM with a gluten-free diet seems to have a positive effect on

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glycemic control and on the growth[5]. This study was conducted to detect the association of celiac disease and type 1 DM which can help in the future management of diabetes in those patients.

Patients and Methods

This is a prospective case control study conducted from June 2016 to October 2016 on a group of 90 Adult Egyptian patients with Type 1 DM (53 females and 37 males)
compared to 48 controls (20 females and 28 males). Age of population in this study was ranging from 20 to 40 years. All diabetic patients were on human insulin and were asymptomatic i.e. none of them had gastrointestinal symptoms suggestive of celiac disease such as diarrhea, abdominal pain, abdominal distention, vomiting or flatulence. History was taken, clinical examination was done, and blood samples were collected. Each participant gave written informed consent before enrollment. We excluded patients already diagnosed or treated for celiac disease. All subjects were serologically screened for glycosylated hemoglobin (HbA1c) and the presence of anti-tissue transglutaminase antibodies (IgA) with (ELISA) technique. Anti-tissue transglutaminase IgG was selectively done for patients who were expressing negative anti-tissue transglutaminase IgA. The gained measures were analyzed by using SPSS program, t-test and chi-square were used to compare between groups.

Results

This study included 90 patients diagnosed as T1DM with mean age 28.2±6.26 for 58.9% females and 41.1% males compared to 48 controls with mean age 28.3±5.22 for 41.7% females and 58.3% males with statistically significant difference between females in both groups with p-value (0.04). Regarding HBA1C, there were statistically significant difference between two groups with p-value 0.001 as seen in table (1).
By measuring Anti TTG IgA in both cases and control groups, it was found that about 61.9% (55 cases) of diabetic group were positive, 38.9% (35) were negative and all cases in control group were negative with no positive cases. From the 55 positive cases found, 30 cases were weak positive and 25 cases were strong positive. Regarding gender, Anti TTG IgA was positive in 20 male cases and 35 female cases, table (2). From 35 Anti TTG IgA negative cases in diabetic group, Anti TTG IgG was measured; only 3 cases (5.3%) were weak positive and 2 cases (3.5%) were strong positive.

Table 1: Comparison between age and HBA1C level in both diabetic and controls in studied groups

Parameters	Groups		P-value
	Cases (90)X'±SD	Controls(48)X'±SD	
Age	28.2 ±6.26	28.3±5.2	0.862
HBA1C	8.92±1.5	5.62±0.6	0.001*

Table 2: Comparison between level of Anti TTG IgA level in both male and female group in case group

Anti TTG	Case group (Diabetic)				
IgA	Male (37)		Females (53)		P-value
	N	%	N	%	
Negative	17	45.9%	18	34%	0.011*
Strong positive	14	37.8%	11	20.8%	
Weak positive	6	16.2%	24	45.3%	
Total	37	100%	53	100%	

Regarding age and HBA1C, there was a direct correlation between age and HBA1C level in diabetic cases with Anti TTG IgA with p-value (0.005 & 0.032), and regarding Anti TTG IgG, there was direct correlation between it and age and level of HBA1C in diabetic group with p-value (0.053&0.048) (Tables 3 & 4).

Table 3: Correlation between level of Anti TTG IgA level with age and HBA1C in diabetic cases

Variables	Anti TTG IgA	
	R	P-value
Age	0.293	0.005
HBA1C	0.228	0.032

Table 4: Correlation between level of Anti TTG IgG level with age and HBA1C in diabetic cases

Variables	Anti TTG IgA	
	R	P-value
Age	0.015	0.053
HBA1C	0.094	0.048

Discussion

Celiac disease is an inflammatory small bowel disease caused by intolerance to ingestion of gluten found in cereal grain. There is association between type 1 diabetes and celiac disease. Explanation could be that the same susceptibility genotypes are involved in the etiopathogenesis of diabetes and celiac disease. In both diseases, genetic susceptibility is associated with the HLA-DQ 1*0501, 1*0201 heterodimer as more than 90% of celiac disease patients and about 60% to 70% of diabetics carry this HLA type[6]. Usually type 1 DM precedes the onset of CD that often occurs in asymptomatic form[7]. This study was done to detect the prevalence of silent celiac disease in adult patients with type 1 diabetes mellitus by using serological immune-enzymatic tests.
In our study, serological screening for celiac disease was done for 90 patients with T1DM and 48 healthy controls using anti tissue transglutaminase antibodies IgA and IgG. The prevalence of celiac disease in patients with type 1 diabetes using Anti TTG IgA in our study was 61.1% (P value =0.000) statistically significant. Among Anti TTG IgA negative diabetic patients (35 cases), only 3 cases (5.3%) were weak positive and 2 cases (3.5%) were strong positive P value highly significant (0.042).
In a study conducted in UK by[8], among 113 patients with T1DM, only 6.2% were tested antibody positive. In addition, 12.3% of Danish patients with T1DM were positive for CD in a study done by[9]. In a Saudi study by[10], positive serology tests for CD were detected in 20.9% of patients with T1DM.A Turkish study done by[11] for 48 diabetic patients showed that 30.8% were seropositive for celiac disease using anti-tissue transglutaminase IgA & IgG antibodies.
In contrast to our study a case control study was done by[12], and only 3.3% of patients with T1DM were anti TTG positive and

there was no statistically significant difference between cases and controls.

The different rates reported between those studies and our study may be due to methodological reasons (differences in type of antibody used for screening), the size and duration of diabetes of the sample, genetic and environmental factors and we used Anti TTG which is proven to be a very specific indicator for CD in contrast with other studies where in either AGA or EMA was used.

In our study, number of type 1 diabetic females was 53 (58.9%), while number of type 1 diabetic males was 37 (41.1%). The prevalence of T1DM in our study is more in females (P value (0.04). Regarding level of Anti TTG among diabetic males and females in our study, it was found that, percent of females (61.3%) while males (38.7%), p value (0.000) and is statistically significant. This can be explained by the high prevalence of autoimmune diseases in females[13].

In our study, the mean duration of diabetes among cases is 10.6 years ±7.1. There is a strong correlation between level of Anti TTG and duration of diabetes (p value 0.001). As regards level of HbA1c among diabetic cases, mean level was 8.9 ±1.5 and was found to have a statistically significant correlation with level of Anti TTG (p value 0.031). These results are consistent with the study done in Poland by Mysliwiec[14] that has shown statistically significant positive correlation (p value <0.001) between serum Anti TTGA and HbA1c levels. These results suggest that poorer metabolic compliance of DM1 is related to higher risk of celiac disease development in DM.

References

1. Guoxian Wei, Na Tian, Roland Siezen, Detlef Schuppan, Eva J Helmerhorst (2016): Identification of Food-grade Subtilisins as Gluten degrading Enzymes to treat Celiac Disease. American Journal of Physiology- Gastrointestinal and liver physiology. Doi:10.1152/ajpgi.00185.2016.
2. Ribeiro-Cabral VL, Da-Silva-Patrício FR, Ambrogini-Junior O and Jankiel-Miszputen S. (2011): Anti-tissue transglutaminase antibodies (IgA and IgG) in both Crohn′s disease and autoimmune diabetes. Rev EspEnferm Dig. Sep; 103(9):453-457
3. Rossi T (2004): Celiac disease. Adolesc Med. Clin., (2004) 15: 91-103.
4. AnowerTuamaObaid, Rushdi A. H.Kubba and Prof.ZaidanK.AlHergani (2012): The Detection of Silent Celiac Disease In patients With Type 1 Diabetes Mellitus by the use of Anti Tissue Transglutaminase Antibodies Al - Kindy Col Med J 2012 ; Vol .8 No. (2) p: 132-136.
5. Dieterikh W, Storch WB and Schuppan D (2000): Serum antibodies in celiac disease. Clin.J. 46: 361-364.
6. Farrell R and Kelly CP (2002): Celiac sprue. N Engl J Med 346:180–188.
7. Hoffenberg EJ and Liu E (2011): Screening-identified celiac disease: who needs treatment and when? Clin Gastroenterol Hepatol; 9:284–285.
8. Banerjee k and Goh C (2007): Prevalence of celiac disease in children and adolescents with type I diabetes mellitus in a clinic based population. Postgrad Med G; 83:132-6.
9. Hansed D, BrockñJacobsen B, Lund E, Hansen LP, et al (2006): Clinical benefit t of a gluten-free diet in type 1 diabetic children with screening detected celiac disease. Diabetes Care; 29:2452-6.
10. Saadah OI, Al Agha AE, Albokhari SM and Almoghales JA (2004): Prevalence of celiac disease in Saudi children with type 1 diabetes mellitus. J PediatrGastroenolNutr; 39: S211.
11. Cinaz P, Sari S, Yeşilkaya E, Eğritaş O, Bideci A, Dalgiç B (2010): Prevalence of Celiac disease in Turkish children with type 1 diabetes mellitus and their non-diabetic first-degree relatives. Turk J Gastroenterol. Mar; 21(1):34-8.
12. Sheikholeslami H, Boostani K, Hashemipour S, Hajmanoochehri F and Ziaee A (2005): Prevalence of celiac disease in type1 diabetic patients comparing with nondiabetic healthy individuals. J Iran Diabetes Lipid; 4:49-55. 24.
13. CollinP,Mäki M and Kaukinen K (2007): Safe gluten threshold for patients with celiac disease: some patients are more tolerant than others. Am J ClinNutr; 86:260–1.
14. Myśliwiec M, Balcerska A, Stepiński J, Bakowska A, et al. (2006) Prognostic factors of celiac disease occurrence in type 1 diabetes mellitus children. Endocrinol Diabetol clinic, Poland. Chor Przemiany Materii Wieku Rozw;12(4):281-5. Polish