

A Hospital Based Prospective Study to Correlate Type 1 Diabetes with Celiac Disease and Thyroid Dysfunction Patients

Harish Kumar

Associate Professor, Department of Paediatrics, Government Medical College, Barmer, Rajasthan, India.

ABSTRACT

Background: Autoimmune thyroid disorders are the most prevalent immunological disease in patients with type 1 diabetes. As there are very few studies till date regarding prevalence of Celiac Disease along with thyroid dysfunction among type I Diabetic children in India; therefore, present study is an effort towards this type 1 diabetes to Celiac disease and Thyroid dysfunction.

Materials & Methods: A hospital based prospective study done on 30 type 1 diabetic patients presenting to Paediatric Hospital, Government medical college & attached groups of hospital, Barmer, Rajasthan. 30 type 1 Diabetes patients of 2-15 years of age were selected after obtaining informed verbal consent from their parents/ caregiver accompanying. Data thus collected was entered into Microsoft Excel spreadsheet and analyzed with the help of proportion, mean, SD and appropriate test of significance.

Results: Present study shows that out of 30 type 1 diabetic (T1D) children, 16.66% were suffering from Celiac Disease (CD), 6.66% were having Thyroid Dysfunction (TD) and 3.33% children were having both (CD+TD). 73.33% T1D children were having no celiac disease or thyroid dysfunction. Prevalence of CD progressively decreases with age whereas TD prevalence increases as age increases. Among children

suffering from both CD & TD, also the prevalence decreases with age. The association between age and prevalence was observed to be statistically insignificant. ($p > 0.05$).

Conclusion: It was concluded that the prevalence of Celiac disease in Type 1 diabetic children in present study was 16.66% and most of the children with Celiac disease were asymptomatic.

Keywords: Celiac Disease, Type I Diabetes, Children, Thyroid Dysfunction.


*Correspondence to:

Dr. Harish Kumar,
Associate Professor,
Department of Paediatrics,
Government Medical College, Barmer, Rajasthan, India.

Article History:

Received: 09-07-2019, Revised: 02-08-2019, Accepted: 25-08-2019

Access this article online

Website: www.ijmrp.com	Quick Response code 
DOI: 10.21276/ijmrp.2019.5.5.064	

INTRODUCTION

Type 1 diabetes is not an insignificant disease. One of the most common paediatric endocrine illness, it affects nearly 5, 00,000 children below the age of 15 years. This is more than the relative burden of type 2 diabetes India has to shoulder: every fifth type 1 diabetes child in the world is an Indian, while every seventh type 2 diabetes adult across the globe claims Indian nationality. There is high prevalence of celiac disease in autoimmune disorders such as type 1 diabetes mellitus in general population. When patients with type 1 diabetes were screened for celiac disease, 6.0 to 10.0% were found antibody positive and/or biopsy positive.¹

Autoimmune thyroid disorders are the most prevalent immunological disease in patients with type 1 diabetes. Cross sectional studies have reported a prevalence of hypothyroidism in 12-24% of female and 6% of male patients with type 1 diabetes as well as in 3-6% of type 2 diabetic patients. Hyperthyroidism occurs in 1-2% of patients with diabetes. Most patients have sub clinical disease and the development of diabetes usually precedes.²

As there are very few studies till date regarding prevalence of Celiac Disease along with thyroid dysfunction among type I Diabetic children in India; therefore, present study is an effort towards this type 1 diabetes to Celiac disease and Thyroid dysfunction.

MATERIALS & METHODS

A hospital based prospective study done on 30 type 1 diabetic patients presenting to Paediatric Hospital, Government medical college & attached groups of hospital, Barmer, Rajasthan.

Inclusion Criteria

1. Age group 2 to 15 years
2. Diagnosed case of Type 1 Diabetes

Methodology: 30 type 1 Diabetes patients of 2-15 years of age were selected after obtaining informed verbal consent from their parents/ caregiver accompanying. Following tools and techniques were used to obtain relevant and required information.

Study Tools & Techniques

- I. Questionnaire- pretested pre structured, relevant to objectives containing questions related to personal and clinical details of type 1 Diabetes cases
- II. Human tTG IgA antibody test by ELISA- to determine the prevalence of celiac disease in type 1 diabetes
- III. Thyroid profile: was also measured in all patients.

Methods: The principle of the Anti-Tissue Transglutaminase IgA ELISA test is a three-incubation process whereby the first incubation (30 minutes) involves the binding of serum/plasma antibodies to the transglutaminase that has been coated on the micro plates. Next, non-reactive serum is washed from the micro plates. At the second incubation stage (30 minutes), anti-human

IgA horseradish peroxidase conjugate will bind to IgA class antibodies that are bound to the immobilized antigens. After incubation, any excess unbound enzyme conjugate will be washed away. At this point, a chromogenic solution (tetra methyl benzidine or TMB) is added. Following 15-minute incubation, the chromogen develops into a blue color. After the addition of a stop solution, the color turns to yellow. The color intensity can be gauged proportionally to the amount of IgA antibodies in the sample.

Statistical Analysis: Data thus collected was entered into Microsoft Excel spreadsheet and analyzed with the help of proportion, mean, SD and appropriate test of significance.

Table 1: Distribution of Type 1 Diabetics with Associated Diseases

Group No.	Disease	Study Subjects (Type 1 Diabetics)
1.	Celiac Disease	5 (16.66%)
2.	Thyroid dysfunction	2 (6.66%)
3.	Celiac and Thyroid	1 (3.33%)*
4.	No celiac disease or thyroid dysfunction, only T1D	22 (73.33%)
Total		30 (100%)

Table 2: Distribution of Cases and Study population according to Age (N=30)

Age Group	T1D+CD		T1D+TD		T1D+CD+TD		T1D only		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
<5	2	50.0	1	25	0	0	1	25	4	13.33
5-10	1	10	0	0	1	10	8	80.0	10	33.33
10-15	2	12.5	1	6.25	0	0.0	13	81.25	16	53.33
Total	5	16.66	2	6.66	1	3.33	22	73.33	30	100.0

[$\chi^2= 9.672$, DF=9, P>0.05]

RESULTS

Present study shows that out of 30 type 1 diabetic (T1D) children, 16.66% were suffering from Celiac Disease (CD), 6.66% were having Thyroid Dysfunction (TD) and 3.33% children were having both (CD+TD). 73.33% T1D children were having no celiac disease or thyroid dysfunction (table 1).

Prevalence of CD progressively decreases with age whereas TD prevalence increases as age increases. Among children suffering from both CD & TD, also the prevalence decreases with age. The association between age and prevalence was observed to be statistically insignificant. (p>0.05) (table 2).

DISCUSSION

In present study, prevalence of CD was found 16.66%. In the study by Barera et al³ prevalence of celiac disease at the time of appearance of type 1 diabetes was 3.6% and it increased to 6.2% in subsequent years of patient observation. In Maki et al⁴ study estimated prevalence of celiac disease in type 1 diabetes was 6.7%. Kasper S et al⁵ in their multicentric study observed that CD-specific antibodies were present in 6.7% T1D patients. Joshi R et al⁶ observed the prevalence of CD (based on serology) in children with Type 1 diabetes as 15.49%. Bhadda SK et al found that out of 189 patients of type 1 diabetes mellitus, 21 (11.1%) were diagnosed to have celiac disease. Saddah OI et al⁸ observed that 48 (11.2%) out of 430 children screened had biopsy-proven CD.

Narula P et al⁹ observed GIT symptoms in T1D patients screened for CD and concluded that 3.9% of the total diabetic population had positive celiac serology

In present study thyroid disease prevalence was observed as 6.66% among 30 cases. Pimenta WP et al¹⁰ studied effect of diabetes mellitus on thyroid hormone levels and observed that of 100 diabetic patients studied, 28% had low plasma thyroid hormone levels.17% had high thyroid hormone and 55% had euthyroid levels. This study has shown a high incidence of abnormal thyroid hormone level among diabetes. Joshi R et al⁶ observed 29.6% TD prevalence in T1D patients.

In present study, 3.33% T1D cases were suffering from both CD & TD. Similarly, Mankai A et al¹¹ specifically studied the association of celiac disease with autoimmune thyroid disease. The authors evaluated the prevalence of celiac disease in 100 patients with thyroid autoimmunity (TAI). They found that the prevalence of celiac disease in patients affected by autoimmune thyroid disease was 2%.

Mean age of 30 T1D cases was observed to be 9.33 ± 5.48 years. Mean age of T1D+CD group was 8.53 ± 4.56 years whereas mean age of children affected from T1D+TD was 7.12± 6.32 years. Mean age of children suffering from both CD & TD along with T1DM was 6.34±0 years. Mean age of only T1DM group was 9.65 ± 4.25 years. Prevalence of CD progressively decreases with

age whereas TD prevalence increases as age increases. Among children suffering from both CD & TD, also the prevalence decreases with age. The association between age and prevalence was observed to be statistically insignificant. ($p > 0.05$) Holl RW et al¹² observed that the prevalence of elevated thyroid antibodies increased dramatically with age: from 3.7% in patients less than 5 years of age up to 25.3% in the age group 10 years ($p < 0.0001$).

CONCLUSION

It was concluded that the prevalence of Celiac disease in Type 1 diabetic children in present study was 16.66% and most of the children with Celiac disease were asymptomatic.

REFERENCES

1. World Health Organization. World Health Organization Consultation Definition, Diagnosis and Classification of Diabetes Mellitus and its complications Part 1. Diagnosis and classification of DM, Report of WHO Consultation–Geneva. Geneva: World Health Organization; 1999.
2. White, Lois and Gillet, P M and Bannerman, Elaine and Wilson, D C and Livingston, J. The incidence of childhood coeliac disease in Scotland: first year of the SPSU celiac project. *Journal of Paediatric Gastroenterology, Hepatology and Nutrition*, 2011; 52:132.
3. Barera G, Bonfanti R, Viscardi M. Occurrence of CD after onset of type I diabetes: a 6-year prospective longitudinal study. *Pediatrics*. 2002;109:833–8.
4. Maki M, Collin P. Celiac disease. *Lancet*. 1997;349:1755–9.
5. Kaspers S, Kordonouri O, Schober E, Grabert M, Hauffa BP, Holl RW. Anthropometry, metabolic control, and thyroid autoimmunity in type 1 diabetes with celiac disease: A multicenter survey. *J Pediatr* 2004; 145: 790-5.
6. Joshi R, Madvariya M. Prevalence and clinical profile of celiac disease in children with type 1 diabetes mellitus. *Indian J Endocrinol Metab*. 2015 Nov-Dec; 19(6): 797-803.
7. Bhadada SK, Kochhar R, Bhansali A, Dutta U, Kumar PR, et al. Prevalence and clinical profile of celiac disease in type 1 diabetes mellitus in north India. *J Gastroenterol Hepatol*. 2011;26:378–81.
8. Saadah OI. Celiac disease in children and adolescents at a single center in Saudi Arabia. *Ann Saudi Med* 2011; 31: 51-7.
9. Narula P, Porter L, Langton J, Rao V, Davies P, et al. Gastrointestinal symptoms in children with type 1 diabetes screened for celiac disease. *Pediatrics*. 2009;124:e489–95.
10. Pimenta WP, Mazeto GM, Callegaro CF, Shibata SA, Marins LV, Yamashita S, et al. Thyroid disorders in diabetic patients. *Arq Bras Endocrinol Metabol*. 2005;49:234–40.
11. Mankai A, Ben Hamouda H, Amri F, Ghedira-Besbes L, Harbi A, Tahar Sfar M, et al. Screening by anti-endomysium antibodies for celiac disease in Tunisian children with type 1 diabetes mellitus. *Gastroenterol Clin Biol* 2007; 31: 462-6.
12. Holl RW, Bohm B, Loos U, et al. - Thyroid autoimmunity in children and adolescents with type 1 diabetes mellitus. *Horm Res*. 1999;52:113–8.

Source of Support: Nil.

Conflict of Interest: None Declared.

Copyright: © the author(s) and publisher. IJM RP is an official publication of Ibn Sina Academy of Medieval Medicine & Sciences, registered in 2001 under Indian Trusts Act, 1882.

This is an open access article distributed under the terms of the Creative Commons Attribution Non-commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Cite this article as: Harish Kumar. A Hospital Based Prospective Study to Correlate Type 1 Diabetes with Celiac Disease and Thyroid Dysfunction Patients. *Int J Med Res Prof*. 2019 Sept; 5(5): 283-85. DOI:10.21276/ijmrp.2019.5.5.064