

Research Article

A PROSPECTIVE STUDY OF PREVALENCE OF AUTOIMMUNE THYROID DISEASE AND THYROID DYSFUNCTION IN TYPE 1 DIABETES MELLITUS PATIENTS- A TERTIARY CARE CENTRE

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Received date: 12-07-2026, Date of Acceptance: 17-07-2026, Date of Publication: 27-07-2026.

Abstract

Introduction: Children and adolescents with T1DM are at increased risk for co-morbid autoimmune diseases compared to children in the general population. A high proportion of children and adolescents with T1DM have other organ-specific auto antibodies in addition to islet auto antibodies, and approximately 25% of the patients with T1DM are diagnosed with other autoimmune diseases. Among them, AITD is found to be most commonly associated with type 1 diabetes.

Materials and Methods: This study was a hospital-based observational study done from the period of March 2023 to February 2024. All the type 1 diabetic patients above 12 years of age attending the inpatient and outpatient department of this institution were included in the study after obtaining written consent.

Results: The anti-TPO antibody positivity was found in 9 out of the 92 patients with

overall prevalence of 9.78%. Among the anti-TPO-positive subjects, female to male ratio is 2:1. All the anti-TPO antibody positive patients had abnormal TSH levels and 44.45% had clinically significant hypothyroidism, 22.22% had subclinical hypothyroidism while hyperthyroidism was present in 33.33%.

Conclusion: Our study reveals that there is a moderate prevalence of autoimmune thyroiditis in T1DM patients in this region and they should be followed up with regular screening of anti-TPO and TSH to make an early diagnosis of thyroid dysfunction.

Key Words: autoimmune diseases, anti-TPO-positive subjects, type 1 diabetes, abnormal TSH levels.

INTRODUCTION

Children and adolescents with T1DM are at increased risk for co-morbid autoimmune

diseases compared to children in the general population. A high proportion of children and adolescents with T1DM have other organ-specific auto antibodies in addition to islet auto antibodies, and approximately 25% of the patients with T1DM are diagnosed with other autoimmune diseases. Among them, AITD is found to be most commonly associated with type 1 diabetes.¹ Recent studies have further identified some shared susceptibility genes responsible for the co-occurrence of these conditions. The frequency of thyroid autoimmune disease and the prevalence of thyroid auto antibodies in patients with T1DM are much higher than in general pediatric population, varying widely between 3 to 50% and is often related to age, gender and ethnic origin.²

Clinically thyroid dysfunction can cause metabolic disturbances in T1DM, by increasing insulin resistance and impairing glucose metabolism and may ultimately undermine glycemic control in T1DM.

Therefore, regular screening could help in early identification and treatment of previously undiagnosed thyroid dysfunction in T1DM patients and may help in achieving better glycemic control in them.³ Although the association between T1DM and the occurrence of thyroid autoimmunity in them has been well established in various populations, hardly few studies have been done in this regard in the Indian subcontinent, especially in the South Indian population.⁴

Thyroid dysfunction is common among diabetic patients and can produce metabolic disturbances. Therefore, regular screening of diabetic patients for thyroid dysfunction

allows early treatment.⁵ T1DM patients expressing anti-TPO antibodies should be screened annually. In anti-TPO negative patients, a TSH assay every two to three years suffices. Studies regarding the AITD in T1DM in India are limited. So considering all the above facts, this study was designed with the following objectives: To evaluate the association of AITD and its clinical profile among the type 1 diabetic patients.

MATERIALS AND METHODS

The present study was carried out on T1DM patients who attended the Out-Patient Department and / or were admitted in the various units of General Medicine, Subbaiah Institute of Medical Sciences, Shimoga.

Study Design

This study was a hospital-based observational study done from the period of March 2023 to February 2024.

All the type 1 diabetic patients above 12 years of age attending the inpatient and outpatient department of this institution were included in the study after obtaining written consent.

Case Definitions

Diagnosis of Type 1 Diabetes Mellitus was made in any patient presenting with hyperglycaemia (RBS ≥ 200 mg/dL or 11.1 mmol/L) along with ≥ 1 of clinical symptom of ketosis, rapid weight loss with BMI < 25 kg/m², with onset of diabetes below 50 years of age or having personal or family history of autoimmune disorder.

Methodology

We enrolled 184 Type 1 diabetic patients in the study. After detailed history and clinical examination, relevant investigations were performed in the Multidisciplinary Research

Laboratory of this institution which were filled in the predesigned proforma. After 8 hours of fasting, blood specimen was collected from each participant and analysed for the following parameters. Plasma fasting glucose, postprandial blood glucose level was estimated by GOD/POD method in an autoanalyser. Estimation of Glycated Haemoglobin (HbA1c) was done by High-performance liquid chromatography (HPLC assay) using the Biorad D 10 Machine. Serum tri-iodothyronine, serum thyroxine and thyroid stimulating hormone were estimated in Mini-Vidas (BioMerieux). Other relevant investigations including Complete blood count, LFT, urine for microalbumin, Renal

function test, Serum calcium were measured by standard methods. Estimation of TPO antibody was done by AccuBind ELISA micro wells, a sequential ELISA method. Anti-TPO-Ab level > 50 IU/mL was considered high.

Statistical Evaluation

The categorical variables were expressed as percentages whereas continuous variables were expressed as mean $\pm$ standard deviation. Fisher's exact test and Chi-square test were done for Categorical variables and independent t-test was used for Continuous variables for calculating p value (p value <0.05 = significant). SPSS version 17 Software was used for Statistical analysis

RESULTS

	Anti-TPO Positive T1DM		Anti-TPO Negative T1DM		Total		P Value
	Mean	SD	Mean	SD	Mean	SD	
Serum Anti-TPO antibody level	122.18	18.40	10.78	6.14	21.68	34.21	<0.05
Serum TSH(μ g/L)	16.05	22.52	2.29	1.62	3.64	7.99	<0.05
T3 (ng/dL)	240.95	202.93	132.55	30.53	143.15	74.22	<0.05
T4 (μ g/dL)	29.19	43.46	8.09	16.96	10.15	21.56	<0.05
Random	603	87.78	571.84	113.01	574.89	110.78	Not Significant
Fasting	308.11	127.62	262.39	107.82	266.86	109.97	Not Significant
Postprandial	344	131.98	350.18	134.24	356.77	134.81	Not Significant
HbA1C	11.69	3.41	10.91	3.07	10.99	3.10	Not Significant

Table 1: Serum Anti-TPO Antibody, Thyroid Profile and Glycaemic Status

	Anti-TPO positive T1DM		Anti-TPO negative T1DM		Total	
	Mean	SD	Mean	SD	Mean	SD
Age (years)	25	5.08	23.58	6.19	23.67	6.07
Average duration (months)	33.44	40.81	33.82	49.03	34.69	40.09

Table 2: Distribution of Anti-TPO Positive and Negative T1DM Patients According to Average Age

Caste	T1DM with AITD		T1DM without AITD		Total	
	N	%	N	%	N	%
General	6	33.33	40	24.1	46	25
OBC	4	22.22	40	24.1	44	23.9
SC	0	0	8	4.82	8	4.35
ST	2	11.11	26	15.66	28	15.23
Tea tribes	6	33.34	52	31.32	58	31.52
Others	0	0	0	0	0	0
Total	18	100	166	100	184	100

Table 3: Caste wise Distribution of Type 1 DM Patients with and without AITD

AITD in Relation to BMI	T1DM with AITD		T1DM without AITD		Total		P Value
	N=18	%	n =166	%	n =184	%	
Underweight (<18.50)	8	44.44	80	48.2	88	47.83	0.005
Normal (18.5-24.99)	6	33.33	84	50.6	90	48.91	
Overweight (> or= 25)	4	22.22	2	1.2	6	3.26	
Total	18	100	166	100	184	100	

Table 4: Distribution of Patients with Type 1 DM with and without AITD in Relation to BMI

Complication	Anti-TPO Positive T1DM		Anti-TPO Negative T1DM		Total		P Value
	n =18	%	n =166	%	n =184	%	
Retinopathy	2	11.11	18	10.84	20	10.87	Not Significant
Neuropathy	8	44.44	32	19.28	40	21.74	Not Significant
Nephropathy	10	55.55	28	16.87	38	20.65	Not Significant
Septicaemia	10	55.55	48	28.92	58	31.52	Not Significant
DKA	14	77.78	118	71.1	132	71.74	Not Significant
Anaemia (Hb% < 11 g/dL)	12	66.67	42	25.3	54	29.35	<0.05 Significant
Hypoalbuminaemia (<3.4 g/dL)	14	77.78	48	28.92	42	22.83	<0.05 Significant
Elevated ALP (> 116 U/L)	6	33.33	38	22.89	44	23.91	Not Significant
Hypocalcaemia (< 8.5 mg/dL)	10	55.55	28	16.87	38	20.65	<0.05 Significant
Low serum C-peptide level (< 0.5 ng/mL)	18	100	128	77.11	146	79.35	

Table 5: Distribution of Anti-TPO Positive and Negative T1DM Patients with Complications

DISCUSSION

In our study, the prevalence was found to be 9.78%. This is probably due to varied genetic makeup of the population in this part of the country. On the other hand, this prevalence rate coincides with the studies done in some other countries. Female to male ratio of autoimmune thyroid disease is found to be 2:1 which also strengthens the hypothesis that autoimmune disorders are more common in female. This is because in

females, estradiol seems to accelerate progression of autoimmune disease via enhancing the pathway of T helper type 2 (Th2) cells, while androgens had a protective effect.⁶

The average age of anti-TPO positive patients was 25 ± 5.08 years. The prevalence of autoimmune thyroid disease varies depending on the age, sex and ethnic origin of the subjects and increases with duration of the disease.⁷

But contrary to this, we found that 8 out of 18 patients of AITD were diagnosed within one year of diagnosis of T1DM. So our study reveals that screening for autoimmune thyroid disorder is advisable in all T1DM patients at the time of diagnosis.

8 patients had clinical features of hypothyroidism with high TSH level and two had subclinical hypothyroidism. Three patients had features of hyperthyroidism with low TSH and high thyroid hormone level which had significant p value.⁸

One important observation in our study is that 31.52% of T1DM patients belong to Tea tribe community and 6 had AITD. So genetic study is necessary to know the genetic predisposition.

Significant association was not found between the anti-TPO positive and negative group regarding the complications of diabetes like DKA, retinopathy, neuropathy and nephropathy.⁹

There is a significant association of BMI in between the anti-TPO positive and negative group. Thyroid hormones are critically related to growth and developmental processes, so thyroid dysfunction poses detrimental effect on T1DM patients. Hypothyroidism usually associated with growth retardation while subclinical hypothyroidism increases dyslipidaemia and cardiovascular morbidity.

Hyperthyroidism is most often associated with uncontrolled glycaemic status and increases the risk of DKA and neuromuscular dysfunction. So thyroid function test in T1DM should be done routinely.¹⁰

CONCLUSION

Co-occurrence of autoimmune thyroid disease in type 1 diabetes is not uncommon in this part of the country. High prevalence of T1DM and AITD in tea tribes in this region alarms us of the need for genetic study of this community. Early diagnosis of AITD in T1DM patients can improve growth and development. Routine haematological investigations should be done to rule out anaemia, hypoalbuminaemia, hypocalcaemia. Association of other autoimmune diseases like coeliac disease, autoimmune hepatitis should be checked as well in highly suspected cases. Our results indicate that all T1DM individuals should be screened with anti-TPO and TSH measurement at the time of diagnosis of diabetes. Anti-TPO-positive asymptomatic cases should undergo measurement of thyroid function at least once in a year.

REFERENCES

1. Barker JM, Yu J, Yu L, et al. Autoantibody “subspecificity” in type 1 diabetes: risk for organ-specific autoimmunity clusters in distinct groups. *Diabetes Care* 2005;28(4):850-5.
2. Lu MC, Chang SC, Huang KY, et al. Higher risk of thyroid disorders in young patients with Type 1 diabetes: a 12-year Nationwide, population-based, Retrospective Cohort Study. *PLoS One* 2016;11(3):e0152168.
3. Subramanyam G, Pushparaj JL. Prevalence of anti-TPO antibody in type-1 diabetes and thyroid dysfunction in TPO antibody positive diabetics. *Journal of Evolution of Medical and Dental Sciences* 2012;1(5):668-76.
4. Moayeri H, Rabbani A. Prevalence of autoantibodies to thyroid Peroxidase and

- autoimmune thyroid disease in Type I diabetes mellitus. *Acta Medica Iranica* 2004;42(4):267-71.
5. NICE guideline. Type 1 diabetes in adults: diagnosis and management: nice.org.uk/guidance/ng17. 2015.
 6. Venkatanarasu A, Sachan A. Organ specific autoimmune disorders in type 1 diabetes mellitus. *J Clin Sci Res* 2017;6:103-12.
 7. Ramakrishna BS, Makharia GK, Chetri K, et al. Prevalence of adult celiac disease in india: regional variations and associations. *Am J Gastroenterol* 2016;111(1):115-23.
 8. Shiva S, Ilkhchooyi F, Rezamand A. Thyroid autoimmunity at the onset of type 1 diabetes mellitus in children. *Open Journal of Immunology* 2013;3:37-40.
 9. Honnamurthy JB, Jagathlal PC, Subhakumari KN, et al. Prevalence of Anti thyroid peroxidase (Anti TPO) in type 1 diabetes mellitus. *Thyroid Research and Practice* 2011;8(2):13-6.
 10. Gonzalez GC, Capel I, Rodriguez-Espinosa J. Thyroid autoimmunity at onset of type 1 diabetes as a predictor of thyroid dysfunction. *Diabetes Care* 2007;30(6):e1611-2.