

FREQUENCY OF THYROID DISORDERS IN TYPE 1 DIABETIC PATIENTS PRESENTING AT JINNAH HOSPITAL, LAHORE.

Nasir Mahmood¹ Shahbaz Ahmed², Saeed Ahmed³

¹Assistant Professor of Medicine Aziz Fatima Hospital, Faisalabad.

²Assistant Professor of Community Medicine, Independent Medical College, Faisalabad.

³Assistant Professor Dermatology Aziz Fatima Hospital, Faisalabad.

ABSTRACT:

OBJECTIVE: To assess the frequency of thyroid dysfunction either subclinical or overt and autoimmunity of thyroid, in patients having type 1 diabetes.

STUDY DESIGN: Cross sectional study.

DURATION OF STUDY: This study was carried out from January 2013 to July 2013 at Diabetes/Endocrine clinic of Jinnah Hospital, Lahore.

PATIENTS AND METHODS: A total 50 diagnosed cases of type 1 diabetes mellitus of either age and both genders using insulin since diagnosis were selected with non probability purposive sampling technique. Patients were screened for thyroid disease by antithyroid peroxides antibody, TSH, free T3 and free T4.

RESULTS: The mean age of the patients was 15.8 ± 5.7 years. There were 40 (80%) female and 10 (20%) male patients. Ten (20%) patients had positive antithyroid peroxides antibodies and 40 (80%) patients were negative for antibodies. Out of positive serology there were 1 male and 9 female patients. Out of positive serology, 6 patients were having subclinical hypothyroidism, 3 patients overt hypothyroidism and 1 subclinical hyperthyroidism.

CONCLUSION: Thyroid disorders are quite high in our type 1 diabetic population. So there is a need to improve screening identification among all type 1 diabetics.

KEY WORDS: Type 1 diabetes mellitus, thyroid disease, antithyroid peroxides antibody.

INTRODUCTION:

Among various types of diabetes, insulin dependent diabetes mellitus (IDDM) i.e type 1 diabetes is an autoimmune type of diabetes in which autoimmune system destroys beta cells of pancreas. This destruction leads to a complete absence of insulin and hence hyperglycemia. The usual manifestations of this type of diabetes are weight loss, increased hunger, thirst and frequent urination.^[1]

HLA (Human leukocyte antigen) genes are the main genetic potentials of type 1 DM. It is observed around 95% of type 1 diabetic patients have either HLA-DR3 or HLA-DR4 while HLA-DR2 offer resistance against development of this type of diabetes.^[2]

The autoimmune nature of T1DM predisposes patients to a greater risk of other autoimmune

diseases as well like Hashimoto's Thyroiditis, celiac disease, vitiligo, alopecia, Addison's disease, Connective tissue diseases and pernicious anaemia etc. According to various studies in literature, T1DM patients have higher chances of autoimmunity of thyroid (AIT) around 15 to 30% and all other above listed autoimmune diseases as well. Though thyroid dysfunction is very common with type 1 diabetes, but often not manifested clinically until it is detected as overt or subclinical hyperthyroidism or hypothyroidism.^[3]

Corresponding Author:

Nasir Mahmood
Assistant Professor of Medicine,
Aziz Fatima Hospital. Faisalabad.
Email: drnasirkainth81@yahoo.com

Thyroid dysfunction leads to poor diabetes control in type 1 diabetics. The underlying mechanisms for these effects are increased glucose synthesis in liver, rapid glucose absorption from gut, and also high insulin resistance. Similarly It is observed that carbohydrate metabolism is grossly changed in hypothyroidism. The insulin degradation is reduced in hypothyroid patients, which reduces its requirement.^[4]

The literature review revealed that thyroid autoimmunity is more seen in people with type 1 diabetes.^[5] It is also observed that hidden thyroid disorders can disturb diabetes control and enhance its complications e.g higher percentage of retinopathy and nephropathy was seen in such patients.^[6]

Autoimmune thyroid dysfunction can be diagnosed with confidence by measuring thyroid peroxidase (anti-TPO) and thyroglobulin (anti-Tg) antibodies.^[7]

It is also noticed that Thyroid antibodies are more frequent in T1DM patients. Various studies have shown different percentages of thyroid disorders in type 1 diabetics, which is from 3% to 50% in various populations.^[8,9]

The review of trials has found that there is no evidence available about the frequency of thyroid disorders in our type 1 diabetic patients. This study was designed to establish this relationship.

METHODS:

It was a cross sectional study. A total 50 diagnosed cases of type 1 diabetes mellitus of any age and both genders were selected. Technique for sampling was non probability purposive. After elaborating the objectives of study, a written informed consent was obtained from the patients. This study was conducted from Jan 2013 to July 2013 in Diabetic / Endocrine Clinic of Jinnah Hospital, Lahore. The study was approved by hospital research and ethical committee, according to standards laid down in declaration of Helsinki. Complete history details including physical

examination were performed for all patients. Age of onset of DM and duration of DM were recorded. A detailed general physical and systemic examination was also performed. Patients, with a history of any acute illness and drug intake which can affect thyroid function, were excluded from this study.

Blood samples of all patients were taken to determine serum levels of thyroid stimulating hormone (TSH), free thyroxine (T4), free thyronine (T3) and anti-TPO Ab.

Serum free T4 and free T3 concentrations were determined using radio-immunoassay . A normal ranges for free T4 and free T3 were 11 to 23 µg/dl and 2.80 to 5.80 µg/dl respectively . Serum TSH concentrations were measured with immunoradiometric assay. Normal range for TSH level was 0.4-4.0 mU/l. Serum anti-TPO Ab was measured by Rapid ELISA. Normal range for anti TPO was 10 ---35IU/ml.

TSH decided hypothyroidism vs hyperthyroidism as it was high in hypothyroid and suppressed in hyperthyroid. While subclinical hypothyroidism was labelled as high TSH and normal free T4 and subclinical hyperthyroidism as suppressed TSH and normal free T4.

Statistical Analysis:

All the collected data was entered into SPSS versions 23 and analyzed. Qualitative variables like sex and frequency of thyroid disease were presented as frequency and percentage respectively. Quantitative variable like age was presented as mean and standard deviation.

RESULTS:

The mean age of the patients was 15.8±5.7 years. There were 40 (80%) female patients and 10 (20%) male patients. In the distribution of patients by frequency of thyroid disease, 10 (20%) patients had positive serology for thyroid disease while 40 (80%) patients had negative serology for thyroid disease (Table 1).

Table 1: Distribution of patients by frequency of thyroid disease (n=50)

Thyroid disease	No. of patients	Percentage
Yes	10	20
No	40	80
Total	50	100.0

Table 2: Sex * Thyroid_Disease Crosstabulation

			Thyroid_Disease		Total
			Yes	No	
Sex	Male	Count	3	7	10
		% within Sex	30.0%	70.0%	100.0%
	Female	Count	7	33	40
		% within Sex	17.5%	82.5%	100.0%
Total		Count	10	40	50
		% within Sex	20.0%	80.0%	100.0%

Chi Square Value: 0.481 & P-value = 0.001

The p-value is less than 0.05 so the result are significant .

Out of positive serology ,6 (12%) patients were having subclinical hypothyroidism, 3 (6%) patients overt hypothyroidism and 1 (2%) patient was having subclinical hyperthyroidism .

The mean antiThyroid peroxidase antibody titer of positive serology patients was 129.9±21.3. There were 3 (30%) patient in the anti TPO titer range of below 50, 4 (40%) patients in the anti TPO titer range of 50-100 and 3 (30%) patient in the anti TPO titer range of more than 100 (Table 3).

Table 3 Distribution of patients by anti TPO antibodies (n=10)

Anti TTG	No. of patients	Percentage
Below 50	3	30
50-100	4	40
>100	3	30
Total	10	100.0
Mean±SD	129.9±21.3	

DISCUSSION:

In this cross sectional study, it is concluded that thyroid disorders are quite highly evident in our type 1 diabetic patients. In another study, 204 diabetic patients were studied to diagnose the thyroid disorders. The prevalence of thyroid auto immune disorders was 17.6% and of those chronic autoimmune thyroiditis was the most frequent in them. This study supports our study results.^[10]

On Friday, March 15, 2013 (health day news), a report was published which stated that people who have type 1 diabetes are more likely to develop autoimmune dysfunction of thyroid gland than general population. Dr, Betul Hatipoglu, endocrinologist, says that "I always counsel my patients that thyroid and type 1 diabetes are sisters diseases, having same origin."^[11]

Another study proved that the frequency of thyroid diseases in diabetic patients is 2-3 times

more than in non diabetic persons in that population. It is also noticed that it increases with advancing age, and also strongly affected by gender i.e more in females and autoimmunity of diabetes mellitus.^[12]

Thyroid dysfunction increases clinical relevance of type 1 diabetic patients as it imposes a number of metabolic challenges in these patients. Commendable consequences are hypoglycaemia in hypothyroidism and development of ketoacidosis in hyperthyroidism.^[13]

As it is evident that unnoticed thyroid autoimmunity could worsen diabetic patients outlook. Therefore, its early recognition and treatment is crucial. We can conclude from this study that thyroid function should be assessed in all type 1 diabetic patients. Although, currently no such guidelines existed that to whom we should test and to whom we should treat. Our study opens a gateway for new researchers to find out further investigations regarding the thyroid and type 1 DM.

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Author	Review	Status
DR. NASIR MAHMOOD -21- Administrative, Information, Case	Concept of study & Division of contents	MLT
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