

Original Article

Analysis of prevalence of thyroid dysfunction in patients with diabetes

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ABSTRACT:

Background: The present study was conducted for assessing prevalence of thyroid dysfunction in patients with diabetes. **Materials & methods:** A total of 100 diabetic subjects were enrolled. Complete medical history of all the patients was recorded. Blood samples were obtained from all the patients. Thyroid profile was evaluated of all the patients. Assessment of the results was done using SPSS software. **Results:** Mean age of the diabetic subjects was 44.6 years. Among diabetic subjects, mean T3 levels was found to be 1.48 ng/ml while mean T4 and TSH levels was found to be 6.85 µg/dL and 9.76 µIU/ml respectively. Thyroid dysfunction was seen in 23 percent of the patients. **Conclusion:** Screening for thyroid disease among patients with diabetes mellitus should be routinely performed.

Key words: Thyroid, Diabetes, Dysfunction

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INTRODUCTION

Diabetes mellitus (DM) is a metabolic disease, involving inappropriately elevated blood glucose levels. DM has several categories, including type 1, type 2, maturity-onset diabetes of the young (MODY), gestational diabetes, neonatal diabetes, and secondary causes due to endocrinopathies, steroid use, etc. The main subtypes of DM are Type 1 diabetes mellitus (T1DM) and Type 2 diabetes mellitus (T2DM), which classically result from defective insulin secretion (T1DM) and/or action (T2DM). T1DM presents in children or adolescents, while T2DM is thought to affect middle-aged and older adults who have prolonged hyperglycemia due to poor lifestyle and dietary choices. The pathogenesis for T1DM and T2DM is drastically different, and therefore each type has various etiologies, presentations, and treatments.¹⁻³ Patients with abnormalities of thyroid gland function or structure come to medical attention for several reasons. They present with symptoms attributable to physiologic effects of increased or decreased plasma concentrations of thyroid hormone (hyperthyroidism or hypothyroidism, respectively). They may also present with symptoms related to localized or generalized enlargement of the gland.⁴⁻⁶ Hence; the

present study was conducted for assessing the thyroid profile in diabetic patients.

MATERIALS & METHODS

The present study was conducted for assessing the thyroid profile in diabetic patients. A total of 100 diabetic subjects were enrolled. The inclusion criteria was duration of DM longer than 6 months for patients with T2DM or 1 year for those with T1DM. Patients were diagnosed to have type 2 DM when it was diagnosed with an age ≥ 30 years, without insulin use in the first year after diagnosis and without history of ketosis or ketonuria. Complete medical history of all the patients was recorded. Blood samples were obtained from all the patients. Thyroid profile was evaluated of all the patients. Assessment of the results was done using SPSS software.

RESULTS

Mean age of the diabetic subjects was 44.6 years. Among diabetic subjects, mean T3 levels was found to be 1.48 ng/ml while mean T4 and TSH levels was found to be 6.85 µg/dL and 9.76 µIU/ml respectively. Thyroid dysfunction was seen in 23 percent of the patients.

Table 1: Comparison of thyroid profile among diabetic and non-diabetic subjects

Thyroid profile	Mean	SD
T3 (ng/ml)	1.48	0.51
T4 (µg/dL)	6.85	1.35
TSH (µIU/ml)	9.76	2.32

Table 2: Prevalence of thyroid dysfunction among diabetic subjects

Thyroid dysfunction	Number	Percentage
Present	23	23
Absent	77	77
Total	100	100

DISCUSSION

Diabetes is a worldwide epidemic. With changing lifestyles and increasing obesity, the prevalence of DM has increased worldwide. The global prevalence of DM was 425 million in 2017. According to the International Diabetes Federation (IDF), in 2015, about 10% of the American population had diabetes. Of these, 7 million were undiagnosed. With an increase in age, the prevalence of DM also increases. About 25% of the population above 65 years of age has diabetes. Chronic hyperglycemia in synergy with the other metabolic aberrations in patients with diabetes mellitus can cause damage to various organ systems, leading to the development of disabling and life-threatening health complications, most prominent of which are microvascular (retinopathy, nephropathy, and neuropathy) and macrovascular complications leading to a 2-fold to 4-fold increased risk of cardiovascular diseases.⁷⁻¹⁰

Diabetes mellitus (DM) and thyroid dysfunction (TD) often tend to coexist in patients. Both hypothyroidism and hyperthyroidism are more common in type 2 diabetes mellitus (T2DM) patients than in their nondiabetic counterparts. Current guidelines are neither clear nor specific about the frequency of thyroid function monitoring in T2DM patients. Circulating thyroid hormones affect several different organs and cells, have a major impact on glucose, lipid, and protein metabolism, and can worsen glycaemic control in T2DM. Hyperthyroidism and thyrotoxicosis can worsen subclinical DM and cause hyperglycaemia in T2DM patients, increasing the risk of diabetic complications. T2DM reduces thyroid-stimulating hormone levels and impairs the conversion of thyroxine (T4) to triiodothyronine (T3) in the peripheral tissues. Poorly managed T2DM can lead to insulin resistance and hyperinsulinaemia, which causes thyroid tissue proliferation and increases nodule formation and goitre size.⁹⁻¹¹

Mean age of the diabetic subjects was 44.6 years. Among diabetic subjects, mean T3 levels was found to be 1.48 ng/ml while mean T4 and TSH levels was found to be 6.85 µg/dL and 9.76 µIU/ml respectively. Thyroid dysfunction was seen in 23 percent of the patients. Mehalingam V et al assessed the level of thyroid dysfunction in patients with type 2 diabetes

mellitus and to identify the association of thyroid dysfunction with diabetic complications. All subjects were screened for diabetic complications (nephropathy, neuropathy, retinopathy & cardiovascular disease). Hypothyroidism was seen in 13.9%, while hyperthyroidism was observed in 3.6% of the study subjects. Thyroid dysfunction was more common among females than males. No correlation was seen between thyroid dysfunction and diabetic complications in the study subjects. The prevalence of thyroid dysfunction is 17.5% in patients with type 2 diabetes mellitus.¹⁰ Palma CC et al investigated the prevalence of TD in patients with type 1 and type 2 diabetes mellitus (T1DM and T2DM). Three hundred eighty-six (386) patients with T1DM or T2DM that regularly attended the outpatient clinic of the Diabetes unit, Hospital Universitário Pedro Ernesto, participated in the study. All patients underwent a clinical and laboratory evaluation. Thyroid dysfunction was classified as clinical hypothyroidism (C-Hypo) if TSH > 4.20 µIU/mL and FT4 < 0.93 ng/dL; Subclinical hypothyroidism (SC-Hypo) if TSH > 4.20 µIU/ml and FT4 ranged from 0.93 to 1.7 ng/dL; Subclinical hyperthyroidism (SC-Hyper) if TSH < 0.27 µIU/ml and FT4 in the normal range (0.93 and 1.7 ng/dL) and Clinical hyperthyroidism (C-Hyper) if TSH < 0.27 µIU/ml and FT4 > 1.7 µIU/mL. Autoimmunity were diagnosed when anti-TPO levels were greater than 34 IU/mL. The positive autoimmunity was not considered as a criterion of thyroid dysfunction. The prevalence of TD in all diabetic patients was 14.7%. In patients who had not or denied prior TD the frequency of TD was 13%. The most frequently TD was subclinical hypothyroidism, in 13% of patients with T1DM and in 12% of patients with T2DM. The prevalence of anti-TPO antibodies was 10.8%. Forty-four (11.2%) new cases of TD were diagnosed during the clinical evaluation. The forty-nine patients with prior TD, 50% with T1DM and 76% with T2DM were with normal TSH levels.¹¹

CONCLUSION

Screening for thyroid disease among patients with diabetes mellitus should be routinely performed.

REFERENCES

1. Rajaei E, Jalali MT, Shahrabi S, Asnafi AA, Pezeshki SMS. HLA in Autoimmune Diseases: Dependable Diagnostic Biomarkers? *Curr Rheumatol Rev*. 2019;15(4):269-276.
2. Klein BE, Klein R, Moss SE, Cruickshanks KJ. Parental history of diabetes in a population-based study. *Diabetes Care*. 1996 Aug;19(8):827-30.
3. Barnett AH, Eff C, Leslie RD, Pyke DA. Diabetes in identical twins. A study of 200 pairs. *Diabetologia*. 1981 Feb;20(2):87-93.
4. Gambert SR. Atypical presentation of thyroid disease in the elderly. *Geriatrics*. 1985;40:63-69.
5. Griffin JE. Southwestern internal medicine conference: the dilemma of abnormal thyroid function tests—is thyroid disease present or not? *Am J Med Sci*. 1985;289:76-88.

6. Hamburger JI. The various presentations of thyroiditis. *Ann Int Med.* 1986;103:579–589.
7. Zheng Y, Ley SH, Hu FB. Global aetiology and epidemiology of type 2 diabetes mellitus and its complications. *Nat Rev Endocrinol.* 2018 Feb;14(2):88-98.
8. Malek R, Hannat S, Nechadi A, Mekideche FZ, Kaabeche M. Diabetes and Ramadan: A multicenter study in Algerian population. *Diabetes Res Clin Pract.* 2019 Apr;150:322-330.
9. Choi YJ, Chung YS. Type 2 diabetes mellitus and bone fragility: Special focus on bone imaging. *Osteoporos Sarcopenia.* 2016 Mar;2(1):20-24.
10. Mehalingam V, Sahoo J, Bobby Z, Vinod KV. Thyroid dysfunction in patients with type 2 diabetes mellitus and its association with diabetic complications. *J Family Med Prim Care.* 2020;9(8):4277-4281.
11. Palma CC, Pavesi M, Nogueira VG, Clemente EL, Vasconcellos Mde F, Pereira LC Júnior, Pacheco FF, Braga TG, Bello Lde F, Soares JO, Dos Santos SC, Campos VP, Gomes MB. Prevalence of thyroid dysfunction in patients with diabetes mellitus. *DiabetolMetabSyndr.* 2013 Oct 9;5(1):58.