International Journal of Research in Medical Sciences
Prakash V et al. Int J Res Med Sci. 2020 Mar;8(3):1119-1122
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: http://dx.doi.org/10.18203/2320-6012.ijrms20200791

Original Research Article

Prevalence of thyroid dysfunction in type 2 diabetics

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Received: 14 January 2020
Revised: 30 January 2020
Accepted: 05 February 2020

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ABSTRACT

Background: Type 2 Diabetes Mellitus has emerged as a common endocrine disorder in india. Thyroid dysfunction may complicate glycaemic control of diabetic patients. For better management of diabetes, it is necessary to detect and treat thyroid dysfunction in these patients.
Methods: This was an observational study conducted at SMS Hospital Jaipur, Rajasthan, India, between March 2016 to November 2017. Total 100 patients were included out of which 50 were Diabetic patients and 50 were age and sex matched nondiabetic controls reported in outpatient department of SMS Hospital, Jaipur. Patients of type 1 Diabetes, previously known case of thyroid disorder, patients having endocrine disorder or autoimmune disorder other than Diabetes, critically ill patients and pregnant females were excluded from study. Serum Fasting Blood Sugar, Free T3, Free T4, TSH were measured in all study subjects and results were analysed statistically to find out if there is any difference in prevalence of thyroid dysfunction in Diabetic patients and non-diabetic controls.
Results: Thyroid dysfunction was present in 16 (32%) of 50 type 2 diabetics and 3 (6%) of 50 nondiabetic controls. The prevalence of thyroid dysfunction in type 2 diabetic females and males was 43.3% and 15% respectively. Mean fasting blood sugar was higher in diabetic patients having thyroid dysfunction (209.12 mg/dl) as compared to euthyroid diabetic subjects (173.58 mg/dl). Twelve (75%), out of 16 study subjects with thyroid dysfunction have secondary hypothyroidism. Three (18.75%) of them have mild (sub-clinical) hypothyroidism. One person (6.25%) has subclinical hyperthyroidism.
Conclusions: Prevalence of thyroid dysfunction is higher in type 2 diabetic patients as compared to nondiabetic. Better glycaemic control is observed in euthyroid diabetic patients as compared to diabetic patients having thyroid dysfunction.

Keywords: Diabetes mellitus, Jaipur, Prevalence, Thyroid dysfunction

INTRODUCTION

Diabetes mellitus is a group of metabolic disorders sharing the common underlying feature of hyperglycemia. Diabetes can be a devastating disease because the abnormal glucose metabolism and other metabolic derangements have serious pathologic effects on virtually all the systems of the body. The pathogenesis of the long-term complications of diabetes is multifactorial, although persistent hyperglycemia seems to be a key mediator.[1] The disease burden related to diabetes is high and rising in every country, due to the global rise in the prevalence of obesity and unhealthy lifestyles.

The global prevalence (age-standardized) of diabetes has nearly doubled since 1980, rising from 4.7% to 8.5% in the adult population, expected to rise to 592 million by 2035.[2,3] Prevalence of Diabetes Mellitus in India in 2013 was 65.1 million and it will be increased to 109 million in 2035.[3]

Prevalence of thyroid dysfunction represented by hyperthyroidism, hypothyroidism and subclinical hypothyroidism and hyperthyroidism in adult population was 6.6%.[4] Thyroid dysfunction may present either as hyperthyroidism or hypothyroidism and both can be differentiated by levels of Thyroid Stimulating Hormone (TSH) in serum.[4] Autoimmunity was stated to be the underlying mechanism behind the increased prevalence of thyroid disorders in type 1A diabetes.[5]

But this cannot explain high prevalence of thyroid disorders in antibody negative (type 1B) or type 2 diabetics.[6,7] According to some authors insulin treatment in type 1 diabetics and high plasma level of insulin in type 2 diabetics due to insulin resistance may equally predispose both groups to derange thyroid function.[7-9] Various studies have found that diabetes and thyroid disorders mutually influence each other and both disorders tend to coexists. The most common thyroid dysfunction in diabetics is subclinical hypothyroidism.[10] Early diagnosis and treatment of coexisting thyroid dysfunction is beneficial to Type 2 diabetic patients in preventing future complications.

This study aims at finding difference in proportion of thyroid dysfunction among type 2 diabetic and non-diabetic age and sex matched controls.

METHODS

This prospective, observational study was done in SMS Hospital, Jaipur from March 2016 to November 2017. In this study 50 Diabetic patients and 50 age and sex matched nondiabetic patients reported in outpatient department of SMS Hospital were taken after applying inclusion and exclusion criteria.

Inclusion criteria

- Known Case of Diabetes Mellitus type 2.

Exclusion criteria

- Patients with Type 1 DM.
- H/O endocrine or other autoimmune disease other than diabetes.
- Diabetic patient having previous evidence of thyroid disease or on the treatment for the same.
- Critically ill patients unable to give consent.
- Pregnant female

Statistical analysis was performed with the SPSS, version 21 for Windows statistical software package (SPSS Inc., Chicago, IL, USA). The Categorical data was presented as numbers (percent) and were compared among groups using Chi square test. The quantitative data was presented as mean and standard deviation and were compared by student's t-test. Probability was considered to be significant if less than 0.05.

RESULTS

Authors enrolled 50 patients (20 male and 30 females) of diagnosed cases of Type 2 diabetes mellitus and 50 nondiabetic's case of minor ailments. Minimum age of patients was 35 and maximum was 60. Out of 50 diabetics patients ,16 were having thyroid dysfunction.

In this study authors compared the fasting blood sugar level in diabetes patients and its association with thyroid function status. Mean fasting blood sugar was higher in diabetic patients having thyroid dysfunction (209.12 mg/dl) as compared to euthyroid diabetic subjects (173.58), and this difference was statistically significant (p=0.005) (Table 1).

Table 1: Comparing mean fasting blood sugar (mg/dl) in diabetic patients.

	Mean	SD	p value
Euthyroid diabetics	173.58	39.03	0.005
Dysthyroid diabetics	209. 12	42.98	

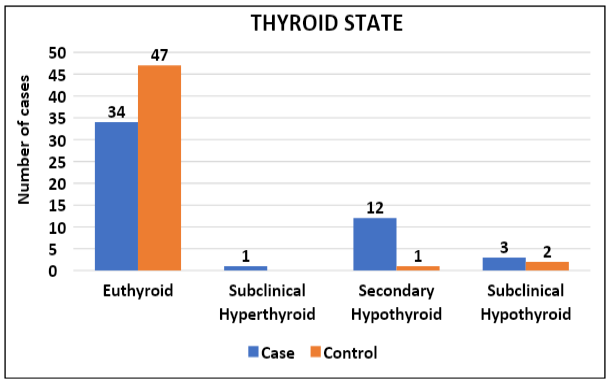

Figure 1: Thyroid function pattern in type 2 diabetics and controls.

In this study authors observed the prevalence of thyroid dysfunction in diabetes patients. Thyroid dysfunction was found in 32% of type 2 DM patients, and in 6% of controls (p=0.0009). Difference is statistically significant. 13 (43.3%) out of 30 diabetic females and 3 (15%) out of 20 diabetic males were having dysfunctional thyroid. This puts the overall prevalence of thyroid dysfunction in type 2 diabetics at 43.3% and 15% in females and males respectively.

The pattern of thyroid dysfunction observed in the Type 2 DM patients were also observed. Twelve (75%), out of 16 study subjects with thyroid dysfunction have secondary hypothyroidism and these include 10 females and 2 males whose TSH values were within the stipulated reference range and FT3 and FT4,were both low, three (18.75%) of them have mild (sub-clinical) hypothyroidism with high TSH while both FT3 and FT4 were normal. One person (6.25%) has subclinical hyperthyroidism (Figure 1).

DISCUSSION

In the present study a high prevalence of thyroid dysfunction was observed in type 2 diabetic subjects as compared to that found in the normal population and similar results were reported in previous studies. On comparing mean fasting blood sugar in diabetic group, it was 173.6 mg/dl in euthyroid patients and 209.1 mg/dl in diabetics with dysfunctional thyroid state. These differences were highly significant. A study conducted by Cho JH et al, also suggested that Poor glycemic control in T2DM was associated with the risk of SCH, especially in elderly women.[11] But study conducted by Jin kui yang et al.[12] There was no significant difference in glycemic control in subjects of both group.

The findings in this study include an overall thyroid dysfunction prevalence higher ($p<0.05$) in type 2 diabetics than in controls. This finding agrees with those of Radaideh et al, Smithson and Ibrahim M Elmenshawi et al, of whom reported similar findings in Jordan and in the UK respectively.[7,13,14] However the prevalence rate of 32% found in type 2 diabetics in this study is much higher than 10.8% reported by Smithson in the UK and 12.5% reported by Radaideh et al, in Jordan.[7,13] In study done by Ibrahim M Elmenshawi et, prevalence of thyroid dysfunction was 31%.[14]

Among the types of thyroid dysfunction, secondary hypothyroidism (75%) was found to be the most common form of thyroid dysfunction in patient of type 2 DM was in sharp contrast with the earlier studies of Cooper et al, Radaideh et al, Johnson, Rama et al, Weetman, Singh et al and Vikhe et al, all of which reported subclinical hypothyroidism as the most prevalent thyroid dysfunction.[7,15-20] Among the subject's females were predominant and thyroid dysfunction was found to be more common in female as compared to male type 2 diabetics. Celani et al, and Papazafiropoulou et al, in their study also reported significantly higher prevalence of thyroid dysfunction in female.[21,22]

The single hyperthyroid type 2 diabetic in this study is a male and this agrees with Udiong et al, who reported a higher prevalence of hyperthyroidism in male diabetics in Calabar.[8]

CONCLUSION

This study shows prevalence of thyroid dysfunction is higher in type 2 diabetic patients as compared to nondiabetic. So early detection and treatment of thyroid dysfunction in patients with type 2 diabetes can decrease future complications and helpful in achieving better glycemic control.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Prakash V, Marker S, Rao K, Nawal CL, Chejara RS. Prevalence of thyroid dysfunction in type 2 diabetics. Int J Res Med Sci 2020;8:1119-22.