

Thyroid Dysfunction in Type 2 Diabetes Mellitus in Saharanpur (INDIA)

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(Received 25 Dec, 2016; Accepted 06 Jan, 2017; Published 03 Feb, 2017)

ABSTRACT: The Incidence of Maturity onset diabetes i.e. type 2 diabetes is increasing in India. Thyroid dysfunction which was considered as a very rare hormonal disorder is also having a rising trend in incidence. Keeping in view of both the hormonal disorders and also other studies the present work in Saharanpur (India) was carried out to know the relationship if any between the two diseases. Due to lack of adequate information about this relationship may be responsible for diabetic patients who may have developed thyroid dysfunction. The study population consisted of (n=100) subjects divided into two groups: diabetic group (n=50) and non-diabetic (n=50) as an healthy control group. The biochemical parameters such as – fasting plasma glucose; triiodothyronine (T₃), total thyroxine/tetraiodothyronine (T₄) and Thyroid Stimulating Hormone (TSH) were measured for the assessment of thyroid dysfunction. Therefore, the present study identified the patients at risk with subclinical hypothyroidism in type 2 diabetes.

Keywords: Hypothyroidism; Hyperthyroidism; Type 2 diabetes mellitus (type 2 DM) and Thyroid Stimulating Hormone (TSH).

INTRODUCTION: The association between diabetes and thyroid dysfunction were first published in 1979.¹ The present study was for assessment of Thyroid dysfunction in type 2 diabetes patients. Thyroid dysfunction is a disorder of Thyroid gland which manifests either as hyper or hypothyroidism and is reflected in the level of thyroid stimulating hormone (TSH).² Diabetes Mellitus is the commonest endocrine disorder, leading cause of death worldwide.³ After, 1979 a number of studies estimated prevalence of thyroid dysfunction among diabetes patients ranging from 2.2 to 17%^{4,5} & ⁶ however, fewer studies have estimated higher prevalence of thyroid diabetics i.e. 31% & 46.5% respectively.⁷ & ⁸ Hypothyroidism is a clinical syndrome occurs from a deficiency of thyroid hormones. It is very common thyroid problem in diabetic patient.⁹

Thyroid hormones and insulin are the antagonists and both are involved in cellular metabolism of carbohydrates, proteins and lipids. The functional impairment occurs in thyroid hormones as well as insulin if their levels changed.¹⁰ Diabetes Mellitus (DM) appears to influence thyroid function in two sites: firstly at the level of hypothalamic control of TSH release and secondly at the conversion of T₄ to T₃ in the peripheral tissue. Increased hyperglycemia causes reversible reduction of the activity and hepatic concentration of T₄-5-deiodinase, low serum concentration T₃ increase in reverse T₃ and also variation in the level of T₄.¹¹

Failure to identify the imbalance of thyroid hormone in the patients with type 2 diabetes may be a measure cause of poor management and diagnosis of diabetic patients. Therefore there is need to consider the thyroid hormones in type 2 diabetic patients as routine investigations and serum T₃, serum T₄ and serum TSH are more reliable and sensitive tests for thyroid dysfunction in the management of type 2 diabetic patients. Therefore the present study is carried out for the assessment of thyroid dysfunction in type 2 diabetic patients of Saharanpur (U.P.) by the measurement of serum T₃, Serum T₄ and Serum TSH levels.

MATERIALS AND METHODS: The patients (Type 2 DM) attending Institute in Saharanpur (India) between July 2015 to Sept. 2016 was taken up for study purpose. Blood glucose was estimated by glucose Oxidase. Peroxidase (GOD-POD) enzymatic method by using spectrophotometer (Systronics). Glycosylated haemoglobin (HbA1c) was measured by resin ion exchange method. Estimation of total T₃ (Serum Triiodothyronine), total T₄ (Serum Thyroxine) and total TSH (Serum Thyroid Stimulating Hormone) were done by commercial available ELISA Kit. All the values were expressed as Mean ± SD Student's t-test was used to assess the statistical significance of the results. p value ≤ 0.05 was used as threshold of significance.

RESULTS AND DISCUSSION: This study showed a high prevalence of thyroid dysfunction in type 2 DM (31.21%) in comparison with other studies done in other parts of the world except in one study done in Spain¹² who found an overall prevalence of thyroid dysfunction in 32.4% of type 2 diabetics patients. A study in Jordan⁶ found the overall prevalence of thyroid disease in type 2 DM to be 12.5% and 6.6% in the control group and the most common is subclinical hypothyroidism. In another study in Saudi Arabia¹³ the association between thyroid dysfunction, thyroid autoimmunity and type 2 DM was investigated and found that thyroid autoimmunity in diabetics was 10% and in the control it was 5%, while thyroid dysfunction was found in 16% diabetics and 7% control. In a study done in Greece the prevalence of thyroid dysfunction in type 2 DM was found to be 12.3% with a higher prevalence in females (14).

CONCLUSION: The reason for high prevalence observed in our study is unknown as it is beyond the scope of this study. In conclusion, based on our finding we can say that the prevalence of thyroid disorder is quite high in type 2 DM and most of them have subclinical hypothyroidism, and most of these patients were above 45 of age. Prevalence was higher in female patients and patients with BMI higher than 25 were at increased risk. It correlates to the study in Greece where they found a higher prevalence in females.¹⁴ Possible influence of female hormonal influence in addition of diabetes in thyroid dysfunction cannot be denied and requires further work.

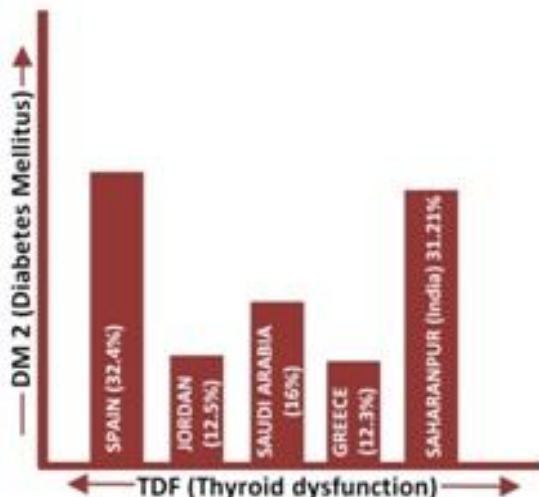


Figure 1: Incidence of thyroid dysfunction in DM 2 in different studies.

ACKNOWLEDGEMENT: The authors kindly acknowledge Mulayam Singh Yadav Medical College & Hospital, Meerut as well as department of Microbiology & department of Pharmaceutical Chemistry of Shobhit University, Gangoh – Saharanpur for providing resources for the study. This study was done at the

department of Microbiology of Shobhit University, Saharanpur.

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