

## Association of Thyroid Disorder in Type 2 Diabetic Patient

Dr. M. Anita Devi<sup>1</sup>, L. Samananda Singh<sup>2</sup>, Dr. N. Sashikanta Singh<sup>3</sup>

<sup>1</sup>Professor & Head, Department of Physiology, RIMS, Imphal, Manipur – 795004.

<sup>2</sup>Junior Research Fellow, Department of Physiology, RIMS, Imphal, Manipur – 795004.

<sup>3</sup>Medical Officer, CHC, Shagolmang

**Abstract:** Diabetic patients are highly associated with thyroid disorders, it may disrupt in the treatment of diabetes. The present study was done in the department of physiology, RIMS, after getting approval from the institutional ethical committee. Sample was collected from the known cases of type 2 diabetic patients as well as non-diabetic cases. The study consisted of total-120 cases, out of which 50 were taken as control and 70 were known type 2 diabetic patients. Glucose level, glycosylated haemoglobin and thyroid hormone levels (T3, T4 and TSH) were estimated. The serum T3 and T4 level of type 2 diabetic patients had significantly reduced as compared to the control whereas TSH level were found high. In this study, Type 2 diabetic patients were highly associated with hypothyroidism as compared to control.

**Key words:** Type 2 diabetes                      T3, T4 and TSH                      Hypothyroidism

### I. Introduction

Type 2 diabetes is characterised by combination of defective insulin secretion and peripheral insulin resistance (1). The endocrine disorders, such as thyroid abnormalities associated with Diabetes (2, 3). Thyroid hormones are involved in cellular functions, excess or deficit of these hormones can produce in functional derangement of cell (4, 5). Association of thyroid hormone disorders in type 2 diabetic patients are very common (6). Since, findings from the different study reports were differed, the prevalence rates of thyroid dysfunction in diabetic patients still remain controversial. Moreover not many studies have been reported in thyroid dysfunction in type 2 diabetes. Therefore, this study was carried out in the department of physiology, RIMS, Imphal to see the profile of thyroid disorders in type 2 diabetic patients.

### II. Materials And Methods

The study was conducted in the department of physiology, RIMS, Imphal after getting approval from the institutional ethical committee. Samples were collected from the known cases of type 2 diabetic patients who live in the urban areas of Manipur. The study consisted of total-120 subjects, out of which 70 were known type 2 diabetic cases and 50 were taken as control. Subjects were selected who had no previous history of thyroid disorders. Age, weight, sex, height and BMI were recorded. The levels of serum thyroid stimulating hormone (TSH), total triiodothyronine (T3) and total thyroxine (T4) were also measured by using Lisa Scan EM. Then, Blood glucose was tested by ACCU-CHEK active whereas HbA1C was determined by Bayer's Multitest A1C System. All data were expressed as mean  $\pm$  SEM and statistical significance was evaluated by Student's t-test using SPSS version 20.0 Software.

### III. Results

Age, weight, sex, height and BMI of control and diabetic subjects were shown in table-1. The serum thyroid hormone levels of diabetic and non-diabetic subjects were shown in table-2. The Level of T3 and T4 in diabetic subjects showed significant reduction when compared to control whereas TSH was significantly high. The percentage of glycosylated haemoglobin (HbA1c) in diabetic subjects was found significantly higher than normal subjects.

Table - 1 Baseline characteristics of study subjects.

Demographic profile	Control	Diabetic subjects
Age (years)	49.48 $\pm$ 1.43	51.36 $\pm$ 1.31
Weight (kg)	61.58 $\pm$ 1.54	59.17 $\pm$ 1.60
Sex	Male	20
	female	30
Height (cm)	159.21 $\pm$ 6.24	160.04 $\pm$ 6.45
BMI (kg/m <sup>2</sup> )	23.86 $\pm$ 4.23	25.14 $\pm$ 2.35

All values are in mean  $\pm$  SEM.

Table - 2 comparing between normal subjects and diabetic subjects

Parameters	Control	Diabetic subjects
T3 (ng/ml)	1.83±0.12	1.12±0.14*
T4 (µg/dl)	8.75±0.27	7.79±0.21*
TSH (mIU/L)	2.72±0.18	4.16±0.23*
A1C (%)	5.64±0.13	7.75±0.31*
Glucose (mg/dl)	Fasting	180.3±11.70*
	Random	282.4±14.11*

All values are in mean ± SEM. \*p<0.05

Normal range [T3 is 0.69-2.02 ng/ml, T4 is 4.4-11.6 µg/dl and TSH is 0.3-4.0 mIU/L]

#### IV. Discussion

This study showed that the mean serum T3 and T4 in patients were significantly lower than control. However, TSH level was significantly higher in the diabetic patients which indicates hypothyroidism in the diabetic patients. Our Study result correlates with the findings of *Singh et al.* (5) who showed a significant decrease in T3 and T4 levels in type 2 diabetic patients. Diabetic cases were assessed by the glycosylated haemoglobin (HbA1c) and fasting glucose level, which indicates poor glycaemic control in diabetic patients.

Abnormal thyroid hormones in diabetes may also depend on the glycaemic status of the diabetic patients. Glycaemic status is influenced by insulin, which modulates the Thyrotropin-releasing hormone (TRH) and thyroid stimulating hormone (TSH) level (7, 8). It has also been reported that in diabetes abnormal thyroid hormone level was found is due to the presence of thyroid hormone binding inhibitor (THBI) which is an inhibitor of the extra thyroidal conversion enzyme of T4 to T3 and also due to the dysfunction of hypothalamic-pituitary-thyroid axis (9).

#### V. Conclusion

In this study, association of hypothyroidism was shown in type 2 diabetic patients as compared to control. In the treatment of diabetes, early detection of abnormal thyroid hormone levels and other bio-chemical variables will be helpful.

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