ORIGINAL RESEARCH PAPER

Volume-9 | Issue-3 | March-2020 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

DIURNAL VARIATION OF THYROID DYSFUNCTION IN FASTING, POSTMEAL & RANDOM BLOOD SAMPLES IN PROLONGED DIABETICS

Biochemistry

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ABSTRACT

BACKGROUND: Diabetes mellitus (DM) and thyroid dysfunction (TD) are the two most common endocrine disorders in clinical practice . Patients with diabetes mellitus are at an increased risk of developing thyroid diseases.[1] The frequency of thyroid dysfunction in diabetic patients is higher than that of the general population and up to a third of patients with diabetes (DM) ultimately develop thyroid dysfunction. Thyroid dysfunction may impair metabolic control and add to cardiovascular disease risk in prolonged diabetic patients.[2] The objective of this study was to investigate the prevalence of Thyroid dysfunction in patients with diabetes mellitus.

AIMS: Our aim is to study Pearsons correlation between thyroid dysfunction in diabetes mellitus and to examine thyroid disease screening strategies in routine diabetes care, in diabetic patients (fasting,postmeal,Random blood samples) attending clinical biochemistry OPD at tertiary care Unit, IGGMC, Nagpur.

MATERIALS & METHODS – This study include about 150 patients attending the clinical Biochemistry OPD, IGGMC, Nagpur. All Diabetic patients (more than 5 yrs) who were attending biochemistry OPD for routine Blood sugar tests were selected for this study. History was taken as per designed proforma and consent form was obtained. We collect 50 Fasting Blood samples ,50 Postmeal & 50 Random blood samples from known Diabetic patients .Collected sample was analysed for Blood sugar as well as thyroid test ie T3,T4 & TSH. Blood sugar test was run on Autoanalyser EM 460 in clinical Biochemistry Laboratory,IGGMC,Nagpur. Thyroid tests was run on Elisa reader & washer Serum values of Thyroid stimulating hormone (TSH), thyroxine (T4) and tri-iodo thyronine (T3) were assayed by ELISA tests and values were compared & correlated with Blood sugar level in Diabetics in all groups Fasting,Postmeal as well as Random Blood samples. The data was analysed & Pearsons Correlation was obtained. Student's T-test was used & . P value <0.05 was considered statistically significant.

RESULTS: Results of our study shows Positive Pearsons correlation between TSH level & Blood sugar in Fasting, Postmeal & Random Blood samples of all Diabetic Patients while there is Negative Pearsons correlation between T3,T4 in all Diabetics. P value is found to be statistically significant in all groups (cases)

CONCLUSIONS: We conclude that screening for thyroid disease among patients with diabetes mellitus should be routinely performed considering the prevalence of new cases diagnosed and the classical risk factors such as hypertension and dyslipidemia, arising from an undiagnosed thyroid dysfunction.

KEYWORDS

Blood Sugar level, Fasting, Post meal & Random, Thyroid Profile Test, Prolonged Diabetes

INTRODUCTION

Diabetic patients have a higher prevalence of thyroid disorders compared with the normal population Diabetes Mellitus (DM) and thyroid dysfunction (TD) are the two most common endocrine disorders in clinical practice [3]. The association between DM and TD is widely known, with the first studies published in 1979 [4]. Since then, several studies in different countries were conducted to estimate the prevalence of TD in diabetic patients. The relationship between TD and DM is characterized by a complex interaction of interdependence. Screening of TD, especially the subclinical dysfunction, in patients with DM is justified because most patients can be asymptomatic.[5]

The strong link between diabetes and thyroid diseases encouraged the American Diabetes Association (ADA) to propose that people with diabetes must be checked periodically for thyroid dysfunction [6]. Thyroid disease should be screened annually in diabetic patients to detect asymptomatic thyroid dysfunction [7].

Objectives of the study

1) The aim of this study is to investigate the prevalence of TD in patients with diabetes mellitus (DM)
2) To study Pearsons correlation between Blood sugar level in prolonged diabetes & thyroid profile
3) To study correlation between fasting, postmeal, random blood sugar with thyroid dysfunction in prolonged diabetics

Method of collection of data & selection of subjects:

This study include about 150 patients attending the clinical Biochemistry OPD, IGGMC, Nagpur. All Diabetic patients (history of Diabetes more than 5 yrs) who were attending biochemistry OPD for routine Blood sugar tests were selected for this study. History was taken as per designed proforma and consent form was obtained. We collect 50 Fasting Blood samples , 50 Postmeal & 50 Random blood samples from known Diabetic patients Collected sample was analysed for Blood sugar as well as thyroid test ie T3,T4 & TSH.

Serum values of Thyroid stimulating hormone (TSH), thyroxine (T4) and tri-iodo thyronine (T3) were assayed by ELISA tests and values were compared & correlated with Blood sugar level in Diabetics in all groups Fasting,Postmeal as well as Random Blood samples.

Blood sugar test was run on Auto analyser EM 460 in clinical Biochemistry Laboratory, IGGMC, Nagpur.

Blood sugar level was estimated by GOD-POD kit method.

Normal Range – Fasting (70 to 100 mg%) Postmeal (upto 150 mg%) Random (70 to 120 mg%)

Thyroid tests was run on Elisa reader & washer.

For T3, T4, TSH –

Immunoassay Elisa kit method on Elisa Reader & Washer

Normal Range –T3 - 0.52 to 1.85 ng/ml, T4 - 5 to 15 ug/dl, TSH – 0.39 to 6.16 uIU/ml

Analysis was carried on Autoanalyser EM – 460 in clinical Biochemistry lab, IGGMC for Serum cholesterol, Triglycerides, HDL,LDL & VLDL . All estimations was done & their values were compared & correlated. The data was analysed & Pearsons Correlation was obtained. Student's T-test was used & . P value <0.05 was considered statistically significant.

RESULTS

Blood Sugar	Correlation	T3	T4	TSH
Glucose fasting	Pearson Correlation P value	-0.703 0.000	-0.760 0.000	0.718 0.000
Glucose Post meal	Pearson Correlation P value	-0.330 0.001	-0.446 0.000	0.368 0.000
Glucose Random	Pearson Correlation P value	-0.396 0.000	-0.510 0.000	0.426 0.000

All p values are significant

	T3	T4	TSH	glucose (f)	glucose (PM)	glucose®
mean	1.0427	4.554	5.634	103.96	169.53	129.95
S.D	0.340982	2.65403904	4.706416	22.77156	34.24819	26.37851

DISCUSSION

Result of our study shows TSH level (Mean – 5.63) in Diabetic patients in all blood samples ie fasting, postmeal & random is positively correlated with Blood sugar level in Diabetes by Pearsons correlation (Table 1) Similarly Vice versa with T3 ,T4 & Blood sugar level which shows Negative Pearsons Correlation. Our findings similar to findings from Spain published by Díez et al. in 2011 [8],

Effects of thyroid hormones on various metabolic processes like diabetes mellitus may worsen diseased condition.. Uncontrolled hyperthyroidism in diabetic patients may trigger hyperglycaemic emergencies while recurrent hypoglycaemic episodes have been reported in diabetic patients with hypothyroidism.[9] Furthermore, thyroid dysfunction may amplify cardiovascular disease risk in diabetic patients through inter-relationships with dyslipidaemia, insulin resistance and vascular endothelial dysfunction.[10]

Our result of a positive correlation between blood sugar level and TSH is consistent with the results by Hollowell,et al. [11].

In a study by M. F. Celani et al. [12], 89 % of patients had hypothyroidism and 11 % had hyperthyroidism. Hypothyroidism was shown to be more prevalent thyroid disorder in type 2 diabetics in the studies of Strieder, M. F. Prummel et al. [13]. The increased frequency of thyroid dysfunction in diabetic patients and its likely deleterious effects on cardiovascular and metabolic function calls for a systematic approach to thyroid disease screening in diabetes.[14] Routine annual thyroid testing should be targeted at diabetic patients at risk of thyroid dysfunction such as patients with DM

CONCLUSION –

Thyroid dysfunction is common in diabetic patients and can produce significant metabolic disturbances. The presence of thyroid dysfunction may affect diabetes control. Therefore, regular screening for thyroid abnormalities in all diabetic patients will allow early treatment and prevent further complications as well as improve diabetic control which can be otherwise adversely affected by thyroid dysfunction..

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