

Correlative study of dyslipidemia among hypothyroidism and type-2 Diabetes Mellitus of Telangana Rural Population - Retrospective Study

Chakrapani Vuppula¹, Thota Abhinav^{2*}, Hita Vuppala³

¹Assistant Professor, Department of General Medicine, TRR Institute of Medical Sciences Panjagutta, Hyderabad, Telangana, India

²Assistant Professor Department of General Medicine TRR Institute of Medical Sciences Inole (V), Patancheru (M) Hyderabad, Telangana, India

³PG Student Department of Radiagnostics, Malla Reddy Medical College Hyderabad-500015, Telangana, India

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Abstract

Background: Diabetes and thyroid dysfunctions are commonly associated with cardiovascular disorder which results in morbidity and mortality. **Methods:** out of 120, forty were type-II DM, forty Hypothyroid and forty had both DM and Hypothyroidism. These patients were compared with healthy volunteers (controlled) group of same number (40), Every patient underwent Biochemical study including plasma glucose, lipid profile and thyroid profile. **Results:** All the parameters of Biochemistry Glucose and lipid profile were higher in type DM with Hypothyroidism patients except HDL which is at lower side. **Conclusion:** This pragmatic correlative study having low thyroid function profile is positively associated with lipid dysregulation in patients with DM and hypothyroidism. These findings will be a tool for clinicians to treat such patients efficiently to avoid morbidity and mortality.

Keywords: Lipid profile, chemiluminescence Immuno assay, plasma glucose, Hypothyroidism, Telangana

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Introduction

Type-II DM (Diabetes Mellitus) is most commonly seen metabolic disorder as it affects more than 385 million population and expected to reach about 590 million by 2035 globally[1].

Type-II DM is usually associated with dyslipidemia which increases the cardiovascular disorders[2]. Thyroid dysfunction is a common endocrinal disorder in the general population. The prevalence rate of thyroid dysfunction is much higher among type-II DM and ranges from 7% to 16%, and 4-14% hypercholesterolemia is reported as a hypothyroid state.

Moreover cardio vascular dysfunction [3], Dyslipidemia and atherosclerosis related to cardiovascular disorders were proved to be associated with hypothyroidism[4]. Sinus tachycardia, Atrial flutter and Atrial fibrillation are commonly found in patients suffering from overt or subclinical hyperthyroidism. It is also reported that, even with relative low thyroid functions which commonly remain within the normal range might be more dangerous in type-II Diabetics[5]

Hence correlative study of dyslipidemia among Hypothyroidism and type-II DM is evaluated individually and also in patients suffering with both DM and hypothyroidism, so that the various parameters will predict the consequences of such patients in both sexes.

Material and Method

120 adult patients aged between 20 to 50 years visiting the Medicine department of TRR Medical Collage Hospital were studied.

Inclusive Criteria

40 patients having only T2-II DM, 40 patients having only Hypothyroidism and 40 patients having both DM and hypothyroidism were selected after confirmation by blood examination.

*Correspondence

Dr. Thota Abhinav

Assistant Professor Department of General Medicine TRR institute of Medical Sciences Inole (V), Patancheru (M) Hyderabad, Telangana, India

E-Mail: chakrapanii1962@gmail.com

Exclusion Criteria

The patients suffering from cardio-vascular disease, malignancy of thyroid and immune-compromised patients are excluded from study.

Methods

Three groups were made into forty (40) T2-DM, forty (40) Hypothyroidism, 40 (forty) DM and Hypothyroidism. These 120 (one twenty) patients were compared with, 40 (forty) healthy volunteers (controlled group).

Every patient was examined by all Biochemical investigations i.e. plasma glucose, lipid profile and Thyroid profile. These tests are carried out by using fully automated biochemistry analyzer by Turbo Chem Awareness Technology Int., Reagents kits by CPC Diagnostics. Thyroid hormonal assay was estimated by chemiluminescence Immuno-assay Methods. The duration of study was from January-2018 to December-2019.

Statistical analysis

Various parameters from all four groups were studied to get the mean value and standard deviation. So that significant values can be noted for study. The statistical deviation was carried out in SPSS software.

The ratio of the male and females 1:2

Observation and Results

Table-1: Mean values and SD of lipid profiles in type-II DM, Hypothyroidism and controls.

1. Fasting glucose was 190.7 (± 3.70) in DM, 90.48 (± 2.00) in Hypothyroidism (Hy), 190.80 (± 1.80) in DM with Hy and 86.5 (± 1.00) in control group
2. TC (Total Cholesterol) – 308.1 (± 4.20) in DM, 311.5 (± 1.33) in Hy, 335.9 (± 4.50) in DM and Hy, 172 (± 1.33) in controlled.
3. TG (triglycerides) – 327.4 (± 4.30) in type-II DM, 319.9 (± 2.40) in Hy, 349.05 (± 6.11) in type-II DM and Hy, 168.6 (± 1.70) in controlled.
4. VLDL – 64.8 (± 0.90) in type-II DM, 62.3 (± 0.42) in Hy, 69.90 (± 1.09) in type-II and Hy, 33.70 (± 0.32) in controlled.
5. LDL – 215.9 (± 4.8) in type-II DM, 205.6 (± 1.53) in Hy, 235.2 (± 4.02) in type-II and Hy, 99.5 (± 1.30) in controlled.
6. HDL – 29.2 (± 0.25) in type-II DM, 29.92 (± 0.20) in Hy, 30.70

(±0.26) in type-II and Hy, 40.3 (±0.49) in controlled. in type-II and Hy, 3.95 (±0.11) in controlled group.
 7. TSH – 3.89 (±0.10) in type-II DM, 20.08 (±1.55) in Hy, 23 (±0.95)

Table 1: Mean values and standard Errors of lipid profile type-II DM, Hypothyroidism and controlled

Particular	Glucose Fasting (GF)(mg/ml)	TC (mg/dl)	TG (mg/dl)	VLDL (mg/dl)	LDL (mg/dl)	HDL Mg/dl)	TSH
Type-II DM	190.2 (±3.70)	308.10 (±4.20)	327.44 (±4.30)	64.82 (±0.90)	215.90 (±4.8)	29.21 (±0.25)	3.89 (±0.10)
Hypothyroidism HY	90.48 (±2.00)	311.53 (±1.33)	319.9 (±2.40)	62.32 (±0.42)	205.4 (±1.65)	39.92 (±0.20)	20.08 (±1.55)
Type-II DM with Hypothyroidism	190.80 (±1.80)	355.90 (±1.88)	349.05 (±26.11)	69.90 (±1.09)	235.2 (4.02)	39.92 (±0.20)	20.08 (±1.55)
Control group (Normal)	86.5 (±1.00)	172 (±1.33)	167.60 (±1.70)	33.70 (±0.32)	99.55 (±0.30)	40.30 (±0.49)	3.95 (±0.11)

All the Biochemical parameters except HDL are higher in type-II DM and Hypothyroidism patients

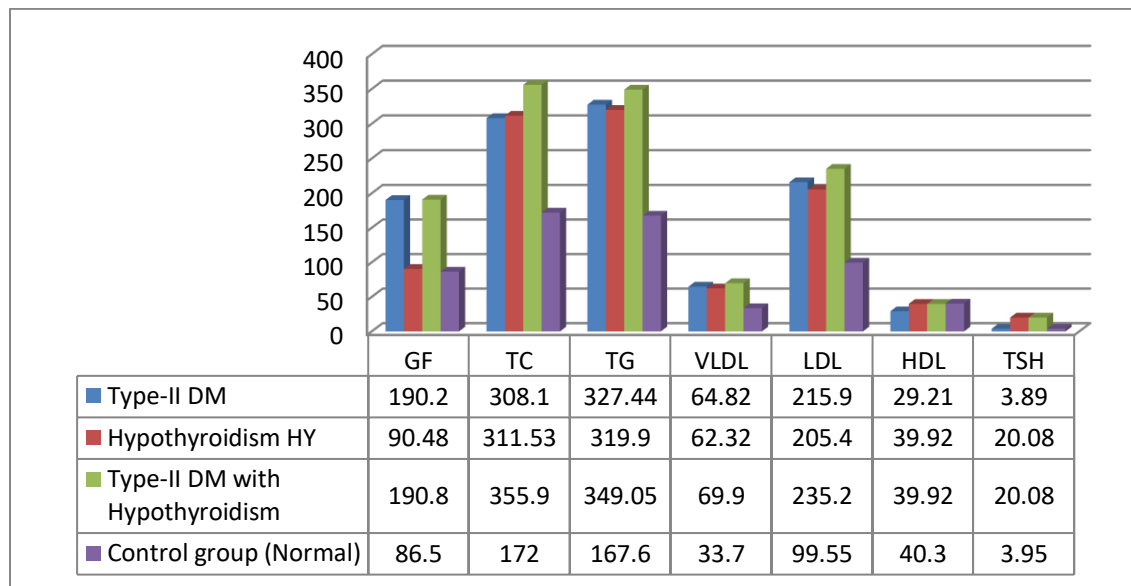


Fig 1: Mean values and standard errors of lipid profile type-II DM, Hypothyroidism and controlled

Discussion

Present correlative study of dyslipidemia among hypothyroidism and type-II DM patients of Telangana Rural population. The mean values with SD in type-II DM patients had 190.3 (±3.70) Fasting blood glucose, 308.10 (±4.20) TC, 327.44 (±4.30) TG, 64.82 (±0.90) VLDL, 215.90 (±4.8) LDL, 29.21 (±0.25) HDL, 3.89 (±0.10) TSH. In Hypothyroidism patients – 90.48 (±2.0) Glucose fasting, 308.10 (±4.20) TC, 62.32 (±0.42) VLDL, 319.9 (±2.40) TG, 205.66 (±1.65) LDL, 39.9 (±0.20) HDL, 20.08 (±1.55) TSH. In Type-II and Hypothyroidism patients 190.80 (±1.80) Glucose fasting, 335.9 (±4.50) TC, 349.05 (±6.11) TG, 69.90 (±1.09) VLDL, 235.2 (±4.02) LDL, 30.7 (±0.26) HDL, 23.9 (±0.95) TSH. In controlled group – 86.5 (±1.00) Glucose fasting, 172 (±1.33) TC, 168.6 (±1.70) TG, 33.70 (±0.32) VLDL, 99.55 (±1.30) LDL, 40.30 (±0.49) HDL, 3.95 (±0.11) TSH (Table-1), These findings are more or less in agreement with previous studies[6-8]. Hypothyroidism and DM accompanying hyper-cholesterolemia and hypertension shows strong association with cardio-vascular diseases especially in adult women[9]. Dyslipidemia is a single major risk factor for development of cardiovascular complications. It was observed that overt hypothyroidism occurred with major changes in lipoprotein fractions which leads to cardiovascular complications. The prevalence of low HDL cholesterol level indicates increased level of hypertriglyceridemia associated with endocrine disorders[10]. The hypercholesterolemia of hypothyroidism is well known risk factor for cardio-vascular atherosclerotic disease that will aggravate both micro and Macro angiopathic changes in T2-DM patients leads to IHD

(Ischemic Heart Disease) and peripheral neuro-vascular complications.

This study reveals that hypothyroidism and DM with dyslipidemia is associated with much more deleterious effects. Moreover hypothyroidism in females may cause early menopause corroborated with dyslipidemic effects along with cholelithiasis also [11]. TSH was significantly associated with high triglycerides in type-II DM that related to visceral obesity and high risk of atherosclerosis susceptibility in DM patients. Moreover, positive correlation between TSH and TG, TC and LDL may be due to activation of autoimmune mechanism that is involved in lipoprotein production. TSH is also involved in hepatic expression of hydroxymethylglutaryl coenzyme-A Reductase which enhances cholesterol synthesis.

Summary and Conclusion

The present study of dyslipidemia in DM-type-2 and hypothyroidism patients had elevated lipid profile in DM with hypothyroidism patients indicates that endocrine abnormalities are directly related to lipid profile causing atherosclerosis, obesity, cholelithiasis.

But this study demands further genetic, nutritional, hormonal, patho-physiological, angiological studies because exact pathogenesis of atherosclerosis and pathways of hormones are still unclear.

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Conflict of Interest: Nil

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