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Research Article

Frequency of thyroid dysfunction in cases of metabolic syndrome

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ABSTRACT

Objective: Frequency of thyroid dysfunction in cases of metabolic syndrome

Material and methods: This case/control study was conducted at Department of Medicine Jinnah Hospital, Lahore from January 2018 to June 2018. Total 54 patients with metabolic syndrome were selected for this study. Thyroid dysfunction was assessed in selected patients.

Results: Amongst the controls 92.6% were euthyroid, 5.6% were hypothyroid, 1.9% were subclinical hypothyroid. Among cases 64.8% were euthyroid. Thyroid dysfunction was found to be prevalent among 35.2% metabolic syndrome patients.

Conclusions: Present study clearly reveals a higher incidence of thyroid dysfunction in metabolic syndrome. Metabolic syndrome and thyroid dysfunction are both considered as independent risk factors for cardiovascular disease. Therefore presence of both these entities in an individual increases the risk of a cardiovascular compromise. Hence assessment of thyroid function in metabolic syndrome might serve as a risk assesment tool to identify individuals predisposed to cardiovascular disease early, thereby resulting in a timely intervention.

Keywords: Thyroid dysfunction, Metabolic syndrome, Hypothyroidism

INTRODUCTION

Metabolic syndrome in its primitivity was described for the first time by Kylin E in 1920 as a constellation of hypertension, hyperglycemia, gout and android obesity.[1]The term “syndrome X” was used by Harmans Hellar in 1977.Reaven described it as “Insulin resistance syndrome”.[2]

The present name “Metabolic syndrome” was coined by WHO in 1999 for the constellation of symptoms comprising of hypertension, dyslipidemia, abdominal obesity, impaired fasting blood glucose.[3] Thyroid dysfunction is defined as an altered thyroid stimulating hormone status along with normal or altered thyroid hormone status. People suffering from metabolic syndrome are highly predisposed to suffer from cardiovascular disease. Few studies conducted in Asia have reported that 25%-35% of the total adult population in Asia is suffering from metabolic syndrome.[4,5]

Thyroid hormones have a profound role in metabolism and significantly influence lipid dynamics. Therefore even slightest alteration in thyroid hormone status might trigger an alteration in lipid metabolism rendering the person

dyslipidemic which in turn is an important feather in the cap called metabolic syndrome.[6]

We therefore intended to observe thyroid function in patients with metabolic syndrome and to decipher significant correlations if any which might in turn help in a better understanding of the complex metabolic cascade dysfunction which eventually predisposes a person with metabolic syndrome to develop cardiovascular disease.

METHODS

This case/control study was conducted at Department of Medicine Jinnah Hospital, Lahore from January 2018 to June 2018. Total 54 cases of metabolic syndrome who satisfied the IDF consensus (2006), men with waist circumference ≥90 cm and women with waist circumference ≥80cm were taken as having central obesity, triglyceride levels >150 mg/dl or those already receiving specific medication for same were classified as having dyslipidemic, HDL levels <40mg/dl in case of males and <50 mg/dl in case of females or those who were already receiving medication for these were considered as dyslipidemic, Blood pressure: systolic blood pressure >130 mm of Hg & diastolic blood pressure >85 mm of Hg were considered as hypertensive, Hyperglycemia: Fasting plasma glucose level>100 mg/dl or previously diagnosed cases of type 2 diabetes mellitus were excluded from the study. Known cases of hypothyroidism, subclinical hypothyroidism or hyperthyroid patient's already receiving treatment, individuals less than 18 years of age, pregnant women and patients with liver disorders, heart failure, renal failure were excluded from the study.

5 ml of venous blood was collected with full aseptic precautions from each patient and control subject after properly explaining the entire procedure in their local language. A written consent was obtained from each of these patients and subjects wherein they expressed their willingness to participate in the study. Each of the blood samples collected was subjected to assay for; Fasting blood glucose, Lipid profile, FT4 and TSH.

Waist circumference was recorded in horizontal plane midway between the inferior margin of the ribs and the superior border of the iliac crest. Blood pressure was recorded in both arms in supine posture after a minimum of 5 minutes of rest. Collected data was entered in SPSS version 16. Mean and SD was calculated for numerical data and frequencies were calculated for categorical data.

RESULTS

Present study clearly demonstrates the high incidence of thyroid dysfunction in patients with metabolic syndrome. Amongst the total of 108 individuals who participated in the study 38.8% males in the study group and 61.2% were females. In the control group though 27.7% were males and 72.3% were females. The mean waist circumference in the cases was 89.07±5.31 cm, whereas for the control group it was 69.07±4.03 cm. The mean FBS in cases was 187.02±59.86 mg/dl whereas in controls it was 80.76±9.55 mg/dl. A total of 51 out of the 54 cases exhibited impaired glucose tolerance and had FBS>100mg/dl. The patients with metabolic syndrome exhibited considerably higher ranges for both systolic and diastolic blood pressures (Table 1 and 2). 46 out of the 54 metabolic syndrome patients exhibited SBP >130 mg/dl. Results have been summarized from tables 1-4.

Table 1: Comparison of SBP among cases and controls.

Systolic Blood Pressure (SBP) [mm of Hg]	Cases (%)	Controls (%)
>130	8 (14.8)	54 (100)
<130	46 (85.2)	0
Total	54	54
Mean±SD	148.26±16.83	112.96±5.64

Table 2: Comparison of DBP in cases and controls.

Diastolic blood pressure (DBP) [mm of Hg]	Cases (%)	Controls (%)
>85	16 (29.6)	54 (100)
<85	38 (70.4)	0
Total	54 (100)	54 (100)
Mean±SD	88.81±7.35	74.22±5.08

Table 3: Comparison of TSH levels among cases and controls.

TSH (mIU/ml)	Cases (%)	Controls (%)
<0.45	0	0
0.45-4.5	35 (64.8)	50 (92.6)
>4.5	19 (35.2)	4 (7.4)
	54 (100)	54 (100)
Mean±SD	5.75±9.84	2.81±2.95

Table 4: Thyroid status in cases and controls.

Thyroid Status	Cases (%)	Controls (%)
Euthyroid	35 (64.8)	50 (92.6)
Subclinical hypothyroid	13 (24.1)	1 (1.9)
Hypothyroid	6 (11.1)	3 (5.6)
Inference	Hypothyroid and Subclinical hypothyroid is significantly more associated with cases with P<0.001	

DISCUSSION

Present study clearly demonstrates that thyroid dysfunction is more prevalent in patients with metabolic syndrome. This finding of ours is in clear agreement with the famous Rotterdam study.[7] The Rotterdam study has also reported that patients with hypothyroidism have a twofold increased risk of atherosclerosis.[7]

The increase in serum cholesterol in hypothyroidism is accompanied by increased levels of serum phospholipids, serum triglycerides and LDL cholesterol. The activity of cholesterol ester transfer protein is decreased in hypothyroidism, thus HDL cholesterol level reduced in hypothyroidism. Aneemieke Ross et al found that free T4 was significantly associated with insulin resistance and with four of five components of the metabolic syndrome (except glucose intolerance).[8]Uzunlulu et al have reported similar findings as ours wherein the mean blood pressure, mean waist circumference, TSH levels, cholesterol and triglyceride levels were found to be considerably higher in patients with metabolic syndromes as compared to healthy controls.[9]

CONCLUSION

Thyroid dysfunction, metabolic syndrome, dyslipidemia are all individual risk factors for development of cardiovascular disease specially ischaemic heart disease. Therefore a concomitant presence of both these entities clearly increases the risk of cardiovascular disease. Thus screening of metabolic syndrome patients for thyroid function will equip clinicians with the insight of identifying individuals who are at greater risk of suffering a cardiovascular morbidity.

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