A STUDY OF PREVALENCE OF THYROID DYSFUNCTION IN PATIENTS WITH METABOLIC SYNDROME

INTRODUCTION

Metabolic syndrome is generally characterized as a clustering of the abnormal levels of blood lipids (low High Density Lipoprotein (HDL) and high triglycerides), impaired fasting glucose, elevated blood pressure and excess abdominal obesity.

Obesity, insulin resistance, physical inactivity, advanced age and hormonal imbalance have been suggested as the underlying risk factors for the development of this syndrome. Metabolic syndrome affects approximately one quarter of the population in developed countries. People with metabolic syndrome are at an increased risk of atherosclerotic cardiovascular disease and type 2 diabetes.

Several studies have reported that higher thyroid stimulating hormone (TSH) concentrations are associated with a higher likelihood for the occurrence of metabolic syndrome.

Additionally, thyroid disease, especially overt hypothyroidism, is associated with atherosclerotic cardiovascular disease. Since metabolic syndrome and thyroid dysfunction are independent risk factors of atherosclerotic cardiovascular disease (CVD), the concurrent existence of the two will substantially increases the risk of CVD. Several studies have shown a significant association which links metabolic syndrome with subclinical and overt hypothyroidism and the association seen metabolic syndrome to be more in females. Uzunulu et al reported that the prevalence of subclinical hypothyroidism was more in females with metabolic syndrome.

AIMS AND OBJECTIVES

To study the prevalence and type of thyroid dysfunction in a diagnosed case of metabolic syndrome.

MATERIAL AND METHOD

This observational and non-interventional study was carried out at a tertiary care centre from June 2018 to December 2018. 100 metabolic syndrome patients, attending OPD and admitted in medicine ward of our institute and fulfilling the criteria of NCEP-ATP III guideline were included in this study. Subjects were screened with the following inclusion/exclusion criteria.

EXCLUSION CRITERIA:
- Critically ill patients
- Pregnant women
- Patients with Drug induced thyroid dysfunction
- Patients with Thyroid malignancy

Methodology:

A complete physical and systemic examination was performed including CBC, RFT, Blood Glucose profile, Thyroid examination, complete urine. X-ray chest, USG-KUB, 2D-echo was performed in all cases.

Comparison with various studies:

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Our study</th>
<th>Uzunulu’s study</th>
<th>Ghanshyam P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>57.63 ± 10.58</td>
<td>48.5 ± 11.3</td>
<td>51 ± 9.4</td>
</tr>
<tr>
<td>Sex (M:F)</td>
<td>40:60</td>
<td>53:167</td>
<td>180:240</td>
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</tbody>
</table>

RESULTS AND DISCUSSION

Comparison with various studies:

Fasting plasma glucose >110 mg/dl
Triglyceride >150 mg/dl
HDL cholesterol <40 mg in men, <50 mg in women
Causes hypertriglyceridaemia. and biliary excretion of cholesterol thus resulting in elevated serum LDL receptors, thus leading to LDL clearance from the serum. Lipoprotein (a) [Lp(a)] levels and possibly, triglyceride levels. Plasma cholesterol levels as proven by the HUNT study also seen in unclear. It is known that overt hypothyroidism to an increase in insulin resistance be subclinical hypothyroidism remains between insulin resistance be subclinical hypothyroidism remains. Several studies have proved the association between insulin resistance and very low density lipoproteins (VLDL) and an increased HDL cholesterol (HDL-C) clearance. Production of hepatic cholesterol and very low density lipoproteins mild thyroid dysfunction. Insulin resistance leads to an increased risk of dyslipidemia along with relatively frequently found increased glucose were higher than both above mentioned community based studies. In our study, the females in the 40-60 year age group had a higher incidence of thyroid dysfunction as compared to the other age groups, as most of the subjects in this group were having more risk factors like tobacco, sedentary lifestyle etc. Our results were comparable with those of the above mentioned study. The incidence of thyroid dysfunction was more in patients with more than three components of the metabolic syndrome. The mean waist circumference which was noted in females with metabolic syndrome and thyroid dysfunction was 37.81 inches as compared to 37.50 inches in euthyroid females with metabolic syndrome. Uzunlulu et al & Ghashtam et al also noted a higher mean waist circumference in patients with metabolic syndrome and subclinical hypothyroidism. In our study, among the components of the metabolic syndrome, women with a waist circumference >35 inches (88 centimeters) had a higher incidence of thyroid dysfunction.

Table 2: Prevalence of Thyroid dysfunction

<table>
<thead>
<tr>
<th>Gender</th>
<th>Euthyroid</th>
<th>Sub-clinical hypothyroid</th>
<th>Overt hypothyroid</th>
<th>Sub-clinical hypothyroid</th>
<th>Overt hypothyroid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>33</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Female</td>
<td>37</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>21</td>
<td>9</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

In our study the percentage of sub clinical hypothyroid was 21% and overt hypothyroid was 9%, which were comparable with 43% and 15% in R V Jaykumar’ study, 21.9% and 7.4% in Ghashtam P’ study and 16.36% of sub clinical hypothyroid in Uzunlulu’ study.

Our study revealed that the prevalence of thyroid dysfunction was more among the females with metabolic syndrome. Subclinical hypothyroidism and overt hypothyroidism were present in 26.66% and 11.66% of females and in 12% and 5% of males respectively. None of the patient had subclinical or overt hyperthyroidism.

This indicates a possible interplay between the thyroid status and insulin sensitivity. The main pathophysiological basis underlying the metabolic syndrome has been attributed to insulin resistance. Insulin resistance is a cardinal feature of type 2 diabetes mellitus and an increased risk of dyslipidaemia along with relatively frequently found mild thyroid dysfunction. Insulin resistance leads to an increased production of hepatic cholesterol and very low density lipoproteins (VLDL) and an increased HDL cholesterol (HDL-C) clearance. Bakker et al suggested that insulin resistance augments the deleterious effect of hypothyroidism on the lipid profile. Several studies have proved the association between insulin resistance and hypothyroidism for overt hypothyroidism, but the association between insulin resistance be subclinical hypothyroidism remains unclear. It is known that overt hypothyroidism to an increase in the plasma cholesterol levels as proven by the HUNT study’ also seen in our study.

In patients with overt hypothyroidism, there is an increase in serum total Cholesterol, low-density lipoprotein (LDL) cholesterol, apo B, lipoprotein (a) [Lp(a)] levels and possibly, triglyceride levels. Normally, thyroid hormones increase the expression of the cell surface LDL receptors, thus leading to LDL clearance from the serum. In hypothyroidism, the depletion of the thyroid hormones leads to a reduced number of LDL receptors in the liver, thereby decreasing the biliary excretion of cholesterol thus resulting in elevated serum LDL and VLDL levels. It also eases the lipoprotein lipase activity and causes hypertriglyceridaemia.

CONCLUSION

It can be concluded from the present study that sub clinical hypothyroidism and overt hypothyroidism is significantly associated with metabolic syndrome, especially females with metabolic syndrome have a higher prevalence of thyroid dysfunction which predisposes them to cardiovascular events. Therefore, we recommend the routine screening of the thyroid function in females with metabolic syndrome.

So we can say that in future performing thyroid function test specifically S.TSH would be the routine and necessary test in patients with metabolic syndrome especially female patients, to diagnose and treat subclinical and overt thyroid dysfunction early and reducing the cardiovascular risk significant.

REFERENCES