



## Correlation of Thyroid Profile and Lipid profile in Metabolic Syndrome patients

### KEYWORDS

Metabolic Syndrome, Subclinical hypothyroidism.

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### ABSTRACT

**Objective:** The aim of our study is to assess thyroid function tests in patients with Metabolic Syndrome and to find a correlation between hypothyroidism and lipid profile in metabolic syndrome.

**Study Design:** A hospital based cross sectional study was conducted on patients attending the OPD of Medicine of GSVM Medical College, Kanpur (U.P) for a period of 10 months from January 2015 to October 2015. A total no. of 100 cases of Metabolic syndrome in the age group 30-60 yrs (According to IDF consensus 2006) were selected randomly for the study. Above 60 yrs and below 30 yrs were excluded from our study. Besides patients having any chronic illness such as TB, Carcinoma's and patients on lipid lowering drugs were excluded from this study.

**Methodology:** All the 100 subjects were analyzed for Serum T3, Serum T4, Serum TSH and lipid profile. Samples were collected in fasting state and Sr. T3, T4 & TSH were estimated using ELISA competitive immunoassay method. Total Cholesterol & HDL Cholesterol were determined by enzymatic methods. LDL & VLDL were calculated and TG was estimated by an analytical method. Statistical analysis was done & results expressed in Mean±SD±SE.

**Results:** Out of 100 cases of Metabolic Syndrome, 20 were of Subclinical hypothyroidism, 7 had overt Hypothyroidism & 73 patients were Euthyroid. Among these patients Hypertriglyceridaemia, hypercholesterolaemia, raised LDL and low HDL was found in overt hypothyroidism, Subclinical hypothyroidism and to some extent in Euthyroid cases.

**Introduction:** International Diabetes Federation (IDF consensus 2006), defines Metabolic syndrome as central obesity (WC ≥ 90cm in males and ≥ 80 cm in females for Asian Indian population and any 2 of the following).

- Raised TG ≥ 150 mg/dl

- Reduced HDL cholesterol < 40 mg/dl in males  
< 50 mg/dl in females<sup>(1)</sup>

- Raised BP ≥ 130/85 mm of Hg

- Raised FBG ≥ 100 mg/dl

Patients of Metabolic syndrome are more prone to have conditions like hypothyroidism, PCOD, fatty liver etc.

Several studies have shown a significant association between Metabolic syndrome and thyroid disorders, since thyroid hormones are known to play a role in regulating the synthesis, metabolism and mobilization of lipids.

Subclinical hypothyroidism is defined as a Sr. TSH conc. above the statistically defined upper limit of the reference range when Sr. T<sub>3</sub> and T<sub>4</sub> conc. is within its reference range<sup>(2)</sup>.

SCH is associated with progression to overt hypothyroidism and there is fair evidence that Sr. TSH levels greater than 10µl/ml are associated with elevations in total cholesterol & LDL cholesterol levels<sup>(3,4,5)</sup>. Women with SCH have a higher incidence of diastolic hypertension, hypertriglyceridaemia, elevated TC/HDL cholesterol and LDL/HDL cholesterol ratios<sup>(6)</sup>.

In 2007, it was found that about 1/6<sup>th</sup> of Metabolic syndrome patients had SCH. This finding indicates a need for investigating the presence of SCH in management of Metabolic syndrome patients<sup>(7)</sup>.

**Material and Methodology:-** A hospital based cross sectional study was conducted on patients attending the OPD of Medicine of GSVM Medical College, Kanpur (U.P). A total no. of 100 patients of Metabolic syndrome in the age group 30-60yrs were selected randomly for the study (According to IDF criteria 2006). Patients above 60 yrs and below 30 yrs were not included in the study, besides patients with known thyroid disorder, CRF, CNS disorders and patients with any

chronic illness like Diabetes Mellitus, TB, carcinoma were excluded.

All the 100 subjects were analyzed for Sr. T3, Sr. T4, Sr. TSH and lipid profile. Samples were collected in fasting state and Sr. T3, T4 and TSH were estimated using ELISA competitive immunoassay method as described by sterling L<sup>(8)</sup>. Total Cholesterol & HDL were determined by enzymatic method<sup>(9,10)</sup>. TG was estimated by an analytical method described by Fossati et al<sup>(11)</sup>. LDL was calculated using Freidwald computational method<sup>(12)</sup>.

**Results:** Out of 100 cases of Metabolic syndrome (42 males + 58 females), 20 were of Subclinical hypothyroidism, 7 had overt hypothyroidism & 73 patients were euthyroid.

Among these patients Hypertriglyceridaemia was found in 16 (80%) patients who were euthyroid. These differences in TG levels were statistically significant among the three groups with p value <0.001.

S.No.	Parameter	Euthyroid (73) No. %	SCH (20) No. %	Overt (7) hypothyroids No. %	P value
1	TG	9 12.3%	16 80%	3 42.8%	<0.001
2	HDL	54 73.9%	13 65%	7 100%	<0.001
3	LDL	3 2.7%	6 30%	4 57%	<0.001
4	TC	13 17.7%	18 90%	7 100%	<0.001

In our study among 100 patients of Metabolic syndrome only 26 had normal HDL. In the euthyroid group 54 out of 73 (73.9%) patients low HDL. In the overt hypothyroidism group 7 out of 7 (100%) patients had low HDL. In Subclinical hypothyroidism 13 out of 20 patients (65%) patients had low HDL.

Among the euthyroid patients 13 out of 73 had increased total cholesterol and among the SCH patients 18 out of 20 had increased total cholesterol levels. Among patients of overt hypothyroidism 7 out of 7 had increased total cholesterol. The relationship was found statistically significant (p value <0.001).

A total of 13 patients out of 100 (13%) patients of Metabolic syndrome had increased LDL. In the euthyroid group only 2 out of 73 (2.7%) and in subclinical hypothyroid group 6 out of 20 (30%) patients had increased LDL. In the overt hypothyroid group 4 out of 7 (57%)

patients had increased LDL.

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**Discussion:** High prevalence of Metabolic syndrome is a global phenomenon Hypothyroidism and Metabolic syndrome are recognized risk factors for Atherosclerotic cardiovascular disease. Thyroid function affects lipid metabolism & Carbohydrate metabolism. The aim of the present study was to find out the prevalence of hypothyroidism in patients with Metabolic syndrome. In our study there were 100 patients with Metabolic syndrome 27% were hypothyroid and 73% were euthyroid. Among the hypothyroid patients 20% were SCH and 7% were overt hypothyroidism.

It has been well established in a study by Meher et al, 4 (4%) of cases had overt hypothyroidism, 22 (22%) had SCH and 74 (74%) were euthyroid<sup>(13)</sup>. It was observed that there is an intimate interaction of Thyroid hormones with all components of the Metabolic syndrome. In another study by Prabin Gyawali et al. prevalence of thyroid disorders in patients with Metabolic syndrome was 31.84% with high prevalence of Subclinical hypothyroidism (29.32%)<sup>(14)</sup>. In a large study by Uzunzulu et al Subclinical hypothyroidism was seen in 36 (16.4%) cases in the Metabolic syndrome group and in 11 (5.8%) cases in the control group ( $p=0.001$ )<sup>(15)</sup>. Muhammad Shahzad Saleem et demonstrated that thyroid function decreased as the number of components of Metabolic syndrome increased<sup>(16)</sup>.

The patients in the hypothyroid group had higher total cholesterol, TG, LDL, VLDL and TSH levels as compared to patients categorized in euthyroid group and it was found statistically significant ( $p$  value  $<0.001$ ).

Thyroid hormones are known to play a role in regulating the synthesis, metabolism and mobilization of lipids. Several studies have reported that higher TSH is associated with a higher likelihood for the occurrence of Metabolic syndrome and the association seems to be more in females.

**Conclusion:** Since Metabolic syndrome and thyroid dysfunction are independent risk factors of atherosclerotic cardiovascular disease (CVD), the concurrent existence of the two will substantially increase the risk of CVD.

Life style measures such as appropriate meal planning and increased physical activity in the form of regular dynamic exercises are the basic foundations of management of Metabolic syndrome.

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