



Original Research Article

Prevalence of lipid profile derangement in previously diagnosed treatment naive cases of Subclinical Hypothyroid patients and its comparison with age and sex matched normal individuals: A case control study at tertiary health care centre from central India

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Abstract

Background: Clinical significance of Sub-Clinical Hypothyroidism (SCH) is because of its high prevalence, risk of progression to overt hypothyroidism (OH), serious complications like neurobehavioral and cardiovascular disorders and poor quality of life because of non-specific symptoms. Cardiovascular complications occur in these patients is because of un-favorable lipid profile.

Methods: This prospective observational study was carried out in the Department of Medicine MGM Medical College and MY Hospital Indore from January 2017 to June 2018 enrolling total 100 patients.

Results: In normal subject, the mean total cholesterol was 125.92 ± 43.38 mg/dl, in SCH patients it was 117.14 ± 39.33 mg/dl, showing a higher mean total cholesterol in SCH patients as compared to normal subjects, and the difference came out to be statistically significant ($P < 0.05$). In normal subject, the mean triglyceride was 80.72 ± 13.03 mg/dl, in SCH patients it was 123 ± 74.34 mg/dl, showing a higher mean triglycerides in SCH patients as compared to normal subjects and the difference was found to be statistically significant ($P < 0.05$). In normal subject, the VLDL was 16.12 ± 2.72 mg/dl, in SCH patients it was 26.05 ± 16.80 mg/dl, showing a higher mean VLDL in SCH patients as compared to normal subjects. The difference was statistically significant ($P < 0.05$).

Conclusions: SCH is associated with slight increase in TC, TG, VLDL, and LDL levels and decrease in HDL. Increased TC, TG, VLDL, and LDL in high normal range and decreased HDL in low normal range indicating trend towards atherogenic lipid profile. Thus SCH is associated with increased cardiovascular risk due lipid profile derangements.

Keywords: Cholesterol, subclinical hypothyroidism, overt hypothyroidism, triglyceride.

Introduction

Marginal elevation (5.3-10 mIU/ml) of serum TSH in the presence of normal free T₄ levels (0.7-2.5ng/dl) is called as Subclinical Hypothyroidism (SCH) or mild thyroid failure. This term is only applicable when the hypothalamic-pituitary-thyroid axis is normal, there is no recent or ongoing severe illness, and thyroid function has been stable for weeks or more.^[1]

One of the commonest endocrine conditions occurring in about 4 to 10% population. The prevalence increases with age and is more common in women. Clinical significance of SCH is because of its high prevalence, risk of progression to overt hypothyroidism (OH), serious complications like neurobehavioral and cardiovascular disorders and poor quality of life because of non-specific symptoms. Cardiovascular complications occur in these patients is because of unfavourable lipid profile. Thyroid hormones have varied effects on lipid metabolism, as they regulate lipids synthesis and degradation, by regulating the activity of key enzymes in these pathways. An elevated TSH, usually above 10mIU/l in combination with a subnormal free T₄ characterizes OH. The association between OH and dyslipidemia is well known which predispose to cardiovascular complications however association of SCH with lipid profile derangements is uncertain. Various studies conducted on this relationship, have variable results. In this respect, it has been postulated that Hypothyroidism is associated with suppression of both synthesis and degradation of lipids with greater 2 reduction in degradation ultimately resulting in accumulation of Low density lipoproteins (LDL-C) and triglycerides (TG). Reduced Lipid degradation may be because of decrease in post heparin lipolytic activity, as well as reduced LDL receptors.

Methods

This study was carried out in the Department of Medicine MGM Medical College and MY Hospital Indore from January 2017 to June 2018

enrolling total 100 subjects, out of which 50 patients were of SCH not taking any treatment and 50 were normal subjects coming with patients to the OPD or wards in MY Hospital, Indore, MP.

Inclusion Criteria

1. Already diagnosed and treatment naive SCH patients based on TSH level between 5-10 micro IU/ml and normal free T₄ value 0.7-2.5ng/dl.
2. Age and sex matched already diagnosed treatment naive patients of overt hypothyroidism.
3. Age and sex matched normal subjects giving consent.
4. Patients 30-60 years of age who give consent.

Exclusion Criteria

1. Patients receiving drugs which are known to cause SCH and affect lipid metabolism.
2. Patient on treatment for hypothyroidism.
3. Patients with systemic diseases like Diabetes mellitus, PCOD, Renal and Hepatic failure, Stroke, ischemic heart disease, primary or secondary dyslipidemia, pregnant women and substance abusers.
4. Patients not giving consent for the study.
5. Patients <30 years and >60 years.

Sample Size

Total 100 patients and 50 normal controls, 50 of SCH and 50 of overt Hypothyroidism not taking treatment and 50 age and sex matched individuals who were the caretakers of patients coming to MYH, Indore.

Duration of Study

2 Years from day of approval. Patients and their caregivers were explained about the study in details verbally and by means of a patient information sheet written in simple understandable language. After applying inclusion and exclusion criteria, selected patients from OPD, were enrolled after taking consent to take part in the study. A brief history was taken and

patient's vitals were taken. Routine investigations like complete blood counts, sodium, potassium, renal function test, liver function test, lipid profiles, thyroid functions, and free T₄ were done.

Data Analysis

Data analysis was done using SPSS software.

Results

This study was carried out in the Department of Medicine MGM Medical College and MY Hospital Indore from January 2017 to June 2018 enrolling total 100 subjects, out of which 50

patients were of SCH not taking any treatment and 50 were normal subjects coming with patients to the OPD or wards in MY Hospital. Results of this study were as follows:

As shown in table 1, in our study of total 100 patients there were 85(85.0%) females and 15 (15.0%) males showing a female preponderance. As shown in table 2, there were 60(60%) patients in the age group 30-40 years, 25(25%) were in the age group 41-50 years, 15(15%) were in the age group 51-60 years. Majority of the patients were in the age group 30-40 years.

Table 1: Distribution of patients according to gender

Gender	Normal Subjects		Subclinical Hypothyroidism		Total	
	Number	%	Number	%	Number	%
Female	42	84	43	86	85	85
Male	8	16	7	14	15	15
Total	50	100	50	100	100	100

Table 2: Distribution of patients according to age group

Age Group In Years	Normal Subjects		Subclinical Hypothyroidism		Total	
	Number	%	Number	%	Number	%
30-40	31	62	29	58	60	60
41-50	12	24	13	26	25	25
51-60	7	14	8	16	15	15
Total	50	100	50	100	100	100

As shown in table 3, comparison of various lipid parameters in between normal and SCH. In normal subject, the mean total cholesterol(TC) was 125.92±43.38mg/dl and in SCH patients it was 117.14±39.33mg/dl, showing a higher mean TC in SCH patients as compared to normal subjects, and the difference came out to be statistically significant (P<0.05). Mean triglyceride (TG) levels was 80.72±13.03mg/dl in normal subjects, and it was 123±74.34mg/dl in SCH patients, showing a higher mean TG in SCH patients as compared to normal subjects and the difference was found to be statistically significant (P<0.05). The very low density lipoprotein (VLDL) was 16.12±2.72mg/dl in normal subjects,

and it was 26.05±16.80mg/dl in SCH patients, showing a higher mean VLDL in SCH patients as compared to normal subjects. The difference was statistically significant (P<0.05). In normal subject, the Low density lipoprotein(LDL) was 60.21±7.80 mg/dl, and in SCH patients it was 78.88±31.21mg/dl showing a higher mean LDL in SCH patients as compared to normal subjects and the difference came out to be statistically significant (P<0.05). In normal subject, the high density lipoprotein(HDL) was 49.39±4.52 mg/dl, in SCH patients it was 45.32±15.4mg/dl, showing a lower mean HDL in SCH patients as compared to normal subjects and the difference came out to be statistically not significant (P>0.05).

Table 3: Comparison of various lipid parameters in between controls and subclinical hypothyroidism patients

Characteristics	Controls	Subclinical Hypothyroidism	't' value	P value
Total Cholesterol in mg/dl (mean±SD)	100.24 ± 12.54	149.04 ± 38.30	-8.560, df=98	0.000
Triglycerides in mg/dl (mean± SD)	80.72 ± 13.03	123 ± 74.34	-3.96, df=98	0.000
VLDL in mg/dl (Mean± SD)	16.12 ± 2.72	26.05± 16.80	-4.125, df=98	0.000
LDL in mg/dl (Mean± SD)	60.21 ± 7.80	78.88 ± 31.21	-4.10, df=98	0.000
HDL in mg/dl (mean± SD)	49.39 ± 4.52	45.32 ± 15.4	1.78, df=98	0.77

Discussion

In our study, there were 65(65%) patients in the age group 30-40 years, 25 (25%) patients in age group 41-50 years, and 15(15%) patients in age group 51-60 years. Majority of the patients were in the age group 30-40 years. Study done by Bayar Qasim et al^[2] also showed that majority of the patients were in age group 30-39 years.

In our study, out of total 100 patients and 50 controls, 85(85%) were females and 15(15%) were males. Hence there was female preponderance in our study. Study done by Zoe Efstathiadou et al^[3] found male-female ratio of 1:12, Mounika Guntaka et al^[4] found male-female ratio of 1:9. These studies suggest female preponderance of thyroid disease like our study.

Lipid Profile Analysis: In our study, the mean TC levels, mean TG levels, mean LDL levels and mean VLDL levels were found to be significantly raised in patients of subclinical as compared to normal controls ($P<0.05$). Mean HDL levels were found to be decreased in subclinical hypothyroidism patients as compared to normal subjects but this difference was statistically non significant ($P>0.05$). Study conducted by Shashi A et al^[5] exhibited a significantly higher concentration of TC($P<0.0001$), TG($P<0.0001$), LDL ($P<0.0001$) significantly lower concentration of HDL($P<0.0001$) in SCH patients as compared to euthyroid controls and these results were similar to our study.

Conclusions

Subclinical hypothyroidism is associated with increase in TC, TG, VLDL and LDL levels and decrease in HDL. Increased TC, TG, VLDL and LDL in high normal range and decreased HDL in low normal range indicating trend towards atherogenic lipid profile. Thus Subclinical hypothyroidism is associated with increased cardiovascular risk due lipid profile derangements.

Disclosure

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Conflict of interest: Not declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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