

Subclinical hypothyroidism and its impact on lipid profile in population of Wayanad district Kerala

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Abstract

Background: Hypothyroidism causing dyslipidemia and cardiovascular diseases is well known. But subclinical hypothyroidism and its effect on lipid parameters is still controversial. Some data suggests there is no effect of subclinical hypothyroidism on lipid parameters. But major cross-sectional studies support subclinical hypothyroidism is associated with lipid abnormalities. We need large studies to define the relation between subclinical hypothyroidism and its impact on lipid parameters. Our study tried to find the effect of subclinical hypothyroidism on lipid parameters, comparing with age sex matched controls.

Methods: It is a cross-sectional observation study conducted in department of DM WIMS medical college Meppadi Kerala. We studied about 86 patients with subclinical hypothyroidism and 80 age sex matched control patients. We analyzed lipid parameters with TSH, FT4, FT3 levels. Correlations between TSH levels and lipid parameters also carried out.

Results: In our study Subclinical hypothyroidism patients showed lipid abnormalities in levels of Total cholesterol, LDL-c and Triglycerides as compared to controls. There was linear correlation between TSH levels and lipid abnormalities in patients with subclinical hypothyroidism as compared to controls. Patients with subclinical

hypothyroidism had significant rise in anti TPO antibodies as compared to controls.

Conclusion: Subclinical hypothyroidism is associated with lipid abnormalities like increase in Total cholesterol LDL-c and Triglycerides levels. There was linear correlation between TSH levels and Lipid abnormalities in our study. There are still controversies exist in treating subclinical hypothyroidism and lipid abnormalities. We need large randomized trials to resolve the issue.

Keywords: TSH, FT4, FT3, TPO antibodies.

Introduction

Thyroid hormones play an important role in metabolic activity of body tissues .They also regulates synthesis, mobilization and metabolism of lipids ⁽¹⁾.The deficiency of thyroid hormones leads to dyslipidemia and cardiovascular diseases. The treatment of hypothyroidism restores normal lipid metabolism. Another clinical entity, subclinical hypothyroidism is emerging as cause for lipid abnormalities before the onset of full blown hypothyroidism. Subclinical hypothyroidism is defined as increase in thyroid stimulating hormone (TSH) in spite of FT4 and FT3 being normal.⁽²⁾ sub clinical hypothyroidism is common .It has prevalence of 3%- 8% in general population ⁽³⁾.The subclinical hypothyroidism is common in female and older patients may lead to overt hypothyroidism in few years.⁽⁴⁾ The treatment of subclinical hypothyroidism is controversial. But some

studies suggest beneficial effect of its treatment and some other studies show conflicting results. Most studies show the subclinical hypothyroidism is associated with increase in total cholesterol (TC), low density lipoprotein –c (LDL_C) and triglycerides (TG).⁽⁵⁾ These abnormal lipids may lead to cardiovascular and peripheral vascular diseases. So it is important to diagnose early and treat to prevent complications due to dyslipidemia. There is very limited data available to justify treatment of subclinical hypothyroidism. We need large randomized trials to know the effect of subclinical hypothyroidism on lipids.

Objectives

The aim of our study was to know the lipid abnormalities present in sub clinical hypothyroidism patients compared to age sex matched normal individuals in Wayanad area of Kerala

Material and Methods

This study was conducted in the medicine dept of DM WIMS medical college Meppadi, Kerala .The study was conducted between May 2015 to April 2016 for a period of one year. It is a crosssectional observation study. We included 86 patients with sub clinical hypothyroidism and 80 sex and age matched healthy patients as controls. Ethical clearance was obtained from college ethical committee for the study. An informed consent was obtained from all patients and controls for including in the study.

Inclusion criteria

1) Patients with raised TSH ($>5.5 \mu\text{IU/ml}$) and normal FT4 (0.89-1.76 ng/dl) and FT3 (2.3-4.2 pg/ml) were included in the study. Patients with normal TSH, FT4, and FT4 were included as controls.

Exclusion criteria

- 1) Preexisting hypothyroidism on treatment
- 2) Patients with dyslipidemia on treatment

3) Patients with conditions affecting lipid parameters like nephrotic syndrome, renal failure, obesity, smoking and diabetes mellitus were excluded from the study.

A detailed history and clinical examination was carried out in all the patients. Blood was obtained in fasting state for estimation of TSH, FT4, FT3 ,TPO antibodies and total cholesterol,LDL,HDL and triglycerides.LDL was calculated by using Friedewald formula.⁽⁶⁾ CBC RBS RFT LFT were done in all patients.ECG and echocardiography were carried out wherever necessary to rule out cardiac diseases.

Statistical analysis

Statistical analysis was done using SPSS v16.Continuous variables were presented as mean and standard deviation. Categorical variables were presented as percentage or ratio. Chi square test and unpaired t tests were used to compare the variables. A P value of < 0.05 is considered as significant.

Results

In 86 subclinical hypothyroidism patients mean age was 40 ± 6.5 years and in control patients it was 32.8 ± 7.2 years. Sex ratio (M:F) in cases was 18:68 and in controls it was 10:70. The female preponderance was noted in cases.BMI (kg/m^2) was almost matched in cases and controls.TSH levels were higher in case ($9.4 \pm 1.6 \mu\text{IU/ml}$) as compared to controls ($2.4 \pm 0.9 \mu\text{IU/ml}$) which was statically significant. Free T4 FREE T3 were normal in both case and controls.Anti TPO antibodies were significantly raised in patients as compared to controls and p value (>0.002) was significant.

In respect of lipid parameters Total cholesterol, LDL-c, and Triglycerides were elevated as compared to controls.HDL was normal in both groups. CBC, LFT, FBS and KFT were normal in both groups. There was

linear correlation between TSH and lipid abnormalities in patients with subclinical hypothyroidism.

Table 1: Clinical and biochemical parameters in Patients and Controls

Variables	Patients(mean)	Controls(mean)	P value
Age in years	40±6.5	32.8±7.2	0.722
Sex (M:F)	18:68	10:70	0.690
BMI (kg/m ²)	25.6±2.2	24.8±1.8	0.380
TSH (µIU/ml)	9.4±1.6	2.4±0.9	< 0.002
Free T4 (ng/dl)	1.2±0.06	1.5±0.06	<0.001
Free T3 (pg/ml)	2.8±0.04	2.4±0.6	<0.002
Anti TPO antibodies (%)	46.8	20.8	<0.001

Table 2: Lipid parameters in patients and controls

Variables	Patients (mean)	Controls (mean)	P value
Total cholesterol	200.6±11.2	168±16.8	0.012
LDL-c	120±12.6	86.8±10.2	0.001
Triglycerides	168.8±12.6	140.2±8.6	0.002
HDL	48.2±0.9	48±0.4	0.410

Table 3: Pearson’s correlation between TSH and Lipid parameters

Variable 1	Variable 2	Correlation coefficient	P value
TSH	Total cholesterol	0.6201	<0.0002

TSH	LDL-c	0.5801	<0.0001
TSH	Triglycerides	0.6212	<0.0001
TSH	HDL	-0.4015	<0.06

Discussion

Overt hypothyroidism causing dyslipidemia and cardiovascular diseases is well understood (7, 8). But subclinical hypothyroidism causing dyslipidemia and its impact on cardiovascular diseases is not clear. Study by National health nutrition examination survey 3 has showed sub clinical hypothyroidism is not associated with any changes in Total cholesterol LDL-c Triglycerides and HDL.(3)But in study by Laway et al showed that there are higher levels of Total cholesterol LDL-c and Triglycerides in patients with subclinical hypothyroidism.(9). In our study also Total cholesterol LDL-c and triglycerides were higher in subclinical hypothyroidism patients as compared to controls and they were statically significant. Another study by Asranna et al also showed increase in Total cholesterol LDL-c Triglycerides in patients with subclinical hypothyroidism (10). Indian study by Bandopadhyay et al showed elevated levels of Total cholesterol LDL-c Triglycerides in subclinical hypothyroidism patients which was statically significant (11). Canaris G S et al studied about 25862 participants in health camp at Colarado . They also found that fasting Total cholesterol LDL-c Triglycerides were higher in subclinical hypothyroidism patients (12). Our study also showed similar results. Major Crossectional studies also show direct linear relation between TSH levels and Total cholesterol LDL-c Triglycerides levels in sub clinical hypothyroidism patients.

So subclinical hypothyroidism is emerging as pathological condition and needs to be considered in treatment of dyslipidemia. However still large randomized trials are

needed to know the effect of subclinical hypothyroidism on lipid parameters.

Conclusion

Subclinical hypothyroidism is emerging as common condition before the onset of overt hypothyroidism. There is no clear cut consensus in treatment of subclinical hypothyroidism and asocial dyslipidemia. The hurdle is due to lack of large data. In our study there is linear correlation between TSH levels and abnormal lipid parameters and were statically significant. We still feel larger randomized studies are needed to know the association between subclinical hypothyroidism and lipid abnormalities.

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