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A Study to Compare the Clinical Profile and Laboratory Abnormalities in the Subclinical Hypothyroidism Patient with Healthy Controls

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Abstract
Background*: subclinical hypothyroidism is more common than overt hypothyroidism and it is associated with Coronary artery disease and many biochemical abnormalities*
Aim and objectives*: A study to compare the clinical profile and laboratory abnormalities in the subclinical hypothyroidism patient with healthy controls*
Methods: *this is hospital based analytical study done in department of medicine at SMS medical college and AG hospital from July 2012 to June 2013. All the subjects diagnosed with elevated TSH and normal free T3 T4 TSH. Total 50 patients of subclinical hypothyroidism diagnosed as per criteria and compared with 50 healthy individuals of same age group.*
Results*: it was observed that cases showed significantly higher level of triglycerides and very low density lipoprotein (VLDL) levels in the patients with subclinical hypothyroidism.*
Conclusion*: screening of lipid profile in subclinical hypothyroidism can be helpful for preventing complication related to dyslipidemia.*

I. Introduction

Subclinical hypothyroidism can be best defined as a high serum TSH and normal serum FT3 FT4 associated with few or no symptoms/signs of hypothyroidism. It is referred to as a state of mild thyroid failure and is essentially a laboratory diagnosis. [1,2] therefore early diagnosis and treatment may prevent the onset of overt hypothyroidism and its associated effects in which include risk of coronary artery disease (CAD), peripheral vascular disease and various biochemical abnormalities.

The prevalence of subclinical hypothyroidism ranges from 4 to 15%, in India there is significant numbers of patients with thyroid disease. Thyroid disease is different from other disease in terms of their ease of diagnosis, accessibility of medical treatment and relative visibility of thyroid swelling. Early diagnosis and treatment remains the cornerstone of management.[3]

Thyroid hormones have significant effects on the synthesis, mobilization and metabolism of lipids. They affect serum cholesterol mainly by altering lipoprotein metabolism. Hypercholestremia is favoured due to the hormone deficit and the decreased activity of the lipoprotein lipase further increases the risk of CAD[12].

Similarly subclinical hypothyroidism may be associated with increased risk coronary artery disease and various biochemical abnormalities including increased LDL-C levels, increased total cholesterol and serum TG levels.[13]. Some case control trials had reported increased concentration of serum total cholesterol and LDL cholesterol in subjects with subclinical hypothyroidism compared to euthyroid controls[14].

However the results of lipid profile alternations in subclinical hypothyroidism are controversial in different studies; some of those showing positive correlation and prompt reversal of changes following treatment [6,7] and while other are refusing any correlation between the two [8]. So we planned study to determine lipid abnormalities in patients with subclinical hypothyroidism.

II. Materials And Methods

It hospital based analytical study done in department of medicine, SMS medical College, Jaipur
Study period – July 32021 to June 2013
Study size- 50 patients of subclinical hypothyroidism diagnosed as per criteria. Matched with 50 healthy individuals (age and sex)
Sampling- cases of subclinical hypothyroidism attending OPD/ wards in department of medicine SMS medical college
Inclusion criteria

Patients with elevated TSH (5.0 to 10 micro IU/ml) and normal total free T3/T4 levels

Exclusion criteria

- the patients suffering from overt hypothyroidism(TSH >10 IU/ml and/or clinical signs of hypothyroidism)
- the patients suffering from

a. end stage renal disease
b. underlying known cardiac disease
c. type 1 $ 2 diabetes mellitus
d. sever systemic infections
e. systemic arterial hypertension

- The patients undergoing treatment with thyroxin and anti thyroid drugs
- The patients undergoing treatment with anti lipidemic drugs
- Pregnant women and women on oral contraceptive drugs

Data collection

The information on age sex region occupation was noted on preformed Performa sheet. A informed consent was taken from all cases and controls. A complete history including complains, past history personal history drug history obstetrics and menstrual history was noted through systemic examination was done.
Blood sample was withdrawn from patients and healthy subjects after overnight fasting with dry disposable syringe and needle under aseptic conditions. All investigation done in central lab at SMS medical college. And results were compared with healthy controls of age $ sex matched. Following investigation was done-

- Complete blood count
- Renal function test
- Liver function test
- Lipid profile
- Thyroid profile
- ESR PBF

Normal value for FT3 1.8 to 4.2
FT4 0.89 to 1.76
TSH 0.4 to 4.4ul/ml

III. Statistical Analysis

Microsoft excels and SPSS 17.0 for windows was used for data storage and analysis. Continuous variables were expressed as mean± standard deviation. Unpaired students to test and chi square test were used to determine statistical difference between variables. Pearson's coefficient was used to investigate the correlation between the two variables. Statistical significance was set at P value ≤0.05.

IV. Results

Table 1 Comparison of age and sex

Age in year	Care			Control		
	M	F	Total	M	F	Total
<40	1/(2.00)	29 (58.00)	30 (60.00)	1 (2.00)	26 (52.00)	27 (54.00)
>40	5 (10.00)	15 (30.00)	20(40.00)	5 (10.00)	18 (36.00)	23 (46.00)
Total	6 (12.00)	44 (88.00)	50 (100.00)	6 (12.00)	44 (88.00)	50 (100.00)

Mean +SD (case) = 38.46+12.34 Mean + SD (Control) = 40.64+13.73

The mean age was 38.46±12.34 years and 40.64±13.73 in cases and controls. This was similar to a study by Sanjoy K Bhandopadyay et al where it was 38.56 years [15]. Another study done by Saini, yadav et al showed 31.55 years [11].

In our study 11(88%) were females in cases and 44(88) in controls, which was similar to study Sanjoy Bhandopandyay et al [15] where females constitute 78% of study populations. Another study done by sing K ding 95 and Saini V Yadav A Arora et al[11] where females was 88% and 80.22 of study population.

Table 2 Comparison of Lipid profile in cases and controls

		Total Cholesterol			TG		
		Normal	Abnormal	Total	Normal	Abnormal	Total
Case	No	40	10	50	30	20	50
	%	80	20	100	60	40	100

Control	N o	44	6	50	45	5	50
	%	88	12	100	90	10	100

X2=1.190 d.f=1 P>0.05 Ns X2 = 14.040 d.f=1 p<0.001 ns

		LDL			HDL		
		Normal	Abnormal	Total	Normal	Abnormal	Total
Case	No	40	10	50	39	11	50
	%	80	20	100	78	22	100
Control	N o	44	6	50	43	7	50
	%	88	12	100	86	14	100

X2=0.260 d.f-=1 P>0.05 X2= 1.084 d.f=1 P>0.05 NS

In our study out of 50 cases 10 (20%) had abnormal serum TC level and out of 50 controls 5 (12%) had abnormal TC level. Maximum serum TC level was 264 mg/ dl and minimum serum TC was 136 mg/dl in cases, whereas in control maximum level of TC was 261mg/dl and minimum was 261mg/dl. This difference was statistically not significant (p>0.05).

These findings are similar to a study done by sing K, sing S.[10]. However many studies reported higher mean total cholesterol values as compared to this study. Efstathiadou et al[12] and William J. Hueston [16] found total cholesterol value of 222mg/dl and 217mg/dl. Which shows statistically significant p value of 0.007 (p value <0.05)

Similarly our study showed significant difference in triglycerides level which showed maximum value of 236 mg/dl and minimum value of 124 mg/dl in cases as compared to controls where maximum value is 216 mg/dl and minimum value 121 mg/dl. (P value<0.001). This study was similar to study done by William J Huston et al [16]. The LDL level in cases was maximum of 187mg/dl and minimum of 46mg/dl, whereas in controls it was maximum of 101.5mg/dl and 44mg/dl which has no statistical significance with p value >0.05 similar to study done by Sing K Sing [10] and William J Hueston [16].

The serum HDL level in cases was maximum of 78 mg/dl and minimum of 23 mg/dl whereas in control it was maximum of 68 mg/dl and minimum of 31 mg/dl. These finding is similar to study done by sing K, Singh S [10] and William J Houston [16] et al which showed no statically significance. The VLDL level in cases showed maximum of 47 mg/dl and minimum of 25 mg/dl whereas in control it was 43mg/dl of maximum and 24 mg/dl of minimum.

Table 3 Comparison of mean ± SD in cases and controls

		Mean+Sd		P Value	Significance
		Case	Control		
1	FT3	2.30+0.60	.37+0.47	>0.05	NS
2	FT4	1.20+0.5	1.5+0.23	>0.05	NS
3	TSH	7.38+1.33	2.52+0.8	<0.001	HS
4	TC	181.88+35.50	170.34+34.31	>0.05	NS
5	TG	163.54+31.76	143.40+19.05	<0.001	NS
6	LDL	103.48+36.10	93.12+35.59	>0.05	NS
7	HDL	47.68+10.73	48.5+8.17	>0.05	NS
8	VLDL	32.74+6.29	28.70+3.80	<0.01	HS

Table 4 Mean SD of TSH in Anti TPO +ve and –ve cases group subjects

	Anti TPO		**P- VALUE**	**Significance**
	+ve	**-ve**		
Mean TSH	7.19±1.39	7.44±1.30	>0.05	NS

The inclusion criteria was similar to study done by Sing K, Singh [10] and Saini et al [11] has cut off value limit for TSH was >5.0 micro IU/ml and 6.1 micro IU/dl.

Mean serum T3 in case was 2.37±0.47 pg/dl and in control was 2.37±0.47 pg/dl. The minimum and maximum value was 1.8 pg/dl and 3.9 pg/dl in case which was statistically not significant. Mean FT4 in case was 1.20±0.25 ng/dl and in control was 1.25±0.23 ng/dl. This difference was also not statistically difference (p value >0.05). Mean serum TSH in anti TPO +ve group was 7.19± 1.39 mg/dl and mean serum TSH of anti TPO –ve cases group was 7.44±1.30 mg/dl**.** These findings were similar to study done by Salmon Rizvi et al[17]. The mean value of TSH in cases was 7.38±1.33uIU/ml and in control was 2.52±0.82 uIU/ml. These finding was similar to study done by Saini v et al [10].

V. Discussion And Conclusion.

Woman in reproductive age group were most commonly affected. Our study showed significantly higher levels of triglycerides (TG) and VLDL levels in patients with sub clinical hypothyroidism. No statistical

correlation was found between total cholesterol LDL and HDL. Our study emphasized that it is necessary that subjects with laboratory report of hypertriglyceridemia should also further examined and tested for serum thyroid hormones measurements and particularly the evaluation of TSH should be reassessed carefully.

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