FREQUENCY OF DYSLIPIDEMIA IN PATIENTS HAVING SUBCLINICAL HYPOTHYROIDISM

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ABSTRACT

OBJECTIVES

To determine the lipid abnormalities in subclinical hypothyroidism.

METHODOLOGY

A case-control study was conducted on euthyroid and subclinical hypothyroid patients presenting to OPD and medical wards of Hayatabad Medical Complex from January to December 2023. The euthyroid control arm had no history of thyroid disease in the past. These hundred control patients were compared to a hundred cases who had subclinical hypothyroidism. All the patients underwent laboratory tests for thyroid hormones and lipid levels. Overt hypothyroidism was excluded. All the results were compared using SPSS statistical analysis version 23.

RESULTS

We found that in subclinical hypothyroidism, high triglycerides (TG) were the only abnormal findings, while total cholesterol (TC) and high-density lipoproteins (HDL) were not affected. The risk of hyper triglyceridemia with thyroid stimulating hormone (TSH) levels ≥10mIU/L was 2-fold higher compared to that in the average population (P<0.05)..

CONCLUSION

Disorders of TG metabolism with subclinical hypothyroidism show a direct correlation with the level of TSH, and the risk of hypertriglyceridemia is moderately increased when the level of TSH ≥10mIU/L. SCH does not affect the level of TC and HDL.

KEYWORDS: *Subclinical Hypothyroidism (SCH), Dyslipidemia, Thyroid Stimulating Hormone (TSH), Total Cholesterol (TC), Triglycerides (TG), High-Density Lipoproteins (HDL)*

INTRODUCTION

Subclinical hypothyroidism (SCH) is an endocrine metabolic disease with no apparent clinical manifestations but elevated thyroid stimulating hormone levels and normal thyroid hormones (T3 and T4). The incidence of SCH is 3%-18%. The disease is 3-5-fold more common among women than in men.[1,2,3] Subclinical hypothyroidism (SCH) is associated with an increase in total cholesterol (TC) and low-density lipoprotein cholesterol (LDL-C), particularly triglyceride (TG) metabolism.[4,5,6] A cross-sectional case-control study conducted by Rajendra et al. found a significant increase in TG and LDL-C levels in the Asian population with SCH.[7] Many studies conducted in different population groups show varying results. Although hyperlipidemia in overt hypothyroidism is a known phenomenon, hyperlipidemia in the subacute variant (SCH) is not a settled issue.[8,9,10,11] The prevalence of subclinical hypothyroidism is 4.3% in the general population, according to an international study result. It has also shown that SCH is related to age and gender. In a national study conducted among type 2 Diabetes Mellitus patients, 7.8% had subclinical hypothyroidism.[12,13] Kumar et al. have reported dyslipidemia in subclinical hypothyroidism.[14] Dyslipidemia is a well-known complication of primary hypothyroidism, causing an increase in the risk of hypertension and cardiovascular diseases.[15,16] Dyslipidemia is defined as the abnormal amount of lipids (total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), and triglyceride (TG)] in the blood.[2] The normal values are TC (< 200 mg/dl), LDL-C (<100 mg/dl), HDL-C (>60 mg/dl) and TG (<150 mg/dl).[8] Hypothyroidism is a significant cause of secondary dyslipidemia. As per a local study's results, dyslipidemia prevalence among the general population was 59.1%.[17] A study conducted in Nepal found no significant differences in lipid parameters between cases and controls.[13] Our study aims to determine the frequency of dyslipidemia in sub-clinical hypothyroidism patients presented to medical outpatient and medical wards of Hayat Abad Medical Complex

Peshawar. The knowledge of the frequency of dyslipidemia in patients with subclinical hypothyroidism in our setup will enable us to detect and treat dyslipidemia early and reduce the overall cardiovascular risk in such patients.

METHODOLOGY

A total of a hundred cases and a hundred controls were compared. All the patients underwent laboratory tests for thyroid hormones and lipid levels in the central laboratory of the study setting. Overt hypothyroidism was excluded. All cases were compared using SPSS statistical analysis version 23. Mean ± standard deviation was calculated for continuous variables like the age of patients. Frequency and percentages were calculated for qualitative variables like gender, thyroid status, and dyslipidemia. Dyslipidemia was stratified by age, gender, and thyroid status to see effect modifiers. An Independent *t*-test was used to compare the means of the age between the patient and control groups. A chi-square test was employed to distribute cholesterol levels between the case and control groups.

RESULTS

In our study, the mean age of patients was found to be 48.4 ± 11.6 years, and that of control was 48.23±11.8 years, and the difference was statistically insignificant (P=0.15). There were 49.45% (99) female and 50.55% (101) male in the groups (Table 1). The control group had a male: female ratio of 52:48 and the case group had a male: female ratio of 52:51. The highest number of participants in the cases was 41-50 years in both the case and control groups (Table 1). The subjects in the control group were euthyroid. Elevated TSH level was found in cases versus controls (10±2.5 Vs. 2.5±1.6), which was statistically significant. No significant differences were found among lipid parameters between cases and controls (Table 2), but serum TG was positively correlated with TSH levels.

Table 1: Demographic Characteristics

Population Profile		Frequency	%age
Gender	Male: n=101		
	Case	49	48.5
	Control	52	51.5
	Female: n=99		
	Case	51	51.5
	Control	48	48.5
Age in Years (%age of Study)			
31-40 n=44(22)	Case	11	50
	Control	11	50
41-50 n=84(42)	Case	41	49
	Control	43	51
51-60 n=70(35)	Case	34	51
	Control	36	49
61-70 n=2(1)	Case	01	50
	Control	01	50

Table 2: Lipid Profile

Lipid	Levels	Case		Control		Total		Odd Ratio	P-Value
Total Cholesterol	<200	65	67%	67	67%	132	66%	0.915	0.88
	≥200	35	35%	33	33%	68	34%		
Triglycerides	<150	66	66%	47	47%	113	56.5%	1.691	0.02
	≥150	44	44%	53	53%	97	48.5%		
HDL	<30	51	51%	48	48%	99	49.5%	1.128	0.77
	≥30	49	49%	52	52%	101	50.5%		

DISCUSSION

Patients with SCH remain underdiagnosed as they are mostly asymptomatic. SCH may progress to overt hypothyroidism, which is associated with metabolic derangements and cardiovascular risk. This, in turn, increases morbidity and mortality due to alterations in risk factors positively correlated to cardiovascular complications. The correlation between lipid profile and hypothyroidism is well established, but lipid profile alteration in SCH is controversial. This controversial subject has not been addressed well, as few studies are available. The national studies on this subject are very few, and similar international studies are not many. Of interest is the fact that these studies have shown varied results, sometimes conflicting. Several studies have shown a positive correlation between the thyroid and lipids, and if treated timely, the changes in lipids can be reversed back to normal, whereas various other studies have shown no correlation between the two.[14,15,16,17,18,19,20] Our study conflicts with a few studies while supplementing other studies on the same subject. Our study showed no difference in serum TC HDL levels in cases and controls. However, triglyceride levels were elevated in the case group of our research. This agrees with Alamdari et al.'s 32 reports. A similar study by Khatiwada et al. SCH patients showed a significant positive correlation between TSH and TC, TG.[5,6,21] Study done by S. Ashok Kumar found an association between TSH and TC, LDL, TG, and HDL.[14] Not all studies mentioned reached the same conclusion regarding the presence/lack of association between lipid profiles and TSH levels. The differences between the results regarding the lipid profile of various studies are probably due to different cut-off points used to define SCH, differences in the prevalence of this disorder, and differences in the ethnicity, age, and gender of participants. Our study showed elevated levels of TG supporting dyslipidemia in SCH; however, our study failed to show an association between TC and HDL in SCH.

LIMITATIONS

This was a single hospital-based study. It cannot be applied to the general population, and extensive

community-based studies are needed to generalize these findings. Lipid ranges must be used to detect the exact lipid values in those more comprehensive studies. Community studies may be more appropriate for getting insight into such a controversial subject.

CONCLUSIONS

There were no significant differences in TC and HDL between subclinical hypothyroidism patients and euthyroid controls. There was an elevation in TG only. It is pertinent to mention that the study consisted of only two values of these lipids: below-normal and above-normal ranges. All the available studies are similar. Future studies must have different values in the normal range and then various groups of abnormal ranges for more precise values. Screening for SCH solely to detect lipid abnormalities may not be more beneficial than general hyperlipidemia screening. Further research is needed to clarify the relationship between SCH and lipid metabolism.

CONFLICT OF INTEREST: None

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