



EVALUATION OF CARDIOVASCULAR RISK FACTORS IN PATIENTS OF SUBCLINICAL HYPOTHYROIDISM

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ABSTRACT

Background and objectives: The association between thyroid disorders and cardiovascular disease is an active subject of research. While a no. of studies have been done on hypothyroid patients, subclinical hypothyroidism (ScH) is less researched. Mixed results have been reported in studies linking ScH with dyslipidemias, hypertension and anthropometric parameters. Data on Indian populations is relatively scanty. The current study was planned to evaluate the relationship of cardiovascular risk factors with ScH in Kashmiri population. **Materials and Methods:** A cross sectional study was conducted in the departments of Biochemistry and General Medicine, Govt. Medical College Hospital, Srinagar on fifty known patients of ScH and fifty age and gender matched euthyroid controls. Clinical and anthropometric details were collected. Thyroid hormones, lipid profile and blood glucose levels were estimated. **Results and conclusions:** Serum levels of fasting blood glucose, triglyceride, High density lipoprotein, and Low Density Lipoprotein in ScH patients were 99.02 ± 28.90 mg/dl, 166.32 ± 70.50 mg/dl, 43.82 ± 11.44 mg/dl, 111.58 ± 95.14 mg/dl respectively). The same were not statistically significant ($P > .05$). ScH patients had a systolic blood pressure of 118 ± 12.94 mmHg and diastolic blood pressure of 73.4 ± 7.45 mmHg as compared to 118.2 ± 13.04 mmHg and 74.2 ± 8.10 mmHg respectively in euthyroid controls. The same again were not statistically significant ($p > 0.05$). Waist circumference and Body mass index were comparable. Thus in our study we did not find any association of cardiovascular risk factors with ScH.

KEYWORDS: Hypothyroidism, Metabolic Syndrome, Obesity, Hypertension.

INTRODUCTION

The association between thyroid disorders and cardiovascular disease is an active subject of research.^[1,2] Cardiovascular disease continues to be a major cause of disease related mortality all over the world.^[3] Subclinical hypothyroidism (ScH) is defined by high thyroid stimulating hormone (TSH) levels with normal thyroxine (T4).^[4] Studies evaluating the association between ScH and cardiovascular risk factors have been less frequent. While some studies have found a weak association between hypertension and ScH^[5,6], others have been inconclusive.^[7] Mixed results have been reported in studies linking ScH with dyslipidemias.^[5, 8-10] Data on Indian populations has been relatively scanty. The current study was planned to assess the relationship between ScH and cardiovascular risk factors (hypertension, dyslipidemia, BMI etc) in the Kashmiri population.

MATERIALS AND METHODS

The study was conducted in the Departments of Biochemistry and General Medicine, Govt Medical

College, Srinagar on fifty ScH patients attending the Medical OPD and fifty age and gender matched controls. Pregnant women, patients receiving steroids or lipid lowering agents and patients with serious systemic illness were excluded from the study.

Sitting Blood pressure was measured at least after 10 minutes of rest by standard procedure. A second measurement was made after at least 3 minutes. The mean of two measurements was taken for systolic and diastolic blood pressure. Height in cm and weight in kg was measured with light clothing and without shoes. Waist circumference in cm was measured at the superior border of iliac crest in midaxillary line in accordance to NIH protocol.^[11]

ScH was diagnosed following the criteria used by the NHANES (National Health and Nutrition Examination Survey), which establishes normal T4 levels (0.9-1.9 pg/dL), together with high TSH levels (≥ 4.12 mIU/L), with no known records thyroid pathology.^[12]

Clinical data

Demographic, anthropometric and clinical data were collected with the help of a self designed, pretested questionnaire.

Sample collection and transport

For accurate comparison to established normal values, fasting morning serum samples were obtained after an overnight fast of at least 8 hrs. The blood was collected aseptically, preferably from anti cubital vein in heparinised venipuncture tubes. Samples were processed and stored, where necessary, as per accepted guidelines.

Quantitative assays

Estimation of thyroid hormones (TSH, T3, T4,) was done by Chemiluminescence immunoassay technique on Abbot i1000 analyser. Blood glucose and parameters of lipid profile were estimated by enzymatic methods on ABBOT c4000 analyser.

Statistical analysis

Statistical analysis was performed using IBM SPSS and Microsoft Excel. Descriptive analysis was performed, followed by testing for correlations by Pearson's coefficient (r) and testing for associations by independent ttest and chi square test.

Ethical justification

Ethical approval was obtained from Institutional Ethics Committee (IEC) of the institute.

RESULTS AND DISCUSSION

Baseline characteristics were similar in both groups (Table 1).

4 % (2) hypothyroid patients were underweight (BMI <18.5 Kg/m²), 40 % (20) patients had normal BMI (18.5-24.9Kg/m²), 30 % (15) patients were pre-obese (25-29.9 Kg/m²), 14 % (7) patients had class I obesity (30-39.9 Kg/m²) and 4% (2) patients had class II obesity (35- 40 Kg/m²) (p<0.05).

In present study, fasting blood sugar, triglyceride, high density lipoprotein (HDL) and low density lipoprotein (LDL) levels in subclinical hypothyroid patients were 99.02 ± 28.90 mg/dl, 166.32 ± 70.50 mg/dl, 43.82 ± 11.44 mg/dl, 111.58 ± 95.14 mg/dl respectively). The same were not statistically significant when compared to euthyroid controls (P>.05) (Table 2). Different studies have reported differently on these associations. Paoli-Valeri M etal found significantly low levels of HDL in ScH group while other parameters of lipid profile were not significant.^[10] Raised TG,LDL were reported by Geng H etal and Fazaeli M etal in patients of ScH as compared to euthyroid controls.^[13,14] No significant difference in lipid profile and was found by Catlı G etal and Asranna A etal.^[15,16]

In our study we found that hypothyroid patients had a systolic blood pressure of 118 ± 12.94 mmHg and diastolic blood pressure of 73.4 ± 7.45 mmHg as compared to 118.2 ± 13.04 mmHg and 74.2 ± 8.10 mmHg respectively in euthyroid controls. The same again were not statistically significant (p>0.05). Also chi square analysis of hypertensive status between ScH and euthyroid groups did not reveal any significant association (p>0.05). This was similar to the findings of Gonzalez GL etal^[5] while a meta-analysis by Cai Y etal revealed a rather weak relationship of subclinical hypothyroidism with increased systolic and diastolic blood pressure.^[7]

Thus in our study we did not find any association of cardiovascular risk factors with sub clinical hypothyroidism. While the same was reported by several other studies, some studies however have reported on the contrary. Although the variation could be attributed to heterogeneity in population characteristics, a definite association between the two seems to be lacking.

Table 1: Baseline characteristics of patients.

		Euthyroid		Subclinical hypothyroid	
		Frequency	Percent	Frequency	Percent
GENDER	Female	33	66	34	68
	Male	17	34	16	32
	Total	50	100	50	100
SMOKING	Yes	6	12	5	10
	No	44	88	45	90
	Total	50	100	50	100
BMI	<18.4	5	10	6	12
	18.5-24.9	31	62	20	40
	25-29.9	8	16	15	30
	30-39.9	5	10	7	14
	>40	1	2	2	4
	Total	50	100	50	100

Table 2: Biochemical and Anthropometric parameters of study subjects.

	EUTHYROID	ScH	p value
Fasting blood glucose (mg/dl)	91.3 ± 9.35	99.02 ± 28.90	0.075
Total cholesterol (mg/dl)	164.02 ± 42.52	165.28 ± 45.13	0.886
Triglycerides (mg/dl)	151.06 ± 69.82	166.32 ± 70.50	0.279
HDL (mg/dl)	43.28 ± 11.73	43.82 ± 11.44	0.816
LDL (mg/dl)	97.3 ± 34.18	111.58 ± 95.14	0.32
Waist Circumference (cm)	87.04 ± 9.05	86.98 ± 11.40	0.977
BP Systolic (mmHg)	118.2 ± 13.04	118 ± 12.94	0.939
BP Diastolic (mmHg)	74.2 ± 8.10	73.4 ± 7.45	0.609
BMI	23.72 ± 5.10	25.57 ± 6.35	0.11
TSH (μIU/ml)	2.27 ± 1.17	10.70 ± 14.65	0
T3 (ng/ml)	1.31 ± 0.34	1.27 ± 0.35	0.606
T4 (μgm/dl)	7.92 ± 1.72	7.53 ± 1.90	0.295

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