



ASSOCIATION OF SERUM TSH LEVEL WITH LIPID PROFILE IN PCOS WOMEN

Biochemistry

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ABSTRACT

Background: PCOS causes reproductive and obstetric complications, besides this it may lead the development of metabolic syndrome with the characteristics features of insulin resistance, central obesity, impaired glucose tolerance, dyslipidemia & hypertension. In present study we tried to examine the presence of correlation between serum TSH hormone and lipid profile in women with PCOS. **Materials & Methods:** In this observational cross-sectional study, we examined 100 women clinically diagnosed with PCOS and 100 healthy female controls matched for age (18-40 years). We assessed lipid profiles and level of TSH hormone in both groups. **Results:** Serum TSH (Thyroid Stimulating Hormone) level was significantly elevated in women with PCOS as compared to healthy controls ($P < 0.05$). Statistically significant higher level of lipid risk factors such as LDL-C/HDL-C ratio and TC/HDL-C ratio were also observed in PCOS subjects compared to control group. We observed non significant correlation of TSH with lipid components. **Conclusion:** PCOS women are documented with higher prevalence of dyslipidemia and hypothyroidism.

KEYWORDS

INTRODUCTION

PCOS (polycystic ovary syndrome), which involves about one in 15% of women worldwide, is a heterogeneous endocrine disorder that is defined by oligo- or anovulation, clinical and/or biochemical signs of hyperandrogenism, and polycystic ovaries [1]. It is a complex disorder in which hormone regulating the egg development of ovaries with other metabolic pathways are affected [2]. So other conditions like dyslipidemia, hypertension, cardiovascular disease have been associated in PCOS [3].

As it is frequently seen in PCOS, thyroid hormone abnormalities or thyroid autoimmunity are linked to an increased risk of infertility, spontaneous miscarriage, premature delivery, and metabolic dysfunctions [4,5]. Thyroid autoimmunity and subclinical hypothyroidism (SCH) are more common in the PCOS group than in women as a whole [6]. Thyroid-stimulating hormone (TSH) levels are also frequently elevated in women with PCOS [7]. Women with PCOS may experience SCH, which has been linked to hyperlipidemia and has been shown to impair both PCOS and overall pregnancy rate [8].

Thus to avoid the risk of complications in PCOS women it is precious to study the hormonal and lipid profile. Therefore the aim of this study is to assess the level of TSH and lipid parameters in PCOS women and to evaluate the correlation between them.

MATERIAL AND METHODS

This observational cross sectional study included 100 women diagnosed with PCOS. These women were aged 18-40 years attending outpatient services at New Medical College Hospital (NMCH), affiliated with Government Medical College in Kota, India, presenting with primary complaints of menstrual irregularities (amenorrhea or oligomenorrhea) and/or hirsutism, with or without infertility, underwent comprehensive evaluation for polycystic ovarian syndrome were taken as cases. One hundred healthy women were included as controls during the same timeframe. These women did not exhibit hirsutism, acne, male-pattern baldness, family history of PCOS, or signs of hyperandrogenism. They all had regular menstrual cycles lasting between 28 to 35 days and did not meet any of the revised Rotterdam criteria.

Individuals with previous oncological history and also currently undergoing treatment were excluded from study. Pregnant and lactating women were excluded from the study. Individuals with diabetes mellitus, hypertension, thyroid disorders, renal diseases, cardiovascular diseases, or Cushing's syndrome were not eligible. Those on steroid therapy or addicted to other drugs were also excluded. Females less than 18 years and above 40 years of age were not included.

After consulting with patients, informed written consent for study was

taken from each object. 5 ml venous blood sample was drawn from the antecubital vein of each participant after an overnight fast of 10 to 12 hours, using standard aseptic techniques. Serum level of TSH was measured using electrochemiluminescence immunoassay. Lipid profile included total cholesterol (TC), triglyceride (TG) and high density lipoprotein-C (HDL-C) were estimated by Standard Kit method using fully automated analyzer ERBA XL 640. LDL cholesterol & VLDL cholesterol was calculated by using friedwald's formulae :-

$$\text{LDL-c} = \text{TC} - (\text{HDL-c} + \text{VLDL-c})$$

$$\text{VLDL-c} = \text{TG} / 5$$

RESULTS

Out of 200 subjects, 100 subjects diagnosed with PCOS and 100 controls were included in the study. Serum level of TSH hormone in PCOS group was significantly elevated (5.57 ± 1.8) when compared with control women (2.35 ± 1.0) with significant p value of .000. Level of lipid parameters such as Cholesterol, triglycerides, low density lipoprotein (LDL-C) and very low-density lipoprotein (VLDL-C) were elevated ($178.10 \pm 42.8 \text{ mg/dl}$; 131.38 ± 52.8 ; 111.94 ± 44.4 and 23.87 ± 10.5 respectively) as compared to control group (155.08 ± 23.1 ; 99.94 ± 63.1 ; 86.85 ± 27.2 and 19.98 ± 12.6 respectively). Level of HDL-C level was low in PCOS group ($42.28 \pm 14.4 \text{ mg/dl}$) as compared to control group (48.24 ± 9.6).

In our study we found that TSH showed insignificant positive correlation with TC, TG, LDL-C, VLDL-C, LDL/HDL ratio and TC/HDL ratio. We also found TSH showed insignificant negative correlation with HDL-C (Table 1).

Table 1: Showing correlation of TSH Hormone with lipid profile in women with PCOS

S.No.	Parameters	TSH	
		r	p
1	TC	.042	.677
2	TG	.138	.170
3	HDL	-.047	.643
4	LDL	.023	.820
5	VLDL	.138	.170
6	LDL/HDL Ratio	.051	.611
7	TC/HDL Ratio	.076	.455

$p < 0.05$ is significant

DISCUSSION

In our study, we found significant increased level of TSH in PCOS women (5.57 ± 1.8) when compared with healthy control women (2.35 ± 1.0) which suggest hypothyroidism in PCOS. This is comparable to the previous study done by Archana Shirsath et al. [9].

In this study we also found higher level of total cholesterol (TC), triglyceride (TG), low density lipoprotein (LDL-C) and low level of high density lipoprotein (HDL-C) in PCOS women. Our results were matched with the study of Cristian Joan IUHAS et al. [10].

Our study didn't find significant correlation of TSH with lipid components. Ganie et al. [11] indicated that serum concentrations of triglyceride and TSH in patients with PCOS and subclinical hypothyroidism were higher than the controls. This is in concordance to the findings of Celik et al. [12].

CONCLUSION

Our study concluded that level of serum TSH and parameters of lipid profile were elevated along with the reduction of HDL-C in women suffering from PCOS. Increased risk of hyperlipidemia is linked with hypothyroidism that is common in PCOS. Hence, the assessment of biochemical, metabolic, and endocrine markers is crucial for the early diagnosis of PCOS and for keeping track of it.

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