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Original Research Article

Thyroid dysfunction in women with polycystic ovarian syndrome: a comparative study

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ABSTRACT

Background: Polycystic ovary syndrome (PCOS) is the most common endocrinopathy in reproductive age women. Some of the PCOS women show presence of hypothyroidism.

Methods: This study was conducted at tertiary care centre Indira Gandhi Government Medical College and Hospital (IGGMC), Nagpur, Maharashtra, India. The study group had 50 diagnosed patients of PCOS and 50 age matched normal regular menstruating women were taken as controls.

Results: In this study, PCOS patients showed higher mean TSH level than control group (4.024 ± 1.09 and 2.84 ± 0.83 respectively). And more women were diagnosed with overt hypothyroidism in the PCOS group (6%) than in the control group (2%).

Conclusions: The findings of the study showed that PCOS is associated with hypothyroidism as compared to normal population.

Keywords: Hypothyroidism, Polycystic ovary syndrome, Obesity

INTRODUCTION

Polycystic ovary syndrome (PCOS) is the most common endocrinopathy in reproductive age women. The prevalence of PCOS is 8-12% of women of reproductive age. Polycystic ovarian syndrome is characterized by menstrual and hormonal irregularities resulting in anovulation, infertility, and hyperandrogenism¹. Insulin resistance (IR) and hyperandrogenism are amongst the most common endocrine irregularities seen in PCOS.² A similar picture is also shared by hypothyroidism due to associated hyperglycaemia, raised levels of sex hormone binding globulin (SHBG).³ Thyroid disorders are more common in PCOS subjects. Hypothyroidism by virtue of raised thyrotropin releasing hormone (TRH) causes altered follicle stimulating hormone (FSH)/luteinizing hormone (LH) ratio and raised dehydroepiandrosterone (DHEA-S) levels. Also, excess thyroid stimulating

hormone (TSH) causes stimulation of FSH receptor. Cystic ovarian changes with raised ovarian mass have also been reported in hypothyroidism.^{4,5} On this background the aim of this study was to assess a status of thyroid function in subjects with polycystic ovarian syndrome.

METHODS

This study is conducted at tertiary care centre Indira Gandhi Government Medical College and Hospital (IGGMC), Nagpur after approval from institutional ethical committee. 50 patients of PCOS diagnosed according to Rotterdam criteria, in the age group of 20-50 years, coming in Obstetrics and Gynaecology outpatient department, were taken as cases. And 50 age matched normal regular menstruating women were taken as controls. Exclusion criteria for cases were patients with

hyperandrogenism; such as androgen secreting tumours and congenital adrenal hyperplasia, hyperprolactinemia, cardiovascular disease, hormonal contraceptives or other type of medication that may have affected lipid profile and carbohydrate metabolism, smokers or drinkers. All details of study were explained to the subject and informed consent was taken. Clinical examination was done as per the proforma. For Thyroid Profile estimation fasting venous blood sample (3cc) was collected in plain bulb with all aseptic precautions. Investigation is carried out in Clinical Biochemistry Laboratory, IGGMC, Nagpur. T3, T4, TSH were measured by Erba method on ELISA reader.

RESULTS

The study group had 50 diagnosed patients of PCOS and 50 age matched normal regular menstruating women were taken as controls.

Table 1: Age and BMI of the women in PCOS and control group.

	PCOS (n=50) Mean±SD	Control (n=50) Mean±SD
Age (years)	22.86±3.5	24.3±3.5
BMI(Kg/m ²)	30.3±7.6	28.6±5.6

Table 1 shows the age and BMI of women in PCOS and control group. The mean age of the women in PCOS group was 22.86±3.5 years and in the control group was 24.3±3.5 years. The BMI of the women in PCOS group was 30.3±7.6 Kg/m² and in the control group was 28.6±5.6 Kg/m².

Table 2: Thyroid hormone levels in PCOS and control group women.

Thyroid hormone	PCOS (n=50) Mean±SD	Control (n=50) Mean±SD	P value
TSH (mIU/ml)	4.024±1.09	2.84±0.83	0.007
T3 (ng/ml)	0.91±0.35	1.18±0.61	1
T4 (ug/dl)	6.8±1.68	8.9±2.06	0.43

Table 2 shows the comparison of thyroid hormone in both the groups. PCOS patients show higher mean TSH level than control group (4.024±1.09 and 2.84±0.83 respectively; P < 0.007). The T3 levels were 0.91±0.35 and 1.18±0.61 in PCOS and control group respectively (P < 1). Whereas the T4 levels in our study were 6.8±1.68 and 8.9±2.06 in PCOS and control group respectively (P < 0.43).

Table 3 shows that out of the 50 patients with PCOS, 3 patients had overt hypothyroidism and 47 were euthyroid. And in the control group, 1 patient had overt hypothyroidism and 49 patients were euthyroid.

Table 3: Thyroid status of the women in PCOS and control group.

Thyroid status	PCOS (n=50) (%)	Control (n=50) (%)
Overt hypothyroid	3 (6)	1 (2)
Euthyroid	47 (94)	49 (98)

DISCUSSION

The PCOS is one of the commonest endocrinological disorder affecting women in the reproductive age group. Some of the PCOS women show presence of hypothyroidism. The later condition could affect pathophysiology and features of PCOS. In this study, changes in the thyroid function were assessed in women with PCOS matched with healthy control women. The mean age of the women in PCOS group was 22.86±3.5 years and in the control group was 24.3±3.5 years. The mean age is less in the PCOS group as they present early due to menstrual irregularities. In the study by Qun Yu et al the mean age was 27.4±5.4 years and 23.3±4.1 years in PCOS and control group respectively.⁶ The BMI of the women in PCOS group was higher i.e. 30.3±7.6 Kg/m² and in the control group it was 28.6±5.6 Kg/m². Obesity is a common feature of both PCOS and hypothyroidism. The coexistence of hypothyroidism and PCOS has been related to complex pathophysiological changes caused by obesity and IR observed in the PCOS, though not conclusively.⁷ Similar finding was seen in the study by Sowmya D et al, where the BMI was 32.28±3.2 and 24.16±3.4 Kg/m² in PCOS and control group respectively.⁸ This increased severity of insulin resistance as well as obesity could have adverse metabolic consequences in hypothyroid PCOS women. PCOS patients showed higher mean TSH level as compared to control group (4.024±1.09 and 2.84±0.83 respectively), though the difference was not significant (P= 0.007). In the study by Sinha U et al, PCOS patients had mean TSH of 4.547±2.66 and for control group it was 2.67±3.11 (P < 0.05).⁵ Whereas in the study by Qun Yu et al the mean TSH levels were 5.11±2.7 and 2.9±3.2 in PCOS and control group respectively (P < 0.001).⁶ In this study the T3 and T4 levels were lower than the control group but the difference was not significant. In the study by Elslimani F et al, the T3 levels were 2.17±0.41 and 2.00±0.29 in PCOS and control group respectively. And the T4 levels were 9.26±1.87 and 10.2±1.77 in PCOS and control group respectively.⁹ The study shows that more women were diagnosed overt hypothyroidism in the PCOS group (6%) than in the control group (2%). In the study by Qun Yu et al 3% of the patients had overt hypothyroidism in the PCOS group and none was found in the control group.⁶ In the study by Sinha U et al, 2.5% of women in PCOS group and 1.25% of control group had overt hypothyroidism.⁵ Thus, all the above studies show that the incidence of overt hypothyroidism is more in the PCOS group, though the difference was not significant.

CONCLUSION

The findings of the study show that PCOS is associated with hypothyroidism as compared to normal population. Also the presence of PCOS increases the risk of obesity in patients. Obesity is also found associated with hypothyroidism. Thus hypothyroidism and PCOS has been related to complex pathophysiological changes and this study suggests that thyroid disorders are more common in PCOS subjects.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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