

### Thyroid disorders and polycystic ovary syndrome

<sup>1</sup>Dr. Gitanjali Jamwal, Ex. Senior Resident, Department of Obs. and Gynae, Dr. RPGMC Tanda, Kangra

<sup>2</sup>Dr. Kamal Singh, Assistant Professor, Department of Obs. and Gynae, Dr. RPGMC Tanda, Kangra

<sup>3</sup>Dr. Apra Attri, Senior Resident, Department of Obs. and Gynae, Dr. RPGMC Tanda, Kangra

<sup>4</sup>Dr. Rajinder Motte, Ex Professor, Department of Obs. and Gynae, Dr. RPGMC Tanda, Kangra

**Corresponding Author:** Dr. Kamal Singh, Assistant Professor, Department of Obs. and Gynae, Dr. RPGMC Tanda, Kangra

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#### Abstract

**Background:** Dysfunction and anatomic abnormalities of the thyroid are among the most common diseases of the endocrine gland. Abnormalities in the supply of thyroid hormone to the peripheral tissue are associated with alteration in a number of metabolic processes

**Methods:** 100 cases of women with PCOS based on Rotterdam’s criteria and an equal number of age-matched controls (women without PCOS) were included in the study.

**Results:** T4 level was significantly lower in PCOS group ( $0.83 \pm 0.65$  ng/ml ) as compare to control ( $1.90 \pm 0.86$  ng/ml ). T3 level was significantly higher in PCOS group ( $2.44 \pm 1.02$  ng/ml) as compare to control ( $2.11 \pm 1.16$  ng/ml ). TSH level was significantly higher in PCOS group ( $8.01 \pm 5.32$  ng/ml ) as compare to control ( $3.02 \pm 0.98$  ng/ml ).

**Conclusion:** High prevalence of thyroid disorders in PCOS patients thus points towards the importance of early correction of hypothyroidism in the management of infertility associated with PCOS.

**Keywords:** Women, T4, T3, TSH, PCOS

#### Introduction

Polycystic ovarian syndrome (PCOS) is a multisystem endocrinopathy in women of reproductive age with the ovarian expression of various metabolic disturbances and a wide spectrum of clinical features like infertility, obesity, menstrual abnormalities and hyperandrogenism. The condition is relatively common and affects about 20% of women of reproductive age. The diverse manifestations of PCOS start at an early age when a girl is maturing into a young woman.<sup>1</sup>

PCOS is one of the major risk factor for metabolic syndrome and the prevalence of metabolic syndrome in PCOS is 40-50%.<sup>2</sup> Since insulin resistance has its metabolic effects both on adolescent and adults, PCOS forms a key for search of metabolic syndrome.<sup>3</sup>

Dysfunction and anatomic abnormalities of the thyroid are among the most common diseases of the endocrine gland. Abnormalities in the supply of thyroid hormone to the peripheral tissue are associated with alteration in a number of metabolic processes.

Early stages of thyroid dysfunction (before symptoms are obvious) can lead to subtle change in ovulation and endometrial receptivity, which may have profound effect on fertility. Infantile hypothyroidism if untreated, leads to sexual immaturity.<sup>4</sup>

### Material & Methods

Type of Study: Cross-sectional study

Rotterdam Criteria

Two of the following three criteria are required:

- a) Oligo/anovulation
- b) Hyperandrogenism
  - i. Clinical (hirsutism or less commonly male pattern alopecia) or
  - ii. Biochemical (raised Free Androgen index or free testosterone)
- c) Polycystic ovaries on ultrasound.

Inclusion Criteria

- Age group - 13-45 years
- Giving written informed consent

Exclusion Criteria

- Women on OCP
- Women on steroids
- Hyperprolactinemia
- Congenital Adrenal Hyperplasia
- Cushing's Syndrome
- Virilizing tumor of ovary
- Vitiligo
- Endometriosis

**Control:** Women of the same age group visiting OPD with problems unrelated to Rotterdam's Criteria of PCOS were controls.

### Data Collection & Analysis

After obtaining permission study population selected through analyzing inclusion and exclusion criteria and with help of consecutive sampling, the questionnaire

administered to study subjects by the researcher. All relevant information related to study subjects' socio demographic details, anthropometry, clinical profile, biochemical parameters were collected and entered into Microsoft Excel and will be analysed with help of appropriate software and tests of significance considering level of significance as  $p < 0.05$ .

### Results

Table 1: Risk of Thyroid Disorder in PCOS and Control Group

Group	With Thyroid Disease		Without Thyroid Disease		p-value
	No.	%	No.	%	
PCOS	34	34.00	66	66.00	<0.01
Control	4	4.00	96	96.00	

34.00% PCOS cases were present with thyroid disorder.

Table 2: Thyroid function test

Variables	Cases		Controls		p-value
	Mean	SD	Mean	SD	
T <sub>3</sub>	2.44	1.02	2.11	1.16	>0.05
T <sub>4</sub>	0.83	0.65	1.90	0.86	<0.01
TSH	8.01	5.32	3.02	0.98	<0.01

T<sub>4</sub> level was significantly lower in PCOS group (0.83± 0.65 ng/ml ) as compare to control (1.90± 0.86 ng/ml ). T<sub>3</sub> level was significantly higher in PCOS group (2.44± 1.02 ng/ml) as compare to control (2.11± 1.16 ng/ml ). TSH level was significantly higher in PCOS group (8.01± 5.32 ng/ml ) as compare to control (3.02± 0.98 ng/ml ).

### Discussion

Patients with PCOS often have defective progesterone secretion which leads to an increased estrogen to progesterone ratio. Oestrogen can increase the expression of IL-6 in T cell and inhibitory action of progesterone

may leads to over stimulated immune system and makes these patients more prone to autoimmune disorder.<sup>5</sup>

T4 level was significantly lower in PCOS group ( $0.83 \pm 0.65$  ng/ml ) as compare to control ( $1.90 \pm 0.86$  ng/ml ).

T3 level was significantly higher in PCOS group ( $2.44 \pm 1.02$  ng/ml) as compare to control ( $2.11 \pm 1.16$  ng/ml ).

TSH level was significantly higher in PCOS group ( $8.01 \pm 5.32$  ng/ml ) as compare to control ( $3.02 \pm 0.98$  ng/ml ).

Similar results were reported by Sinha U et al (2013).<sup>6</sup> In our study mean serum TSH level was found to be significantly higher in PCOS group and in control group. Significant difference was found between two groups. Similar correlation between TSH and Anti-TPO antibody level was reported by Janssen OE et al (2004)<sup>7</sup>

### Conclusion

High prevalence of thyroid disorders in PCOS patients thus points towards the importance of early correction of hypothyroidism in the management of infertility associated with PCOS.

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