

Original Research Article

Autoimmune Thyroiditis in Polycystic ovarian syndrome casesMishra Divya¹, Nagar Pushpa², Meena B.S³, Saluja Sudha⁴, Rabinder Iqbal⁵, Goyal Nidhi⁶, Swami Mukesh⁷¹Resident, ²Sr Professor, ³Sr Professor HOD, ⁴Asst Professor, ⁵Resident, ⁶Resident, ⁷Resident

Department of Obst. & Gynae., S.M.S. Medical College & Hospital, Jaipur (Rajasthan) 302015

***Corresponding author**

Mishra Divya

Email: div07.lit@gmail.com

Abstract: Polycystic ovarian syndrome (PCOS) is one of the most common endocrine disorders in women of reproductive age. In recent years, a number of publications have reported close association between autoimmune thyroiditis and PCOS. Both the conditions have profound effect on fertility, reproductive biology, and metabolic abnormalities. We conducted this study to evaluate the incidence of autoimmune thyroiditis and compared various PCOS and thyroid related components among autoimmunity positive and negative PCOS cases. We found that 20.3% of PCOS cases had autoimmune thyroiditis, mean anti thyro peroxidase antibody level (Anti -TPO Ab) was 112.49±261.01IU/ml. Autoimmunity was more commonly found in adolescent girls. Thyroid disorders were more common in autoimmune positive cases. We conclude that autoimmune thyroiditis is a common phenomenon in polycystic ovarian syndrome cases and requires close surveillance.

Keywords: polycystic ovarian syndrome, autoimmune thyroiditis, anti thyro peroxidase antibody level, thyroid disorders, autoimmune positive

INTRODUCTION

Polycystic ovarian syndrome (PCOS) is one of the most common endocrine disorders in women of reproductive age. Current incidence of PCOS is increasing due to change in life style and stress. PCOS receives considerable attention because of its high prevalence and possible reproductive, metabolic and cardiovascular consequences. Hasimoto thyroiditis is the most common autoimmune disorder of the fertile age with the prevalence of 4-15%. In recent years, a number of publications have reported close association between autoimmune thyroiditis and PCOS. PCOS cases are found to have larger thyroid volumes and hypoechogenic thyroid on ultrasound. Most obvious connection between the two disorders seems to be hyperestrogenism. PCOS is known to be a hyperestrogenic state. Hyperestrogenism has been proposed as one explanation for the occurrence of increased autoimmune diseases in females when compared to males [1]. Estrogen stimulates immune system by increasing the secretion of Interleukin (IL)-1 in monocytes and IL-6 in T-Helper cells [2, 3]. Also Estrogen receptors have a proliferative action on B-lymphocytes. Both the conditions have profound effect

on fertility, reproductive biology, and metabolic abnormalities and together can cause serious implications in an individual's health. With this background we conducted this study to evaluate the incidence of autoimmune thyroiditis. We compared various PCOS and thyroid related components among autoimmunity positive and negative PCOS cases.

AIM AND OBJECTIVE –

The study was undertaken to study autoimmune thyroiditis in polycystic ovarian syndrome cases.

MATERIAL AND METHOD –

This was a comparative study conducted in the Department of Obstetrics and Gynaecology, S.M.S. Medical College and attached hospitals, Jaipur from 1st march 2015 till 28th February 2016. Institutional Review Board Clearance and Ethical committee approval was taken prior to the study. Every patient in the age group of 13-45 years with signs of hyperandrogenism and menstrual abnormality visiting the outpatient department was screened for this study. Fifty four women of age group 13-45 years, diagnosed as having

PCOS according to the Androgen Excess and PCOS Society (AE & PCOS) Criteria 2006 were included. Diseases which can manifest as PCOS like non-classical type of congenital adrenal hyperplasia, virilising tumor or adrenal tumor, Cushing syndrome, hyperprolactinemia were excluded from the study. A written informed consent was taken from women who were participating in the study. The Androgen Excess And PCOS Society (AE & PCOS) Criteria 2006 was used to define PCOS. Complete history and detailed Examination was done. Signs of Thyroid Disorders and Hyperandrogenism were documented. Clinical hirsutism was assessed by Modified Ferriman – Gallwey Score > 7. Serum Luteinizing Hormone (LH) and Follicle Stimulating Hormone (FSH) were estimated on day 2 of menstrual cycle. Luteinizing Hormone (LH) to Follicle Stimulating Hormone (FSH) ratio above 2 was considered elevated. Ultrasound pelvis was done to diagnose Polycystic Ovarian Morphology. Thyroid function tests (free T₃, free T₄, TSH) and AntiThyroperoxidase Antibody (AntiTPO Ab) was done in all cases. All women with Anti-TPO Ab level >35 IU/ml were considered Anti-TPO Ab positive. PCOS cases were divided in two groups’ anti-TPO Ab positive group and anti- TPO Ab negative group. Clinical, biochemical and hormonal parameters were compared in the two groups. Data collected was entered in MS Excel sheet. Qualitative data was expressed as proportion and percentage and Quantitative data was expressed as mean and standard

deviation. Qualitative data was analyzed using Chi square test and quantitative data was analyzed using t test. P value <0.05 was considered as significant and p value <0.01 as highly significant.

RESULTS

Anti – TPO level >35 IU/ml was detected in 11 (20.3%) out of 54 PCOS cases. Anti-TPO Ab level was significantly very high in PCOS women with mean Anti –TPO level 112.49±261.01 IU/ml. It was found that mean age of Anti-TPO Ab positive cases was 19.45±2.38 years whereas 23.55 ± 5.16 years in Anti-TPO negative cases; p value =0.013, indicating that Anti-TPO Ab positivity was more common in adolescents. No significant difference was found in BMI, F-G Score, and LH:FSH ratio among the two groups (Table 1). Mean TSH level was 7.72±13.55 µIU/ml in Anti – TPO Ab positive cases and 4.41±3.03 µIU/ml in Anti – TPO Ab negative cases, but no significant difference was found; p value = 0.139 (Table 2). No significant difference was found in occurrence of subclinical and overt hypothyroidism based on Anti – TPO Ab status. Incidence of hyperthyroidism (9.09%) and goitre (9.09%) was found to be higher in Anti-TPO Ab positive cases (Table 3). Correlation analysis was done for various parameters associated with Anti-TPO Levels in PCOS Women. Anti-TPO Ab levels were correlated positively with LH (r=0.5862; p=0.00001), FSH (r=0.5819; p=0.00001) and TSH levels (r=0.4909; p=0.00016) (Table 4).

Table 1: Comparison of Clinical, Biochemical and Hormonal Parameters of PCOS Patients based on Anti-TPO Ab Status

	Anti-TPO Ab Positive (n=11)	Anti-TPO Ab Negative (n=43)	P Value
AGE (years)	19.45±2.38	23.55±5.16	0.013(S)
BMI (Kg/m ²)	25.11±2.65	24.67±2.98	0.653(NS)
F-G Score	11.72±6.84	12.069±8.05	0.897(NS)
LH:FSH	2.52±0.90	2.44±1.03	0.809(NS)

Table 2: Statistical Value of Thyroid Specific Variables in Polycystic Ovarian Syndrome Patients Based on Anti-TPO Ab Status

	Anti-TPO Ab positive (n=11)	Anti-TPO Ab negative (n=43)	P Value
FREE T ₃ (pg/ml)	3.66±2.46	2.78±0.70	0.042(S)
FREE T ₄ (ng/ml)	1.29±0.99	0.94±0.30	0.046(S)
TSH (µIU/ml)	7.72±13.55	4.41±3.03	0.139(NS)

Table 3: Incidence of Thyroid Disorders in PCOS Patients Based on Anti –TPO Ab Status

	Anti-TPO Ab Positive (n=11)	Anti-TPO Ab Negative (n=43)	P value
Subclinical Hypothyroidism	3 (27.2%)	11 (25.5%)	0.9094 (NS)
Overt Hypothyroidism	1 (9.09%)	1 (2.32%)	0.29(NS)
Hyperthyroidism	1 (9.09%)	0	0.048(S)
Goitre	1 (9.09 %)	0	0.048(S)
Euthyroid	5 (45.45%)	32 (74.4%)	0.0676 (NS)

Table 4: Results of Correlation Analysis for Parameters Associated with Anti-TPO Ab Levels in PCOS Women

Variables	Anti – TPO	
	R	P
Age (years)	-0.2112	0.125634
BMI (Kg/m ²)	0.065	0.640522
F-G SCORE	0.0724	0.60288
LH(mIU/ml)	0.5862	0.00001 (HS)
FSH(mIU/ml)	0.5819	0.00001 (HS)
LH:FSH	0.0689	0.620564
FT3 (pg/ml)	0.519	0.0005(HS)
FT4 (ng/ml)	0.2733	0.045544(S)
TSH (μIU/ml)	0.4909	0.000164 (HS)

DISCUSSION

In the present study high incidence of thyroid autoantibodies was noted in patients with PCOS. In our study, we found that Anti-TPO Ab level was very high in PCOS women with mean Anti –TPO level 112.49±261.01IU/ml. Similar results were found in multiple studies indicating higher prevalence of Anti-TPO Ab levels in PCOS cases. In study conducted by Arducet *et al.*; in 2015 [4], Anti-TPO Ab level was significantly higher in PCOS women with mean levels 2.8 IU/ml vs 1.5 IU/ml, p value = 0.017. They also found positive correlation between estradiol/progesterone ratio and Anti-TPO Ab level suggesting that imbalance between estradiol and progesterone plays an important role in autoimmunity among PCOS women. Janssen OE *et al.*; in 2004 [5], reported that Anti TPO Ab level was significantly higher in PCOS women as compared to the control group (123 ±328 IU/ml in PCOS and 10 ± 18 IU/ml in control group; p value <0.001). In our study we compared various parameters in PCOS women based on their Anti – TPO Ab status. All women with Anti–TPO Ab level >35 IU/ml were considered Anti–TPO Ab positive. It was found that mean age of Anti–TPO Ab positive cases was 19.45±2.38 IU/ml years whereas 23.55 ± 5.16 IU/ml years in Anti–TPO negative cases; p value=0.013(Table1), indicating that Anti–TPO Ab positivity was more common in adolescents. No significant difference was found in BMI, F-G Score,

and LH: FSH ratio among the two groups. In the study conducted by Janssen OE [5] antibody positivity was found in the later reproductive ages with mean age of 30.9 ± 6.4 years. No significant difference was found in BMI and LH: FSH ratio (Table2). Mean TSH level was 7.72±13.55μIU/ml in Anti–TPO Ab positive cases and 4.41±3.03 μIU/ml in Anti–TPO Ab negative cases in our study and no significant difference was found; p value = 0.139(Table3). Similar results were reported by Janssen OE *et al.*; in 2004 [5] and Arduc A *et al.*; 2015 [4]. In our study Anti-TPO Ab levels were correlated positively with LH (r=0.5862; p=0.00001), FSH (r=0.5819; p=0.00001), and TSH levels (r=0.4909; p=0.00016) in Pearson correlation analysis (Table4). Similar analysis was done by Arduc A *et al.*; in 2015 [3], in their study TSH levels correlated positively with Anti TPO Ab levels (r=0.514; p<0.0001). Similar correlation between TSH and Anti TPO Ab level was reported by Janssen OE [5]. No correlation was found with LH and FSH in both the studies.

CONCLUSIONS

We conclude that there is strong association of autoimmune thyroiditis and PCOS. This association is more significant in young individuals. Hence all cases of PCOS should be screened for autoimmune thyroiditis with or without overt thyroid disorders.

REFERENCES

1. Cutolo M, Sulli A, Straub RH. Estrogen metabolism and autoimmunity. *Autoimmunity reviews*. 2012 May 31; 11(6):A460-4.
2. Li ZG, Danis VA, Brooks PM. Effect of gonadal steroids on the production of IL-1 and IL-6 by blood mononuclear cells in vitro. *Clinical and experimental rheumatology*. 1992 Dec; 11(2):157-62.
3. Angstwurm MW, Gärtner R, Ziegler-Heitbrock HL. Cyclic plasma IL-6 levels during normal menstrual cycle. *Cytokine*. 1997 May 31; 9(5):370-4.
4. Arduc A, AycicekDogan B, Bilmez S, ImgaNasiroglu N, Tuna MM, Isik S, Berker D, Guler S. High prevalence of Hashimoto's thyroiditis in patients with polycystic ovary syndrome: does the imbalance between estradiol and progesterone play a role? *Endocrine research*. 2015 Oct 2; 40(4):204-10.
5. Janssen OE, Mehlmauer N, Hahn S, Offner AH, Gartner R. High prevalence of autoimmune thyroiditis in patients with polycystic ovary syndrome. *European journal of endocrinology*. 2004 Mar 1; 150(3):363-9.