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ASSOCIATION OF SERUM TSH AND ANTI TPO ANTIBODY IN INFERTILE FEMALES

Physiology

Okram Sheetle	Post Graduate Trainee
Vikramjit Ningthouja T*	Post Graduate Trainee *Corresponding Author
Florence Lalvarmawi	Associate Professor, Department Of Physiology, Regional Institute Of Medical Sciences, Imphal
Chanchal Lamabam	Assistant Professor, Department Of Biochemistry, Jawaharlal Nehru Institute Of Medical Sciences, Imphal
Rajima Sahani	Post Graduate Trainee

ABSTRACT

Endocrine glands play major role in maintaining fertility. Thyroid hormones have great effects on reproduction and pregnancy. TSH plays a potential role in implantation process by significantly upregulating LIF expression in endometrial cell cultures. Women who are positive for anti-thyroid peroxidase antibodies (TPO-Ab) have increased incidence of spontaneous abortion. Thyroid autoimmunity may result in recurrent embryo implantation failure, recurrent miscarriages as well as primary and secondary infertility. This study was conducted on 120 infertile females. Serum TSH and serum anti TPO antibody were estimated using ELISA kits. Almost half of the participants (49.2%) had abnormal TSH level. Serum anti TPO antibody was elevated in 52.5% of the participants, with a mean of 52.96±37.12 IU/ml. Among the participants with high TSH level (4.2 µIU/ml), 94.7% of them had elevated serum anti TPO antibody. The association was found to be statistically significant with a p – value of 0.001. Thus, it can be concluded that infertility is associated with abnormal thyroid hormone levels and that serum TSH is associated with anti TPO antibody in infertile females.

KEYWORDS

Serum TSH, serum anti TPO antibody, infertile females, thyroid hormones

INTRODUCTION

Infertility is the inability of a couple to conceive after a year of having regular unprotected intercourse.[1] Thyroid hormones have great effects on reproduction and pregnancy.[2] TSH plays a potential role in implantation process by significantly upregulating LIF expression in endometrial cell cultures.[3] Human thyroid peroxidase is an enzyme responsible for the biosynthesis of hormones by the thyroid gland. It catalyses iodination and coupling of tyrosine residues in thyroglobulin leading to the synthesis of triiodothyronine and thyroxine.[4] Thyroid autoimmunity may result in recurrent embryo implantation failure, recurrent miscarriages as well as primary and secondary infertility. Anti-TPO antibodies may exaggerate or perpetuate thyroid injury but not essentially initiate it. Thus, the evaluation of serum anti-TPO antibody levels with respect to serum concentration of thyroid hormones would help in establishing its probable pathogenic role in induction of hypo- or hyperthyroidism.[5]

AIM

- To determine the levels of serum TSH and anti TPO antibody among infertile females
- To determine the association between serum TSH and anti TPO antibody among infertile females

MATERIALS AND METHODS

This was a cross – sectional study done in the Department of Physiology in collaboration with the Department of Obstetrics and Gynecology, RIMS, Imphal on 120 infertile females between the period of January, 2021 to May, 2022. ELISA kits were used to determine the serum TSH and anti TPO antibody levels.

Inclusion Criteria

Infertile women within the age group of 20 to 45 years

Exclusion Criteria

Women with already diagnosed thyroid disorders

Data Collection

Patients fulfilling the inclusion criteria were taken up for the study. An informed written consent was taken from all the subjects.

After taking informed consent, all study participants were subjected to detailed history and general physical examination.

Sample Collection And Storage

Fasting 5ml blood was drawn from the antecubital vein in between 8AM to 10AM and the collected samples was allowed to clot and centrifuged at 3000 rpm for 30 minutes and serum thus collected was stored in the freezer compartment of the refrigerator at -2ºC to -10ºC. Prior to the assay, all the samples were brought to room temperature and estimation for serum TSH and anti-thyroid peroxidase auto-antibody was done using Enzyme Linked Immunosorbent Assay (ELISA) method.

RESULTS

Fig 1 shows that out of 120 infertile female participants, 50.9% of them had normal serum TSH level (0.4 – 4.2 µIU/ml)50.9%

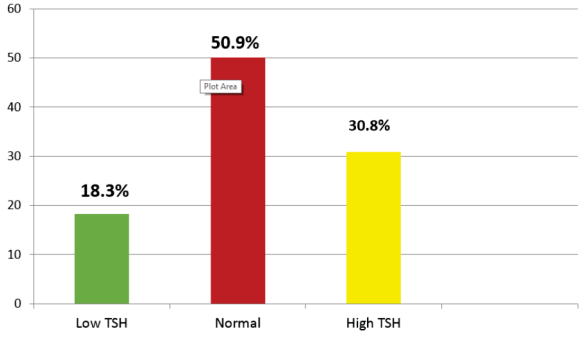

Fig.1: Distribution Of Participants By Serum TSH Level

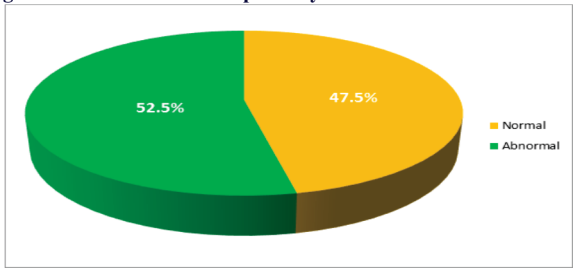

Fig.2: Distribution Of Participants By Serum Anti – Tpo Ab Level. It Is Observed That More Than Half Of The Participants (52.5%) Had High Serum Anti – Tpo Auto Antibody Level.

Table 1: Association Between Tsh And Anti – Tpo Antibody Levels

TSH(µIU/ml)	Serum anti – TPO		Total	*P – value
	Positive	Negative		
>4.2	36 (94.7%)	2 (5.3%)	38 (100%)	0.001*
0.4 – 4.2	9 (15%)	51(85%)	60 (100%)	
<0.4	19 (86.4%)	3 (13.6%)	22 (100%)	
Total	64 (53.3%)	56 (46.7%)	120 (100%)	

*Chi – square test

It is evident from Table 1 that majority (94.7%) of the participants with high TSH level (>4.2 µIU/ml) were found to be positive for serum anti – TPO Ab. Among the participants with normal TSH level (0.4 - 4.2 µIU/ml), majority (85%) of them were found to be negative for serum anti – TPO Ab. Among the participants with low TSH level (<0.4 µIU/ml), majority (86.4%) of them had positive anti – TPO antibody (>40IU/ml). The results were found to be statistically significant (p – value =0.001).

DISCUSSION

Thyroid disorders are associated with a variety of abnormalities such as delayed onset of puberty, menstrual disorders, anovulatory cycles, infertility and pregnancy wastage. Thyroid autoimmunity is related to primary as well as secondary infertility, recurrent embryo implantation failure and miscarriages. Autoantibodies alter the function of thyroid gland by cellular damage that occurs when sensitized T – lymphocytes and /or autoantibodies bind to thyroid cell membranes leading to cell lysis and inflammatory reactions.

In our study, serum TSH level was higher (3.89±3.29µIU/ml) among the participants with elevated anti – TPO antibody as compared with those of participants with normal anti – TPO antibody level with a mean serum TSH level of 2.28±1.10µIU/ml and was found to be statistically significant with a p- value of 0.001. Among the participants with high serum TSH level, 94.7% were anti TPO Ab positive; and the p – value of the correlation between the two was found to be statistically significant. This finding is in agreement with that of Gupta et al[6] where majority (58.82%) of the women with high TSH level were anti TPO Ab positive. Also, in a study conducted by Grassi et al[7] on 129 infertile women, 83.33% of the women with high serum TSH level had positive serum anti – TPO. Infertility can be a result of thyroid dysfunction alone or association of thyroid dysfunction with autoimmunity. Thyroid autoimmunity is one of the most important causes of thyroid dysfunction.

CONCLUSION

In our study, there was statistically significant association between anti TPO Ab positivity and serum TSH abnormality. Thyroid autoimmunity creates a cytotoxic environment that damages the maturing oocytes reducing its quality and fertilization potential and by inducing subtle dysfunction during early pregnancy.[8] Therefore, detection of thyroid autoimmunity and thyroid dysfunction can be recommended to be a part of battery of tests for work up on infertility. Population – based studies on a large scale are however, required to further verify the association.

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