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PREVALENCE OF SERUM THYROID HORMONES AND MENSTRUAL IRREGULARITIES WITH INFERTILITY IN UTTAR PRADESH, INDIA

Neha Sharma* and Simant Baliar Singh

Department of Biochemistry, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly- 243 202, Uttar Pradesh, India

ABSTRACT

Keywords:

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Triiodothyronine (T₃),
Tetraiodothyronine (T₄),
menstrual disorder,
hypothyroidism

Correspondence to Author:

Neha Sharma

Department of Biochemistry, Shri Ram
Murti Smarak Institute of Medical
Sciences, Bareilly - 243 202, Uttar
Pradesh, India

E-mail: neha16.sharma@gmail.com

It is important to predict the serum thyroid hormones level in females during infertility to prevent its occurrence later on. In this study, we studied serum thyroid hormones and menstrual irregularities during infertility. A case control study was performed in 75 infertile patients with menstrual irregularities and 50 healthy matched women. Three biochemical parameters were measured in serum, hormones triiodothyronine (T₃), tetraiodothyronine (T₄) and serum thyroid stimulating hormone (TSH) by TOSOH-AIA-360, immunoassay method. Out of 75 infertile women sixteen percent (16%) had menstrual irregularities with hypothyroidism. The mean serum thyroid level in 75 infertile women were 0.88±0.34 ng/ml, 7.69±2.87 µIU/dl and 5.43±6.88 µIU/ml, respectively. Serum T₃, T₄ and TSH level were statistically highly significant in infertile women. Serum thyroid stimulating hormone level was found at higher side in infertile women. High incidence of hypothyroidism was found in infertile women and it shows a positive correlation with menstrual disorder.

INTRODUCTION: Mild or subclinical hypothyroidism is characterized by normal serum free thyroxin concentrations with elevated serum thyroid-stimulating hormone concentrations.

Hypothyroid disorders complicating pregnancy are common¹. Hypothyroidism is an important cause of both primary and secondary infertility². Therefore, it is important to predict hypothyroidism during infertility to prevent its occurrence later on³. Many reports have described the use of serum thyroid hormones biochemical parameter to predict the development of infertility, but with controversial results⁴.

Hypothyroidism is characterized low serum level of thyroxin and decrease negative feedback on the hypothalamopituitary axis⁵.

The resulting increase secretion of thyrotrophs releasing hormone (TRH) stimulates thyrotrophs, thereby increasing the level of thyroid stimulating hormone (TSH)¹³. Hypothyroidism caused slower body function and irregular menstrual cycle in women³.

Thyroid dysfunction is a condition known to reduce the like hood of pregnancy and to adversely affect pregnancy outcome⁶.



Problem in fertility can occur at any point in the process of conception in the development of release of egg or sperm, in fertilization or transport of the fertilized egg from the fallopian tube to the uterus, in implantation of the embryo in the uterine lining (endothelium) ⁷. The above study undertaken shows a definite rise in serum thyroid hormones level and cases of infertility. Therefore, in this study, we examined serum thyroid hormone level in women during infertility with menstrual irregularities.

MATERIAL AND METHOD: This study was conducted in ShriRamMurtiSmarak Institute of Medical Sciences, Bareilly (north Indian city) on patients of 24-35 years of age of infertile women with irregular menstrual cycle, attending the out patients department of gynecology and obstetrics in collaboration with the department of biochemistry. 75 infertile women were included in this retrospective study with 50 healthy matched control women.

Ethical approval was not applicable for this research work.

Blood sample were collected by aseptic technique As per our clinical laboratory procedure, serum was separated from venous blood of fasting subjects and analysed within two hours of collection. The serum separated from the sample was analyzed for following parameters. Triiodothyronine (T₃), tetraiodothyronine (T₄), thyroid stimulating hormone (TSH) by TOSOH-AIA-360, Immunoassay method supplied by TOSOH Biosciences, Inc. 6000 Shoreline ct, Suite 10, Southsan Francis co cA 94080, USA. All results were expressed in mean±S.D.

Difference between mean were calculated by student 't' test. The level of significance was set as p < 0.05. Statistical analysis was performed using Graph Pad Prism version 5.00 for Windows, Graph Pad software, San Diego California USA, www.graphpad.com.

RESULTS: TSH stimulated granulosa cells show a significant increase in CAMP concentrations via activation through TSH-receptor. Thyroid dysfunction may cause short luteal phase, failure to sustain a fertilized egg, and loss of early pregnancy.⁸

Out of 75 patients, 16% sixteen percent (12/75) had menstrual irregularities with hypothyroidism (**Table 1**). All women were in the age group of 24-35 years, **Table 2, 3** shows the menstrual disturbances with hypothyroidism in infertile women. Different type of menstrual disturbances like amenorrhea, oligomenorrhoea, menorrhagia and polymenorrhoea shown in table 2, 3. Out of 75 patients with irregular menstrual cycle only (10) ten had amenorrhea, of these only one (1) had (1/10, 10%) hypothyroidism. Forty (40) patients had oligomenorrhoea out of them only three 3 (3/40, 7.5%) had hypothyroidism. Twelve and thirteen (12, 13) patients had menorrhagia and polymenorrhoea, respectively. Out of them only 3 three (3/12, 25%) and five 5(5/13, 38.46%) had hypothyroidism.

Table 4 shows T₃, T₄ and TSH level in healthy control age matched patients. In control the mean value for T₃, T₄ and TSH were 1.35±0.32 ng/ml, 7.50±1.65 µg/dl and 2.12±1.03 µg/ml, respectively. **Table 5** shows the serum T₃, T₄ and TSH level in infertile women, the values were found to be 0.88±0.34 ng/ml, 7.69±2.87 µg/dl and 5.43±6.88 µlu/ml, respectively. On statistical analysis serum T₃ and TSH level in these women were found to be statistically significant (**table 6**).

P-value for serum T₃ is found to be <0.001, T₄ p>0.05 and TSH p< 0.01, respectively. These were statistically highly significant. Out of 75 patients 13.34% patients (10/75) had amenorrhea, 53.33% (40/75) had oligomenorrhoea 16% (12/75) had menorrhagia and 17.33 (13/75) had polymenorrhoea (Table 2). More than half of hypothyroid patients have menstrual irregularities and one third of sub fertile patients have thyroid disease.

TABLE 1: THYROID PROFILE IN DIFFERENT MENSTRUAL DISTURBANCES

Total	Case studied	Abnormal Thyroid factor (hypothyroidism)	percentage
	75	12	16%

TABLE 2: DIFFERENT MENSTRUAL DISTURBANCES IN PATIENTS n=75

No. of cases studied n=75	Menstrual Disturbances	Percentage
10	Amenorrhea	13.34%
40	Oligomenorrhoea	53.33%
12	Menorrhagia	16.0%
13	Polymenorrhoea	17.33%

TABLE 3: MENSTRUAL DISTURBANCE WITH HYPOTHYROIDISM

No. of cases	Menstrual disturbances	Hypothyroidism	Percentage
10	Amenorrhoea	1	10%
40	Oligomenorrhoea	3	7.5%
12	Menorrhagia	3	25%
13	Polymenorrhoea	5	38.46%

TABLE 4: T₃, T₄ & TSH LEVEL IN NORMAL HEALTHY CONTROL GROUP WOMEN n=50

Hormones	Normal range	Mean±SD
T ₃ ng/ml	0.79-1.58	1.35± 0.32
T ₄ µg/dl	4.0-11.0	7.5±1.65
TSH µIU/ml	0.39-5.55	2.2±1.03

TABLE 5: SERUM T₃, T₄ AND TSH LEVEL IN INFERTILE WOMEN WITH MENSTRUAL IRREGULARITIES (n=75)

Hormones	Range	Mean±SD
T ₃ ng/ml	0.21-2.4	0.88±0.34
T ₄ µg/dl	2.1-20.0	7.69±2.87
TSH µIU/ml	0.08-37.0	5.43± 6.88

TABLE 6: SERUM T₃, T₄ AND TSH LEVEL IN NORMAL AND INFERTILE WOMEN WITH IRREGULAR MENSTRUAL CYCLE

Subject	T ₃ ng/ml	T ₄ µg/dl	TSH µIU/ml
Normal women n=50	1.35± 0.32	7.5± 1.65	2.12 ±1.03
Infertile women n= 75	0.88± 0.34	7.69± 2.87	5.43 ±6.88

T₃ <0.001; T₄ >0.05; TSH <0.01; Highly significant

DISCUSSION: Infertility is defined as the failure of a couple to achieve a pregnancy despite one year regular unprotected sexual intercourse⁹. Although it has been proved that for normal sexual function, thyroid secretion of T₃, T₄ need to approximately normal.

Thyroid hormones have profound effects on reproduction and pregnancy. Thyroid dysfunction is implicated in a broad spectrum of reproductive disorders, ranging from abnormal sexual development to menstrual irregularities and infertility⁹.

This study was demonstrated increased thyroid stimulating hormone level in infertile women. Serum thyroid level also affected by diet. We also found that menstrual pattern was abnormal in majority of infertile women. Our study is correlated with the study of Shalvev *et al.*, (1994)¹⁰. Shalvev *et al.*, studied the routine thyroid function test in infertile women and

reported the low incidence of hypothyroidism in the pregnant patients is related to the close association between infertility and hypothyroidism⁴.

In our study, 16% (12/75) had hypothyroidism with menstrual irregularities. These value correlated with the study of Usha R. Sharma and Chandrika Parmar¹¹. Usha R. Sharma reported hypo-thyroidism with menstrual irregularities. Our incidence of hypothyroidism is more probably because of case of infertility was not sub divided in to primary and secondary. In hypothyroidism, there is decreased synthesis of factors VII, VIII, IX, and XI and estrogen break through bleeding secondary to anovulation, which may explain the frequent, prolonged, and heavy menstruation¹².

Our study was also correlated with the study of Hassle *et al.*, (1958), Singh *et al.*, (1990), and agarwal *et al.* (1994)¹³. Menon *et al.*, (1995) studied menstrual dysfunction and thyroid disease and reported that there are contradictory reports regarding the types of menstrual disturbances seen in hypothyroidism and paucity of information in the Indian literature on the subject¹⁰.

Our study has some limitations. It is a retrospective study which is inferior to prospective studies when the associations between different variables are to be ascertained. Our study is limited only to Women between 24 to 35 years in age. A wider range of age would have been more useful in gauging the distribution of the studied parameters in the population.

CONCLUSION: The combination of analyzed serum thyroid hormone level and menstrual irregularities were important for infertility cases and useful for the prediction of infertility. So that they will be treated according to medically.

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REFERENCES:

1. Marry shomon : infertility: is it low thyroid disguise ? thyroid guide to fertility pregnancy and breast feeding 2006 : 1-6.
2. L.Armada Dias; jj carvalho, MMD Breitenbach CR franci and EG moura: is the fertility in hypothyroidism mainly due to ovarian or pituitary function changes? Brazillan journal of medical and biological research 2001; 34:1209-1215.
3. Lisa A and Farah MD: infertility, etiology and evaluation. Jacksonville medicine 2000 :1-9
4. Raber w, Nowotony p and vytiska Binstorfer E and vier happer H: Thyroxine treatment modified in infertile women according to thyroxine releasing hormone testing: 5 year follw up of 283 women referred after exclusion of absolute causes of infertility. hum. reprod 2003 ; 18 :707 -14.
5. Corinee R, fan TZ Samuel Dagogo jack²jack H Landenson¹ and ANN M Glonowski: Thyroid function during pregnancy. Clinical chemistry1999; 45(12):2250-2258.
6. Luca chiovato:Thyroid disorders , infertility and miscarriage. Endocrine abstract 2009; 20: 526-1
7. Poppe k and velkeniers B: Thyroid disorders in infertrile women. Am. Endocrinol (paris) 2003; 64: 45-50.
8. Aghajanova L, Lindeberg M, Carlsson IB, Stavreus-Evers A, Zhang P, Scott JE, : Receptors for thyroid-stimulating hormone and thyroid hormones in human ovarian tissue. *Reprod Biomed Online*.2009; 1 8:337–47.
9. Trokoudes, krinos M, Skordi S Nicos, Picolos, Michalis K, Pedieos IVF cenre and Cyprus : infertility and thyroid disorder. Current opinion in obstetrics and gynecology 2006; 18(4): 446-451.
10. Menon V.K. and Bharocha K.E: Menstrual dysfunction and thyroid disease. India.jou.gynea & obst 1995; 40: 521-526.
11. Usha R Sharma and Chandrika Parmar: Thyroid profile in infertile women and menstrual dysfunction. Indian medical Gazette 1998: 1-7.
12. Poppe K, Velkeniers B, Glinoe D: The role of thyroid autoimmunity in fertility and pregnancy. *Nat Clin Pract Endocrinol Metab*2008; 4:394–405
13. SinghL, Agarwal C.G. choudhary: Thyroid profile in infertile women. Ind.j. Gynea. & obst. 1990; 37(12):248-253.

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