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PREVALENCE OF HYPOTHYROID AND MENSTRUAL IRREGULARETIES WITH INFERTILITY IN UDAIPUR, RAJASTHAN, INDIA.

Biochemistry

KEYWORDS: hypothyroidism, Triiodothyronine (T3), Tetraiodothyronine (T4), menstrual disorder.

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ABSTRACT

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. **Method :** A case control study was performed in 90 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 TOSOHAIA-360, immunoassay method. **Result :** 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. **Conclusion :** 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.[1] The prevalence of hypothyroidism in the developed world is about 4-5% [1,2] The prevalence of subclinical hypothyroidism in the developed world is about 4-15% [3,4] In a developing and densely populated country like India, communicable diseases are priority health concerns due to their large contribution to the national disease burden[5]. In India, hypothyroidism was usually categorized under the cluster of iodine deficient disorders (IDDs), which were represented in terms of total goiter rates and urinary iodine concentrations, typicallyassessed in school-aged children[6,7,8]. Ever since India adopted the universal salt iodization program in 1983 [12] there has been a decline in goiter prevalence in several parts of the country, which were previously endemic [13-15]. In 2004, a WHO assessment of global iodine status classified India as having 'optimal' iodine nutrition2[6,7] with a majority of households (83.2% urban and 66.1% rural) now consuming adequate iodized salt[8,9] India is supposedly undergoing a transition from iodine deficiency to sufficiency state. A recent review of studies conducted in the post-iodization phase gives some indication of the corresponding change in the thyroid status of the Indian population[2]. Prevalence of hypothyroidism is 2-4% in women in the reproductive age group. Hypothyroidism can affect fertility due to anovulatory cycles, luteal phase defects, hyperprolactinemia, and sex hormone imbalance. Thyroid hormones are closely interacting through the women's reproductive hormones (estrogens and progesterone) to defend normal role of the ovaries along with maturation of egg (oocyte) .[2] Hormones are liable for maintain mood, reproduction , be asleep, sexual characteristics drive, and ability to switch stress, now to name a few function.[3] 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 Annanta Institute of Medical Sciences, Udaipur (southern part of Rajasthan, Indian city) on patients of 2o-45 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. 90 infertile women were included in this retrospective study with 50 healthy matched control women. 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 cobas e-411 Immunoassay method . 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: All women were in the age group of 20-45 years, Table 5 shows the menstrual disturbances with hypothyroidism in infertile women. Different type of menstrual disturbances like amenorrhea, oligomenorrhoea, menorrhagia and polymenorrhoea shown in table 5 , Out of 90 patients with irregular menstrual cycle only 15 had amenorrhea, of these only six (6) had hypothyroidism. Forty five (45) patients had oligomenorrhoea out of them only 16 had hypothyroidism. Twelve and thirteen (16, 14) patients had menorrhagia and polymenorrhoea, respectively. Out of them only 8 and 9 had hypothyroidism. Table 2 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 3 shows the serum T3, T4 and TSH level in infertile women, the values were found to be 0.90±0.34 ng/ml, 7.±1.68 µg/dl and 5.83±6.18 µIu/ml, respectively. On statistical analysis serum T3 and TSH level in these women were found to be statistically significant (table 4). P-value for serum T3 is found to be 0.05 and TSH p< 0.01 ,respectively. These were statistically highly significant. 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	hypothyroid	Percentage
90	35	38.88%

T3, T4 & TSH LEVEL IN NORMAL HEALTHY CONTROL GROUP WOMEN (n=50)

Hormones	Normal range	Mean ± Sd
T3 ng/ml	0.79-1.58	1.35± 0.32
T4 ug/dl	4.0-11.0	7.5±1.65
TSH uiu/ml	0.39-5.55	2.2±1.03

TABLE-3

T3 , T4 AND TSH LEVEL IN INFERTILE WOMEN WITH MENSTRUAL IRREGULARITIES (n=90)

Hormones	Normal range	Mean ± Sd
T3 ng/ml	0.21-2.4	0.90±0.34
T4 ug/dl	2.1-20.0	7.9±1.68
TSH uiu/ml	0.08-37.0	5.83± 6.18

TABLE-4

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

Subject	T3ng/ml	T4 µg/dl	TSH µIU/m
Normal women n=50	1.35± 0.32	7.5± 1.65	2.12 ±1.03
Infertile women n= 90	0.90±0.34	7.9±1.68	5.83± 6.18

T3 <0.001; T4 >o.o5TSH< 0.01 Highly significant.

TABLE-5

MENSTRUAL DISTURBANCE WITH HYPOTHYROIDISM

No. of cases	Menstrual disturbances	Hypothyroidism	Percentage
15	Amenorrhea	6	40%
45	Oligomenorrhoea	16	35.55%
16	Menorrhogia	8	50%
14	Polymenorrhoea	9	64.28%

DISCUSSION: Infertility is defined as the failure of a couple to achieve a pregnancy despite one year regular unprotected sexual intercourse [9] . 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 infertility [9 . 14.] 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 hypothyroidism 4 .. Usha R. Sharma reported hypothyroidism 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 menstruation [12] . Our study was also correlated with the study of Hassle et al., (1958), singh et al., (1990), and agarwal et al. (1994) [13,15]. 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 subject [10,13] . 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 20 to 45 years in age. A wider range of age would have been more useful in gauging the distribution of the studied parameters in the population. A high incidence of hyperprolactinemia was found in infertile women and a positive correlation was found between hyperprolactinemia and hypothyroidism. [12,16]

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 they can treated according to medically.

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