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CORRELATION OF THYROID STIMULATING HORMONE WITH PROLACTIN, FSH AND LH IN SUDANESE INFERTILE FEMALES

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ABSTRACT

Introduction: Measurement of prolactin and thyroid hormones, especially thyroid stimulating hormone (TSH), has been considered an important component of infertility work up in women. Thyroid dysfunctions interfere with numerous aspects of reproduction and pregnancy. **Objectives:** To correlate thyroid stimulating hormones level with FSH, LH and prolactin in infertility in the reproductive age women**. Materials and methods:** This study included 60 infertile women in reproductive age who attended the infertility clinics. 45 out of them were of primary infertility and 15 of secondary infertility. Thyroid stimulating hormones, prolactin, LH and FSH hormones levels were measured from all participants by TOSOH AIA360 (Fluorescence Enzyme Immunoassay). **Results:** Hyperprolactinemia was depicted in 21.6% infertile females. Prevalence of primary infertility was 75% while that of secondary infertility was 25% in study group, there was a significant positive correlation between serum TSH and Prolactin levels in infertile women with ($p < 0.05$) and negative correlation of TSH with LH and FSH. **Conclusion:** There was higher prevalence of hyperprolactinemia with normal thyroid function in infertile patients.

KEYWORDS: Infertility, Thyroid stimulating hormones, FSH, LH, Prolactin, Sudan.

INTRODUCTION

Infertility is the inability to conceive after one year of unprotected intercourse.[1] two types were identified of it, primary infertility which is refer to couple or patients who have no previous successful pregnancy and secondary infertility which encompasses patients who have previously conceived but are currently unable to conceive.[2]

Approximately 85-90% of healthy young couples conceive within one year and infertility affects 10 -15 % of couples.[3]

The main causes of female infertility include ovulatory disorders, pelvic inflammatory disease (PID), endometriosis, polycystic ovarian syndrome, and advanced age, environmental and occupational exposure to chemicals, congenital abnormalities and hormonal imbalance.[4]

Prolactin is defined as a pituitary-secreted polypeptide hormone which was named for its stimulatory action on lactation. Its primary function is to enhance breast development during pregnancy and to induce lactation.[5] Measurement of prolactin is usually included in the differential work up for female patients who present with amenorrhea, oligomenorrhoea, galactorrhea, or infertility or for male patients who present with sexual dysfunction. However, its secretion is pulsatile; it increases with sleep, stress, pregnancy, and chest wall stimulation or trauma.[5] Hyperprolactinemia is defined as circulating prolactin levels above normal range, which occurs in conditions other than pregnancy and lactation, when physiological hyperprolactinemia occurs.[6] The present of hyperprolactinaemia, hypothyroidism can contribute to infertility. This is because thyroid hormones are necessary for maximum production of both progesterone and estradiol.[7] Thyroid dysfunction which is quite prevalent in the population affects many organs including male and female gonads, interferes with human reproductive physiology, which reduces the likelihood of pregnancy and adversely affects pregnancy outcome, thus becoming relevant in the alogarithm of reproductive dysfunction.[8-9] Thyroid dysfunctions interfere with numerous aspects of reproduction and pregnancy. Therefore measurement of prolactin and thyroid hormones, especially thyroid stimulating hormone (TSH), has been considered important components of infertility work up in women.[10]

MATERIALS AND METHODS

This was a hospital based, analytic, descriptive cross-sectional study, conducted in Sudan, Khartoum state from November 2016 to January 2017.

Subjects and Study Population

60 infertile females (with both types of infertility) were selected from the patients who attend the outpatients clinics for hormonal studies. After filling and singing the informed consent, TSH, PRL, LH and FSH of all subjects were done at their first visit.

The inclusion criteria for the selection of cases were diagnosis of infertility (both primary & secondary) in the reproductive age.

The exclusion criteria that adopted during case selection were; male factor infertility, female factors-tubal factor, urogenital tract anomalies, obvious organic lesion in pelvis, hypothalamus pituitary axis disease, any history of thyroid disease or thyroid surgery or being on medication for thyroid disorders or hyperperprolactinemiac were also amounted to exclusion for the study in addition to any women unwilling to participate or signed the informed consent. These criteria were laid down after checking the detailed history of subjects recorded in a pre-designed data collection sheet at the time of sample collection.

Samples were taken for estimation of serum TSH, PRL, LH and FSH levels.

Samples Collection, Preparation and Analysis

Five ml of blood samples were drawn from each individual of study population, using standard venipuncture techniques. Samples were allowed to clot and then centrifuged at 3000rpm for 10 minutes to obtain clear, transparent serum. The separated sera were analysed for TSH, PRL, LH and FSH estimation or stored at 2-80c if not tested immediately. Serum TSH, PRL, LH and FSH levels were estimated using TOSOH AIA360 (Fluorescence Enzyme Immunoassay) method. The normal ranges for serum TSH, PRL, LH, and FSH are as follows: (0.28-6.28µIU/ml), (1.2-19ng/ml), (2.12-10.89µIU/ml) and (3.85-8.78µIU/ml) respectively. These values were used to confirm abnormal cases and then to find Correlation of thyroid hormones with PRL, LH and FSH.

Statistical analysis

Statistical analysis was performed using SPSS (SPSS, version 16), data were expressed as mean and standard deviation (M±SD), the means were compared using independent T.test and Pearson's correlation analysis was used for correlation of parameters measured, P-value < 0.05 was considered as statistically significant.

Ethical consideration

This study was approved by faculty of medical laboratory sciences, AlNeelain University, Khartoum, Sudan, and ethical clearance was obtained from ministry of health. All participants signed an informed consent before sample collection.

RESULTS

The current study was designed to correlate thyroid stimulating hormone in infertile females with serum prolactin, LH and FSH. The study included 60 subjects with infertility (both primary& secondary) in reproductive age (20-40years).

The mean of serum TSH level in infertile females with hyperprolactinemia was (2.8833±1.34761) and the mean serum TSH level in infertile females without hyperprolactinemia was (1.8479±1.09311) [table1].

The mean value of serum prolactin levels in infertile women with normal prolactin level was (11.3702±4.67955) and the mean value of serum prolactin in hyperprolactinemaic infertile females (>20 ng/ml) was (26.2615±7.55916). Out of 60 infertile patients, 13 (21.6%) had high prolactin levels (in both types of infertility)[table2].

The percentage prevalence of hyperprolactinemia status in both types of infertiliy steted showed that hyperprolactinemia was more common seen in women suffering from primary infertility which was found to be encountered 9 out of 13 patients than those with secondary infertility.

Hyperprolactinemia was depicted in 21.6% infertile females in our present study. Out of the 60infertile females, 75% were suffering from primary infertility while 25% were suffering from secondary infertility.

The Pearson's correlation coefficient and p. value was calculated for serum TSH, PRL, LH and FSH [Table4]. There was positive correlation between TSH and prolactin level ($r=0.386^{**}$, p.value=0.002) [Figure1], There was also negative correlation of TSH with LH (R=0.132, p.value=0.314) and FSH (r=0.201,p.value=0.123)[Table4].

Table: 1 TSH mean levels in prolactin groups of infertile females.

Prolactin group	TSH (mean ±SD) µIU/ml	No of cases
1.2-19 ng/ml	1.8479±1.09311	47
>20 ng/ml	2.8833±1.34761	13
Total	2.0550±1.21033	60

Table: 2 Prolactin mean levels and their frequencies in infertile females.

Prolactin group	Prolactin(mean ±SD)	No of cases	Frequency
1.2-19ng/ml	11.3702±4.67955	47	78.3%
>20ng/ml	26.2615±7.55916	13	21.6%
Total	14.5967±8.18347	60	100%

Table 3: Prolactin mean level and their frequencies in infertile females acording to infertility types.

Type of infertility	Prolactin (mean ±SD)	No of cases	No of hyperprolactinemic cases	Frequency
Primary	13.9933±7.86273	45	9	75%
Secondary	15.0467±9.60616	15	4	25%
Total	14.2567±8.25912	60	13	100%

Table 4: Correlation of TSH with PRL,LH and FSH in infertile women.

	TSH	
Variable	Pearson Correlation	p.value
PRL	0.386**	0.002
LH	0.132	0.314
FSH	0.201	0.123

P. value <0.05 is statistically significant.

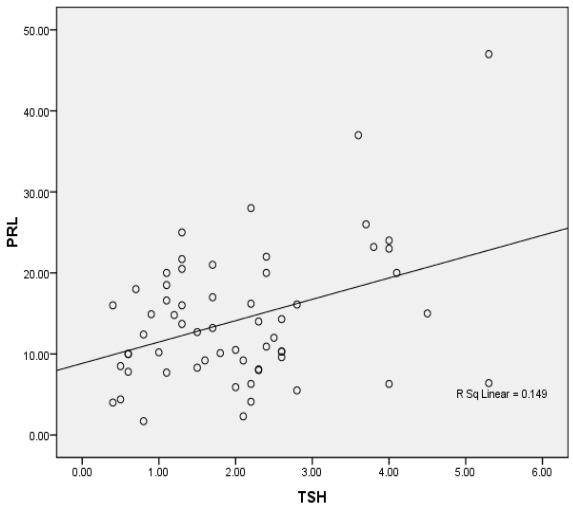

Figure1: scatter plot show significant positive correlation between thyroid stimulating hormone and prolactin in infertile females.(r=0.386 and P.value 0.002).

DISCUSSION

Hyperprolactinemia is one of the most common endocrinological disorders affecting fertility. The understanding that hyperprolactinemia not only manifests as galactorrhea and amenorrhea but also causes gonadal dysfunction and infertility led to the estimation of prolactin in infertile females.[11]

In our study the prevalence of hyperprolactinemia in infertile females was 21.6%(13/60) which is found to be 24.3% by Omer M Shoaib and ELhashimi E. Hassan[12], 11.5%by Madhuprita Agrawal et al[13] and 24.6%by Nallusamy et al.[11]

The present study has shown that there was a positive correlation between TSH and prolactin which is similar to study OF Renuka Z Lal et al[14], and Omer M Shoaib and ELhashimi E. Hassan study.[12]

Also the negative correlation between TSH with LH and FSH in this study was similar to Renuka Z Lal et al.[14]

Hyperprolactinemia affects both type of infertility in our study which is more common seen in patients suffering from primary infertility which was found to be encountered 9 out of 13 patients than those with secondary infertility.

CONCLUSION

The present study revealed that in different groups of infertile women, an increase in serum Prolactin level and variation in TSH level were observed.

The main etiology of infertility was an ovulatory cycle due to Hyperprolactinemia which represent a common problem in reproductive dysfunction affecting about one-fourth of infertile women. There is positive correlation between increased prolactin level and TSH level in infertile women.

Hence, assessment of serum TSH and prolactin levels are mandatory in the work up of all infertile women, especially those presenting with menstrual irregularities. Since a significant correlation exists between serum TSH and prolactin levels in infertile females with irregular menstrual cycle, further studies with a large sample size and long follow-up that are necessary to validate the variation in TSH and prolactin levels.

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