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CORRELATION OF SERUM THYROID STIMULATING HORMONE WITH FOLLICLE STIMULATING HORMONE AND LUTEINIZING HORMONE IN INFERTILITY IN REPRODUCTIVE AGE GROUP WOMEN

Biochemistry

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ABSTRACT

The aim of the study was to determine the correlation of TSH with FSH and LH in infertility in reproductive age group women. In this study 100 infertile women and 50 normal fertile women volunteers were selected on OPD basis between age group 20 to 45 years. They were investigated for serum TSH, FSH and LH by Enzyme linked immunosorbent assay technology. FSH and LH hormonal levels of the infertile women when compared to control groups were significantly found to be lower. The mean±SDof FSH and LH in infertile women were 2.4± 1.30($p < 0.001$) and1.32 ± 0.21($p < 0.001$) respectively. Serum TSH concentration was increased in infertile group compared with control group.The level of TSH mean±SD were 7.92 ± 0.78($P<0.001$) in infertile women.From our study we have concluded that serum TSH was negatively correlated with LH and FSH in infertile groups.

KEYWORDS

Infertility, TSH, FSH and LH.

INTRODUCTION

Infertility is defined as failure to achieve pregnancy after at least one year of regular unprotected sexual intercourse of a couple at reproductive age (Vayena et al., 2002).The major causes of female infertility may include blockage of the fallopian tubes, pelvic inflammatory disease, age factors, chromosomal anomalies, amenorrhoea and endocrinological dysfunctions. [Balen AH et al 2007]Hormonal disorders of female reproductive system are comprised of a number of problems resulting from aberrant dysfunction of hypothalamic- pituitary-ovarian axis. These relatively common disorders often lead to infertility [Goswami et al 2009].Hormone interaction between the hypothalamus, anterior pituitary gland, and ovaries regulates the female reproductive system. Pituitary gland is the most important endocrine gland in the body that secretes FSH , LH, TSH, ACTH, GH, and PRL. These hormones play important roles in a wide variety of physiological processes, including metabolism, growth and development, and reproduction. [Karaca Z et al 2010]

Follicle stimulation hormone (FSH) and luteinizing hormone (LH) are two pituitary glycoproteins that are essential for normal gonadal function. [Sheikha MH et al 2011]. Follicle stimulating hormone plays an important role in oogenesis. It triggers the maturation of follicles (e.g., the proliferation of granulosa cells) and synthesis of the androgen-converting enzyme aromatase. Furthermore, it plays a central role in the recruitment of the dominant follicle.Luteinizing hormone and FSH promote ovulation and stimulate secretion of the sex hormones estradiol and progesterone from the ovaries. [Gaber SS et al 2009]

It is well known that the function of the thyroid hormones includes modulation of carbohydrates, proteins and fat metabolism, gene expression and also sexual and reproductive function and when the thyroid hormone gets out of balance, many body functions are affected.Thyroid dysfunction in females have been found to be associated with anovulatory cycles, decreased fecundity and increased morbidity during pregnancy.Moreover it is associated with menstrual as well as ovulatory dysfunctions like amenorrohea, oligomenorrhoea, anovulation, inadequate corpus leuteal phase and galactorrhoea.[12] Thus we conducted our study with an objective to elucidate a relationship between TSH with LH and FSH in female infertility.

MATERIALAND METHOD

The present investigation was carried out at JLN Medical College and associated group of hospitals, Ajmer.The data were collected from 100 infertile women and 50 normal fertile women attending the OPD of Gynecology and Obstetrics and special investigation laboratory of the Biochemistry. The details pertaining to the patients regarding age, height, weight, no of years after marriage is furnished.The clinicalexamination revealed that the women hasnormal uterus, ovary and fallopian tube andthe semen analysis of their husband wasalso normal. After taking the informed consent from both the groups; blood samples for TSH, LH and FSH were taken in their early follicular phase of menstrual cycle i.e. between days 3rd to 5th in plain vacutainers following standard laboratory procedures. These parameters were assayed by Enzyme linked immunosorbent assay (ELISA) technique. Data were presented as mean±standard deviation.

RESULT AND OBSERVATION

Parameters	Infertile Women (Cases) (Mean + SD)	Fertile Women (Control) (Mean + SD)	P-Value
TSH (µIU/ml)	7.92 + 0.78	3.82 + 1.71	p <0.001 (HS)
FSH (mIU/ml)	2.4 + 1.30	5.3 + 2.72	p <0.001 (HS)
LH (mIU/ml)	1.32 + 0.21	6.8 + 3.62	p <0.001 (HS)

TABLE -2 CORRELATION BETWEEN TSH AND FSH IN INFERTILE WOMEN

Group I	No. of Cases	Mean + SD	Coefficient of correlation
TSH (µIU/ml)	100	7.92 + 0.78	r = -0.103
FSH (mIU/ml)	100	2.4 + 1.30	

TABLE - 3 CORRELATION BETWEEN TSH AND LH IN INFERTILE WOMEN

Group I	No. of Cases	Mean + SD	Coefficient of correlation
TSH (µIU/ml)	100	7.92 + 0.78	r = -0.11
LH (mIU/ml)	100	1.32 + 0.21	

Table 1 shows the hormonal characteristics of the infertile group when compared to control group. There is statistically significant decrease in the level of serum FSH and LH concentration was observed in the infertilegroup than in the control group. The mean±SD of serum FSH and LH was2.4 ± 1.30($p < 0.001$)and 1.32± 0.21($p < 0.001$)respectively in infertile group.The level of serum TSH was increased in infertile group when compared to control group.Themean±SD of serum TSHwas 7.92± 0.78 in infertile group($p < 0.001$).There was a highly significant negative correlation between TSH with FSH($r = -0.103$) and TSH with LH
($r = -0.11$) was observed (Table- 2, 3).

DISCUSSION

In the present study, the Mean± SD value of TSH in normal fertile women was 3.82 ± 1.71, in infertile women it was 7.92 ± 0.78 (Table -

1).The increase in TSH was observed statistically highly significant (P<0.001) in infertile women, when compared to normal fertile women.(Table – 1). The Mean± SD value of FSH in normal fertile women was 5.3±2.72, in infertile women it was 2.4±1.30(Table - 1).The decrease in FSH was observed statistically significant (P<0.001) in infertile women when compared to normal fertile women (Table - 1).There was a highly significant negative correlation between FSH and TSH levels in the infertile patients group (r = -0.103) as depicted in (Table -2).

In our study, the Mean± SD value of LH in normal fertile women was 6.8 ±3.62, in infertile women it was 1.32 ± 0.21 (Table - 1).The decrease in LH was observed statistically significant (p<0.001) in infertile women,when compared to normal fertile women. (Table - 1).There was a highly significant negative correlation between LH and TSH levels in the infertile patients group (r= -0.11) as depicted in (Table – 3).In this study serum LH and FSH was decreased in infertile women as compared to control, the differences among these groups being highly significant (P< 0.001). LH and FSH both are negatively correlated with TSH.

Our findings are also in agreement with K. Mohan and Mazher Sultana (2010), in their study of 70 women, found lower level of serum FSH in infertile women were when compared to control groups, difference being statistically significant (P<0.001). Serum LH concentration was lower in the infertile group than in the control group(P<0.001).

AzimaKalsum, SaminaJalali (2002), in their study shows a significant decrease in serum LH in follicular, ovulatory and luteal phase in hyperprolactinemic women having primary and secondary infertility. Significantly (P<0.05) low serum FSH levels were observed in ovulatory phase in women reported with primary infertility. Similarly significant (P<0.05) decrease in serum FSH in luteal phase in hyperprolactinemic women reported with secondary infertility was observed [11]. Yamaguchi, et al. (1991), found decreased LH secretion in nocturnal hyperprolactinemic women [12].

Researchers have also found that decreased levels of LH in the midcycle clearly indicate the possibility of anovulation, which could result in infertility. Elevated levels of prolactin in such infertile patients show that there is a mechanism which operates at the anterior pituitary level and leads to abnormal distribution of LH and FSH, thus further explains the abnormal or delayed ovum maturation. These also corroborate with the findings of our study.

This study is very useful in prevention and management of infertility. Thiscan establish counseling strategies possible for those whoare affected by the reproductive dysfunction.

Limitations of study
Our sample size was relatively small.

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Nil

CONFLICT OF INTEREST
We have no competing interests

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CONCLUSION
From the present study it is concluded that there occurs a derangement in hypothalamic-pituitary-ovarian and hypothalamic-pituitary-thyroid axis in female infertility. Thus, it becomes not only inevitable but also fundamental to evaluate the hormonal status of the females with infertility as it not only gives an insight towards the understanding of its etiopathogenesisbutalso helps in the designing of the effective treatment protocols. Thepresent study showed high prevalence of hypothyroidism in infertile women when compared with fertile counterparts. We also found that there was decrease in the Serum FSH and LH levels in infertile women as compared to the fertile ones in the control group. A negative correlation was found between TSH with FSH and LH.

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