

Study of Serum TSH and Prolactin Levels in Patients of Female Infertility

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Research Article

Abstract: Background: The prevalence of infertility is estimated between 12 and 14 % and remains stable in recent years. Female causes of infertility comprise of endometriosis, tubal damage and ovulatory dysfunction. Thyroid dysfunction itself is a condition interfering with normal ovarian function. Hypothyroidism can affect fertility due to anovulatory cycles, luteal phase defects, hyperprolactinemia, and sex hormone imbalance. **Aims and Objectives:** Study of Serum TSH and Prolactin levels in patients of female infertility and in normal fertile females. **Materials and Methods:** This study was undertaken in Department of Biochemistry MGM medical college, Aurangabad. A total of 50 infertile women visiting for the first time gynaecology OPD at MGM medical college, Aurangabad (M. S.) for infertility were investigated for thyroid stimulating hormone (TSH) and prolactin (PRL). 50 fertile women with similar age and socioeconomic status were enrolled as the controls. **Results:** The prevalence of hypothyroidism was slightly higher in the infertile group in comparison with that of the general population. There was a positive correlation between serum TSH and prolactin levels in the infertile subjects. Menstrual disorders (mainly oligomenorrhea), were reported by about 70% of the infertile women. Hyperprolactinemia was depicted in 51% of the infertile women while it was only 10% in the control group. The infertile women with hypothyroidism had significantly higher prolactin levels when compared to the subjects with fertile women. **Conclusion:** There is a greater propensity for thyroid disorder in infertile women than the fertile ones. There is also a higher prevalence of hyperprolactinemia in infertile patients.

Keywords: Hypothyroidism, infertility, subclinical, Hyperprolactinemia.

Introduction

Infertility is defined as the inability to conceive after one year of regular intercourse without contraception. [1] 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. 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 algorithm of reproductive

dysfunction.(2,3) Difficulty to conceive or subfertility constitutes a major psychological burden. Proper evaluation of these disorders involves a multidimensional diagnostic approach, with a pivotal contribution from clinical laboratories (4). 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 an important component of infertility work up in women (5). In the present study age matched primary infertile females were compared with normal fertile females to assess status of prolactin and thyroid stimulating hormone (TSH).

Materials and Methods

The study was conducted on 50 women (age group 20–40 years) in Biochemistry Department of a MGM Medical College Aurangabad from August 2012 to August 2013. The study was conducted after taking informed, written consent of the participants. Infertile women having tubular blockage, pelvic inflammatory disease, endometriosis and with genital TB; with liver, renal or cardiac diseases; those already on treatment for thyroid disorders or hyperprolactinemia; or cases where abnormality was found in husband's semen analysis also were excluded from the study. TSH and PRL were measured by the chemiluminescent immunometric method as per the instruction manual for Immulite 1000, (SIEMENS). Normal TSH and PRL levels were 0.4–4 μ IU/ml and 1.9–25 ng/ml, respectively, as per kit supplier's instruction. Therefore, hypothyroidism was considered at TSH levels of $> 7.1 \mu$ IU/ml and hyperprolactinemia at PRL levels of >25 ng/ml.

Result

The infertile female patients were compared with the fertile females (controls) for thyroid profile. Serum TSH levels were found to be decreased in infertile females and PRL levels were increased as compared to controls as shown in Table 1. This decrease was also statistically highly significant ($p < 0.05$). Table 2 summarizes the

percentage prevalence of thyroid status in primary infertile females.

Table 1: TSH and PRL levels in control (fertile) and infertile females

| | TSH uIU/dl | PRL ng/ml |
|-----------------------------------|---------------|----------------|
| Fertile females (control) | 3.46± 1.85 | 11.65 ± 4.67 |
| Primary infertile females (cases) | 7.94 ±9.58 * | 50.24 ± 42.11* |

*p<0.05 statistically significant

Table 2: Thyroid status in infertile females

| Age group | No. Of cases | Thyroid status | | |
|------------|--------------|----------------|-----------------|--------------|
| | | Hypothyroidism | Hyperthyroidism | Euthyroidism |
| 20- 40 yrs | 50 | 10 (20%) | 17 (34%) | 23 (46%) |

Discussion

Infertility represents a common condition with important medical, economic and psychological implications. Infertility has a serious impact on husband-wife relationship including their physical and mental health. In the society childlessness is a challenging condition to the couple and has to face many social and family problems. According to the standard protocol, infertility evaluation usually identifies different causes including male infertility (30%), female infertility (35%); the combination of both 20% and finally unexplained or idiopathic infertility 15%. (2, 3) A large number of investigations as well as hormonal assessments are done to diagnose and manage the infertility. 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.[9,10] Hypothyroidism is associated with increased production of TRH, which stimulates pituitary to secrete TSH and PRL. Hyperprolactinemia adversely affects fertility potential by impairing GnRH pulsatility and thereby ovarian function. Therefore in every infertile female should be investigated for TSH and PRL levels regardless of their menstrual rhythm at the time of initial consultation. In our study, The prevalence of hypothyroidism in this age group was about 2-4 % [6] which is found to be 8% by Goswami et al [7] and 20% by Sharma et al [8] while in our study this prevalence is 20% which is similar to that of Sharma et al. In addition

to thyroid profile other endocrine hormones like prolactin should be considered in infertility. Hyperprolactinemia and hypothyroidism are associated with infertility in females need more research.

Conclusion

In the present study there is high prevalence of hypothyroidism in infertile female. These disorders may lead to menstrual irregularities resulting in infertility. This is also associated with hyperprolactinemia and these patients are commonly associated with ovulatory failure. Hence, assessment of serum TSH and prolactin levels are mandatory in the work up of all infertile women, especially those presenting with menstrual irregularities.

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