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Research Article

COMPARATIVE STUDY OF FSH, LH, PROLACTIN, AND TSH INCASES OF PRIMARY INFERTILITY, CASES OF EARLY PREGNANCY LOSS, AND NORMAL FERTILE WOMEN

SEEMA[1]*, MANINDER KAUR[1], MANJIT KAUR MOHI[2]

[1]Department of Biochemistry, Government Medical College, Patiala, Punjab, India. [2]Department of Obstetrics and Gynaecology, Government Medical College, Patiala, Punjab, India. Email: seemanaurath@gmail.com

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ABSTRACT

Objectives: This study aimed to assess and compare follicle-stimulating hormone (FSH), luteinizing hormone (LH), prolactin, and thyroid-stimulating hormone (TSH) levels in normal fertile females, patients with primary infertility, and patients with early pregnancy loss (EPL).

Methods: Patients were divided into three groups of 25 each. Group I consisted of patients of primary infertility, Group II consisted of patients of EPL, and Group C consisted of normal fertile females and acted as the control group. Hormone levels in different groups were compared statistically.

Results: FSH levels in the infertility group (Group I) and control group (Group C) were similar ($p>0.05$). The difference between the FSH levels of EPL (Group II) and the control group (Group C) was statistically significant ($p<0.05$). There was a statistically significant difference between LH levels of the infertility group (Group I), EPL (Group II), and control group (Group C) ($p<0.05$). The difference between prolactin levels of the infertility group (Group I), EPL (Group II), and control group (Group C) was also statistically significant ($p<0.05$). The difference between the TSH levels of the infertility group (Group I), EPL (Group II), and control group (Group C) was also statistically significant ($p<0.05$).

Conclusion: This study supports the fact that women with infertility and repeated abortions have altered hypothalamic–pituitary–ovarian axis as compared to fertile women.

Keywords: Infertility, Early pregnancy loss, Follicle-stimulating hormone, Luteinizing hormone, Prolactin, Thyroid-stimulating hormone.

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INTRODUCTION

Inability to bear child due to infertility or fetus loss in early pregnancy loss (EPL) can add substantial mental trauma to a woman's life. It has a major social bearing also, in developing countries like India, where joint families add to the expectations from young couples. Primary infertility prevalence in India is about 8.9% [1]. It is very difficult to assess the EPL rate due to the fact that an unknown number of losses goes unreported in rural areas and in low socioeconomic strata of society. As per the report published on the National Health Portal of the Government of India on January 20, 2018, spontaneous abortion in the first trimester is common, affecting at least 15–20% of clinically recognized pregnancies [2].

Causes of infertility and EPL can be factors related to ovulation, peritoneal reasons, or endometriosis [3]. Hormonal balance is very important for normal ovulation, fertilization, and continuation of pregnancy. Abnormal levels of follicle-stimulating hormone (FSH), luteinizing hormone (LH), and prolactin can cause infertility [4]. It is believed that pituitary hormones such as thyroid-stimulating hormone (TSH) act in combination with FSH and LH for the maturation of follicles [5]. Normal functioning of hypothalamic–pituitary–ovarian axis is very important and any abnormal component can lead to infertility [6]. Secretion in excess or absence of secretion of TSH, LH, FSH, and prolactin can lead to irregular menstrual cycles and low fertility [7].

Aims and objectives

This study aimed to assess and compare FSH, LH, prolactin, and TSH levels in normal fertile females, patients with primary infertility, and patients with EPL.

METHODS

The present study was conducted in the department of biochemistry in the state government medical college, in collaboration with the department of obs and gyne.

50 patients reporting in the outpatient department of obs and gyne were included in the study. Out of these 50 patients, 25 were of primary infertility (Group I) who had never conceived and the other 25 were patients with history of repeated EPL, (Group II). 25 patients were of reproductive age group, with a normal menstrual cycle, and proved fertility were taken as control (Group C).

Patients with other known causes of infertility (tubal factors, male reasons, etc.) and abortions (trauma, pelvic pathology, etc.) were excluded from the study.

FSH, LH, prolactin, and TSH levels were measured in the blood samples of all the patients included in the study.

Results were analyzed statistically to establish their significance.

RESULTS

All three groups were demographically similar (Table 1).

All three groups were also comparable in the duration of marriage (Table 2).

FSH levels in three groups were measured and compared statistically (Table 3).

When compared statistically, FSH levels in the infertility group (Group I) and control group (Group C) were similar ($p>0.05$). The difference between the FSH levels of EPL (Group II) and the control group (Group C) was statistically significant ($p<0.05$).

LH levels in three groups were measured and compared statistically (Table 4).

When compared statistically, the difference between LH levels of the infertility group (Group I) and control group (Group C) was statistically significant ($p<0.05$). The difference between LH levels of EPL (Group II) and the control group (Group C) was also statistically significant ($p<0.05$).

Prolactin levels in three groups were measured and compared statistically (Table 5).

When compared statistically, the difference between prolactin levels of the infertility group (Group I) and control group (Group C) was statistically significant ($p<0.05$). The difference between prolactin levels of EPL (Group II) and the control group (Group C) was also statistically significant ($p<0.05$).

TSH levels in three groups were measured and compared statistically (Table 6).

When compared statistically, the difference between the TSH levels of the infertility group (Group I) and the control group (Group C) was statistically significant ($p<0.05$). The difference between the TSH levels of EPL (Group II) and the control group (Group C) was also statistically significant ($p<0.05$).

Table 1: Age (years) distribution in different groups

Group	Range	Mean	SD
Group I	22–35	28.56	3.92
Group II	21–38	27.48	4.21
Group C	22–34	28.28	3.55

Table 2: Duration of marriage (years) in different groups

Group	Range	Mean	SD
Group I	3–12	6.6	3.16
Group II	2–9	5.6	4.98
Group C	3–10	6.6	2.09

Table 3: FSH levels (mLU/mL) in different groups

Group	Range	Mean	SD
Group I	2.16–10.3	6.35	2.33
Group II	3.81–12.78	8.01	2.45
Group C	3.6–9.1	6.17	1.46

EPL: Early pregnancy loss

Table 4: LH levels (mLU/mL) in different groups

Group	Range	Mean	SD
Group I	2.03–46.25	14.2	11.61
Group II	2.06–45.6	15.5	15
Group C	2.9–8.2	5.46	1.7

LH: Luteinizing hormone

Table 5: Prolcatin levels (ng/mL) in different groups

Group	Range	Mean	SD
Group I	8.3–62.5	23.46	14.69
Group II	13.4–155	48.38	15.01
Group C	11.35–17.7	15.44	1.68

Table 6: TSH levels (ng/mL) in different groups

Group	Range	Mean	SD
Group I	2.7–41.2	9.38	9.52
Group II	2.06–50.8	11.09	11.03
Group C	1.54–5.2	3.1	1.17

TSH: Thyroid-stimulating hormone

DISCUSSION

The present study focused on measuring the blood levels of various hormones (FSH, LH, TSH, and prolactin) in patients of infertility and compared these levels with similar levels in fertile females of comparable age.

Kundu *et al*., in their study of 100 females with the complaint of infertility, found thyroid dysfunction in 27% of cases and hyperprolactinemia in 9% of cases. The present study also finds an association of infertility with hormonal imbalance [8].

Nasser *et al*. compared hormonal levels in 91 cases of infertility and compared them with levels in 75 normal cases. They found significant differences in prolactin and TSH levels in the two groups. There was no difference in the FSH levels. This partially correlates with the present study [9].

Keerthanaa and Hiremath conducted a prospective analytical study in 200 cases of infertility. They found deranged thyroid function in 23.5% of participants and 31% had high prolactin levels. Like the present study, this study also associates hormone dysfunction with infertility [10].

Kataria *et al*. carried out a study in 60 cases and divided them into two groups of 30 each. One group consisted of females with infertility and the other was the normal group. They found the majority of infertile women had abnormal thyroid and prolactin profiles [11].

Subhan *et al*., in their study of 97 patients, found abnormal thyroid function and TSH levels in infertile females when compared to normal females. We have the same findings in our study [12].

Al-Fahham and Al-Nowainy evaluated levels of FSH, LH, and prolactin levels in 44 infertile women. They concluded that hormonal imbalance is just a minor issue suspected to cause infertility in women as the majority of women had normal hormonal profiles. Their results are at variance with the findings of the present study. Case selection and demographic profile could have brought in the variation. Moreover, their patients presented with vaginitis, urinary tract infection, and obesity-which could have resulted in infertility [13].

Sahin and Önder also found no difference between levels of TSH, LH, FT3, FT4, and prolactin among 84 subjects divided into three groups of primary infertility, secondary infertility, and fertile women. They found the hormone levels to be within normal limits in all three groups. Demographic and physiological differences might have played a role [14].

Bheem *et al*. compared hormonal levels in 88 infertile women with 88 fertile women. They found that levels of FSH, LH, and prolactin statistically significantly altered in patients with infertility as compared to the fertile group. This study correlates with the present study [4].

Fupare *et al*. studied levels of thyroid hormones, FSH, LH, and prolactin in cases of primary and secondary infertility and compared them with levels of normal fertile women. They found significant abnormalities in infertility groups [5].

CONCLUSION

This study supports the fact that women with infertility and repeated abortions have altered hypothalamic–pituitary–ovarian axis as compared to fertile women.

AUTHORS CONTRIBUTION

Dr. Seema: Data collection and analysis, paper writing. Dr. Maninder Kaur: Techniques, methodology, paper writing. Dr. Manjit Kaur Mohi: Patient selection and enrolment, paper writing.

CONFLICT OF INTEREST

None.

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