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Relevance of Sex Hormones Levels With Spermogram of Infertile Men

By Thualfeqar G Mohammed, Salman A Ahmed & Majid K Hussain
Department of Biochemistry, College of Medicine, Kufa University

Abstract - Infertility is the inability of a sexually active, noncontracepting couple to achieve pregnancy in one year. The causes of male infertility include, the testicular primary failure, deficient gonadotropin secretion or due to unexplained causes. The present study was conducted to verify the relationship of male sex hormones changes with spermogram. To achieve this aim 75 infertile men with ages of 30.9±5.8 y and 35 fertile men with ages of 31.5±6.3 y (control group) were enrolled and the prevalence and pattern of endocrinological abnormalities in the patients were investigated for male infertility who attending the Central Public Health Laboratories Department of Hormones and Kamal ALSamaraie hospital period from September 2009 to April 2010.

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Relevance of Sex Hormones Levels With Spermogram of Infertile Men

Thualfeqar G Mohammed[α], Salman A Ahmed[σ] & Majid K Hussain[ρ]

Abstract - Infertility is the inability of a sexually active, non-contracepting couple to achieve pregnancy in one year. The causes of male infertility include, the testicular primary failure, deficient gonadotropin secretion or due to unexplained causes. The present study was conducted to verify the relationship of male sex hormones changes with spermogram. To achieve this aim 75 infertile men with ages of 30.9±5.8 y and 35 fertile men with ages of 31.5±6.3 y (control group) were enrolled and the prevalence and pattern of endocrinological abnormalities in the patients were investigated for male infertility who attending the Central Public Health Laboratories Department of Hormones and Kamal AL-Samaraie hospital period from September 2009 to April 2010.

Significant ($p<0.01$) decreases were observed for the levels of total and free testosterone, and significant ($p<0.05$) increases were indicated for the levels of FSH and LH in the group of azoospermia and oligospermia when compared with the control group.

The highest levels of FSH, LH, and the lowest levels of total and free testosterone were observed in the group of azoospermia and oligospermia in comparison with other subgroups of the infertile patients.

Keywords : Azoospermia, Oligozoospermia, Teratospermia, Asthenozoospermia, FSH, LH, Prolactin, Testosterone, Infertility.

I. Introduction

The successful and complete male germ cell development is dependent on the balanced endocrine interplay of hypothalamus, pituitary and the testis. Gonadotropin releasing hormone (Gnrh) secreted by the hypothalamus elicits the release of gonadotrophins i.e. follicle stimulating hormone(FSH) and lutenizing hormone(LH) from the pituitary gland [1]. FSH binds with receptors in the sertoli cells and stimulates spermatogenesis. LH stimulates the production of testosterone in Leydig cells, which in turn may act on the Sertoli and peritubular cells of the seminiferous tubules and stimulates spermatogenesis [2].

Author α ρ : Department of Biochemistry, College of Medicine, Kufa University. Najaf-Iraq.
Author σ : Department of Chemistry, College of science, Al-Nahr ain University. Baghdad-Iraq.
E-mail : tgalmohanna@hotmail.com

The failure of pituitary to secret FSH and LH will result in disruption of testicular function leading to infertility. Testosterone, estradiol and inhibin control the secretion of gonadotrophins through feedback mechanism [3]. Infertility is a common disorder and nearly one out of every six to eight couples suffers couples suffers from it at any given time. Infertility among couples in their respective age is more common than hypertension, diabetes, heart diseases and even the common flu [4].

Globally, it has been estimated that approximately 10-15% couples seek medical help for the problem of infertility. In 20-25% cases the problems are attributable to the male partner, while 30-40% represent female factor. In approximately 30% of cases both partners and in 15% no specific factor can be identified [5].

Male infertility can be assessed through semen analysis and hormonal profile [6]. Absence of spermatozoa in the semen ejaculate is called “azoospermia”, count less than 20 million/ml “Oligospermia”, density of 20 million/ml but motility of less than 50% is called “asthenospermia”, teratospermia is a reduced percentage of sperm with normal morphology assessed by light microscopy [7].

Male infertility is associated with a reduction in the quality of sperms. Decrease in sperm density, eventually leading to azoospermia has been found to be associated with raised FSH, LH and low testosterone level [8]. Primary hypogonadism results from disorders that affect the gonads directly, and secondary hypogonadism results from defective pituitary gonadotropin secretion.

II. Materials and Methods

Subjects : A total of 75 subjects with 35 controls, were included in the study. Subjects were categorized as azoospermia, oligozoospermia, teratospermia and asthenozoospermia on the basis of their semen concentration and motility.

Semen analysis : The seminal fluid analysis was done according to the procedure described by the World Health Organization [7].

Hormonal Assessment: Sex hormones were estimated by an enzyme immunoassay method with final fluorescent detection (ELFA), the hormones analysed

included FSH, LH, prolactin and testosterone, while free testosterone concentrations were determined by enzyme linked immunosorbent assay (ELISA).

Statistical Analysis : Data were analyzed statistically, by application of students t-test & one way ANOVA. Statistical analysis was performed with the SPSS 16 statistical Package for social sciences and also Excel 2007 with significant difference was set at $P<0.05$.

III. Results

To evaluate serum hormonal levels in various subgroups of infertile men, patients were categorized into four groups according to the results of their semen analysis. Group 1 consisted of 19 patients with azoospermia, group 2 contained 17 patients with oligospermia, group 3 comprised of 24 patients with asthenospermia, and group 4 involved 15 patients with teratospermia. The results of FSH, LH, prolactin, testosterone and free testosterone levels are shown in table 1 and Figure 1-4. Significant ($p<0.01$) decreases were observed for the levels of total and free testosterone, and significant ($p<0.05$) increases were indicated for the levels of FSH and LH in the group of azoospermia and oligospermia when compared with the control group Patients' of asthenospermia and teratospermia showed insignificant variation when compared with the control group. On the other hand prolactin levels did not show significant variation.

Table 1 : ANOVA analysis of serum hormonal profile data in subgroups of infertile men and the control group.

Parameter	A&B	A&C	A&D	A&E
FSH	0 0	0 0	NS	NS
LH	0 0	0 0	NS	NS
Prolactin	NS	NS	NS	NS
Testosterone	0 00	0 00	NS	NS
Free testosterone	0 00	0 00	NS	NS

A: Control group NO. = 35, B: Azoospermia group NO. = 19, C: Oligospermia group NO. =17, D: Asthenospermia group NO. = 24 and E: Teratospermia group NO. = 15.

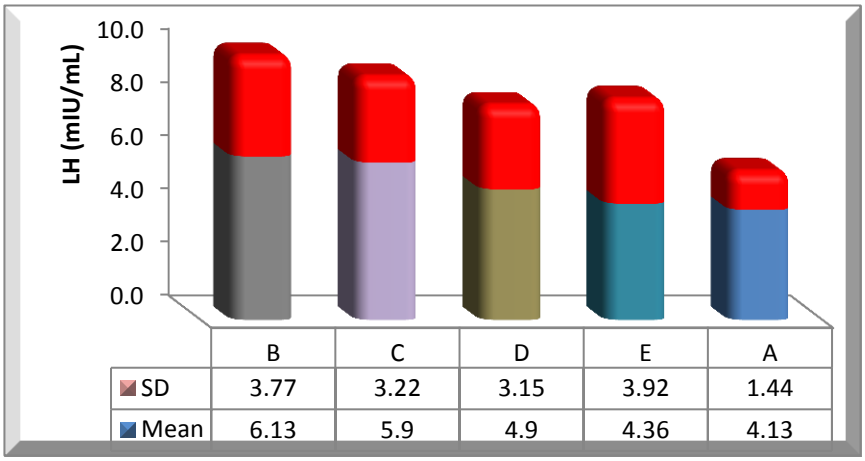

Figure 1 : Levels of serum follicle stimulating hormone (FSH) in various subgroups of infertile men and the control group.

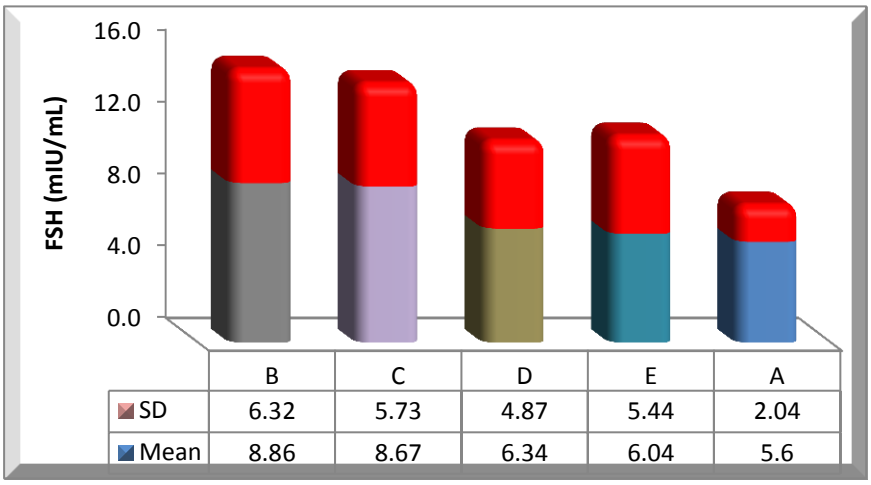

Figure 2 : Levels of serum lutenizing hormone (LH) in various subgroups of infertile men and the control group.

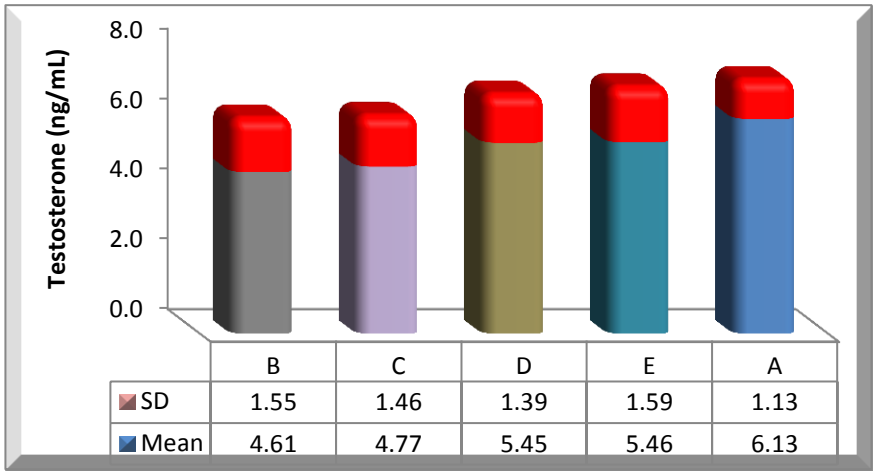

Figure 3 : Levels of serum testosterone in various subgroups of infertile men and the control group.

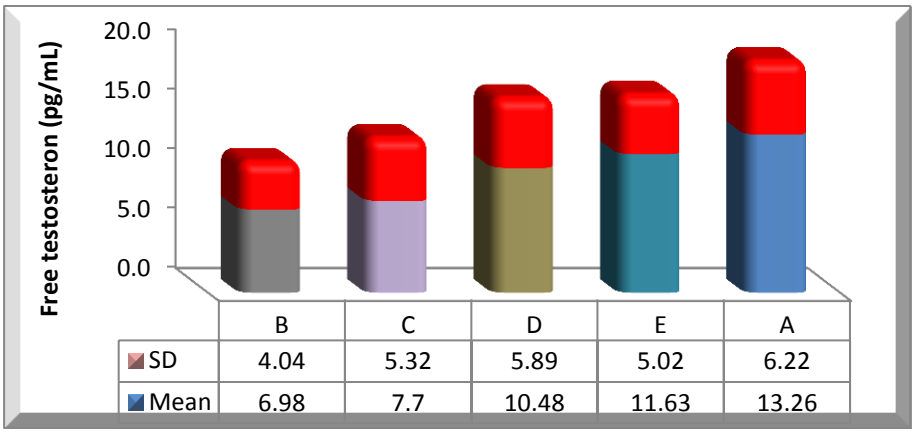

Figure 4 : Levels of serum free testosterone in various subgroups of infertile men and the control group.

IV. Discussion

FSH, LH and testosterone are prime regulators of germ cell development. The quantitative production of spermatozoa generally requires the presence of FSH, LH and testosterone. FSH acts directly on the seminiferous tubules whereas luteinizing hormone stimulates spermatogenesis indirectly via testosterone. FSH plays a key role in stimulating mitotic and meiotic DNA synthesis in spermatogonia [9].

Testosterone is essential for spermatogenesis in all species. There is some debate as to the relative levels required [10]. The androgen receptors are located on Sertoli cells [11] and the peritubular myoid cells and, since they are not expressed on germ cells, the signal must be transduced by these cells, particularly the Sertoli cells. Testosterone deficiency in men is manifested typically by symptoms of hypogonadism, including decreases in erectile function and libido [12].

The current results demonstrated elevated levels of FSH and LH with decreased levels of free and total testosterone in the azoospermia and oligospermia patients. However such difference could not be observed in patients with asthenospermia and teratospermia. These result indicated to seminiferous epithelial damage [13].

The current finding are in consistence with previous reports. Babu *et al* had reported elevated levels of FSH and LH levels with low testosterone concentration in infertile men [14]. Sulthan *et al* had illustrated elevated concentrations of FSH in infertile men due to the seminiferous epithelial destruction [15]. Similar findings had been also reported in other studies [16, 17].

V. Conclusion

These results suggested that changes of sex hormones in man are related to the alterations of spermogram. Such relationships must be considered in the management of the enrolled patients. The need for measuring prolactin levels in the evaluation of male infertility is unnecessary.

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