Original Article

Role of Testosterone in Male Fertility/Infertility

Role of Testosterone in Male Fertility/ Infertility in Tertiary Care Hospital of Karachi

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ABSTRACT

Objective: To determine the effect of testosterone in male fertility in a tertiary care hospital of Karachi.
Study Design: Case Control study.
Place and Duration of Study: This study was conducted at the Gynecology and Obstetrics Department, Jinnah Post Graduate Medical Center Karachi from October 2016 to May 2018.
Materials and Methods: This study was conducted on 100 married males in collaboration with RHS centre (Male infertility clinic) at JPMC, Karachi. The male patients were divided into two major groups Group A (control group of fertile males) and Group B (case group of infertile males), Group B is further subdivided into three subgroups of Azoospermia, Oligospermia and Others causes of infertility. Semen Analysis was done following WHO criteria and the Quantitative measurement of testosterone in the serum was carried out by ELISA kit.
Results: The serum levels of testosterone was found out to be lower in infertile male group B1 (Azoospermia) and higher in group B2 (Oligospermia) and remains normal in Group A (Proven fathers) and Group B3 (Others).
Conclusion: Testosterone is lower in Azoospermia, Normal in Proven Fathers and higher in Oligospermia patient.
Key Words: Azoospermia, Fertile, Infertile, Oligospermia, Semen Analysis, Testosterone.

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INTRODUCTION

Infertility is when a married couple is unable to conceive a child after one year of regular unprotected sexual intercourse . It affect 15-20 % population worldwide [1]Male infertility is define as when a male is unable to achieve pregnancy with fertile female and there is an equal participation of both the partners in infertility i.e 40% due to male and 40% due to female and 20% is combination of both [2]However the exact cause of male infertility sometimes, is not ruled out and 20-50% of males present with idiopathic infertility [3]The quality of human sperm is declining world wide due to the lifestyle, enviormental and nutritional factors [4]Endocrine problems leads to decrease sperm production , drug reactions and exposure to radiations may leads to male infertility [5] Testosterone is a principle sex hormone and maintains reproductive functions in males [6] activating the membrane bound androgen receptors after binding.[7]

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The decrease production of sperm is due to impaired spermatogenesis and is due to hormonal imbalance of pituitary hormones i.e. FSH, LH and testosterone due to various drug, hormones and surgical procedures [8] Detoriation in the quality of semen occurs after about fifteen years of infertility treatment and there is an increase in LH hormone and decrease in testosterone/LH ratio [9]Testosterone plays a key role as an androgenic like development of secondary sex characters and maturity of sex organs [10]and anabolic hormone in the body before birth, during early infancy ,pre-pubertal, pubertal and in adult age by regulating hypothalamic-pituatry-adrenal axis response [11]as it is mainly secreted from the testes and also from adrenal glands [12]Low or high levels of testosterone may impaired the functioning of reproductive system in males and may leads to male infertility by decreasing the sperm production to less than 20 million sperms/ml as compared to normal semen volume and other normal semen parameters and causing infertility in males.

In this study we compared the effects of testosterone on fertile i.e. Proven fathers and infertile males like Azoospermia (no sperm in ejaculate), Oligoospermia Sperm count is very low) and others causes infertility

MATERIALS AND METHODS

This case control study was conducted on total 100 married fertile and infertile male subjects presenting to RHS centre (Male infertility Clinic) Department of Gynaecology and Obstetrics, JPMC , Karachi during

October 2016- May 2018 and the following data and results were collected. The subject included in our study were divided into two major groups of fertile and infertile males. Group A (control group) of 25 normal fertile males and Group B (case group) of 75 infertile males which were further subdivided into three groups Azoospermia (B 1) = 25 , Oligospermia (B2) = 25 and others

(B3) = 25 categories of male infertility like AsthenospermiaAspermia,Necrospermia,Oligoasthenos permia,Teratospermia. All married males of age 18-45 years with no restriction of socioeconomic status are included in this study. Group A includes 25 fertile males (Proven Fathers) with a baby of one day to one year and Group B includes 75 infertile married males living with their physiologicaly normal (investigated by Gynaecologist) wives of child bearing age for a year and having regular intercourse without protection and wives are not

becoming pregnant and they are subdivided into (Group) B1) = 25 Azoospermia (zero sperm count

(Group B2) = 25 Oligospermia (low sperm count

,(Group B3) = 25 Others categories of male infertility confirmed by their Semen Analysis. Unmarried males above 45 years of age and suffering from chronic disease e.g liver and renal diseases and hypogonadism are excluded from this study .A detailed history was taken on a questionnaire with their informed consent and two types of samples (Blood and Semen) were collected and Semen was analysed according to WHO procedure as prescribed in WHO manual [1](WHO,2010) i.e Semen sample were obtained by masturbation after 3-4 days of sexual abstinence not more than 7 days and the sample was taken by providing an isolated place and a sterile plastic jar to the patients and control and analysis was performed for semen parameters within half an hour of collection of semen at room temperature. The quantitative measurement of testosterone in serum was carried out by enzyme immunoassay using testosterone –ELISA kit no KAPD1559 DIA source Belgium

RESULTS

A total of 100 male subjects included in this case control study were divided in two major groups A (proven fathers) and B (infertile) males and group B is further subdivided into three subgroups of Azoospermia B1, Oligospermia B2 and Others B3 of different categories of male infertility .

Our result in Table 1 gives the multiple comparison of means for serum testosterone across group, it was seen that, serum testosterone in azoospermia patients 1.63 units lesser as compare to oligospermia, 1.19 unit lesser as as compare to others, and 1.22 unit lesser as compare to proven father, they all differences were significant with $p < 0.01$ obtained using LSD test.

Comparison of oligospermia with others tell us that mean of serum testosterone was 0.44 unit higher in oligosoermia, 0.4 unit higher in proven father, but these differences cannot be consider significant as p was obtained more than 0.05.

Table No.1: Comparisons of Serum Testosterone of case and control

Serum Testosterone				
Groups Cases and controls		**Mean Difference**	**Standard Error**	**p-value**
Group B1 Azoospermia	Group B2 Oligospermia	-1.63	0.52	<0.01*
	Group B3 Others	-1.19	0.52	0.026*
	Group A Proven Father	-1.22	0.52	0.02*
Group B2 Oligospermia	Group B3 OTHERS	0.44	0.52	0.406
	Group A Proven Father	0.4	0.52	0.445
Group B3 Others	Group A Proven Father	-0.03	0.52	0.945
* The mean difference is significant at the 0.05 level.				

Table No.2: Comparison of Serum Testosterone between case and control groups

Parameters	Control Group A (Fertile) n=25	Cases Group B (Infertile) n=75			P value
	Group A n=25 Proven Father	Group B1 n=25 Azoos-permia	Group B2 n=25 Oligos-permia	Group B3 n=25 Others	
	Mean ±S.D				
Serum Testosterone (ng/ml)	4.56±1.25	3.33±1.78	4.9±1.93	4.53±2.36	0.017*
*p<0.05 was considered significant using ANOVA					

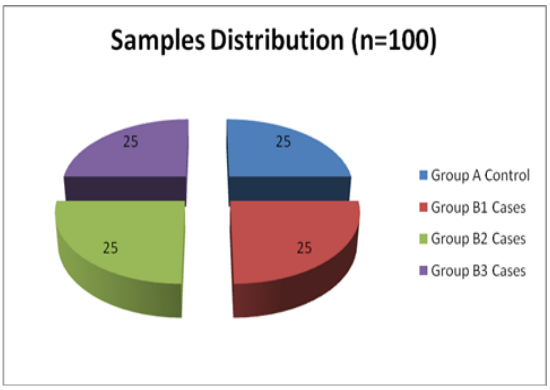

Figure No.1: Sample Distribution of case and control groups

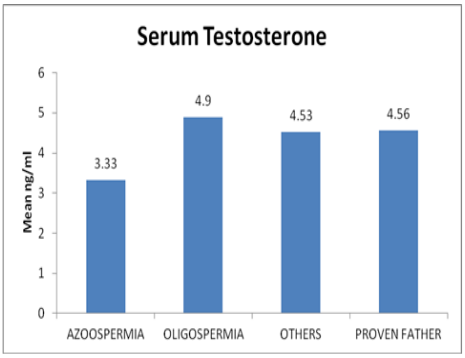

Figure No.2: Serum Testosterone of case and control groups

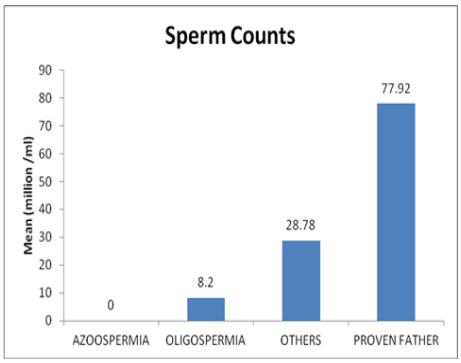

Figure No.3: Sprem Count of case and control group

Serum levels of testosterone in Azoospermia patients was getting down, it was also gives significant p-value , 0.017 that tell us that mean of serum testosterone was not some across four groups.

DISCUSSION

In this case control study we had investigated the male patients for their fertility status attending the male infertility clinic at RHS A centre, JPMC, Karachi. The aim of our present study was to found out the effect of testosterone on male fertility and infertility. In the previous studies, we have found that the testosterone had a potent effect on male fertility parameters and a very few studies had been conducted with reference to testosterone level in different groups of infertility like Azoospermia, Oligospermia and others groups of infertility. Although testosterone is not a factor for infertility because the production of sperm is stimulated by hormones other than testosterone .Testosterone is responsible for sperm maturation and its level is higher in the testes where sperm are produce as compared to in blood and therefore a small amount of it can cause sperm production. [13]In Egypt , a study was done [14]showed a negative correlation between serum testosterone and Azoospermia patient and this was in agreement with our study.

A similar study was conducted in China by [15]which was in favour of our present study that serum testosterone had negative correlation with sperm motility as seen in our group B3 patients i.e Asthenozoospermia. According to the study done by [16] in Mansehra ,Pakistan serum testosterone was found out to be lower in Azoospermia patients ,oligospermia and others group patients and there was also a differences in the level of testosterone in fertile patients. The study done by [17,18]showed that the level of testosterone in serum was higher in Oligospermia males than in other groups of infertility and it also improves spermatogenesis even in fertile males and this is also proved in our study. In a study conducted by [19,20] evealed the role of testosterone on semen parameters and its influenced on the fertility status of male.

Testosterone is supposed to be an important parameter while diagnosing male fertility and it plays a vital role in male reproduction. In a present study we found that the level of testosterone in different study groups were variable and while comparing the groups we found that the level of testosterone in proven fathers (control group A) is less than the infertile groups (case groups B) like Oligospermia (B2) ,but in Azoospermia (B1) the level of testosterone is lower than the others (B3) group which shows that there must be a malfunctioning of the testes either in their physiological or anatomical structures.

CONCLUSION

In this study we found out that testosterone was not solely responsible for the fertility regulation in males because the level of testosterone was higher in infertile group as compared to the proven fertility.

Author's Contribution:

Concept & Design of Study:	Fareena Khalil
Drafting:	Intesar Burney
Data Analysis:	Abdul Shakoor
Revisiting Critically:	Fareena Khalil, Abdul Shakoor
Final Approval of version:	Fareena Khalil

Conflict of Interest: The study has no conflict of interest to declare by any author.

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