



EVALUATION OF PROLACTIN, TESTOSTERONE AND FOLLICLE STIMULATING HORMONE OF SUDANESE MALES WITH VARICOCELE ATTENDING AN INFERTILITY CLINIC

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ABSTRACT

Varicocele is observed in 19–41% of men with infertility it has been associated with hormonal imbalance and testicular hyperthermia. The objective of this study was to assess the serum levels of prolactin, testosterone and follicle stimulating hormone (FSH) among 186 men with varicocele attending andrology clinic in Reproductive Health Care Center (RHCC) Khartoum Sudan, beside 52 normal age matched fertile men as control group. Automated chemical analyzer was used to measure these hormones. The mean serum prolactin in varicocele group was (269.66±20.03 ng/ml), versus (185.79 ±9.77 ng/ml); P value (0.006), testosterone was (14.04±0.44 ng/dl), versus (14.54±0.75 ng/dl) and FSH (11.41±0.96 mIU/ml), versus (5.18±0.39 mIU/ml); P value (0.003). The study illustrated a significant increase in serum prolactin and FSH in the test group compared to the control group.

Conclusion: in Sudanese men with varicocele serum prolactin and FSH significantly increase; while serum testosterone does not significantly change.

KEY WORDS: Varicocele, infertility, serum, prolactin, testosterone and follicle stimulating hormone.

INTRODUCTION

Varicocele is an abnormal dilatation of the testicular veins in the pampiniform plexus^[1], which rises the testicular temperature and have adverse effect on sperm production.^[2] Varicocele is associated with pain, testicular atrophy, and reduced fertility rates^[3], it is observed in 10–20% of the general population, and in 19–41% of men with infertility^[4, 5, 6, 7]; percentage of varicocele may reaches up to 80% in men with secondary infertility.^[8] The link between varicocele and infertility was first reported by Celsius in the first century AD.^[9] Varicocele is as multifactorial disease^[10]; associated with biochemical changes in the epididymal fluid, stasis of internal spermatic vein and testicular hypoxia.^[11, 10] The pathophysiologic pathway of varicocele-derived infertility remains unclear, proposed mechanisms include venous stasis, hyperthermia, heat stress, testicular hypoxia, and hormonal imbalance.^[4, 10, 12] Less is known about the subclinical varicocele and its relationship to infertility.^[13, 5] The hypothalamo-pituitary-testicular axis is of great importance in male fertility.^[14] Varicocele in infertile males is associated with Leydig cell dysfunction, testicular damage and hypogonadism.^[15, 16] Antisperm antibodies are often found in varicocele

patients.^[17] Elevated scrotal temperatures subsequently lead to impaired spermatogenesis.^[18] Gonadotropins and testosterone are the prime regulators of germ cell development.^[19] Testosterone is essential for growth and division of germinal cells in forming spermatozoa.^[14] Presence of varicocele was also associated with higher serum levels of FSH.^[20, 21] Markedly elevated serum FSH concentration clearly indicates an abnormality in spermatogenesis.^[22] Higher concentration of FSH is considered to be a reliable indicator of germinal epithelial damage.^[19] Relationships among testosterone, LH, FSH & PRL concentrations help to provide an understanding of the source of abnormal testosterone.^[23, 22] An adequate testosterone supply is crucial for Sertoli cell survival and differentiation in spermatogenesis.^[23] The grade of varicocele and total testosterone are not significantly correlated in men with varicocele.^[21, 24]

Scrotal ultrasonography (USG) is an important investigation to reveal subclinical varicocele for early diagnosis and management of these infertile male subjects.^[5] Doppler USG has become a standard diagnostic tool.^[9]

This research was done to evaluate sex hormones imbalance in Sudanese men attending andrology clinic in Khartoum, complaining of varicocele associated with infertility.

PATIENTS AND METHODS

In this case control study 186 consecutive patients diagnosed with varicocele and complaining of infertility, were included in the study. Fifty two healthy age matched males with normal sexual life and with no history of hormonal disturbance; were served as control. A detailed medical history and complete physical examination included measurement of testicular size; semen analysis and hormonal parameters were measured for all patients and control. All the patients of varicocele group underwent simultaneous Scrotal Color-Doppler ultrasonography. Varicocele was clinically classified into three grades according to Dubin criteria. Ten ml blood specimens were collected from each participant, under sterile conditions into sterile plain container. Serum was separated by centrifugation into another plain container, and then stored at -70 °C till the time of analysis. Serum FSH, prolactin, and testosterone levels were measured using automated chemical analyzer (TOSOH model AIA- 360).

ETHEICAL CONSIDERATIONS

Ethical approval for the study was obtained from ethical committee of State Ministry of Health-Khartoum. Informed consents were taken from all the men participated in the study. The study was done in the Andrology Clinic in Reproductive Health Care Center (RHCC) Khartoum Sudan, from the period June 2015 to August 2016. The precision and accuracy of all methods used in this study were checked by including commercially prepared control sera obtained from Biosystem- Spain.

STATISTICAL ANALYSIS

Data was analyzed using Statistical Package for Social Science (IBM- SPSS) version 20. *P*. value <0.05 was significance.

RESULTS

Comparing the results obtained from the 186 men with varicocele and the 52 with non varicocele fertile men using t test. The study revealed that the mean age of the varicocele patients was (36.00±6.83 years), versus (37.65±8.598 years) in the control group. The number of the varicocele patients according to grades of varicocele; were 117 (62.9%) grade 1 (G1), 45(24.2%) grade 2 (G2) and 24(12.9%) grade 3 (G3). In varicocele group men; left side varicocele was found in 109 (58.6%), right side varicocele was observed in 19(10.2%); while bilateral testicular varicocele was seen in 58(31.2%). The mean serum prolactin was (269.66±20.03 ng/ml) in varicocele group, versus (185.79 ±9.77 ng/ml) in the control group, *P* value (0.006); with significant difference. The mean serum testosterone was (14.04±0.44 ng/dl) in varicocele group, versus (14.54±0.75 ng/dl) in the control group; *P*

value (0.086); with insignificant difference. The mean serum FSH was (11.41±0.96 mIU/ml) in varicocele patients, versus (5.18±0.39 mIU/ml) in healthy control men, *P* value (0.003); with significant difference. Serum Prolactin and FSH levels were not significantly correlated with the grade of the varicocele *P* value (0.569 & 0.373) respectively.

Table (1). Comparative study of serum testosterone, follicle stimulating hormone (FSH) and prolactin in men with varicocele and their control group

parameters	Varicocele patients (No=186) (mean ±std)	Control (No=52) (mean ±std)	<i>P</i> value
Age (years)	36.00±6.83	37.65±8.59	
prolactin (ng/ml)	269.66±20.03	185.79 ±9.77	0.006
Testosterone (ng/dl)	14.04±0.44	14.54±0.75	0.580
FSH (mIU/ml)	11.41±0.96	5.18±0.39	0.003

DISCUSSION

Varicocele is a much more serious problem than previously thought. Research in the pathogenesis of varicocele has focused on, tissue hypoxia and hormonal imbalances as reported by Bharat et al (2013).^[12] It's known that, to produce sperm; the testis must be 2-3°C cooler than the core body temperature of 37°C. Elevated scrotal temperatures occurring in varicocele; subsequently lead to impaired spermatogenesis as reported by Victor & Larry (2004)^[18] and Garolla et al (2015).^[25] Testicular varicocele is the most common cause of male infertility, this condition impairs or decreases production and quality of sperm as mentioned by Aquila et al (2015).^[26]

Data from the present study show significant increase in the levels of serum FSH of the infertile men complaining of varicocele, when compared to normal fertile men (*P* value = 0.003); (Table 1). These findings are consistent with many previously studies reported by.^[25, 27, 28, 29, 21] Higher concentration of serum FSH is considered to be a reliable indicator of germinal epithelial damage as written by Ramesh et al, (2004).^[19] As a result of varicocele hyperthermia, testicular blood flow and venous pressure changes, which in turn reflux hormonal dysfunction as mentioned by Cathy et al (2001)^[4] and Paula et al (2013).^[11] On the other hand FSH binds with receptors in the sertoli cells and stimulates conversion of spermatids to spermatozoa as recorded by Martin (2001).^[30]

Data concerning serum prolactin in men with varicocele is scarce; in this research prolactin as- one of anterior pituitary hormones - is significantly increased in Sudanese men with varicocele; this finding is in contrary to many researchers like Younes (2000)^[29] and Cuneyt et al (2008)^[31]. Hyperprolactinemia is associated with

hypogonadism in men. On the other hand hyperprolactinemia may be due to prolactin secreting tumors or macroprolactinemia as reported in Turkey by Celal et al (2008)^[32]; which cannot be excluded in this study.

In this study serum testosterone level was not significantly different between men with and without varicocele; which also reported recently by Damsgaard et al, (2016).^[21] The present study shows that; the varicocele grade has no impact on testosterone hormones which is in agreement with that reported recently by Yamacake et al (2016).^[24]

CONCLUSION

In Sudanese men with varicocele serum prolactin and FSH significantly increase; while testosterone does not significantly change. Further research is required to verify the real cause of hyperplactinemia in varicocele associated with infertility in Sudanese.

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