EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 5
Issue: 7
670-673
Year: 2018

SERUM FSH, LH, PROLACTIN AND TESTOSTERONE LEVELS AMONG SUDANESE PATIENTS WITH TESTICULAR AZOOSPERMIA

Eiman Ali Basheir*[1] and Tarig Mohamed Fadl-Elmula[2]

[1,2]Department of Chemical Pathology, Faculty of Medical Laboratory Sciences, University of Khartoum-Sudan.

***Corresponding Author: Eiman Ali Basheir**
Department of Chemical Pathology, Faculty of Medical Laboratory Sciences, University of Khartoum-Sudan.

Article Received on 15/05/2018 **Article Revised on 05/06/2018** **Article Accepted on 26/06/2018**

ABSTRACT

Background: Azoospermia is the medical condition of a man not having any measurable level of sperm in his semen. It is associated with sterility, but many forms are amenable to medical treatment. In humans, azoospermia affects about 1% of the male population and may be seen in up to 20% of male infertility situations. Male infertility can usually be diagnosed by testicular biopsy, spermiography and sometimes vasography. However, the first and the last of these methods are not always suitable, safe or acceptable to the patient, therefore looking for biochemical markers in serum and seminal fluid could help in the diagnosis of azoospermia. **Methodology:** This cross section study was done in 72 patient specimens, 41 azoospermic men (56.9%) and 31 normospermic men (43.1%). Men were attending Reproductive Health Care Center during June to August 2015 with complete medical and clinical histories. Patients' age ranged from 25 to 59 years old. Men with azoospermia and the controls group were consented. Semen samples were analyzed manually as indicated by the WHO manual for semen analysis. Serum samples were analyzed for FSH, LH, Prolactin and Testosterone by ELISA using TOSOH analyzer. **Results:** Azoospermic patients have high levels of FSH and LH when comparing to the control group and when comparing to the normal range provided by the manufacture. Azoospermic patients have high level of prolactin when comparing to the control group but within the normal range provided by the manufacture, while have lower level of testosterone when comparing to the control group but within the normal range provided by the manufacture. **Conclusion:** Serum FSH, LH and Prolactin levels were statistically significant higher in patients with azoospermia than in normospermic Sudanese men (P-value<0.05). Serum testosterone level was statistically significant lower in patients with azoospermia than in normospermic Sudanese men (P-value <0.05). Azoospermic patients have high levels of FSH and LH, while normal levels of Testosterone and Prolactin were obtained when comparing to the normal range provided by the manufacture.

KEY WORDS: Azoospermia, Follicular stimulating hormone (FSH), Luteinizing hormone (LH), prolactin and Testosterone.

INTRODUCTION

Azoospermia is the medical condition of a man not having any measurable level of sperm in his semen. It is associated with sterility, but many forms are amenable to medical treatment. In humans, azoospermia affects about 1% of the male population[1] and may be seen in up to 20% of male infertility situations.[2] Azoospermia can be classified into three major types pretesticular azoospermia, Testicular azoospermia and post testicular[2]. Pretesticular azoospermia is characterized by inadequate stimulation of normal testicles and genital tract due to hypopituitarism, hyperprolactinemia, and exogenous FSH suppression by testosterone and Chemotherapy[3]. Pretesticular azoospermia is seen in about 2% of azoospermia[2]. Testicular azoospermia in which the testes are abnormal, atrophic, or absent and sperm production severely disturbed to absent[2]. Testicular failure includes absence of production as well as low production and maturation arrest during the process of spermatogenesis[2]. Causes for testicular failure include congenital issues such as in certain genetic conditions (e.g. Klinefelter syndrome), some cases of cryptorchidism or Sertoli cell-only syndrome as well as acquired conditions by infection (orchitis), surgery (trauma, cancer), and radiation[3]. The condition is seen in 49-93% of men with azoospermia[2]. In post testicular azoospermia sperm are produced but not ejaculated, a condition that affects 7-51% of azoospermic men.[2] The main cause is a physical obstruction (obstructive azoospermia) of the post testicular genital tracts. The most common reason is a vasectomy done to induce contraceptive sterility[4]. Other obstructions can be congenital as cystic fibrosis or acquired, such as ejaculatory duct obstruction for instance by infection.

Ejaculatory disorders include retrograde ejaculation and anejaculation.[4]

The initial diagnosis of azoospermia is made when no spermatozoa can be detected on high- powered microscopic examination of centrifuged seminal fluid on at least two occasions[5].

The World Health Organization (WHO) Laboratory Manual for the Examination of Human Semen and Semen-Cervical Mucus Interactions recommends that the seminal fluid be centrifuged for 15 minutes at a centrifugation speed of, preferably, 3000 x g or greater[5]. The evaluation of a patient with azoospermia is performed to determine the aetiology of the patient's condition. This allows the physician to establish whether the cause of azoospermia is amenable to therapy, identify appropriate treatment options; and determine whether a significant medical disorder is the underlying cause of the azoospermia[5]. The pre-testicular and post-testicular abnormalities that cause azoospermia are frequently correctable. Testicular disorders are generally irreversible, with the possible exception of impaired spermatogenesis associated with varicoceles[5]. The diagnosis of azoospermia depend on the patient's history, physical examination including a thorough evaluation of the scrotum and testes, laboratory tests, and possibly imaging. History includes the general health, sexual health, past fertility, libido, and sexual activity. Past exposure to a number of agents needs to be queried including medical agents like hormone/steroid therapy, antibiotics, 5-ASA inhibitors (sulfasalazine), alpha-blockers, 5 alpha-reductase inhibitors, chemotherapeutic agents, pesticides, recreational drugs (marijuana, excessive alcohol), and heat exposure of the testes. A history of surgical procedures of the genital system needs to be elicited. The family history needs to be assessed to look for genetic abnormalities[2]. Male infertility can usually be diagnosed by testicular biopsy, spermiography and sometimes vasography[6].

However, the first and the last of these methods are not always suitable, safe or acceptable to the patient, therefore looking for biochemical markers in serum and seminal fluid which could help in the diagnosis of azoospermia.

The serum FSH of a patient with normal semen volume is a critical factor in determining whether a diagnostic testicular biopsy is needed to establish the presence or absence of normal spermatogenesis[7]. In fact, FSH values in the upper normal range usually indicate impaired spermatogenesis while marked elevation of serum FSH is diagnostic of abnormal spermatogenesis, usually non obstructive azoospermia[5].

Therefore, a testicular biopsy is not necessary to either establish the diagnosis or to gain clinically useful prognostic information for patients with clinical findings consistent with the diagnosis of nonobstructive azoospermia (i.e. testicular atrophy or markedly elevated FSH). Conversely, patients who have a normal serum FSH should undergo a diagnostic testicular biopsy[5].

Several authors have already reported data on hormones levels related to azoospermia, with conflicting results. For example, serum levels of FSH, LH and prolactin have been found to be higher in azoospermic patients comparing to control (normospermic)[8] [9] [10] [11] [12] [13] [14]. However lower serum levels of FSH, LH and prolactin were obtained by Pierrepoint et al in1978[15]. While no change in the serum levels of FSH, LH and prolactin were reported by Sheth, Joshi et al in 1973[16]. The same can be said for serum concentrations of steroid hormones testosterone. Some authors reported normal levels (Purvis et al, 1975a; Nankin et al, 1977; Bain, 1979)[10] [12] [13] while others found lower levels(Tea et al in 1972; Lugana/., 1977; Pierrepoint et al, 1978; Abdallah al,1979a)[15] [17] [18].

MATERIALS AND METHODS

This cross section study has done in 72 men, 41 azoospermic men (56.9%) and 31 normospermic men (43.1%). Men were attending Reproductive Health Care Center during June 2015 to August 2015 with complete medical and clinical histories. Patients' age is between 25 to 59 years old. Men with azoospermia and the controls group have an inform consent.

Men with low semen volume (less than 1.5ml), varicocele, and smoker, taking exogenous testosterone or have retrograde ejaculation were excluded from this study.

Testicular azoospermia have diagnosed according to Male Infertility Best Practice Policy Committee of the American Urological Association, (AUA; Appendix 1) and the Practice Committee of the American Society for Reproductive Medicine.

Semen samples were obtained by masturbation after 3–5 days of sexual abstinence and kept in sterile nontoxic recipients. Written and verbal advices were given to the patients to follow the procedure. Samples were analyzed manually as indicated by the WHO manual for semen analysis.

Serum samples were analyzed for FSH, LH, Prolactin and Testosterone by ELISA using TOSOH analyzer. Control materials were used in conjunction to patients' samples in every analytical runs.

SPSS was used for statistical analysis. Results were presented as mean values with deviations (±SD). Significance of the differences was performed using independent T -test for equality of means, person correlation test.
P -value of <.05 was considered significant

RESULTS

Azoospermic patients have high levels of FSH (mean = 30.065) when comparing to controls group (mean = 5.86129, P-value = 0.000) and to the normal FSH level provided by manufacture (2—14mIU/ml).

Also patients with azoospermia showed high levels of LH (mean = 17.9375) comparing to the controls group (mean = 4.529032, P-value = 0.000) and to the normal LH level provided by manufacture (2--10mIU/ml).

Serum total testosterone level is lower in patients with azoospermia (mean = 13.405) than in controls group (mean = 19.28065) with P-value (0.000), but the level of testosterone in both groups fall within the normal range that provided by the manufacture (9—35 nmol/ml).

Serum prolactin level is higher in azoospermic patients (mean =252.2) than in controls group (mean = 186.81) with P-value (0.008) but the level of prolactin in both groups fall within the normal range provided by the manufacture (50—350m14mIU/ml).

Physical semen characteristics (colour, liquefaction time, viscosity and volume) were compared between Azoospermic and normospermic group.

Semen colour was grey in 92.5% and yellow in 7.5% of patients' with azoospermia, while it was grey in 96.8% and yellow in 3.2% in the normospermic men.

Liquefaction time was normal (less than 20min) in 80% of Azoospermic men and 86.7% in normospermic men. Viscosity was normal in 75% of Azoospermic men and 87.1% in normospermic men.

Semen volume was significantly lower in Azoospermic men than in normospermic men (P-value = 0.016).

Table 1: shows the control (normospermic).

	Age	FSH mIUml	LH mIUml	T.Tes nmolL	PRL mIUL
Mean	37.84	5.86129	4.529032	19.28065	186.81
SD	6.492	2.001612	1.914714	7.237008	85.478
Min	28	3	2.1	9	63
Max	54	10	9.4	37	380

Table 2: shows the patients with azoospermia.

	Age	FSH mIUml	LH mIUml	T.Tes nmolL	PRL mIUL
Mean	38.48	30.065	17.9375	13.405	252.2
SD	8.299	21.2411	10.6243	6.154504	111.239
Min	20	3.6	4.1	2.1	97
Max	59	87.4	47.3	28	529
P-value	0.726	0.000	0.000	0.000	0.008

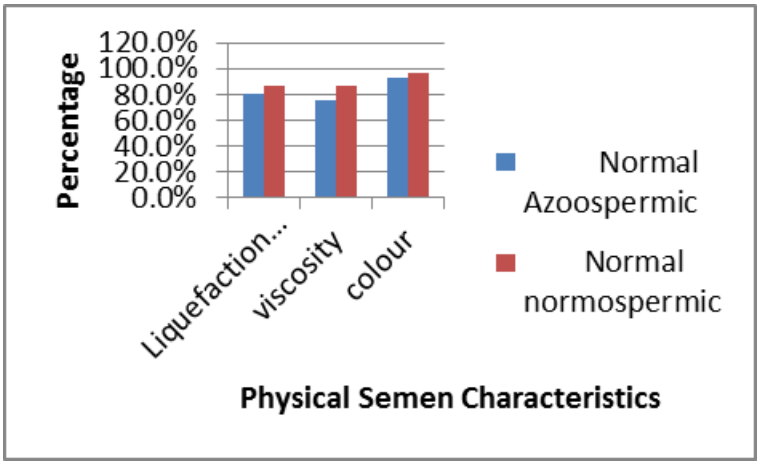

Figure1: Liquefaction time, viscosity and colour of Azoospermic and Normospermic.

DISCUSSION

This study has done in 72 men, 41 azoospermic men (56.9%) and 31 normospermic men (43.1%).

Azoospermic patients have high levels of FSH,LH and prolactin (mean = 30.065, 17.9375 and 252.2 respectively) and when comparing to controls group (mean = 5.86129, 4.529032 and186.81 for FSH, LH and Prolactin respectively, P-value = 0.000 for FSH and LH,while P-value for prolactin =0.008), this finding agree with Franchimont et al, 1972; de Kretse et al, 1974; Purvis et al 1975a; Segal et al 1976;Nankin et al

1977; Bain, 1979 and Garce et al 1981.While disagree with Pierrepoint et al in1978 and Sheth, Joshi et al in 1973.

Serum total testosterone level is lower in patients with azoospermia (mean = 13.405) than in controls group (mean = 19.28065) with P-value (0.000), this finding agree with Tea et al in 1972, Lugana/., 1977; Pierrepoint et al, 1978; and Abdallah al,1979a.

While disagree with Purvis et al, 1975a; Nankin et al, 1977; Bain, 1979.

CONCLUSION

This study shows statistically significant high serum FSH, LH and Prolactin levels between patients with azoospermia and normospermic Sudanese men (P-value<0.05), while significant lower testosterone level between patients with azoospermia and normospermic Sudanese men (P-value <0.05).

Azoospermic patients have high levels of FSH and LH, while normal levels of Testosterone and Prolactin were obtained comparing to the normal range by the manufacture.

ACKNOWLEDGMENT

The authors are grateful and express their appreciation to department of chemical pathology, university of Khartoum and Reproductive Health care center for facilitating and supporting this research. They express a lot of appreciation to Nashua and Hamid Musa for their assistance in statistical analysis. Special thanks to our families for their kind support and encouragement.

REFERENCES

1. Male Infertility Best Practice Policy Committee of the American Urological Association; Practice Committee of the American Society for Reproductive Medicine (2001).
2. Jarvi, K; Lo, K; Fischer, A; Grantmyre, J; Zini, A; Chow, V; Mak, V. "CUA Guideline: The workup of azoospermic males". Canadian Urological Association journal 2010; 4(3): 163–7.
3. Dohle, Gert R. "Male infertility in cancer patients: Review of the literature". International Journal of Urology 2010; 17(4): 327–331.
4. Practice Committee of ASRM, August 2008. "The management of infertility due to obstructive azzospermia (PDF). Retrieved June 14, 2010.
5. The Evaluation of the Azoospermic Male: Best Practice Statement Reviewed and Revised 2011.
6. L.C Graceia Diez, J. M Gonzalez Buitrago, J, J Corrales, E.Battaner and J.M Miralles.Hormone Levels in serum and seminal plasma with different type of azoospermia, REPROD.Fert. 1983; **67**: 209-214.
7. Coburn M, Wheeler T and Lipshultz LI: Testicular biopsy. Its use and limitations. Urol Clin North Am 1987; 14: 551.
8. Franchimont, P., Millet, D., Vendreley, E., Letawe, J.,Legross, J.J. & Netter, A. Relationship between Spermatogenesis and serum gonadotropin levels in azoospermia and oligospermia. J. clin. Endocr.Metab. 1972; 34: 1003-1008.
9. de Kretser, D.M., Burger, H.G. & Hudson, B. Relationship between germinal cells and serum FSH levels in males with infertility. J. clin. Endocr. Metab. 1974; 38: 787-793.
10. Purvis, K. Landgren, B.M., Cekan, Z. & Diczfalusy, E. Indices of gonadal function in the human male Plasma levels of unconjugated steroids gonadotrophins under normal and pathological conditions. Clin. Endocr. 1975a; 4: 237-246.
11. Segal, S., Polishuk, W.Z. & Ben- David, hyperprolactinemic male infertility. Fert. Steril. 1976; 27: 1425-1427.
12. Nankin, H.R., Castañeda, E. & Troen, Endo¬crine profiles in oligospermic men. In The Testis in Normal and Infertile Men, 1977; 529-538.
13. Bain, J., Duthie, M. & Keene, J. (1979) Relationship of seminal plasma testosterone and dihydrotestosterone to sperm count and motility in man. Arch. Androl. 35-39.
14. J.J. & Miralles, J.M. Gonadotropinas séricas: GarDiez, L.C., Gonzalez Buitrago, J.M., Corrales, correlaciones con la densidad, motilidad, vitalidad y morfologيa de los espermatozoides en el varón. Med. Clin. 1981; 77: 371-379.
15. Pierrepoint, CG., John, B.M., Groom, G.V., Wilson, D.W. & Gow, J.G. Prolactin and testosterone levels in the plasma of fertile and infertile men. J. Endocr. 1978; 76: 171-172.
16. Sheth, A.R., Shah, G.V. & Mugatwala, P.P. Levels of luteinizing hormone in semen of fertile and infertile men and possible significance of luteinizing hormone in sperm metabolism. Fert. Steril. 1976; 27: 933-936.
17. Tea, N.T., Castanier, M., Grenier, J. & SchoUer, R. Taux des oestrogènes dans le plasma séminal. Comparaison avec le spermogramme. Annls Endocr. 1972; 33: 297-298.
18. Abdalla, M.I., Ibrahim, LI., Rizk, A.M., El Agouz, W.T., Girgis, S.M., Etriby, A.A. & El Daghly, R. Endocrine studies of azoospermia. I. Serum steroid levels in Sertoli cell only syndrome. Arch. Androl. 1979a; 2: 253-256.