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Original article

The evaluation of gonadotropins (FSH, LH) and testicular pathology in infertile men

Hamid Shafi[1], Yousef-Reza Yousefnia Pasha[1,*], Mostafa Asgharpour[2]

[1]Infertility and Reproductive Health Research Center, Health Research Institute & Department of Surgery, Babol University of Medical Sciences, Babol, Iran
[2]Student Research Committee, Babol University of Medical Sciences, Babol, Iran

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Abstract

Background: Azoospermia is the most challenging issue associated with infertility treatment. The aim of this study was to re-examine the relationship between plasma levels of follicle stimulating hormone (FSH) and luteinizing hormone (LH) with testicular pathology in azoospermic infertile men visiting the infertility clinic in north of Iran.

Methods: Fifty eligible azoospermic infertile men who had the medical indication of testicular biopsy for sperm retrieval in infertility clinic were included in the study. Plasma FSH and LH were measured by immunoassay. Then a bilateral testicular biopsy using Bouin's solution as a fixative was performed under local anesthesia. The One-way analysis of variance was used to assess the differences between the groups.

Results: The plasma levels of FSH (p=0.0001) and LH (p=0.044) among infertile men with Sertoli-cell-only syndrome was significantly higher than those with hypospermatogenesis. Also, the plasma levels of FSH among infertile men with maturation arrest was significantly higher than those with hypospermatogenesis (p=0.003). There were no statistically significant differences in plasma LH levels between hypospermatogenesis and maturation arrest.

Conclusions: The findings of the present study indicated that the plasma levels of FSH and LH among infertile men with azoospermia testis correlated with the histopathological features. Therefore, it is necessary to emphasize the fact that azoospermic cases with highly-elevated plasma FSH and LH levels could be excluded from separate testicular biopsy as they are not suitable cases for conventional treatments.

Keywords: Azoospermia, FSH, LH, Testicular biopsies

Introduction

Infertility is a significant public health problem, affecting approximately 15.5 per cent of the couples in Babol, Iran (1). It is worth noting that about 50 per cent of the couples experiencing infertility are males (2, 3). It should also be noted that around 15–20% of male infertility is due to azoospermia, which is described as a sperm concentration with complete absence of sperm from the ejaculate (4, 5). There are many causes leading to azoospermia such as the failure of spermatogenesis and the obstruction of the vas deferens (6-8). The infection of the genital tract is known to damage the spermatogenesis (9, 10). The spermatogenic damage may lead to an increase in the level of plasma follicle-stimulating hormone (FSH) (11). Nevertheless, many infertile men have normal

*Corresponding author: Dr. Yousef-Reza Yousefnia Pasha, Infertility and Reproductive Health Research Center, Health Research Institute & Department of Surgery, Babol University of Medical sciences, Babol, Iran, Tel: +981132199596, Email: yousefniapasha@mubabol.ac.ir

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level of plasma FSH (12). The measurement of FSH is the most important hormonal evaluation in the management of azoospermatic men (13). Similarly, spermatogenic damage is sometimes associated with increased luteinizing hormone (LH) (12). The testicular biopsy is considered as a key tool for the diagnosis and treatment of male infertility (14). Therefore, in order to characterize the hormonal testicular function as well as the testicular pathology in male infertility, we re-examined the relationship between the plasma levels of FSH and LH with testicular pathology in infertile men visiting the infertility clinic in Babol, city in north of Iran.

Materials and Methods

The ethical committee at Babol University of Medical Sciences approved the study protocol (No: MUBABOL.REC.1392.6) and written informed consents were also obtained from all participants.

The inclusion criteria for the study were: no history of diabetes, hypertension, and surgical history. The information regarding the past medical history, social history, physical examination, the results of semen analysis, and the histological evaluation of testicular biopsy were extracted from the medical records of individual patients. The subjects were requested for a complete medical history, physical examinations, at least two semen analyses with more than two weeks interval, which were conducted according to the 2010 World Health Organization guidelines, and gonadotropins (FSH and LH).

Blood samples were obtained for the estimation of the plasma level of FSH and LH in the morning (8-10 a.m.). They were measured by immunoassay, and the results were expressed in ng/mL.

Semen samples were taken through masturbation after a 3-day period of sexual abstinence, and collected in a sterile recipient. Sperm analysis was carried out according to the standards of World Health Organization (15). The ordinary extract bilateral testicular biopsy had to be performed if there was no sperm found by both the wet prep analysis of testis tissue and the microscopic testicular sperm.

Finally, 50 eligible azoospermic infertile men who had the medical indication of testicular biopsy for sperm retrieval were included in this study. It should be noted that all cases were selected from among the patients referring to Fatemezahra infertility clinic in Babol,

The bilateral testicular biopsy, using Bouin's solution as a fixative, was performed under local anesthesia to understand the histopathological condition of the subjects. The histological findings were divided into three categories: the hypoermatogenic (mild, moderate, and severe), the maturation arrests, and the sertoli-cell-only.

All the results of FSH and LH were expressed as mean ± standard deviation (S.D.). The One-way analysis of variance was used to assess the differences between the plasma FSH and LH between the groups. P-values less than 0.05 were considered significant.

Results

The mean age of the subjects was 34.8±6.0, ranging from 25 to 58. The mean duration of infertility was 4.5 ± 2.3, ranging from 1.5 to 9. Table 1 illustrates that out of 50 azoospermic infertile men, 29 (58.0%) were hypospermatogenesis, 11 (22.0%) were maturation arrest, and only 10 (20.0%) had Sertoli-cell only syndrome, which is according to the results of testicular histology. Also, in azoospermatic infertile men with abnormal testicular histology, the mean FSH values were 6.1±5.1, 15.8±11.8, and 19.1±8.8 mIU/ml for the hypospermatogenesis, the maturation arrest, and the Sertoli-cell only syndrome, respectively. The plasma FSH levels among azoospermatic infertile men with Sertoli-cell-only syndrome was significantly higher than that of hypospermatogenesis (p=0.0001). Also, the plasma levels of FSH among infertile men with maturation arrest was significantly higher than that of those with hypospermatogenesis (p=0.003).

Furthermore, in azoospermatic infertile men with abnormal testicular histology, the mean LH values were 5.3±2.4, 8.2±5.1, and 8.5±3.8 mIU/ml for the hypospermatogenesis, the maturation arrest, and the Sertoli-cell only syndrome, respectively. The plasma LH levels among azoospermatic infertile men with Sertoli - cell only syndrome was significantly higher than that of hypospermatogenesis (p=0.044).

Table 1. Plasma FSH and LH levels in azoospermic infertile males with abnormal testicular histology

	Number of Subjects	FSH (miu/ml) Mean±SD	LH (miu/ml) Mean±SD
Hypospermatogenesis	29	6.1±5.1 *¥	5.3±2.4£
Maturation arrest	11	15.8±11.8 ¥	8.2±5.1
Sertoli - cell only syndrome	10	19.1±8.8*	8.5±3.8£

* P< 0.0001; ¥ p<0.01; £ P<0.05

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Discussion

Testicular biopsy is performed to differentiate the testicular failure from the obstruction. It is also done for sperm retrieval to be used in assisted reproductive techniques in the case of azoospermic men (16, 17). In addition, in infertile men, the higher plasma FSH is a reliable indicator of damage for the seminiferous epithelial destruction, and is also associated with azoospermia and severe oligozoospermia (18). Therefore, for the initiation of spermatogenesis and the maturation arrest of spermatozoa, the elevation of plasma FSH is necessary. However, the correlation between the disturbances of spermatogenes and the plasma FSH levels has been unestaplished (19). It is suggested that the elevated plasma FSH levels result from the impaired stratum corneum function (20).

In our study, in the case of infertile males with Sertoli - cell only syndrome and the maturation arrest, the mean FSH levels were significantly elevated when compared with hypo spermatogenesis cases. In addition, the highest plasma FSH level was observed in infertile males with Sertoli - cell only syndrome. A similar observation was made by De Krester et al. (21) Babu et al. (22), Nistal et al. (23), and Turek et al. (24), demonstrating elevated levels of FSH and Micic (25), and the elevated levels of LH in infertile males with Sertoli-cell only syndrome. However, Weiss et al. (26) found no significantly elevated plasma FSH level and LH in infertile men with Sertoli-cell only syndrome.

One of the limitations of this study was the limited size of the sample. Therefore, it seems vital to conduct further histological and hormonal findings in a large cohort of azoospermic men through precise histological features

Conclusion

The present study demonstrated that azoospermic infertile men with elevated FSH and LH had a Sertoli - cell only feature on histology. Therefore, it is vital that azoospermic cases with highly-elevated plasma FSH and LH levels be excluded from separate testicular biopsy as they are not suitable cases for conventional treatments. The findings of this study may support the relationship between the plasma levels of FSH and LH, with testicular pathology.

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Conflict of interest

None declared.

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