Özgün araştırma / Original research

Mikroskopik varikoselektominin infertil erkeklerin gonadal hormonlar ve semen parametreleri üzerine etkisi

Effect of microscopic varicocelectomy on gonadal hormones and semen parameters in infertile males

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Özet

Amaç: İnfertilite kliniğine başvuran infertil erkeklere uygulanan, subinguinal mikro varikoselektominin, cinsiyet hormonları üzerindeki etkisini değerlendirmek.

Yöntem: Ocak 2014 ile Haziran 2016 tarihleri arasında, en az bir yıldır korunmasız cinsel ilişkiye rağmen, hiç çocuğu olmayan, birincil infertil hastalar çalışmaya dahil edildi. Çalışma kriterlerine uyan, 76 hastanın, folikül uyarıcı hormon, luteinize edici hormon, total testosteron düzeyleri, semen analizi ve skrotal Doppler ultrasonografi sonuçları retrospektif olarak değerlendirildi.

Bulgular: Ortalama infertilite süresi 3.6 yıldı (1.5-6.3). Ameliyattan önce ve altı ay sonraki toplam testosteron değerleri sırasıyla 380 (340-465) ve 385 (350-470) idi. Bu istatistiksel olarak anlamlıydı (p <0.001). Bu artış, LH düzeylerinin 6.59 ± 1.37'den 6.79 ± 0.94'e çıkması ile koreleydi ve bu da istatistiksel olarak anlamlı bulundu (p <0,019).

Sonuç: İnfertilite ve varikosel genellikle ağrı ve infertilite açısından değerlendirilmekle birlikte, cerrahi sonrası serum testosteron düzeylerinde anlamlı bir artış olması nedeniyle, düşük serum testosteron düzeyi olan hastaların ayırıcı tanısında varikosel düşünülmelidir.

Anahtar Kelimeler: Varikosel; Kısırlık; testosteron

Abstract

Objective: To evaluate the effect of subinguinal micro varicocelectomy on sex hormones of infertile males who are consulting infertility clinic.

Methods: Between the dates of January 2014 to June 2016, despite at least one year of unprotected sexual intercourse, having no children, primarily infertile patients were included in the study. Follicle stimulating hormone, luteinizing hormone, total testosterone levels, semen analysis and scrotal Doppler ultrasonography results in a total of 76 patients, who fulfilled the study criteria were reevaluated retrospectively.

Results: Average time of infertility was 3.6 years (1.5-6.3). Total testosterone values before and six months after surgery were 380(340-465) and 385(350-470) respectively. This was statistically significant (p <0.001). This increase was correlated with an increase of the LH levels from 6.59±1.37 to 6.79±0.94 and this was also seen as statistically significant (p<0.019).

Conclusion: Although infertility and varicocele is generally considered to be evaluated in terms of pain and infertility, due to a significant increase of serum testosterone levels after surgery, varicocele should be considered in the differential diagnosis of patients with low serum testosterone levels.

Keywords: Varicocele; Infertility; testosteron

INTRODUCTION

Varicocele is the dilatation of pampiniform plexus veins which drains the testes. Varicocele in the general population at a rate of around 10-15% and constituting about 50% of male infertility.(1,2) Testicular varicocele pathophysiology is based on hyperthermia, hypoxia, adrenal and perirenal reflux and hormonal dysfunction. (3,4) Varicocele is the most common cause of reversible male infertility.

Patients with varicocele are generally asymptomatic and usually applied with testicular fullness, testicular pain, abnormalities in sperm parameters, testicular atrophy complaints. Clinical studies showed that varicocele can cause deterioration at hypothalamic-pituitary-gonadal axis in the level of the Leydig cells which causes hormonal disfunction. (5)

Therefore, because of the negative progressive effect of varicocele on spermatogenesis and testosterone production, to prevent infertility or androgen deprivation that may occur in the future, early surgery may be suggested. (1,6)

In this study, we scanned the data of the patients who were admitted to our clinic.

MATERIALS AND METHODS

Between the dates of January 2014 to June 2016, despite at least one year of unprotected sexual intercourse, having no children, primarily infertile patients were included in the study. The mean age of the patients was 29.88 ± 6.86. This study was approved by the local ethics committee of Hisar Intercontinental Hospital.

The detailed history of all patients was taken. Genital and neurological examinations were done. Follicle stimulating hormone, luteinizing hormone, total testosterone levels, semen analysis and scrotal Doppler ultrasonography results in a total of 76 patients, who fulfilled the study criteria were reevaluated retrospectively. The Doppler ultrasound which identified it as anechoic tubular structures that dilated on Valsalva maneuver. The volume, pH, sperm density, morphology, and motility of the semen were evaluated. The normal semen parameters according to the WHO Manual for Semen Analysis are as follows: the volume of semen in adult males: 1.5 mL, sperm concentration: 15×10^6, sperm morphology (normal forms): 4%, progressive and non-progressive motility (PR+NP): and 40%, progressive (PR): 32%. Subinguinal varicocelectomy was performed for all of the patients by a single urologist.

Patients with a history of undescended testis, orchiectomy, testicular infection like mump orchistis, hypothalamic-pituitary axis dysfunction and using hormonal therapy due to infertility were excluded from the study.

Statistical Analysis

The data was analysed by using the statistical software package SPSS (Version 22.0, SPSS Inc., Chicago, IL, USA). Normal distributions of the data were evaluated with the Kolmogorov–Smirnov and Shapiro-Wilk normality tests. Statistical analysis results for continuous variables with normal distribution were expressed as the mean ± standard deviation (SD). The continuous variable with non-normal distribution was presented as a median (minimum, maximum). Categorical data were presented as frequency counts and percentage (N, %). Significances of the difference between the two paired groups were evaluated by using paired t-test in cases of normally distributed data and Wilcoxon signed rank test in cases of the data not being normally distributed. A p value<0.05 was considered to be statistically significant.

RESULTS

The average age of the 76 patients included in the study was 29.88 ± 6.86. The average time of infertility was 3.6 years (1.5-6.3). Total testosterone values before and six months after surgery were 380(340-465) and 385(350-470) respectively. This was statistically significant ($p < 0.001$). This increase was correlated with an increase of the LH levels from 6.59±1.37 to 6.79±0.94 and this was also seen as statistically significant ($p<0.019$). There were no statistical changes in the FSH levels as seen in Table 1.

DISCUSSION

As a result of dilation of the internal spermatic veins occurring increases heat in the scrotum, this demonstrated that it causes disorder in the semen parameters. (7,8)

This heat increase can affect the protein structure of the enzymes which are responsible for testosterone pro-

Variables	Groups	N	Mean ± Std. Deviation	Median (min-max)	*p* value
Testosterone	Pre	76	381.48±27.29	380 (340-465)	**<0.001****
	Post	76	390.27±28.44	385 (350-470)	
FSH	Pre	77	8.98±2.15	9 (5-14)	0.298
	Post	76	8.76±1.83	8.5 (5-12.5)	
LH	Pre	76	6.59±1.37	6.6 (0-10)	**0.019***
	Post	76	6.79±0.94	6.55 (4.4-10)	

Statistically significant *p<0.05 **p<0.001

Table 1: Comparison of the pre and post LH, FSH and testosterone value

duction. A study from Ando et al. showed that testicular heat increase can affect the function of the 17 alpha hydroxyprogesterone aldolase enzymes which convert the 17-hydroxyprogesterone to testosterone. (9)

The negative effects of varicocele on spermatogenesis which causes infertility were reported in clinical studies. (6) It is found that, the presence of varicocele is associated with low serum testosterone levels and it demonstrates that, varicocelectomy can improve this negative impact on androgen production. (10)

Testosterone impairment due to negative effects of the varicocele on the Leydig cells is demonstrated in many studies. A study from Al-Turki HA which consisted of 425 patients that are attempting to seek an infertility clinic, reported that serum testosterone levels are less than with clinical varicocele patients. (11) Our study supports this work.

In the study, containing 103 clinical varicocele and infertile patients from Zohdy et al.showed that a statistical significant rise in testosterone levels was observed after surgery.(12) Another study from Najari BB et al. stated that testosterone levels were significantly increased after microsurgery varicocelectomies.(136.0±201.3ng/dl) (13) The study from Gat and et al. reported a post-operative significant increase in 83 infertile patients testosterone levels was determined.(14) Studies showed that after varicocele repair, increase in testosterone levels is associated with improvement in the Sertoli and Leydig cells function due to a decrease in the FSH levels. (14)

Normalization of testosterone level after varicocelectomy has become more apparent with the use of microsurgical techniques. Su et al. determined a 28% increase in testosterone levels after microsurgery varicocelectomy in a study of 53 infertile patients.(15) Likewise, a study from Hurtado and Catalpo et al.showed normalization of testosterone levels after microsurgery varicocelectomy. (16) Cayan et al.also showed a 48% increase in testosterone levels after surgery.(17) Increase in the level of testosterone after varicocelectomy is also demonstrated by other researches.(19) In our study, consistent with literature, statistical improvement in testosterone levels after surgery was determined.(381.48±27.29`dan 390.27±28.44) (p<0.001)

Unlike the other studies, a study from Damsqaard J et al. which consisted of 7035 healthy young men, although more follicle stimulating and luteinizing hormone levels and lower inhibin B levels were identified, there were no significant differences between the patients with and without varicocele in terms of testosterone levels. (19)

Again similar to the previous study, Resorlu et al. did not find any change in the total serum testosterone levels of infertile patients after varicocelectomy. (20)

A study from Gat y et al. showed a significant decrease in serum FSH levels due to improvement in the Sertoli and Leydig cell function, after the varicocelectomy operation.(14) Also, researchers put forward, that improvement in spermatogenesis is associated with the changes in the serum Inhibin-b and FSH values instead of an increase in testosterone levels.(1)

In another research from Su et al reported that after the microsurgery varicocelectomy the total level of serum testosterone increased; however, they did not find any change in the FSH and LH levels. (15)

In a research which investigated gonadal functions after varicocelectomy, the total testosterone level increased to 3.01± 0.43 from 1.77± 0.18; which is statistically significant.(p<0.001). Also, it is reported that this is related to an insignificant decrease of the serum LH and FSH level. (21)

In our study, the serum LH levels after surgery are generally compatible with the literature. We observed statistical improvement in the serum LH levels six months after the surgery (p 0.019). But we did not determine a significant change in serum FSH levels after surgery (p 0.298). Generally, according to the studies in the literature researchers found a decrease in serum FSH levels; however, there are studies that did not determine any change as in our study.

CONCLUSION

Although varicocele is generally considered to be evaluated in terms of pain and infertility, due to the significant increase of serum testosterone levels after surgery, varicocele should be considered in the differential diagnosis of patients with low serum testosterone levels.

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