Original article

Improvement of sperm parameters after varicocelectomy: a single center study during six years

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Abstract

Objective: One of the causes of male infertility is varicocele that has negative effects on sperm parameters.By doing varicocelectomy that it is an effective method for the treatment, there will be significant recovery in sperm parameters. The aim of this study is to evaluate sperm parameters before and after Varicocelectomy and a pregnancy rate in patients.

Methods: This cross-sectional study has been performed on patients with primary and secondary infertility who underwent varicocelectomy during 2009-2014 in hospitals of Sari, north of Iran. Demographic data has been extracted from hospital records and necessary information about spermogram has been gathered according to a checklist designed for this purpose. We used a questionnaire that contained demographic characteristics of patients and values of variables before and after varicocelectomy. Finally all data have been analyzed statistically using SPSS ver.20.The significance level was set at 0.05.

Results: of51 studied cases with the mean age of 37.3 years 50.98 percentswere above 40 years of old. 24 patients had varicocele grade II and 27 ones had grade three. Bilateral varicocelewas the dominant type in patients. The final finding represented that sperm indexes improved significantly after the varicocelectomy (p=0.001).

Conclusion: Results of our study showed that varicocelectomy leads to significant differences in sperm parameters (count, motility and morphology), while the fertility rate also significantly increased.

Keywords: *Infertility;Spermogram;Varicocele.*

Introduction

Varicocele is defined as existence of dilated and twisted veins in Pampyny scrotum veins.This more than all other causes of male low fertility can be corrected by surgery [1]. Varicocele disease is rarely discovered in boys under ten and on puberty period. Left varicocele in young healthy men found to be 15 percent, while in men with lower than normal fertility this figure reaches fourty percent [2]. Bilateral varicocele are non-common in healthy men, but at max twenty percent of men with low fertility have been touched [3]. varicocele wont generally resolve spontaneously.It is associated with testicular atrophy and by correction of a varicocele in adolescent patients atrophy can be returned [4]. Also there is convincing evidence that varicoceles can affect the quality of semen [5].How a varicocele effect on testicular yet is not precisely specified.In this field several theories have been proposed that probably a combination of these effects may lead to a decrease in spermatogenesis [6]. Pituitary-gonadal hormone disorders, kidneys metabolites reflux or adrenal to internal Spermatic vein and additive in hydrostatic pressure associated with venous reflux leads to effects on the Testicle [7]. Most puzzling theory about how the effect of varicocele on testicular function, on the grounds that backflow of hot blood of the corpus cavernosuminto the*pampiniform*plexusresults to disrupted natural temperature balance inhibition of spermatogenesis [8]. This theory, correlate the reduction in sperm productionto venous warm blood stasis and reflexive into the scrotum and testiclestemperature increase [9]. Although, the majority of men with varicoceles are fertile, but the association of varicocelewith infertility is well illustrated by observational studies.With In vitro fertilization(IVF) pregnancy rates expected to be thirty five percent.The total amount of expected

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complications for cutting approach is about one percent, four for laparoscopic and10-15 percents for veins radiological block method [10].Given that infertility is a major causes of divorce among Iranian couples and that varicocele is one of the mainreasons formale infertility,this studyconducted to evaluate the impact of varicocelectomy on sperm parameters.

Methods

This descriptive studyhas been performed in patients with a chief complaint of infertility (primary and secondary) who were underwnt varicocelectomy during 2009 to 2014 in Imam khomeini hospital Sari-Iran.Demographic data were obtained from patients' records and information in relation to spermogram were collected according to the checklist.

Demographic details of the patient and study variables was registered before and after varicocelectomy.Measuring variables included:varicocele grade, unilateral or bilateral varicocele, complications after surgery, sperm parameters before and after surgery that including sperm count, motility, and normal morphology.Patients who had incomplete records were excluded from the study. Moreover, according to the fact that at least three months is required for spermatogenesis, those who tested their spermogram sooner than three months from the surgery were also excluded.

Statistical Analysis

At first, the Kolmogorov-Smirnov (K-S) test was conducted to determine normality of distribution for the study variables. Data were mentioned as the mean ± Standard Deviation.Normally distributed *variables* compared independent t-test. *Chi-squaredtest was also done to examine the relationship between some variables such as varicocele side and the effect of varicocelectomy on sperm count. S*tatistical analysis were consucted using the software SPSS software version 20.0 for Windows (SPSS Inc., Chicago, IL).P-value of less than 0.05 considered statistically significant.

Results

Of the 56 evaluated files; five cases were excluded due to incomplete informationand 51 cases were finally met the criteria.The mean age of patients was37.3±9.5 years (ranged22-55 years). There were eight patients (15.6 percent) in the age group of 2-29 years old,17 patients (33.33%) in 30-39 years and 26 patients (50.98 percent) were in the age group over fourty years.Of the 51 patients studied, 24 patients (47.05%) had varicocele grade two and 27 patients (52.94 percent) were diagnosed with varicocele grade three.In this studyno significant correlation was observed between varicocele grade and the effect of varicocele on sperm count after surgery, by using the chi-square test (p-value =0.24).

Here in this study about 22 cases (43.13 percent) had left side varicocele and 29 patients (56.86 percent) had bilateral varicocele.In this studyno significant relationship was observed between varicocele side and the effect of varicocele on sperm count after surgery (p-value=0.33).

Two cases of patients suffered side-effects after surgery that both were reported as swelling and inflammation of the testicular tissue.No significant association between complications after varicocele surgery and the effect of varicocele on sperm count were observed too(p-value=0.46). Twenty three patients (45.09%) were having children one year after the surgery, of whom nine patients had unilateral varicocele and 14 patients were diagnosed with bilateral varicoceles.In this study a significant relationship was seenbetween varicocelectomy and patients fertility. (p-value=0.001)

Of the 23 fertile patients after the surgery,there were eightpatients with varicocele grade two and 15 patients were diagnosed with varicocele grade three.Of the 23 patients who had children after surgery only three cases were in the age group 20-29 years.13 patients were in the age group 30-39 years and seven cases in the age group over 40 years old.No significant correlation wasfound between ageof patients and varicocelectomy effect on fertility after the surgery (p-value=0.32).

The distribution of sperm parameters in patients with varicocele before and after the treatment based upon the different study age groups is shown in table 1. The mean differents of sperm parameters before and after the varicocelectomy is represented in table 2.

Discussion

Since the normal values of semen parameters is very important for fertility and varicoceles as the most common operable and curable cause of infertility, this study was carried out aimed to assess the effect of varicocelectomys surgery on sperm parameters. The results showed that by varicocele surgery, all sperms parameters such as sperm count and motility, and morphology have significantly improved. In addition, changes in these indicators could have an impact on the infertility treatment procedures. We found that varicocele surgery and sperm parameters recovery can improve factors related to male gametes and Semen defects and consequently have a positive role in improving infertility. In the present study which was in form of the questionnaire the records of 51 patients with varicocele has been examined,

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mean age of patients was 37.3 years. Of the 51 patients studied, 24 patients had varicocele grade two and 27 patients grade three,which were almost similar to the findings of Jorsaraei *et al* study [11]. Here in our study 22 patients had discomfort in the left side, and 29 patients had bilateral varicocele which was different in compare with a studyconducted by Sohrabi *et al*at shahrood city.In the mentioned study about 87.2 percent of the patients had left involved and 3.6 percent conflictright and 10 percent had bilateral involvement [12]. We found that 45.09 percent of our caseshad children one year after surgery, of whom nine patients had unilateral varicocele and 14 patients were diagnosed with bilateral varicoceles. Moreover, the studythat was conducted byjorsaraei *et al*in Babol city 42 percent of patients had a child after one year [11]. In our study, the mean sperm motility,sperm count and the mean sperm normal morphology were significantly increased in patients after the surgery. In this study,by using the chi-squared test after surgery a significant relationship between varicocelectomy and its impact on number of sperms, motility and morphology were observed. A study by James A *et al*has performed in USA to examine the issue of whether to treat varicoceles significantly affect the success rate of Intrauterine insemination (IUI)?. The results showed that in patients who were treatment, sperm motility was higher than non-treatedgroups. However, no significant difference was observed between the two groups in the mean number of total motile sperm [13]. Such results were different from our finding, that may be caused by different testing methods or differences in laboratory kits. Despite these findings, the fertility rate and alive child birth than any insemination cycles was significantly higher in patients who underwent surgical treatment of varicocele compared with non-treated group. This result was similar to our findings in this study. Finally, they concluded that treatment of varicoceles may not improve sperm characteristics but can seem to improve the rate of fertilityand live births. In another study performed in Japan by Onozawa *et al*, they examined the clinical outcomes of varicocelectomy. The fertility rate in the wives who did varicocelectomy compared with conservative treatment group was significantly higher [14] which the significance was similar to our study. Kibar *et al* studied the impact of sub-inguinal varicocelectomy on infertile patients. They reportedthe amount of mean normal sperm morphology rate to be about less than 14% before and six months after varicocelectomy. The results of this study has shown significant improvement in sperm concentration and motility after surgery [15]. The findings of our study was similar to this finding. Also based on the Kruger classification for the sperm morphology, a significant increase in the percentage of sperm normal forms has been observed. Of these 90 patients, 18 patients were managed to achieve complete pregnancy.In the present study we reported a significant relation between varicocelectomy and fertility. O'brien *et al*reviewed the varicocelectomy by microsurgical method. In this study the mean concentration and sperm motility six months after varicocelectomy was significantly higher than it was before the surgery,which weresame as our study outcomes [16]. In total, 28% of couples had unwanted pregnancy that meanfollow-up time was 22 months. Despite the positive results of the existed and mentioned studies, there are some other studies reporting revese finding, represnting that varicocelectomy is associated with a decrease in sperm indexes which result in infertility [17-19]. Such conflictingoutcomes may be due to technical errors in collecting sperm, other associated disorders, low sperm volume and type of varicocele surgery. Also social and cultural problems in our country related to sexual problems and semen collection can help these results become more complicated.

Table 1: sperm parameter before and after the varicocelectomy

Age groups / Variable	20-29		30-39		Over the 40		Total	
	before	after	before	after	Before	after	before	after
Patient Number	8	8	17	17	26	26	51	51
Mean sperm count (milion)	12.41	18.32	11.73	21.44	10.64	18.57	11.06	19.36
Mean sperm motility (percent)	24.32	32.17	26.14	36.51	26.57	33.71	26.43	34.53
Mean normal morphology (percent)	3.1	5.7	2.7	5.4	3.4	6.2	3.1	5.8

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Table 2: Changes in spermogram indexes before and after the varicocelectomy

Sperm parameters	Before	After	P-Value
Mean sperm count (milion)	11.06	19.36	0.001
Mean sperm motility (percent)	26.43	34.53	0.001
Mean normal morphology (percent)	3.1	5.8	0.001

Conclusion

Based upon the resultswe conclude that varicocelectomy significantly increases spermogram parameters and leads to an increase in the fertility rate. But this findings may affected by some enviromental and genetic factors. Because different races are residing in Nothern part of Iran, so it is proposed to evaluate impact of varicocelectomy on sperm parameters in different races with a large sample size. The results of such a large population could provide more clear vision ahead of researchers and clinicians.

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Disclosure

None of the contributing authors have any conflict of interest, including specific financial interests or relationships and affiliations relevant to the subject matter or materials discussed in the manuscript.

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