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### Andrology and Male Sexual Dysfunction

Original article

# Is unilateral varicocelectomy as effective as bilateral varicocelectomy in management of subfertile patients with bilateral varicocele



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#### KEYWORDS

Varicocele;  
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#### Abstract

**Objectives:** To compare the results of unilateral and bilateral subinguinal varicocelectomy for patients with primary infertility, including sperm parameters and pregnancy rate.

**Patients and method:** This a retrospective study including 91 men with primary subfertility with bilateral varicocelectomy. The patients were divided into two groups. Group A (46 patients) were subjected to bilateral varicocelectomy. Group B (45 patients) subjected to left varicocelectomy. Patients with unilateral, recurrent, subclinical, secondary varicocele and azoospermia were excluded. All Patients were evaluated with at least two semen analyses with 15 days apart. Follow up schedule for all patients includes physical examination and semen analysis 3, 6, and 12 months postoperatively.

**Results:** Subinguinal varicocelectomy with loup magnification was successfully performed in all 91 patients, with no intra-operative complications occurred. The age ranged between 25 and 39 years (average 32 years), which was not significantly different within the 2 groups. The mean follow up was 7 months. Neither definite hydrocele nor testicular atrophy was detected. Despite considerable changes were noted in sperm concentration, percentage of motility and normal sperm morphology postvaricocelectomy in both groups, there was not a statistically significant difference between the two groups, ( $P=0.139$ ,  $0.922$ , and  $0.825$ , respectively and also pregnancy rate ( $P=0.14$ ).

**Conclusions:** The semen parameters and pregnancy rate improved significantly in patients who underwent unilateral and bilateral varicocelectomy, with no significant difference between the two groups.

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## Introduction

Varicocele is an abnormal venous dilatation of the pampiniform plexus (PP) caused by different causes. The World Health Organization reported that varicocele is present in 25% of patients with abnormal sperm parameters and 12% of patients with normal sperm parameters [1]. The condition is commonly encountered in the left testicular side (90%) and only 2% in the right side; according to the venous anatomy [2].

American Urological Association (AUA) and the American Society for Reproductive Medicine (ASRM) have recommended varicocelectomy for subfertile men presented with a clinical varicocele and associated with one or more abnormal semen parameters [3].

Most of men with abnormal semen parameters will have an improvement in semen parameters after varicocelectomy [4]. The surgical approach is the gold standard in treatment of varicocele, where its aim is to ligate internal and external spermatic veins with preservation of the vas deferens and lymphatic vessels. In addition to open surgical approaches (high retroperitoneal, inguinal, subinguinal) laparoscopic surgery and, radiologic embolization methods are used [5]. Diminished complication rate are obtained by combining a surgical microscope or loupe during inguinal or subinguinal techniques in order to preserve the arterial and lymphatic system [6,7].

There are a limited number of studies that compared unilateral and bilateral varicocele treatments. In patients with bilateral palpable varicocele, consisting of moderate to large left varicocele with a small right varicocele, it is not sure how much additional benefit results from ligation of the right varicocele. In study consisted of 65 patients with bilateral varicocele who have the aforementioned features, there was no statistical difference between unilateral and bilateral varicocele ligation [8]. In this study, we aimed at comparing the results of unilateral and bilateral subinguinal varicocelectomy for patients with primary infertility, including sperm parameters and pregnancy rate.

## Patients and methods

This is a retrospective study including 91 men presented with primary subfertility (at least one year) associated with bilateral varicocele in the period between March 2014 and June 2017. The patients were divided into two groups. Group A that were subjected to bilateral varicocelectomy included 46 patients (51%). Group B included 45 patients (49%) who subjected to left varicocelectomy only.

All patients were subjected to thorough history taking included sexual and fertility history, general and genital examination to detect

side and degree of varicocele and testicular size. Hormonal assay (LH, FSH, and testosterone) and Color Doppler US were done for all patients.

All patients were evaluated with at least two semen analyses (according to WHO 2010) with 15 days apart [9].

Varicocelectomy was done via subinguinal approach with using of loup in all patients with a single surgeon. Patients with unilateral, recurrent, subclinical, secondary varicocele and azoospermia were excluded from the study.

Follow up schedule for all patients includes physical examination and semen analysis 3, 6, and 12 months postoperatively. semen parameters and spontaneous pregnancy rate were compared Pre and postoperatively in both groups.

Analysis of the data obtained in this study was done with SPSS 20.0. The chi-square test was used to examine the dependency between the groups. (significant dependency was reported at  $P < 0.05$  and insignificant at  $P > 0.05$ .)

## Results

Subinguinal varicocelectomy with loup magnification was successfully performed in all 91 patients, with no intra-operative complications occurred. The age ranged between 25 and 39 years (average 32 years), which was not significantly different within the 2 groups. Varicocele grades were statistically similar between the two groups preoperatively. Of the group (A) 53% were grade III and 47% were grade II. In group (B) 61% were grade III and 39% were grade II. The mean volume of the left testis was 15 cc and the right testis was 18 cc for both groups. The mean follow up for postoperative semen analyses was 7 months. Neither definite hydrocele nor testicular atrophy was detected in the follow up period.

Data of the semen analyses in each group was collected and analyzed, Table 1. Despite considerable changes were noted in sperm concentration, percentage of motility and normal sperm morphology post-varicocelectomy in group A and group B, there was not a statistically significant difference between the two groups ( $P = 0.139$ , 0.922, and 0.825 respectively), Table 1.

Spontaneous pregnancy occurred in 21 patients (46%) of group A and 27 patients (58.7%) of group B following surgery. The remaining 43 (47%) patients of both group were directed to do ICSI. There was not a statistically significant difference between the two groups as regard pregnancy rate ( $P = 0.14$ ).

**Table 1** Semen parameters and postoperative pregnancy rates of the two groups.

	Group (A) no. 46 patients		Group (B) no. 45 patients		P value*
	Pre-operative	Post-operative	Pre-operative	Post-operative	
Sperm concentration $\times 10^6/cc$	19.51 $\pm$ 14.85	28.6 $\pm$ 14.60	21.39 $\pm$ 15.34	29.51 $\pm$ 15.21	0.139
% motility (PR + NP)	31 $\pm$ 0.28	45 $\pm$ 0.21	24 $\pm$ 0.12	43 $\pm$ 0.11	0.922
% morphology	66 $\pm$ 0.27	43 $\pm$ 0.13	66 $\pm$ 0.25	46 $\pm$ 0.12	0.825
Pregnancy rate		21(46%)		27(58.7%)	0.14

\* P value for postoperative results of 2 groups.

## Discussion

Palpable unilateral varicocele occurs on the left side from 85% to 90% of cases. Palpable right varicocele is usually found in cases of bilateral varicocele and rarely occurs unilaterally. The increased frequency of bilateral localization documented in more recent studies can be due to the use of modern diagnostic means, such as conventional or Doppler ultrasound of the scrotum [10].

Varicocele is a major cause of impaired spermatogenesis and the most common correctable cause of male infertility. Varicocele is found in approximately 40% of men with primary infertility and 80% of men with secondary infertility [11].

Varicocele detected by physical examination is associated with a greater postoperative improvement in semen parameters [12], and more predictive of a good clinical outcome than those detected sonographically [13].

The optimal activity of spermatogenesis is at 33 °C. Dilated veins result in increased scrotal and testicular temperature, which alter DNA synthesis within the testicle, leading to morphologic changes in sperm and testicular tissue. Also, Hypoxia could impact both testicular architecture and sperm production. Exposure of the testes to renal and adrenal metabolites due to reflux via the testicular vein causing testicular dysfunction. Altered blood flow Compared with many other tissues, blood pressure in the testicular capillaries and post-capillary venules is very low. The low pressure of this system makes it very sensitive to increases in pressure on the venous side. Increased blood flow (accompany the varicocele), would increase the testicular temperature due to inefficient cooling of the incoming blood [14].

More recently, some studies claimed that increased arterial blood flow to the testis at puberty exceeds venous capacity, resulting in venous dilatation and varicocele. The finding of elevated nitric oxide, a potent vasodilator, in the PP of males with varicocele raises another potential cause for the etiology of varicocele in the adolescent [15].

In our study, sperm concentration, motility, and morphology improved significantly in patients who underwent unilateral and bilateral varicocelectomy, while no significant difference was noted between the two groups. Similarly, there was not any difference between the two groups in terms of postoperative pregnancy rates. This was in accordance with other studies as in a prospective study by Fujisawa et al, compared the data from 75 patients with bilateral varicocele who underwent bilateral varicocelectomy and 34 patients with unilateral varicocele who underwent unilateral varicocelectomy. When semen analyses at the 18th postoperative month were evaluated, sperm concentrations in patients who underwent bilateral varicocelectomy had increased from 8 million/mL to 23.4 million/mL, while sperm concentrations in patients who underwent unilateral varicocelectomy had increased from 8.1 million/mL to 26.9 million/mL. Motility improvement rates increased from 38.9 million/mL to 43.1 million/mL and from 39.6 million/mL to 45.4 million/mL, respectively [16]. In another study, eighty-two patients (45.6%) who underwent unilateral varicocelectomy were identified as Group I and 98 patients (54.4%) who underwent bilateral varicocelectomy were identified as Group II. Although morphology, number, and motility improved in both groups, there was not a statistically significant difference between the groups ( $P > 0.05$ ).

There was not a statistically significant difference between the groups in terms of pregnancy rates ( $P = 0.13$ ) [17]. Libman et al. [18] performed bilateral varicocelectomy in 157 patients and left varicocelectomy in 212 patients with bilateral varicocele and compared sperm count and pregnancy rates. Sperm motility improvement percentage (8% vs. 4.4%) and spontaneous pregnancy rates (49% vs. 36%) were higher in the bilateral varicocelectomy group. On the other hand, other studies showing that left varicocelectomy alone would be sufficient in patients with low-grade bilateral varicocele [19].

The majority of varicocele are left-sided (right-sided may also be seen, either independently or together). Isolated left sided varicocele may lead to impairment of semen parameters and subfertility [20]. Several studies reported that sperm concentration, morphology, and motility improved following varicocelectomy and an increase in spontaneous pregnancy rates was observed [20]. In bilateral varicocele, left side usually is larger or more painful than right one, so if we perform left varicocelectomy only the semen parameters will be improved without doing bilateral varicocelectomy. We believe that most of the benefits of varicocelectomy will be obtained from repair of the larger varicocele. Also, Reported studies showed cross communication between right and left spermatic veins inside the scrotum, retropubic at the level of internal inguinal ring and retroperitoneal [21,22]. So, that may explain why left varicocelectomy can improve semen parameters to a high percent like bilateral varicocelectomy.

When we perform bilateral varicocelectomy? We think that we proceed to do right varicocelectomy with the left side when the right varicocele is of high degree, painful or associated with decrease testicular size. Also we do postpone right varicocelectomy 3–6 month after left varicocelectomy if there is no improvement in semen parameters.

Limitations of our study include: the retrospective nature of the study, (with the usual drawbacks of such studies, including selection bias), small sample, short follow up periods and single centre study.

## Conclusions

Our study demonstrated that, semen parameters (sperm concentration, motility, and morphology) and postoperative pregnancy rate improved significantly in patients who underwent unilateral and bilateral varicocelectomy, with no significant difference was noted between the groups.

## Conflict of interest

We declare that have no conflict of interest.

## Ethical committee approval

Ethical committee of Faculty of Medicine, South Valley University approved the study.

## Informed consent

Informed consent was obtained from all individual participants included in the study.

### Authors' contribution

Abdel-Kader M S (protocol development and manuscript writing/editing).

Hassan A M (data collection or management)

AbdelRazek M (data analysis).

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