

ORIGINAL ARTICLE

Comparison of Open Sub-Inguinal and Microscopic Sub-Inguinal Varicocelectomy for Improvement of Sperm Parameters

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ABSTRACT

Background: Varicoceles along with oligospermia as well as with asthenozoospermia lead to the male infertility. It can weaken the spermatogenesis via many different pathophysiological mechanisms. Many surgical and non-surgical methods are available for its treatment.

Objective: To compare microscopic versus open sub-inguinal varicocelectomy in males with varicocele with oligospermia and asthenozoospermia.

Study Design: Randomized controlled trail

Place and Duration of Study: Department of Urology, Lahore General Hospital, Lahore from 1st May to 30th November 2017.

Methodology: One hundred and fifty males with varicocele were recruited and divided in two equal groups. Group A patients underwent microsurgical sub-inguinal varicocelectomy and Group B patients underwent conventional/open sub-inguinal varicocelectomy. Semen analysis was done before surgery and after four months of surgery and $\geq 50\%$ improvement in semen parameters were noted.

Results: The mean age was 31.69 ± 5.49 years. In group A and group-B $\geq 50\%$ improvement was observed in 36 (48%) and 21 (28%) respectively. The improvement was significantly higher in group A than group B ($p > 0.012$).

Conclusion: The improvement in sperm count and motility was significantly higher in patients treated with microsurgical sub-inguinal varicocelectomy when treated with conventional/open sub-inguinal varicocelectomy.

Keywords: Male infertility, Varicocele, Varicocelectomy, Seminal parameters, Microsurgical sub-inguinal, Conventional/open sub-inguinal

INTRODUCTION

Infertility is defined as the failure to conceive the pregnancy by the female partner for one year after unprotected sexual intercourse.¹ Infertility is the most important medical, and also a social problem, which deliberate the psychological health of couples and families.² It affects about 10 to 15% of married couples all over the world. Out of all infertile couples, approximately 40-50% are solely because of male factors.³ The infertility of couple may occur because of several reasons, also including male factors like irregular ejaculation, disturbed semen parameters or varicocele.⁴⁻⁵ Varicocele can be deliberated as the enlargement of entangled pampiniform the plexus and internal spermatic veins located in spermatic cord. Varicocele can be present in 35% in males with primary infertility while in 75% males with secondary infertility.⁶

Varicocele can affect all semen parameters, i.e. sperm count, motility, morphology, also including testicular size.⁷ In recent years, many research publishes have provided credible data regarding the impact of varicocele on male fertility, treatment options and effective indications.⁷ Varicocele in the pampiniform plexus has an irregular amount of venous dilation.⁸ It may have scrotal pain or swelling, or male subfertility may be examined. Varicoceles are ambiguous in their aetiology. The left, the spermatic vein is perpendicular to the connection renal vein, is more common in the idiopathic varicoceles.⁹

Different methods, both surgical and non-surgical, have been proposed for treatment. The surgical procedures

in infertile men are poorly deliberated. Among all the method, laparoscopic method needs short operative time and less complications i.e. around 17% with sub-inguinal microscopic ligation with advantage of little injury, quick recovery, less complications (3.7%) and recurrence after one year was reported as 1.6% only. But simultaneously, this method requires expert microsurgical techniques, and only local anesthesia. It is a day case procedure, but one-year recurrence after this procedure was 22%.^{10,11} So in this study we compared open sub-inguinal and microscopic sub-inguinal varicocelectomy for improvement of sperm parameters.

METHODOLOGY

This randomized controlled trail was conducted at Department of Urology Lahore General Hospital, Lahore from 1st May 2017 to 30th November 2017 and comprised 150 males diagnosed of varicocele (75 in each group). Group A patients underwent microsurgical sub-inguinal varicocelectomy and Group B patients underwent conventional/open sub-inguinal varicocelectomy. All male patients aged 18-40 years having varicoceles diagnosed during last 1 year with both; oligospermia (sperm count < 15 million per ml) and asthenozoospermia ($< 40\%$ sperm motile assessed on serum analysis), varicoceles was assessed as a spermatic venous diameter of > 3 mm with venous reflux detected by on Doppler ultrasonography were included. Recurrent or bilateral varicocele, inflammatory diseases causing scrotal pain other than varicocele (e.g. inguinal

hernia, spermatocele etc) were excluded. Age and other information were noted. A 2cm transverse skin incision, centered over the external inguinal ring was made to approach the spermatic cord. The incision was made deeper and spermatic cord was grabbed with Babcock clamp, transported, and placed over artery forceps. Normal pressure was applied on ipsilateral hemiscrotum to expand the spermatic fascia. Then, internal spermatic veins were detached, ligated, sub-inguinal varicocelectomy, operative microscope was then added and all steps were done under 8-15 power magnification. On same day after procedure patients were discharged. Semen analysis was conducted before and after four months of surgery to assess the $\geq 50\%$ change in the semen parameters. Data was entered and analyzed through SPSS version 22. Chi-square test was applied to compare frequency of $\geq 50\%$ improvement in both study groups.

RESULTS

The mean age was 31.76 ± 5.35 in group A years and 31.61 ± 5.67 years in group B. One hundred and thirteen (75.33%) cases were married and 37 (24.67%) cases were unmarried. The mean weight, height and BMI in this study was 74.41 ± 13.58 kg, 1.67 ± 0.098 m and 26.76 ± 5.45 kg/m² (Table 1). The mean sperm count before treatment was 13.59 ± 3.62 million in group A and 14.12 ± 3.38 million in group B respectively. The mean sperm count at 4th month was 27.51 ± 7.40 million and 23.48 ± 6.64 million in group A and group-B respectively. The mean sperm motility before surgery in group-A and group-B was $23.97 \pm 8.26\%$ and $24.04 \pm 9.44\%$ respectively. The mean sperm motility at 4th month in group A was $59.45 \pm 18.48\%$ and $54.73 \pm 18.23\%$ in group B (Table 2). Improvement was seen in 36 (48%) cases in group A and 21 (28%) cases in group B and significantly higher in group A than group B ($p=0.012$) [Table 3].

Table 1: Baseline characteristics of patients (n=150)

Variable	Group A	Group B	Total
Age (years)	31.76 ± 5.35	31.61 ± 5.67	31.69 ± 5.49
Married	56 (74.7%)	57 (76%)	113 (75.3%)
Unmarried	19 (25.3%)	18 (24%)	37 (24.7%)
Weight (kg)	74.05 ± 12.60	74.77 ± 14.58	74.41 ± 13.58
Height (m)	1.67 ± 0.10	1.68 ± 0.10	1.67 ± 0.10
BMI	26.93 ± 5.40	26.59 ± 5.54	26.76 ± 5.45

Table 2: Comparison of outcome in both study groups

Variable	Group A	Group B	P value
Sperm count (pre)	13.59 ± 3.62	14.12 ± 3.38	0.3556
Sperm count(post)	27.51 ± 7.40	23.48 ± 6.64	0.0006
Sperm motility(pre)	23.97 ± 8.26	24.04 ± 9.44	0.9615
Sperm motility(post)	59.45 ± 18.48	54.73 ± 18.23	0.1175

Table 3: Comparison of improvement in both study groups

Improvement	Group A	Group B	Total
$\geq 50\%$	36 48%	21 28%	57 38%
$< 50\%$	39 52%	54 72%	93 62%

Chi value=6.367, p-value=0.012

DISCUSSION

Among all the male infertility problems, varicocele is the most common problem. Although common but treatable problem of male infertility.¹³ The rate of varicocele is around 15% in the general population, 19-41% in males

with primary infertility, while in 45-81% in males with secondary infertility.¹³ In routine medical practice, the abnormal semen parameters, especially sperm count, morphology and motility, suspect the varicocele.¹⁴ Many surgical methods are currently applied for treatment of varicocele and every method has its own advantages and disadvantages. But after so much advancement in surgical and medical fields, still there is controversy in different techniques that which can be considered as "gold standard".^{15,16}

Varicoceles is even common in younger age group as a study reported mean age of patients was 24.53 ± 8.13 .¹⁷ In the present study, mean age was 31.69 ± 5.49 with range of 18 and 40 years respectively and the mean age was higher than the above cited study.

Similarly, another trial, conducted on one hundred sixty-two infertile males diagnosed with varicocele underwent sub-inguinal varicocelectomy by micro-surgical method (n=82) whereas 80 underwent procedure by conventional method.⁹ Abdel-Maguid and Othman¹¹ reported that the mean post-operative sperm count and motility was ($\geq 50\%$) in both groups i.e. 42.7% and 67% with microsurgical sub-inguinal varicocelectomy vs 23.7% and 33.8% with non-microsurgical sub-inguinal varicocelectomy. It was concluded that microsurgical technique is better for better improvement in sperm count and motility, leading to higher pregnancy rates, whileless recurrence and hydrocele formation as compared to conventional method.

This study showed last follow up at 4th month and found that microsurgical group and open group $\geq 50\%$ improvement was seen in 36(48%) and 21(28%) respectively. The improvement was significantly higher in group A than group B [$p=0.012$] (Table 3). These results are consistent in terms of higher improvement in microsurgical group.¹¹ One more study postoperatively at three months the sperm count improved about 47.3% to 74% while motility improved from 1.7 folds to 2 folds.¹⁸ These statistics are also in agreement to our results.

One trial conducted to compare three method of varicocelectomy i.e. open surgery, laparoscopic method and sub-inguinal microsurgery for treatment of varicoceles. There was significantly less recurrence with microsurgery than open surgery and laparoscopy (2.6% vs 11% vs 17%, respectively). Also the rate of improved sperm count and motility were also significantly higher with microsurgery, although the pregnancy rate was almost equal in all groups. Thus microsurgery showed better outcome in terms of improved sperm count and motility and less postoperative complications for treatment of varicocele than other two techniques.¹⁹

Moreover, in 2007, another study is done to compare the outcomes of the different surgical techniques used in varicocelectomy. According to their statistics the improvement in sperm motility and/or concentration was comparable and observed in 65%, 67%, and 76% of the open, laparoscopic, and microscopic groups, respectively. So, like our results the concluded that compared with open inguinal and laparoscopic varicocelectomy, sub-inguinal microsurgical varicocelectomy offers the best outcome.¹⁶

Moreover, another trial was conducted to compare three surgical techniques to assess that which is least invasive and more successful. Sperm count was improved

significantly with all methods, but sperm motility was not improved. So, the trial concluded that sub-inguinal microscopic varicocelectomy can be the least invasive procedure than other two methods.¹⁵ Cayan et al²⁰ stated that microsurgical varicocelectomy had more spontaneous pregnancy rates and less recurrence and less postoperative formation of hydrocele as compared to conventional techniques.

Another meta-analysis compared several surgical techniques like open non-microsurgical, laparoscopic or microsurgical procedures to determine the best procedure for treatment of varicocele in infertile men. The primary objective was to determine the pregnancy rate, then secondary objective was to determine the operative time, duration required to return to daily routine, hydrocele formation and recurrence. It was observed that the pregnancy rate was better with microsurgery as compared to open varicocelectomy (odds ratio = 1.63, 95% confidence interval; 1.19–2.23). While insignificant difference was noted between laparoscopic and open procedure (odds ratio = 1.11, 95% confidence interval: 0.65–1.88) and between microsurgery and laparoscopic procedures (odds ratio = 1.37, 95% confidence interval: 0.84–2.24). The microsurgical varicocelectomy takes more operative time than laparoscopic or open surgery. The recurrence rate and hydrocele formation were significantly less in microsurgery as compared to laparoscopic or open surgery. The mean duration to return to daily routine was shorter with microsurgery and laparoscopic procedure than open procedure. Thus, it was concluded that microsurgical method is more effective and have less postoperative complications than other methods for treatment of varicocele in infertile males.²¹

Pakistan literature showed that microvaricocelectomy is associated with improvement in sperm count and also improvement in motility as well. Postoperatively at three months the sperm count improved about 47.3% to 74% while motility improved from 1.7 folds to 2 folds.¹⁸ The ideal method for treatment of varicocele is still controversial.^{22,23} The basic aim of the procedure is to recover the complete interruption of internal venous drainage of testes, excluding vas deferens, while conserving the internal spermatic arteries, vas deferens, spermatic cord and lymphatics.²² The procedure which is simple, have high success rate with low recurrence is preferable.²³

With microsurgical varicocelectomy, internal spermatic arteries, lymphatics and ligate veins can be precisely preserved.²⁴ It can results in better sperm count & motility, no hydrocele development, less one-year recurrence (3.7%).²⁵ Study done by Abdel-Maguid and Othman¹¹ presented that the mean post-operative sperm count and motility was ($\geq 50\%$) in both groups i.e. 42.7% and 67% with microsurgical sub-inguinal varicocelectomy vs 23.7% and 33.8% with non-microsurgical sub-inguinal varicocelectomy.

When we stratified data for age group, improvement $\geq 50\%$ was significantly higher ($P < 0.005$) in group A, while in cases aged 30-40 years both groups were statically significant higher ($P < 0.005$). The improvement was significantly ($P < 0.05$) different in married and non-obese cases. These considerations should be kept in mind before selection of treatment procedure in future.

CONCLUSION

The improvement in sperm count and motility was significantly higher in patients treated with microsurgical sub-inguinal varicocelectomy when treated with conventional/open sub-inguinal varicocelectomy. Hence, using microsurgical technique for male patients having varicoceles with oligospermia and asthenozoospermia can be effective and male infertility can be reduced.

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