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Original Research Article

Benefit of varicocelectomy in infertile men with varicocele

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ABSTRACT

Background: Varicocelectomy does improve semen parameters and pregnancy rates in men with infertility. Various studies have shown the extent of benefit and also shown that some may not benefit. It is important to counsel the patients about the same. The present study was done to determine how much varicocelectomy is beneficial to infertile men with varicocele.

Methods: A prospective observational cohort study was conducted on 25 patients undergoing varicocelectomy for infertility at St. John Medical College Hospital, Bangalore from 1st June 2013 to 31st May 2014. Clinical data, semen analysis, scrotal imaging was done and postoperatively semen analysis was done after three months. The data was analysed to find out how much was the benefit of varicocelectomy.

Results: Twenty-five patients underwent varicocelectomy, all of them showed improvement of semen parameters. Fifteen of them had more than 50% of improvement. This showed that varicocelectomy is beneficial to about 60% of patients.

Conclusions: Varicocelectomy is beneficial to infertile men with palpable varicocele and abnormal semen parameters.

Keywords: Infertility, Scrotum, Semen, Testis, Varicocele, Varicocelectomy

INTRODUCTION

An abnormal tortuosity and dilation of the veins of the pampiniform plexus is known as varicocele. Incidence of varicocele (all grades) in the general population of healthy males is 10% to 15%.¹⁻⁴ Approximately 30-50% of males with primary infertility have a varicocele.⁵⁻⁸ There is a clear association between varicocele, infertility and testicular growth arrest.⁹⁻¹² Varicocelectomy does improve semen parameters and increase the chances of fertility.¹³⁻¹⁶ Not all patients with varicocele will improve following surgery.¹⁶ It is important to counsel the patients before surgery about the extent of benefit that is provided by varicocelectomy.

Present study was done to determine how much varicocelectomy is beneficial in the improvement of semen parameters.

METHODS

Prospective observational cohort study conducted on 25 patients undergoing varicocele surgery for infertility at St. John's Medical College Hospital, Bangalore from 1st June 2013 to 31st May 2014.

Inclusion criteria

- A male patient presenting with infertility due to varicocele only who gives consent for participating in the study
- An infertile adult, when all of following condition are met:
 - a. The couple has known infertility (failure to initiate a pregnancy after at least one year of unprotected coitus at a normal frequency with adequate technique)

- b. The female partner has known fertility or a potentially treatable cause of fertility
- c. The varicocele is palpable on physical examination, or if suspected, the varicocele is corroborated by ultrasound examination
- d. The male partner has abnormal semen analysis.

Exclusion criteria

- Adult fertile men with incidentally detected varicocele, adolescent varicocele, persons meeting inclusion criteria but not willing to give informed consent
- Patients using any form of contraception during the study
- Patients who had/have been taking medications for infertility
- Patients who have taken in the past/taking medications which affect semen parameters.

Method of collection of data

Twenty-five patients were included in the study, all of whom fulfilled protocol requirements. Patients underwent standard evaluation consisting of clinical examination, two semen analyses and scrotal ultrasonography. The following parameters were recorded:

- Age of patient
- Duration of infertility
- History of smoking
- History of drug intake
- Varicocele laterality
- Grade of varicocele - diagnostic classification of the WHO-1993
 - a. Grade I - palpable only during the valsalva maneuver
 - b. Grade II - palpable without the valsalva maneuver
 - c. Grade III - visible without palpation,
- Two Semen analysis reports at least 2 months apart - mean value was adopted
- Testicular volume (by ultrasonography)
- Pampiniform plexus vein diameter (by ultrasonography).

Twenty-five consecutive cases underwent varicocele surgery (subinguinal approach) for infertility after giving informed consent and fulfilling criteria mentioned above. Patients were advised not to use any form of contraception and abstain from smoking for the duration of the study (as smoking is an independent risk factor for infertility).

The patients were reassessed between 90 and 120 days post-operatively with the following:

- History to confirm that patient is not smoking

- Clinical examination to confirm absence of genital infection
- Two Semen analyses were done - mean value was adopted.

Patients, who had more than 50% improvement in sperm count postoperatively, as compared to preoperative sperm count, were considered as responders.

Statistical analysis

Data are presented as means ± standard deviation (SD) or percentages. All statistical analysis was performed using SPSS V18.0 (SPSS Inc., Chicago, IL).

RESULTS

Twenty-five patients met the inclusion criteria and underwent subinguinal varicocele ligation and were followed up as per protocol.

Table 1: Age distribution of patients.

Age group	No. of patients (n=25)	Percentage
0-10	0	
11-20	0	
21-30	10	40%
31-40	14	56%
41-50	1	04%
Mean	31.92	
SD	4.78	

Table 2: Duration of infertility.

Duration of infertility	No. of patients	Percentage
0-5 years	21	84%
6-10 years	2	08%
11-15 years	1	04%
16-20 years	0	
21-25 years	0	
25-30 years	1	04%
Mean	4.66	
SD	5.53	

Table 3: Laterality of varicocele.

Laterality of varicocele	No. of patients	Percentage
Left	7	28%
Bilateral	18	72%

The most frequent age group analysed in this study was between 31-40 years of age (56%). Mean age of patients studied was 31.92 years. with a range of 21-46 years of age (Table 1). Twenty-one (84%) patient had duration of infertility less than 5 year. Mean duration of infertility was 4.66 years with a range of 1 to 28 years (Table 2).

Eighteen patients (72%) had bilateral varicocele while 7 patients (28%) had left side varicocele (Table 3). Out of 25 patients only 18 patients had right side varicocele among which 4 patients had grade I varicocele, 14 patients had grade II varicocele and, none of the patient had grade III varicocele. All the patients had left side varicocele among which none had grade I varicocele, 22 patients had grade II varicocele while only 3 patients had grade III varicocele (Table 4). On right side maximum testicular volume was 16 ml, minimum 7 ml, median 11 ml and mean was 11.12 ± 2.16 ml. While on the left side maximum testicular volume was 14.1 ml, minimum 6 ml, median 11.2 ml and mean was 10.61 ± 2.30 ml. On right side maximum pampiniform vein diameter was 4 mm; minimum 1.6 mm, median 3.2 mm and mean was 2.87 ± 0.80 mm. While on the left side maximum pampiniform vein diameter was 4 mm, minimum 3.3 mm, median 3.7 mm and mean was 3.65 ± 0.22 mm.

Table 4: Grades of varicocele.

Grades of varicocele	Right	Left
Grade I	4	0
Grade II	14	22
Grade III	0	3

Fifteen patients (60%) responded to treatment (varicocelectomy) i.e., had more than 50% improvement in sperm count after surgery, while 10 patients (40%) had not responded to treatment (Table 5).

Table 5: Response to varicocelectomy.

Response	No. of patients	Percentage
Responders	15	60%
Non-responders	10	40%

Table 6: Change in semen parameters after surgery.

Semen parameters	Preoperative	Postoperative	p-value
Sperm counts ($\times 10^6 \text{ml}^{-1}$)	17.38	30.83	0.001
Sperm Motility (%) (Gr. III + IV)	14.88	30.80	0.001

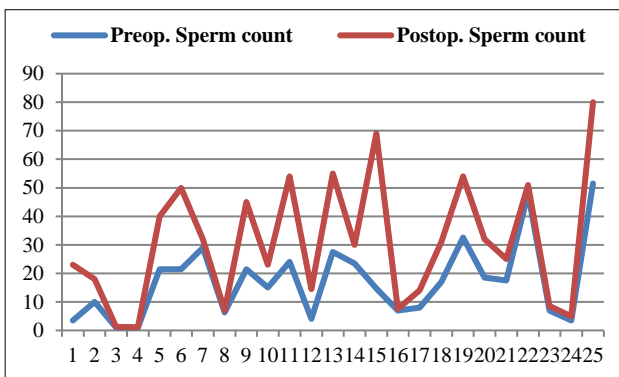


Figure 1: Preoperative and postoperative sperm count.

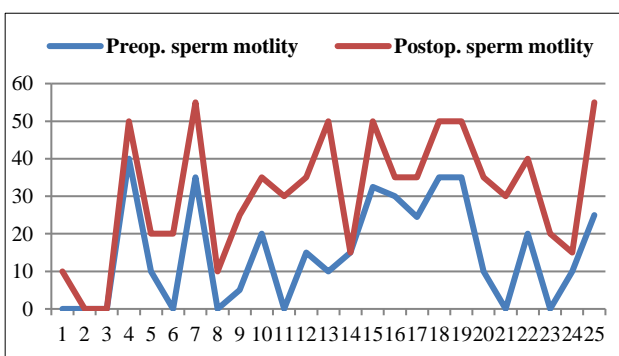


Figure 2: Preoperative and postoperative sperm motility.

Preoperatively maximum sperm count was 51.5 million ml^{-1} , minimum 1 million ml^{-1} , median 17 million ml^{-1} and mean were 17.38 ± 13.38 millions ml^{-1} . While postoperatively maximum sperm count was 80 million ml^{-1} , minimum 1.1 million ml^{-1} , median 30 million ml^{-1} and mean was 30.83 ± 21.90 million ml^{-1} (Table 6) (Figure 1).

Preoperatively maximum sperm motility was 40%, minimum 0%, median 10% and mean was $14.88 \pm 13.84\%$. While postoperatively maximum sperm motility was 55%, minimum 0%, median 35% and mean was $30.80 \pm 16.87\%$ (Table 6) (Figure 2).

DISCUSSION

Varicocelectomy has been reported to improve the semen profile significantly in the majority of patients, and to result in a slight decrease in the frequency of aneuploidy in some chromosomes.¹⁷ In the present study, after varicocelectomy there is statistically significant improvement in sperm count and motility.

Numerous studies have shown the extent of benefit of varicocelectomy on infertile men.

Osifo OD and Agbugui JO did a 5-year prospective study to examine the effect of varicocelectomy on the fertility profile of affected men.¹⁸ They did varicocelectomy on 33 men who had infertility, among whom 23 (69.7%)

achieved pregnancy over one-year period following surgery. Present study didn't assess pregnancy rates.

Varicocele surgery improves semen parameters.¹⁹ Leung L et al, studied impact of varicocele surgery on semen parameters and pregnancy outcomes found improvement in sperm concentration, motility, morphology and pregnancy rates. Cakan M et al studied impact of varicocele surgery on sperm morphology and found that sperm morphology improves following varicocele surgery.²⁰ Senbanjo RO et al, also showed that varicocele surgery results in improvement of semen quality in about 53% of patients.²¹

Many studies have shown that varicocele surgery results in improvement of many semen parameters viz sperm count, sperm motility, sperm morphology and ultimately pregnancy rates.

Present study has also shown that sperm count and motility improve following varicocele surgery which is statistically significant.

Tung MC et al, studied effect of varicocele on infertility and found that semen parameters improve following varicocele surgery and also found that pain associated with varicocele also subsides.²² A retrospective analysis by Pan LJ of 94 varicocele patients showed improvement in sperm concentration and motility.²³ Magoha GA studied impact of varicocele on infertile men and found improvement in sperm count in 66% and sperm motility in 6% of patients.²⁴ They also recorded a pregnancy rate of 33.3%.

Yazdani M et al, studied efficacy of varicocele repair in different age groups.²⁵ They divided 83 patients into two groups of less than 30 years and more than 30 years. They found semen parameters improved in both groups and there was no statistically significant difference between two groups regarding efficacy of varicocele surgery. Present study didn't perform such analysis. Jugwirth A et al did analysis of 272 patients undergoing varicocele surgery and found significant improvement in sperm count and motility in all patients.²⁶

Shamsa A et al, evaluated four parameters (semen analysis, fertility, early ejaculation and spontaneous abortion among spouses) in relation to varicocele and varicocele surgery during a 13-year period.²⁷ A total of 1,711 patients with varicocele underwent varicocele surgery and found that semen parameters improved in about 50% of patients. They also found significant improvements in fertility, ejaculation and reduction in spontaneous abortion.

Leung L et al, did a retrospective analysis of 42 patients undergoing varicocele surgery from January 2000 to December 2009 and found improvement in sperm concentration, motility and morphology and also improvement in spontaneous pregnancy.²⁸

McCulloch A et al, did a study of robot assisted microsurgical varicocele surgery of 145 men with subfertility and found improvements in sperm concentration but not much improvement in motility and morphology.²⁹

The present study included analysis of only sperm count and sperm motility. Various studies have analysed sperm morphology, testicular volume and symptom improvement. The ultimate goal of varicocele repair in infertile men is pregnancy. Present study was a short duration study and hence pregnancy rates couldn't be assessed. So large series of studies are needed to assess the true extent of benefit of varicocele surgery. Patients undergoing varicocele surgery need to be followed for long time to assess pregnancy rates.

CONCLUSION

The present study demonstrated that varicocele surgery significantly improves sperm concentration and motility in infertile men with palpable varicocele and abnormal semen parameters.

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