



## Surgery

### A FIVE YEAR PROSPECTIVE STUDY OF DIFFERENT SURGICAL APPROACHES FOR VARICOCELE TREATMENT IN 90 MALE ADOLESCENTS AT A TERTIARY HEALTH CARE CENTRE IN NORTH KASHMIR WITH PARTICULAR REFERENCE TO IMPROVEMENT IN FERTILITY.

**Sheikh Mehmood Rashid\***

M.S. Associate Professor Department of General Surgery Govt. Medical College and Associated Hospital Baramulla, Kashmir (India) – 193101\*Corresponding Author

**Sheikh Aamir Rashid**

M.B.B.S Undergraduate Department of General Surgery Govt. Medical College and Associated Hospital Baramulla, Kashmir (India) – 193101

**ABSTRACT**

**Background:** Varicocele is the most commonly diagnosed prepubertal andrological condition and is an abnormal dilatation, lengthening and tortuosity of the veins of the spermatic cord. The clinical presentation of varicocele may vary from dull and dragging unilateral or bilateral testicular pain to visible varicose veins lying over the hemiscrotum. **Methods:** A total number of 90 male adolescents with varicoceles were treated at the department of General Surgery at Govt. Medical College Baramulla Kashmir from January 2013 to December 2017 by three recognized surgical techniques viz., scrotal, trans inguinal and high ligation (Palomo's technique) and the results of surgical outcome in the three mentioned surgical approaches were compared. **Conclusion:** We concluded that trans inguinal method is the best one for the correction of varicocele with easy approach, fewer complications and shorter hospital stay. There was a marked improvement in sperm quality and testicular volume in patients operated by this route. **Results:** 56.6% of patients belonged to age group 15-20 years and in 90% of cases, left sided testis was involved. Among 6 patients who were infertile 2 (33.3%) patients became fertile and 4 (66.6%) patients had no effect on their fertility potential after varicocele correction. A significant change in testicular volume was noticed post operatively in all the 3 methods. A statistically significant improvement in sperm count (>50 million per ml) was observed in Trans inguinal technique while a significant improvement in sperm motility (>60%) was seen in trans inguinal and Palomo's approach.

**KEYWORDS :** varicocele, testis, sperm count, ligation, surgical approaches.

**INTRODUCTION**

Varicocele by definition means a compact pack of vessels filled with melancholic blood and is an abnormal dilatation, lengthening and tortuosity of these veins of the spermatic cord<sup>[1]</sup>. The reported incidence in the general male population ranges from 8 to 23%<sup>[2-5]</sup>. The veins ascend in three longitudinal groups, the anterior or spermatic group (varicocele), the middle or vassal group and the posterior or cremasteric group. As the veins ascend from the scrotum, they decrease in number, increase in size and enter the deep inguinal ring as the internal spermatic veins<sup>[6-9]</sup>. Varicocele occurs on the left side in as many as 98% of affected patients<sup>[10-14]</sup>. There is a high degree of correlation between the grade of varicocele, effect on testicular volume and results following varicocelectomy<sup>[15-18]</sup>.

The reported incidence of varicocele in infertile males is as high as 30% suggesting that varicocele might play a significant role in infertility<sup>[9]</sup>. This study involved an analysis of 30 patients treated by three modalities of treatment for varicoceles; viz, the scrotal, Trans inguinal and Palomo's procedure and the results of treatment were analysed with reference to effects on semen analysis, testicular size, fertility outcome, pregnancy rates and complications.

**MATERIAL AND METHODS**

The study included 90 male adolescents with their varicocele who presented at department of General surgery, Govt. Medical College Baramulla, Kashmir from January 2013 to December 2017. Cases were analysed according to age of partner, duration of infertility, previous pregnancies, pregnancy outcome, and history of any previous systemic and genitourinary disorders. All patients were subjected to a complete physical examination. Pre-operatively haemogram, routine urine examination, urine culture, ESR, kidney function tests, sperm analysis and assessment of testicular size (testicular volume) by calipers and ultrasonography was done in all the study subjects. Semen volume, sperm concentration, percentage and progression of motility and morphology were studied and this preoperative semen analysis was compared with three postoperative semen samples at 3, 6 and 9 months. The effects of treatment were also studied by measuring testicular volume which was compared with preoperative reading. The results of the three surgical techniques for the treatment of varicocele viz scrotal, Trans inguinal and Palomo's or high ligation were assessed by the recurrence rate complications and effects on semen analysis.

**RESULTS AND DISCUSSION**

In the present study of 90 patients with varicocele, maximum number of cases (56.6%) was in age group 15-20 years and in 81 (90%) cases left sided testis was involved. Of total number of 90 patients, 24 (26%) patients were married and out of them 18 (75%) patients were infertile.

Among 18 patients who were married but infertile, 6(33.3%) patients became fertile and 12 (66.6%) patients had no effect on their fertility potential after varicocele correction.

Preoperative evaluation revealed 66 (73.3%) patients with sperm count of <50 million/ml and 24 (26.6%) patients with sperm count of ≥50 million/ml; 69 (76.6%) patients with sperm motility of <60% motile sperms and 21 (23.3%) patients with sperm motility of ≥60% motile sperms and 63(70%) patients with sperm morphology showing <60% oval forms and 27(30%) patients with that of ≥60% oval forms. Of 181 patients with left sided varicoceles testicular volume was <15 ml in 48 (59.25%) cases and ≥15 ml in 33 (40.74%) cases while in 9 patients with right sided varicoceles, 6 (66.6%) patients were with testicular volume of <15 ml and 3 (33.3%) case with that of ≥15 ml.

In our series three modalities of treatment were used for varicocele repair each group consisting of 30 (33.3%) patients.

Postoperative evaluation of semen analysis done at 3, 6 and 9 months revealed the results of sperm count, sperm motility and sperm morphology as shown in tables 1, 2 and 3 respectively. The number of cases with sperm count of >50 million was statistically significant at 9 months. Also a statistically significant increase in number of cases with sperm motility of >60% at 9 months was seen. However, no significant improvement in sperm morphology (oval forms) was observed.

A significant change in testicular volume was noted postoperatively reaching statistical significance at 1% level. Two tailed P value (Fishers exact test) was >0.2 (insignificant). The results of postoperative semen analysis in the patients operated by the three mentioned recognized surgical methods for correction of varicocele were analysed and the results of sperm count, sperm motility and sperm morphology are shown in table 4, 5 and 6 respectively. A statistically significant improvement (P<0.005) in sperm count (>50 million/ml) was observed in trans inguinal technique only in sperm count (>50 million/ml) while a significant improvement in sperm motility (>60%) was seen in trans inguinal and Palomos approach. No significant improvement in sperm morphology occurred with either of the 3 techniques. Out of all the 3 surgical techniques for treatment of varicocele, maximum incidence of complications was seen in scrotal method and minimum incidence in Trans inguinal method as shown in table 7.

**DISCUSSION**

In the prospective randomized controlled study of the three methods for the correction of varicocele in the 90 patients studied in the present series, sperm analysis showed a marked improvement after

varicocele. Of the total number of 90 patients, 50% showed sperm count of  $\geq 50$  million/ml ( $p < .01$ ), 66.6% of the patients showed sperm motility of  $\geq 60\%$  ( $p < 0.002$ ) and 40% showed a morphology of  $\geq 60\%$  ( $p > 0.5$ ) oval forms. Our results are in similarity with work done by Arnold M balkler et al 1981, Dubin L et al 1970, Kass EJ et al 1987 and Haans LC et al 1991<sup>[20-23]</sup>. There was marked improvement in testicular volume postoperatively (77.7% of patients showed a testicular volume of  $\geq 15$  ml with  $p < 0.01$ ). Our results are in accordance with those of Kass and Balman 1984, Pintus C et al 2001, Beddy Petal 2005, Orda R et al 1987, Reitelman C et al 1987, Fertel Steril 1985, Lec J et al 2008 and Dobanovacki D 2010<sup>[24-31]</sup>.

Trans inguinal method was found to be the best one for correction of varicocele with fewer complications and shorter hospital stay. There was a marked improvement in sperm quality and testicular volume postoperatively by this method. Similar results were supported by Vermeulen A et al 1984, Li F et al 2012 and Miyaoka R et al 2012<sup>[32-34]</sup>.

Scrotal method should not be usually employed for correction of varicocele because of its major complications. There was no effect on semen analysis in patients operated by this route.

**CONCLUSION**

Varicocele is a common disorder that affects adolescent population. Its clinical presentation can be widely variable and often asymptomatic or silent. If left untreated, varicocele can cause testicular damage leading to infertility. Thus, urgent clinical attention should be sought to correct and repair varicocele. Various surgical procedures have been proposed but trans inguinal method was found to be the best one for correction of varicocele with less complications and shorter hospital stay and marked improvement in sperm quality and testicular volume by this method. Scrotal method has been found to be associated with major complications and should be avoided.

- Sponsorship and Financial support – Nil
- Conflicts of Interest – None
- Written Consent of study subjects taken and there are no ethical issues.

**Table-1 Sperm Count (Preoperative and Postoperative Results) in 90 patients**

Sperm Count	Preoperative	Postoperative		
	no (%)	At 3 mon. Follow-up no.(%)	At 6 mon. Follow-up no.(%)	At 9 mon. Follow-up no. (%)
<50 million	66 (73.3)	60 (66.6)	51 (56.6%)	36 (40%)
>50 million	24 (26.6)	30 (33.3)	39 (43.3%)	54 (60%)
Yates corrected (X <sup>2</sup> )		.08	1.17	5.50
Df		1	1	1
p		1S	1S	Sig

1S = Insignificant, Sig = Significant

**Table-2 Sperm motility (Preoperative and Postoperative Results)**

Sperm Count	Preoperative	Postoperative		
	No. (%)	At 3 mon. Follow-up no. (%)	At 6 mon. Follow-up no.(%)	At 9 mon. Follow-up no.(%)
<60% motile	69 (73.3)	54 (60)	42 (46.6)	30 (33.3)
$\geq 60\%$ motile	21 (23.3)	36 (40)	48 (53.3)	60 (66.6)
Yates corrected (X <sup>2</sup> )		1.233	4.51	9.7
Df		1	1	1
p		>0.2	>0.3	<.002
		1S	1S	HS

1S = Insignificant, HS = Highly Significant

**Table-3 Sperm morphology (Preoperative and Postoperative Results)**

Sperm Count	Preoperative (oval forms)	Postoperative (oval forms)		
	No. (%)	At 3 months Follow-up no. (%)	At 6 months Follow-up no.(%)	At 9 months Follow-up no. (%)

<60%	63 (70)	69 (76.6)	63 (70)	54 (60)
>60%	27 (30)	21 (23.3)	27 (30)	36 (40)
Yates corrected (X <sup>2</sup> )		0.09	0.08	0.29
Df		1	1	1
p		>0.2	>0.3	<.002
		1S	1S	1S

1S = Insignificant

**Table-4 Sperm count (Results of the three surgical methods)**

Method	No. of patients	Pre-operative	Post-Operative	P value
		Sperm count (million/ml) <50 >50 no.(%) no.(%)	Sperm count (million/ml) <50 >50 no.(%) no.(%)	
Trans inguinal	30	24(80) 06(20)	03(10) 09(90)	<0.005(Sig)
Scrotal	30	21(70) 09(30)	21(70) 03(30)	>0.9(1S)
Palomo's	30	21(70) 09(30)	09(30) 07(70)	>0.1(1S)

1S = Insignificant, Sig = Significant

**Table-5 Sperm motility (Results of the three surgical methods)**

Method	No. of patients	Pre-operative	Post-Operative	P value
		Sperm count (million/ml) <50 >50 no.(%) no.(%)	Sperm count (million/ml) <50 >50 no.(%) no.(%)	
Trans inguinal	30	27(90) 01(10)	03(10) 09(90)	<0.001(Sig)
Scrotal	30	18(60) 04(40)	18(60) 04(40)	>0.09(1S)
Palomo's	30	24(80) 02(20)	03(10) 09(90)	>0.003(Sig)

1S = Insignificant, Sig = Significant

**Table-6 Sperm Morphology-Oval forms (Results of the three surgical methods)**

Method	No. of Patients	Pre-Operative	Post-Operative	P value (2-tailed fisher's Exact Test)
		Sperm Morphology <60% >60% no.(%) no.(%)	Sperm Morphology <60% >60% no.(%) no.(%)	
Trans Inguinal	30	15(30) 05(50)	09(30) 07(70)	>0.4(1S)
Scrotal	30	15(50) 05(50)	15(50) 05(50)	>0.9(1S)
Palomo's	30	15(40) 06(60)	09(30) 07(70)	>0.5(1S)

1S = Insignificant

**Table-7 Complications in relation to the method used**

Method	No. of Patients	Hydrocele no.(%)	Scrotal haematoma no.(%)	Wound infection no.(%)	Varicocele Recurrence no.(%)	Varicocele Persistence no.(%)
Trans Inguinal	30	-	-	03(10)	-	03(10)
Scrotal	30	09(30)	09(30)	03(10)	03(10)	06(20)

Palomo's	30	03(10)	-	06(20)	03(10)	06(20)
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