

## Comparative study of laparoscopic varicocele ligation versus sub-inguinal varicocelectomy

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### ABSTRACT

**Background:** In recent studies laparoscopic varicocelectomy (LV) has been preferred and has gained wide acceptance among surgeons. Both laparoscopic varicocelectomy and sub-inguinal varicocelectomy (varicocele ligation) (OSI) have shown to be better outcome in many studies.

**Material & Methods:** The present study was a randomized clinical study which includes 102 patients with idiopathic symptomatic varicocele of grades I–III diagnosed by clinical examination and Doppler ultrasonography were randomly assigned to Laparoscopic varicocelectomy or sub-inguinal varicocelectomy (51 patients in each group). And Follow up to 3 months.

**Results:** Laparoscopic varicocelectomy (LV) was associated with reduced operative time, shorter hospital stay and cosmetically better compared to sub-inguinal varicocelectomy (OSI). The overall incidence of postoperative wound infection was significantly higher among patients undergoing sub-inguinal varicocelectomy compared with LV (5.88 vs 3.92%). The incidence of persistent varicoceles was not significantly different between the 2 groups (0 vs 1.96%), but the varicocele recurrence rate was significantly higher in the LV compared to the OSI group (5.88% vs. 3.92,  $p=1.00$ ).

**Conclusion:** Laparoscopic varicocelectomy is a less invasive treatment than Inguinal varicocelectomy for managing male varicoceles. It is also associated with short hospital stay and better outcomes.

**Key words:** varicocele, laparoscopic varicocelectomy, sub-inguinal varicocelectomy.

### INTRODUCTION

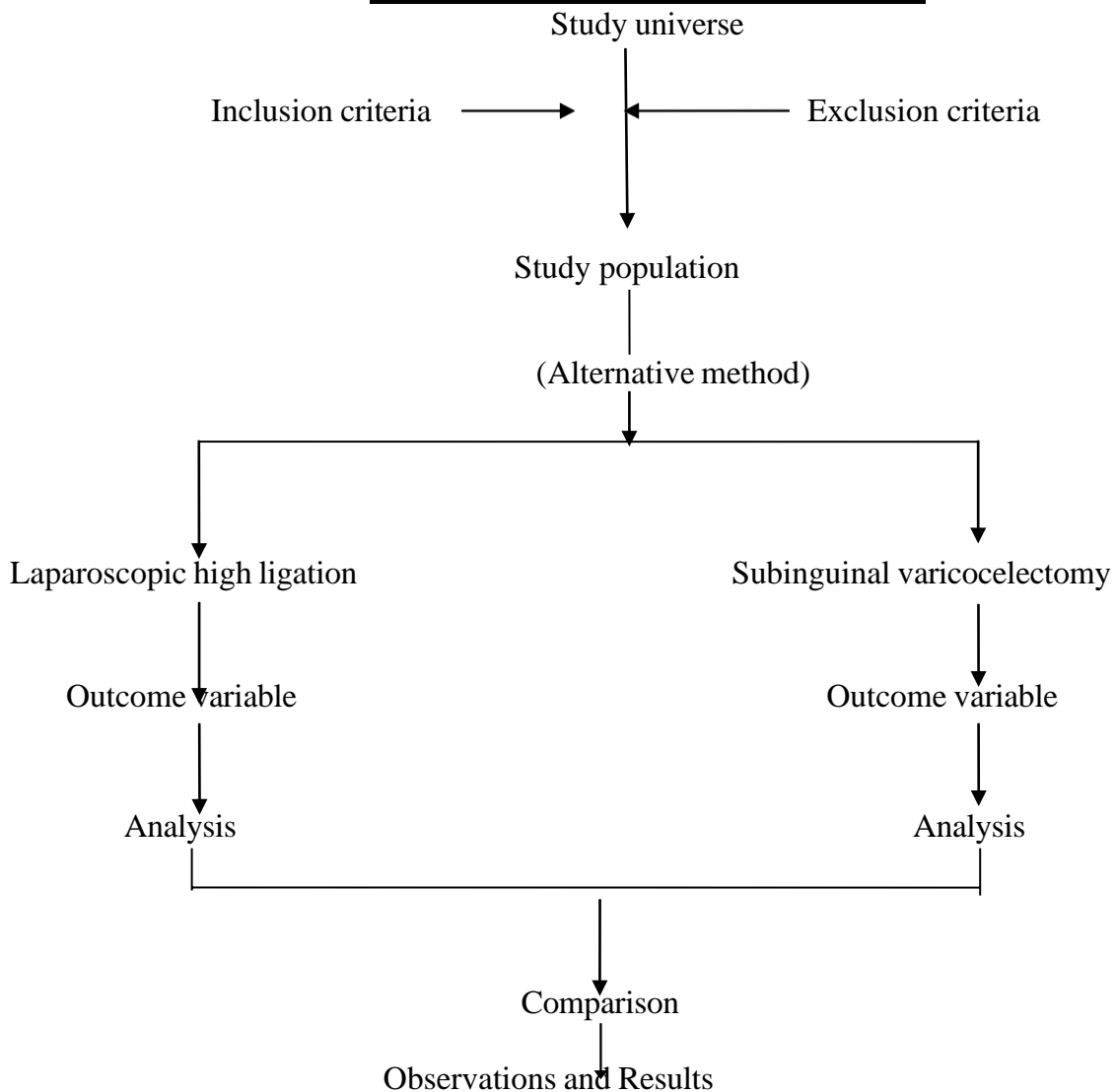
Varicocele is an accumulation of dilated Venous network in the pampiniform plexus that voids the testicles and is situated in the apex of scrotum just above the ostentatious testis. In general male population the clinical Varicocele is present in approximate 15% population up to 35% of male population with primary infertility and 75 % of male population with secondary infertility presents with clinical Varicocele (1). The prevalence of Varicocele in prepubertal boys is very low (2). The collection of veins-imposed effects on the testicular blood circulation and it is obviously not necessary to have both sided varicoceles to affect both testis(3). Varicoceles appear to be more common in males who are tall and heavy, although with the lower BMI than age matched controls(4). Finally there is increased incidence of varicocele in 1st degree relatives, particularly brothers of affected males, suggesting a potential genetic basis and also a role for screening(5). These include the traditional open surgical approaches like retroperitoneal (palomo), inguinal (ivaissevich) and sub inguinal. Percutaneous embolization have few proponents in the third world setting because it require a significant degree of technical expertise. Furthermore, associated radiation exposure while performing the procedure can be detrimental to the already compromised testicular function(6). Reports have suggested that laparoscopic varicocele ligation has the potential advantages of reduced morbidity, reduced analgesic requirements and a more rapid rate of returns to work compared with the standard open surgical approach (7). Prospective studies between laparoscopic and microscopic sub-inguinal varicocelectomy is very limited in India. Therefore, there is a need to study various aspects of these approaches in terms of operative time, complications, recurrence.

The present study was undertaken to evaluate these aspects in our hospital.

**MATERIALS AND METHODS**

The present study was a randomized clinical study which includes Hundred and two patients with idiopathic symptomatic varicocele of grades I–III diagnosed by clinical examination and Doppler ultrasonography were randomly assigned to Laparoscopic varicocelectomy or inguinal varicocelectomy (51 patients in each group). The study duration was of one-year form March, 2018 to May, 2019. Written informed consent was taken from all the patients after taking ethical approval from ethical committee of our hospital. The patients were randomly selected and mean patient age was 24.4 (range 15–40) years. Of the 51 patients treated) LAP 94.12% had a left-sided varicocele, 5.88% had bilateral varicoceles and of 51 patients treated in OSI group 82.35% had a left-sided varicocele, 17.65 % had bilateral varicoceles. Of 102 varicoceles, 68 (66.6%) were grade III, 34 (33.3%) grade II and 0 (0%) were grade I. All patients were followed-up for 3 months to assess early complications, testicular size, late complications and persistence or recurrence of the varicocele.

**FLOW CHART OF METHODOLOGY**



**RESULTS**

In present study total 102 patients were enrolled by simple random sampling method. Laparoscopic varicocelectomy was associated with shorter operative time, shorter hospital stay and cosmetically better compared to sub-inguinal varicocelectomy. The overall incidence of postoperative complications including local

pain, hematoma, seroma was significantly higher among patients undergoing sub-inguinal varicocelectomy compared with Laparoscopic varicocelectomy. The incidence of persistent varicoceles was not significantly different between the 2 groups (LV- 1.96% vs OSI- 0%), the varicocele recurrence rate was slightly higher in the Laparoscopic varicocelectomy compared to the inguinal varicocelectomy group (5.88% vs. 3.92%, p=1.00)

**Table 1.**

	LAP (N=51)		OSI (N=51)		
<b>Color Doppler Grade</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	
Grade 1	0	0.00	0	0.00	
Grade 2	16	31.37	18	35.29	
Grade 3	34	66.67	30	58.82	
Grade 4	1	1.96	3	5.88	
Total	51	100.00	51	100.00	
	LAP (N=51)		OSI (N=51)		
	<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>	
Mean Age	23.78	6.18	25.02	7.35	
	LAP (N=51)		OSI (N=51)		
	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	
B/L	3	5.88	9	17.65	
LEFT	48	94.12	42	82.35	
Total	51	100.00	51	100.00	
	LAP (N=51)		OSI (N=51)		<b>P value</b>
	<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>	

	LAP (N=51)		OSI (N=51)		<b>P value</b>
	<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>	

Operating Time (mins)	42.67	4.39	34.47	8.31	p<0.001
Sperm Count Million Count/ML	67.47	18.99	65.06	22.62	0.561
	<b>LAP (N=51)</b>		<b>OSI (N=51)</b>		<b>P value</b>
	<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>	
Hospital Stay (Hours)	34.76	6.65	43.37	10.21	p<0.001

Tablet 2

	<b>LAP (N=51)</b>		<b>OSI (N=51)</b>	
<b>Wound Infection</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>
Yes	2	3.92	3	5.88
No	49	96.08	48	94.12
Total	51	100.00	51	100.00
<b>Seroma</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>
Yes	0	0	1	1.96
No	51	100.00	50	98.04
Total	51	100.00	51	100.00

	<b>LAP (N=51)</b>	<b>OSI (N=51)</b>
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Hematoma	No.	%	No.	%
Yes	0	0	1	1.96
No	51	100.00	50	98.04
Total	51	100.00	51	100.00

Table 3.

	LAP (N=51)		OSI (N=51)	
Persistence post op (1½ months)	No.	%	No.	%
Yes	1	1.96	0	0
No	50	98.04	51	100.00
Total	51	100.00	51	100.00

	LAP (N=51)		OSI (N=51)		P value
	Mean	SD	Mean	SD	
SPERM COUNT POST OP (3 MONTHS)	74.25	16.51	72.75	20.07	0.679

	LAP (N=51)		OSI (N=51)	
Recurrence post op (3 months)	No.	%	No.	%
Yes	3	5.88	2	3.92
No	48	94.12	49	96.08
Total	51	100.00	51	100.00

## DISCUSSION

In our study mean age in LAP group was 23.78±6.18 yrs. and in OSI group was 25.02±7.35 Yrs. The age difference in each group was statically Insignificant. Both groups were comparable. These early observations did not suggest that age was an important determinant of varicocele prevalence. Subsequent

epidemiological studies have demonstrated that varicoceles develop at puberty. More recent studies suggest that the prevalence of varicoceles in adult men is age related. Levinger *et al.* evaluated the age-related prevalence of varicoceles in men above the age of 30. (8) Out of 504 healthy men, 34.7% were found to have a varicocele on physical examination (with all examinations performed by the same investigator). In our study out of 51 patients in LAP group, 3 patients were bilateral and 48 patients were left side varicocele. Out of 51 patients in OSI group, 9 patients were bilateral and 42 patients were left side varicocele in our study. The side difference in each group was statistically insignificant. Both groups were comparable. In our study out of 51 patients in LAP group, 16 patients were in grade II, 34 patients were in grade III and 1 patient was in grade IV varicocele. Out of 51 patients in OSI group, 18 patients were in grade II, 30 patients were in grade III and 3 patients were in grade IV varicocele in our study. The grade difference in each group was statistically insignificant. Both groups were comparable. In our study mean sperm count in LAP group was  $67.47 \pm 18.99$  million/ml and in OSI group was  $65.06 \pm 22.62$  million/ml. So, in our study, mean time taken for laparoscopy is more than open procedure.

R. Bharathidasan (9) *et al* was also reported that mean operating time was higher in laparoscopy group than open. It was  $48 \pm 6.3$  Minutes in Lap group and  $32 \pm 3.6$  Minutes in Open group. Saeed AB *et al* (10) was also observed that the laparoscopic technique has several advantages over the open retroperitoneal approach. It is simple, shortens the operative time. In our study mean Hospital stay time in LAP group was  $34.76 \pm 6.65$  hours and in OSI group was

$43.37 \pm 10.21$  Hours. The mean hospital stay was significantly higher in OSI group in our study. R. Bharathidasan *et al* was also reported that mean hospital stay time was higher in open group than laparoscopy group. It was  $36 \pm 5.5$  hours in Lap group and  $45 \pm 8.8$  in OSI group. Although laparoscopic varicocelectomy has been performed by many surgeons on a day-surgery basis, the mean hospital stay after laparoscopic varicocelectomy in our study was relatively longer than was anticipated. This difference was partially attributed to some cultural and social factors. Almost all our patients prefer to remain in the hospital and do not wish to resume activities until complete pain relief. In addition, the local health system covers the majority of the costs. The hospital stay after laparoscopic varicocelectomy was not affected by whether the disease was unilateral or bilateral.

In our study mean number of tablets was used in LAP group was  $12.33 \pm 2.10$  and in OSI group was  $16.10 \pm 1.51$ . The mean number of tablets used was significantly higher in OSI group in our study. Saeed AB *et al* (10) was also observed same result. No. of tablets used in OSI group was  $16.3 \pm 1.58$  and in Lap group it was  $11.3 \pm 2.23$ . In our study wound infection was found to be 3.92% in LAP group and 5.88% in OSI group. The wound infection difference in each group was statistically Insignificant. The hematoma was not developed in LAP group and 1.96% patients develop hematoma in OSI group. The seroma was not developed in LAP group and 1.96% patients develop seroma in OSI group. Choudhary V *et al* (11) noted overall incidence of postoperative complications including hydrocele, epididymitis and local pain was significantly higher among patients undergoing inguinal varicocelectomy compared with Laparoscopic varicocelectomy (17.5% vs. 5%). Beutner *et al*

(2007) (12) showed 1.6% wound infection in laparoscopic group. In our study the persistence post op infection in LAP group was 1.96% patients and no persistence post op infection in OSI group. The recurrence was developed 5.88% patients in LAP group and 3.92% patients develop recurrence in OSI group. Choudhary V *et al* (11) was found that the incidence of persistent varicoceles was not significantly different between the 2 groups, but the varicocele recurrence rate was significantly lower in the Laparoscopic varicocelectomy compared to the inguinal varicocelectomy group (5% vs. 17.5%,  $p \leq 0.02$ ). In our study semen characteristics improved after treatment in both groups of patients. At 3 months follow-up after operation mean sperm count in LAP group was  $74.25 \pm 16.25$  million/ml and in OSI group was  $72.75 \pm 20.07$  million/ml. The Mean sperm count difference in each group was statistically

Insignificant. At the end of three months sperm count increased by 6.78 million/ml in Lap group and 7.69 million/ml in OSI group. This difference was statistically insignificant. It is accepted that varicocelectomy improves semen parameters in patients with varicocele.

#### **CONCLUSIONS:**

We concluded from the present study Laparoscopic high ligation of varicocele is a minimal invasive technique that is easily performed. The clear visualization and magnification provide control of the affected vessels thus decreasing post-operative recurrence. Compared to open surgery, laparoscopic high ligation has shorter convalescence, early return to normal activities and less post-operative morbidity. Thus, Laparoscopic high ligation should therefore be the preferred method of treatment for male varicoceles.

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NOT APPLICABLE.

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#### **CONFLICT OF INTEREST**

NONE.

#### **ETHICAL APPROVAL**

yes

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