

Laparoscopic Versus Subinguinal Varicocelelectomy: Comparative Study

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ABSTRACT

Background: Varicocele is abnormal dilatation and tortuosity of the testicular vein within the spermatic cord. Laparoscopic varicocelelectomy is a minimally invasive procedure that can easily be performed by simple instruments. Not only can the bilateral varicocele be easily dealt with through the same ports, but other procedures, such as hernia repair, can also be simultaneously performed. It is the best approach when recurrent disease and obesity are problems.

Objective: To assess and compare between the open and laparoscopic varicocelelectomy approaches in treatment of varicocele as regards postoperative results, complications and efficacy of the technique.

Patients and methods: This prospective study was done on 30 patients with primary varicocele at Aswan University Hospital. They were classified into two equal groups. Group-A underwent open subinguinal varicocele repair. Group-B underwent laparoscopic varicocelelectomy using the intraperitoneal approach.

Results: There were no significant differences between both groups as regard age and laterality. Postoperative pain was reported in 100% of patients in both groups. The open subinguinal procedure and laparoscopic varicocelelectomy showed significant difference as regarding postoperative complications in favor of laparoscopic procedure, while both procedure showed no significant difference regarding improvement of semen parameters.

Conclusion: Laparoscopic varicocelelectomy is better than open technique as regard operation time, postoperative complications (Wound erythema, wound infection, epididymitis, and recurrence) and postoperative hospital stay while other studies revealed that the microsurgical technique is the best of all.

Keywords: Laparoscopic, Subinguinal Varicocelelectomy, Varicocele.

INTRODUCTION

Varicocele is a state of dilatation, elongation, and tortuosity of the pampiniform plexus around the testis, which is caused by retrograde blood flow through the internal spermatic vein. The incidence of varicocele in the general population is about 15% ⁽¹⁾. While in infertile men the incidence is between 19 and 41%. In men with secondary infertility, the incidence is as high as 70-80% ⁽²⁾.

They become clinically detectable at between 10 and 15 years of age and persist into adulthood. Varicoceles may be associated with testicular atrophy in adults, but this diminished volume is best described as growth retardation because 80% of boys demonstrate a significant increase in ipsilateral testicular volume after varicocelelectomy. Varicocele is the main cause of correctable male infertility ⁽³⁾. Therefore, early prophylactic correction of varicoceles may improve fertility later in life. The presenting symptoms vary and include scrotal heaviness or discomfort, and ill-defined scrotal swelling, and growth retardation of the ipsilateral testis. Physical examination typically reveals the classic "bag of worms" appearance and consistency of the scrotum. Left-sided lesions predominate, although bilateral and right-sided lesions do occur ⁽⁴⁾.

Varicocelelectomy can be accomplished using a variety of approaches, including modified Palomo or high ligation, transinguinal or subinguinal with or

without magnification, laparoscopic varix ligation, and transvenous percutaneous occlusion ⁽⁵⁾. Subinguinal varicocelelectomy is preferred in cases of dilatation of external spermatic vein, which has been found in 16-74% as this vein cannot be approached by retroperitoneal or laparoscopic techniques ⁽⁶⁾.

Laparoscopic varicocelelectomy was introduced in the early 1990 as an alternative to the Palomo varicocelelectomy. The complications rates are relatively low for this procedure, except for the hydrocele rate. Laparoscopic varicocelelectomy has been performed using the intraperitoneal, preperitoneal, and lumbotomy approach with almost the same results as those obtained with Palomo procedure ⁽⁷⁾.

As laparoscopic varicocelelectomy has gained increased popularity, recent reports have suggested that laparoscopic varicocele ligation has potential advantages of reduced morbidity, reduced analgesia requirements, and a more rapid rate of return to work compared with the standard open surgical approach ⁽⁸⁾.

The aim of this study was to assess and compare between the open and laparoscopic varicocelelectomy approaches in treatment of varicocele as regard postoperative results, complications and efficacy of the technique.



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PATIENTS AND METHODS

Our prospective study was conducted in General Surgery Department of Aswan University Hospital. This study included 30 patients with primary varicocele.

Ethical approval:

This study was performed after an approval from the Research Ethics Committee in Aswan Faculty of Medicine and all patients signed informed consents to be involved in this study.

Inclusion criteria: Post pubertal men with primary varicocele (unilateral or bilateral), failure of medical treatment of varicocele (severe symptoms that can't be tolerated), and subinfertility.

Exclusion criteria: Before puberty, secondary varicocele or if any additional procedures was done at time of the varicocele repair, and recurrent varicocele after operation.

By computer assisted randomization or card system our patients were randomized into two groups:

Group A: (15 patients) underwent subinguinal open varicocelectomy.

Group B: (15 patients) underwent laparoscopic varicocelectomy.

All intraoperative variants as operative time, type of anesthesia and postoperative variants as analgesics requirement, hospital stay, postoperative complications, and improvement in semen parameters were recorded.

All patients had the direct benefit of managing the varicocele by either type of varicocelectomy.

Preoperative assessment:

All patients were evaluated for: history, physical examination and investigation.

- 1) **History:** On admission of the patient; complete history was obtained carefully, personal history, family history, present history, main complaint, and past history.
- 2) **Physical examination:**
 - **General examination:** general appearance, body built, facial expressions, and complexion.
 - **Local examination:** (abdomen and inguinoscrotal region): Exposure: with patient standing with exposing the area from the nipple to the knee.
 - **Inspection: (1st standing then sitting):** Swelling: fullness in right or left scrotal compartment, testes hanging down with dilated veins over the skin of the scrotum. Skin of the scrotum: Normal, stretched, pigmented, and special signs: thrill on cough.
 - **Palpation of scrotal swelling:** Warmth: by back of the hand. Tenderness: by palm. Edge: ill defined, well

defined, pedunculated. Consistency: Cystic, solid. Scrotal neck test. Bow sign. Palpation of: Penis (ulcer or scar), Scrotum (epididymis and tunica vaginalis), Testes (size, consistency, Testicular sensation).

- **PR examination:** for enlarged prostate.

3) Investigation:

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- **Laboratory:** Semen analysis. CBC, HB, HCT, WBC and RBCs. ALT and AST. Serum creatinine. Random blood sugar, and viral markers.
- **Diagnostic imaging:** Doppler US of the scrotal venous system.

Termination of Procedure:

Upon completion of the varix ligation, each side of ligation was examined and when necessary, secure hemostasis was done with electrocoagulation. The use of electrocautery was minimized to decrease the chance of injuring the spermatic artery. The patient was rotated to a neutral position and placed in the reverse Trendelenburg position. The pelvis was inspected and any irrigant and blood that has accumulated during the procedure was aspirated.

Then each instrument port insertion site was inspected to assess and treat any active hemorrhage. With patient returned to the supine position each sheath was removed. Before removal of the last port the insufflation valve was opened and the carbon dioxide gas was expelled from the peritoneal cavity.

Finally the port sites were sutured by simple interrupted sutures with application of sterile dressing to each wound.

Postoperative Follow up:

All patients underwent either open or laparoscopic varicocelectomy had follow up scrotal U/S and semen analysis after 6 months with the results of postoperative improvement test were included in our results.

Statistical analysis

Data management and statistical analysis were done using SPSS vs.25 (IBM, Armonk, New York, United states). Numerical data was summarized as means and standard deviations or median and ranges. Categorical data was summarized as numbers and percentages. Comparisons between two groups were done using independent t-test or Mann Whitney U test for numerical data. Categorical data were compared using Chi-square test (χ^2) or Fisher's exact test if appropriate. All P values were two sided. P values less than 0.05 were considered significant.

RESULTS

There were no significant differences between both groups as regard age, laterality, presenting symptoms, varicocele grade, and postoperative pain (Table 1).

Table (1): General characteristics, presenting symptoms, varicocele grade, and presence of pain, in both groups

		Group A (n = 15)	Group B (n = 15)	P-value
Age (years)	Mean ±SD	21±3	23±2	0.041
Laterality	Unilateral	8 (53%)	9 (60%)	0.713
	Bilateral	7 (47%)	6 (40%)	0.713
Presenting symptoms	Pain and swelling	11(73%)	13 (86%)	0.361
	Subfertility and swelling	4 (27%)	2 (14%)	0.361
Varicocele grade	Grade I	6 (40%)	9 (60%)	0.273
	Grade II	9 (60%)	6 (40%)	
Postoperative pain	Yes	15 (100%)	15 (100%)	1

Complications in both groups:

Wound erythema and infection, epididymitis, and recurrence were significantly higher in group A compared to group B (Table 2).

Table (2): Frequency distribution of complications in both groups

	Group A (n = 15)	Group B (n = 15)	P-value
Wound erythema	1 (6%)	0	1
Wound infection	1 (6%)	0	1
Epididymitis	1 (6%)	0	1
Hydrocele	2 (13%)	2 (13%)	1
Recurrence	1 (6%)	0	1
Scrotal Hematoma	0	0	-
Testicular atrophy	0	0	-

Operation time was significantly higher in group A compared to group B (Table 3).

Table (3): Operation time in both groups

	Group A (open)	Group B (Lap.)	P-value
Unilateral cases:			
Range	50-65 mins	30-40 mins	0.001
Average	57.5 mins	35 mins	
Bilateral cases:			
Range	60-90 mins	40-60 mins	0.001
Average	75 mins	50 mins	

There was no significant difference regarding median hospital stay and semen analysis test improvement in both group (Table 4).

Table (4): Hospital stay and varicocele test improvement in both groups

		Group A (n = 15)	Group B (n = 15)	P value
Hospital stay (days)	Median (range)	1 (0 - 1)	0 (0 - 1)	0.632
Varicocele test improvement	Test done	15	15	0.624
	Improvement	12 (80%)	13 (87%)	
	No Change	3 (20%)	2 (13%)	
	Worst	0	0	

DISCUSSION

We performed our study to compare between open and laparoscopic varicocelectomy in treatment of varicocele as regard postoperative results and efficacy of the technique.

Our patients included 30 patients with clinical and radiological varicocele were managed by open varicocelectomy in 15 patients (Group A) and laparoscopic technique in 15 patients (Group B).

There was no significant differences between both groups in our study as regard age with mean age (22±3). **Agnifili et al.** ⁽⁹⁾ have reported mean age of 27.4 years (range 17 to 45 years) and 29 years for varicocele. Similar study was performed by **Alaa et al.** ⁽¹⁰⁾ including 60 patients subdivided into 2 groups (group A underwent laparoscopic varicocelectomy and group B underwent open varicocelectomy), each including 30 patients with mean age (25.3±2.1) in group A and mean age (24.4±3.4) in group B (P value 0.593).

Also there were no significant changes as regard laterality in both groups. Incidence of bilateral varicocele following ultrasonography study varies in different studies. In our study the incidence of bilateral was 13 patients (43%) while incidence of left varicocele was 17 patients (57%). In a study done by **Shamsa et al.** ⁽¹¹⁾, of 100 patients, suspected to have varicocele, ultrasonography revealed that bilateral varicocele was present in 87% patients, left side varicocele in 12% and right sided varicocele in 1% patients.

In our study there was no significant difference between both groups either open or laparoscopic as regard presenting symptom.

Postoperatively 100% of patients of both groups in our study complained of pain with significant difference in postoperative analgesic requirement in both groups with. While in similar study of **Alaa et al.** ⁽¹⁰⁾ postoperative pain was significantly lower in laparoscopic group as postoperative day 0 and day 1, compared with the other group (P value < 0.002) with also significant difference in number of analgesics requirement (P value 0.034)

In our study the postoperative complications showed significant increase in group A than group B. Similar study was done by **Al-Kandari et al.** ⁽¹²⁾ including 120 patients found significant difference between open and laparoscopic techniques as regard postoperative complications as postoperative hydrocele occurred in 52 patients in the open group and 10 patients in the laparoscopic group. Recurrence occurred in 7 patients in the open group and 9 patients in the laparoscopic group.

In our study operation time showed significant difference between both groups. In group A the average operative time in unilateral and bilateral varicocele was higher than group B. On the other hand

another study was performed by **Shamsa et al.** ⁽¹¹⁾ and showed that the mean operative times were 30.0 ± 5.5 minutes for laparoscopies and 27.0 ± 3.5 minutes for open varicocelectomies under general anesthesia.

Postoperative hospital stay in our study showed no significant difference between both groups.

We performed in our study postoperative semen analysis test for patients of both groups (Semen analysis and scrotal US) with no significant difference between group A and group B.

On reviewing literature, some studies compared open inguinal, laparoscopic, and subinguinal microscopic, none of the patients of the microscopic group developed postoperative hydrocele as observed in 13% patients of open and 20% in the laparoscopic group ⁽¹²⁾. Microscopic subinguinal technique was not done here as it needs other wider groups to observe and compare for best technique to recommend for safety, less complications, and better outcome.

CONCLUSION

According to our results the laparoscopic varicocelectomy is better than open technique as regard operation time, postoperative complications (Wound erythema, wound infection, epididymitis, and recurrence) and postoperative hospital stay while other studies revealed that the microsurgical technique is the best of all.

Laparoscopic approach carries lesser postoperative pain with early return to work and in case of bilateral varicocele the opposite side is dealt through the same ports. Therefore, if facilities are available for this procedure and once perfection occurs in this minimally invasive technique, this procedure gives a lot of satisfaction to the patients as well as the operating surgeon.

Follow up semen analysis test postoperatively showed no significant difference with a short postoperative follow up of 6 months, but it also showed no significant difference between both groups as regard test improvement.

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