



A COMPREHENSIVE REVIEW OF THE COMPARISON OF LAPAROSCOPIC AND OPEN VARICOCELECTOMY TECHNIQUES

General Surgery

Dr. J. P. S. Shakya Professor, General Surgery Department, Sarojini Naidu Medical College, Agra

Dr Prashant Lavania Head Of Department, General Surgery Department, Sarojini Naidu Medical College, Agra

Dr Utkarsha Tiwari Post Graduate Student, General Surgery Department, Sarojini Naidu Medical College, Agra

ABSTRACT

Overview And Introduction- The abnormal dilatation and convoluted pampiniform plexus of veins is known as Varicocele. The sole therapeutic option is surgical correction. Open scrotal, Open inguinal, Microinguinal, Subinguinal, laparoscopic ligation and embolization of the testicular vein are among the surgical techniques that can be used. Laparoscopic varicocelectomy has several benefits, including safer, higher magnification that makes it easier to identify arteries, lymphatics and the internal spermatic artery with greater accuracy. In bilateral situations, there is no need for a second incision. **Aim** - The purpose of the study is to assess post-operative complication, length of hospital stay and recurrence between laparoscopic and open varicocelectomy. **Methodology-** Retrospective single centre observational descriptive study conducted from September 2018 to February 2020 on 50 patients at Sarojini Naidu Medical College, Agra. **Results And Conclusion-** Varicocele affects 10-20% of adult males and more than 25% of men whose semen analysis is abnormal. Approximately 90% of varicoceles are left sided, and if one is found there is a 30-40% chance that it is a bilateral condition. When compared to open varicocelectomy, laparoscopic varicocelectomy is a safer and more effective procedure, resulting in a significant reduction in operating time, minimal post-operative complication, a shorter hospital stay, increased patient satisfaction and notable changes in pre and post-operative semen parameters.

KEYWORDS

Overview-

A varicocele is an irregular enlargement and dilatation of the scrotal venous plexus, which drains the testicles. The left testicular vein empties into the high pressure left renal vein, while the right empties into the low pressure inferior vena cava beneath the right renal vein, indicating a left-sided preponderance of the condition. Three theories explain why varicoceles occur-

- 1- The anti-reflux valve, which is normally found where the testicular vein enters the left renal vein or the right inferior vena cava is absent.
- 2- nut-cracker effect- The left testicular vein becomes trapped between the aorta and the superior mesenteric artery.
- 3- Angulation where the left renal vein and the left testicular vein converge.

Later in life, varicocele can be caused by obstruction of the testicular vein by a kidney tumor or nephrectomy, although the majority of varicoceles are idiopathic.

Varicocele affects up to 10-20% of adult males and more than 25% of men whose semen analysis is abnormal. Varicocele is described classically as having the consistency of a decompressible bag of worms when the patient is supine. Some people have dragging pain or scrotal or inguinal soreness. There was no pathology found in primary varicocele. Secondary varicocele results from occlusion of the testicular vein, which can be caused by retroperitoneal or renal malignancies.

Classification - subclinical - can be seen on Doppler ultrasonography but is not felt or apparent when at rest or during the Valsalva maneuver.

Grade 1- During the Valsalva maneuver, palpable, otherwise not.

Grade-2- Not visible when at rest, yet palpable. **Grade-3-** At rest palpable and visible.

Procedures:- laparoscopic varicocelectomy - patients underwent general anaesthesia while operating in a supine position. The patient's bladder was to be empty. A small infraumbilical incision, a Veress needle was inserted to create pneumoperitoneum. After that, CO₂ gas was inflated into the abdomen, keeping the pressure between 12-14 mmHg. To move the bowel away from the lower quadrants of the abdomen, the head end was lowered 15-30°. Veress needle was replaced by 10mm trocar. The second and third trocars measuring 10mm and 5mm, were bilaterally inserted through incisions made at the 2/3rd distance from the umbilicus to the anterior superior iliac spine

under direct vision. Perpendicular incisions were made into the peritoneum covering the internal spermatic veins using scissor and grasper. In order to isolate the arterial and lymphatic components from the veins, the vascular mass was elevated. The veins were then ligated by using clips. After achieving the hemostasis, trocars were removed. Incision was sutured and sterile dressing done.

Open Varicocelectomy- Open high ligation of testicular veins was done under spinal or general anaesthesia. A small muscle splitting incision made at the level of the anterior superior iliac spine, the retroperitoneal space was entered, with the peritoneum swept medially to identify the internal spermatic vessels. These vessels were ligated and divided. Great care was taken to preserve the testicular artery. The external spermatic fascia was sutured and the wound was closed in layers. The sterile dressing was done.

Aim Of The Study- The purpose of the study was to assess the effects of Laparoscopic and Open varicocelectomy on post-operative complication, recurrences and length of hospital stay, and semen analysis. **Objective:** To conduct research to forecast outcomes for open and laparoscopic varicocelectomy based on following four parameters:

- 1} Post-operative complications
- 2} Recurrence
- 3} Duration of hospital stay
- 4} Improvement in semen analysis after 3 months

2. Pre-operative variables for both laparoscopic and open Varicocelectomy are studied, including

- Patients symptoms
- Patients age
- Clinical varicocele grade
- Testicular size and subsequent hydrocele presence

Patients and Methods-study Design- Retrospective observational descriptive study with a single center 50 person sample size.

Inclusion criteria-

- 1) All patients with clinical or radiological evidence of varicocele between the 18-55 years of age.
- 2) Individuals with primary varicocele.
- 3) Patients fit for surgery.

Exclusion criteria-

- 1) Patients with associated co-morbidity like renal pathology, liver pathology or any psychiatric illness.

- 2) Patients having derranged coagulations profile.
- 3) Patients less than 18 years of age.
- 4) Patients not giving consents.
- 5) Patients with recurrent varicocele.

Approach-Prior to the study commencing, clearance from the ethical committee was secured. Using a straightforward Random technique, patients admitted to the General Surgery Department who had varicocele on clinical or radiological examination were selected for the study. Result was gathered through proper history, clinical examination and investigations and semen analysis; findings were documented in proforma. After determining the patients suitability for surgery, cases were randomly divided into two groups. Group A patients had open varicocelectomy and Group B had Laparoscopic varicocelectomy. Patients were managed by analgesics and antibiotics. Post-operative complications such as hydrocele, pain odema, total hospital stay and improvement in semen analysis.

GROUPS	GRADE-1 Open varicocele ectomy (25)	GRADE-2 Laparoscopic varicocelectomy(25)
18-20 years old	1	-
• Testicular pain	1(100%)	-
21-25 years old	8	9
• Testicular pain/swelling	6(75%)	7(77.7%)
• infertility	4(50%)	4(44.4%)
>25 years old	16	16
• testicular pain/swelling	12(75%)	13(81.25%)
• infertility	9(56.3%)	14(87.5%)

2. grades:

1	2(8%)	1(4%)
2	11(44%)	10(40%)
3	12(48%)	14(56%)

Table-2 Semen Analysis

GROUP	Group-1 Open varicocelectomy (25)	Group-2 Laparoscopic varicocelectomy (25)
Test done	25	25
Improved	10(40%)	14(56%)
No change	15(60%)	11(44%)

Table-3 Post-op Complications

GROUP	GROUP-1 OPEN VARICOCELECT OMY (25)	GROUP-2 LAPAROSCOPIC VARICOCELECT OMY (25)
Post-operative pain	25 patents	25 patents
• no analgesic inject	-	3(12%)
• 1 injecton	14(56%)	-
• 2 injecton	11(44%)	-
• >2 injecton	-	-
Wound erythema	2(8%)	1(4%)
Wound infection	1(4%)	-
Hydrocele formaton	1(4%)	1(4%)

Table-4 Rate Of Recurrence

group	Group-1 Open varicocelectomy (25)	Group -2 Laparoscopic varicocelectomy (25)
Recurrent hydrocele	2(8%)	1(4%)

Table-5 Average Operating Time

group	Group-1 open varicocelectomy (25)	Group-2 laparoscopic varicocelectomy (25)
	Unilateral disease	
range	25-45 minutes	50-100 minutes
average	40 minutes	56.3 minutes
	Bilateral disease	
Range	40-85 minutes	72-120 minutes
average	75 minutes	78.4 minutes

Table-6 Average Duration Of Hospital Stay

GROUP	GROUP-1 OPEN VARICOCEL ECTOMY (25)	GROUP-2 LAPAROSCOPIC VARICOCELECTOMY (25)
-------	--	---

	Average duration of hospital stay	
<3 days	13(52%)	16(64%)
4-6 days	11(44%)	9(36%)
>6 days	1(4%)	-

DISCUSSION-

Grade I varicocele affects 8% of patients in group I and 4% of patients in group II, grade II varicocele affects 44% of patients in group I and 40% of patients in group II, and grade III varicocele affects 48% of patients in group I and 56% of patients in group II, according to statistics shown in table 1.

Within the first group of patients, one patient, aged between 18 and 20, had mild testicular pain; eight patients, aged between 21 and 25, had both infertility (four patients, or 50%) and testicular pain (6 patients, or 75%); and sixteen patients, aged under 25 years, had both infertility (twelve patients, or 56.3%) and testicular pain (12 patients, or 75%).

In group II patients, there are 9 patients under the age of 21–25 who have infertility (4 patients = 44.4%) and testicular pain (7 patients = 77.7%), whereas there are 16 patients under the age of 25 who have infertility (13 patients = 81.25%) and testicular pain (14 patients = 87.5%).

Based on the information presented in Table 3, all 25 patients in group 1 experienced post-operative discomfort, whereas only 3 out of the 25 patients in group 2 reported experiencing post-operative pain. Of the 25 patients in group I who reported post-operative pain, 14 (56%) and 11 (44%) of them found relief after receiving at least two analgesic injections; the remaining 22 patients in group II did not report any pain following surgery. All three of the group II patients who reported post-operative pain were relieved by a single injectable analgesic dose.

Similar research on 193 patients was conducted by G.A. Bebars, MD, A. Zaki, MD, A.R. Dawood, and M.A. El-Gohary 191. The study's findings indicated that postoperative wound pain was subjectively assessed in patients older than 12 years old, and that the quantity of narcotic injections given during the first 24 hours following the procedure determined the intensity of the pain. Eighty-seven percent of patients undergoing laparoscopic varicocelectomy did not require any opioid injections, compared to all patients in the open varicocelectomy group who needed one or more. Five (3.9%) of the children in the laparoscopic varicocelectomy group experienced moderate shoulder pain following surgery, which subsided over the course of the next day. Thus, our new research can be compared to earlier research. A lower incidence of post-operative discomfort is also in line with earlier research. Less invasive laparoscopy involves less tissue handling and less tissue destruction during laparoscopic varicocele repair, which explains the lower incidence of post-op pain in the laparoscopic varicocelectomy group.

Recurrence of varicocele was noted in 2 patients of group 1, however only 1 patient out of 25 patients in group 11 reported recurrence of varicocele after 6 months, according to data shown in Table 4. Within six to eighteen months following surgery, seven patients in the Open Varicocelectomy Group (10.8%) and five patients in the Laparoscopic Varicocelectomy Group (3.9%) experienced a recurrence of the disease, according to a similar study conducted by G.A. Bebars, MD, A. Zaki, MD, A.R. Dawood, and M.A. El-Gohary 19% on 193 patients. This is also consistent with our research, which found that after six months following surgery, 2 patients (8%) from group I and 1 patient (4%) from group II complained of a recurrence of varicocele.

This is because one of the main causes of postoperative recurrence is aberrant collateral channels, which may be detected and controlled more easily thanks to the laparoscope's good visibility and magnification. The average length of hospital stay for the open laparoscopic group is longer than for the laparoscopic varicocelectomy group, according to the data shown in Table 6. Of the patients in the open varicocelectomy group, 52% spent three days in the hospital, 44% spent four to six days, and 4% spent more than six days. In a laparoscopic varicocelectomy, 64% of patients spent fewer than three days in the hospital, and 36% stayed for four to six days. This was explained by the fact that less tissue manipulation occurred during a laparoscopic varicocelectomy, which results in less pain following surgery and fewer wound problems. These findings enable a shorter release period for patients in the laparoscopic varicocelectomy group.

Patients undergoing open varicocelectomy tend to require longer hospital stays due to increased post-operative discomfort and consequent wound problems. However, laparoscopic varicocelectomy is preferred over open varicocelectomy due to improved visualization, less tissue deterioration, and reduced post-operative pain. The average length of hospital stay for two patient groups were not statistically significant, but the data did show that laparoscopic varicocelectomy is significantly superior to open varicocelectomy because it is a less invasive technique and results in less post-operative morbidity and suffering than open varicocelectomy.

CONCLUSION:

Out of the 50 patients who were enrolled in the study, group I (open high inguinal varicocelectomy) and group II (laparoscopic varicocelectomy) were randomly assigned to two groups. It was discovered that, in comparison to open high inguinal varicocelectomy, laparoscopic varicocelectomy was associated with a shorter hospital stay, a lower rate of recurrence, a lower rate of post-operative pain and better cosmetic results. When compared to patients undergoing laparoscopic varicocelectomy, patients undergoing open high inguinal varicocelectomy experienced a much higher incidence of postoperative complications, such as hydrocele, epididymitis, and local pain (100% vs. 12%).

There was no significant difference in the frequency of persistent varicoceles between the two groups; however, the Laparoscopic varicocelectomy group had a much lower varicocele recurrence rate (4% vs. 8%) than the open high inguinal varicocelectomy group. Additionally, it was noted that group I patients' hospital stays were noticeably longer than those of group II patients. This is thought to be because open varicocelectomy carries a high risk of wound infection and post-operative discomfort. The current investigation led us to the conclusion that laparoscopic varicocelectomy, as opposed to open high inguinal varicocelectomy, is a less intrusive method of treating varicoceles. It is associated with shorter hospital stay, less complications and better surgical outcomes.

REFERENCES

1. Abolbashi M, Mohammadi L, Shamsa A, et al. Comparing the operating duration, sperm characteristics, and complications of open and laparoscopic varicocelectomies 2009;6(3):170-5. *Urol J*.
2. Attyaoui F, Khaier I, Binous MY, et al. Varicocele treated with laparoscopic spermatic vessel ligation: 129 surgeries reported. *Paris: Ann Urol*. 2002;36(5):329-33.
3. Ng FC, Tan SM, Ravindharan T, and others. Technique and outcome of laparoscopic varicocelectomy. 1995;75(4):523-8. *Br J Urol*.
4. Barroso U Jr, Andrade DM, Novaes H, et al. A systematic evaluation of the literature on surgical treatment of varicella in children using the open and laparoscopic Palomo procedure. 2009;181(6):2724-2728 in *J Urol*.
5. Laparoscopic treatment of pediatric varicocele: a multicenter study of the Italian society of video surgery in infancy; Esposito C, Monguzzi GL, Gonzalez-Sabin MA, et al. 2000;163(6):1944-1948 in *Urol*.
6. Laparoscopic varicocele ligation: a comparison between artery ligating and artery preserving varicocelectomy, Huk J, Fryczkowski H, Bihun A, et al. 2001;54(1112):621-32. *Wlad Lok*.
7. Muayed AF, Farhan SD. Male infertiles with bilateral varicocele can have laparoscopic varicocelectomy. *PG Med J Iraqi*. 2011;10(3):234-239.
8. Shabaan H, Ibrahim HM, Al-kandari AM, et al. Comparing the results of open inguinal, laparoscopic, and subinguinal microscopic varicocelectomy techniques: a randomized clinical trial. 2007;69(3):417-20 in *Urol*.
9. Terachi T, Matsuda T, Ogura K, and others. Comparing the invasiveness and efficacy of laparoscopic varicocelectomy with traditional open retroperitoneal high ligation. 62-6 in *Int J Urol*. 1994;1(1).
10. Sedlacek, Dvoracek J, and Kacvara R. Varicocelectomy laparoscopically with lymphatic sparing. 2005;173:1751 in *J Urol*.
11. Hassan JM, Pope JC 4th, Adams MC, et al. development of hydrocele after laparoscopic varicocelectomy. 2006;175(3)(1):1076-1096, *J Urol*.
12. Schietroma M, Agnifili A, Carlei F, et al. Testicular growth, semen characteristics, and recurrence following laparoscopic palomovaricocelectomy. (2008) *Chir Ital*. 60(4):549-54.
13. Castagnetti M, Ajovalasit V, Cimador M, et al. Should sub-inguinal dilated vein interruption be regarded as the gold standard procedure for treating adolescent varicocele? *Pediatrics Minerva*. 2003;55(6):599