

Varicocele - Laparoscopic Versus Open Ligation

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Objective: Evaluation of the advantages and disadvantages of laparoscopic varicocelectomy and its comparison with open ligation of varicocele. **Design:** Prospective comparative study between two techniques of varicocelectomy. **Place and Duration Of Study:** Surgical unit III of Jinnah Hospital, Allama Iqbal medical college, Lahore over a period of two years from January 1, 2002 through December 31, 2003. **Subjects and Methods:** Study comprised of two groups (A and B) with 52 consecutive patients fulfilling the inclusion criteria and comparative variables. Laparoscopic varicocelectomy (LPV) was performed on 26 patients (Group A) and open Palomo varicocelectomy (OPV) was performed on 26 patients (Group B). Outcome data looked at relapse rate, postoperative hydroceles, wound complication and scrotal edema. Operating time, postoperative hospital stay and pain control were compared. In both groups operation was performed by Palomo technique i.e. ligation of both artery and internal spermatic vein in the retro peritoneum above the internal inguinal ring. **Results:** In LPV versus OPV group, the recurrence rate of varicocele was 3.8% in-group A versus no recurrence in-group B ($p < 0.001$). Postoperative hydroceles formation was 7.6% in group A versus 11.4% in group B ($p < 0.003$). Wound complication was 3.8% in group A versus 7.6% in group B ($p < 0.001$). Testicular or scrotal edema was 7.6% in group A versus 11.4% in group B. Postoperative hospital stay was 24 hours in group A versus 72 hours in group B ($p < 0.001$). Operating time was 20 minutes in group A versus 30 minutes in group B ($p < 0.001$). Postoperative analgesia required was almost half in group A as compared to group B ($p < 0.005$). **Conclusion:** The study shows that clinical efficacy of laparoscopic varicocelectomy is superior to traditional open varicocelectomy.

Keywords: Varicocele. Laparoscopic ligation, open varicocelectomy

The varicocele is an enigma in the treatment of male infertility. Varicocele is present in approximately 15-20%¹ of males and although it is most commonly diagnosed cause of infertility, nearly two third of males with varicocele remain fertile. The reason for this discrepancy remains unknown, although it is postulated that the cause of infertility is related to both temperature and time². Varicocele continues to stimulate controversy among reproductive experts. Despite conflicting evidence from different trials, clinical experience still favors the surgical treatment of varicocele in men with infertility. The goal of varicocelectomy in adolescents is to improve the patient's potential for further fertility. Numerous operative techniques e.g. retroperitoneal approach of palomo³, inguinal approach of Ivanissevich⁴, microsurgical⁵ and laparoscopic approach⁶ has been described. While there is no consensus, which operative approach is best suited for adolescents with a varicocele, it is imperative to weigh the advantages and disadvantages of a given method. We present our study, in which we have compared the advantages and shortcomings of laparoscopic approach with open palomo approach.

Patients and methods:

This prospective comparative study was conducted at department of surgery Allama Iqbal medical college /Jinnah hospital Lahore over a period of two years starting from January 2002 through December 2003. Consecutive 52 patients were operated upon for grade II ($n=24$) and grade III ($n=28$) varicocele. To compare and contrast the two techniques, the patients were divided into two groups. Group A comprised of 26 consecutive patients for

laparoscopic varicocelectomy. The ages of patients ranged from 15—34 years (mean age 20 years) Group B comprised of 26 consecutive patients for open varicocelectomy. The ages of patients ranged from 17—35 years (mean age 21 years). Patients having unilateral (left sided) varicocele were included in both the groups. The primary indications for operation in both the groups were, ipsilateral testicular discrepancy (smaller than contra lateral testis by $>20\%$ using ultrasonographic measurements), and patient's symptoms related to varicocele (pain or scrotal discomfort and disturbance of daily activities).

Group A 26 consecutive patients were allocated to undergo laparoscopic Palomo varicocelectomy (LPV). Each patient was advised to empty his bladder before entering the operation theater to avoid catheterization. After inducing general anesthesia, the patient was placed in trendelenburg position.

A pneumoperitoneum was established with CO₂ with veress needle. A subumbilical port was passed for telescope. Two other ports were passed, one in left lower quadrant and other in suprapubic region respectively for unilateral left varicocele...The patient was rotated laterally to elevate the affected side, so that the loops of intestine should migrate away from the operative field under the force of gravity. After dissecting the peritoneal sheet overlying the spermatic bundle >5 cm cranial to vas and internal ring, the packet of testicular vessels were freed away from the psoas muscle by using a curved dissecting instrument. The internal spermatic veins along with its collateral and testicular artery were clipped together using laparoscopic clips and transected. We avoided wandering

too far medially or laterally from the testicular bundle, because medially the external iliac vessel may be encountered, laterally the genitofemoral nerve fibers may be injured by electrocautry or traction⁷. After ensuring that haemostasis is satisfactory and no viscera have been injured, laparoscope and trocars were removed from abdomen. Skin incision was approximated with 3/0 prolene at the working site. Subumbilical camera port was closed at fascial level using 2/0 polyglactin and skin closed with 3/0 prolene. Bupivacain 0.5 % (three ml per site) was used for local anesthesia.

In-group B 26 consecutive patients were allocated to undergo open Palomo varicocelectomy...After inducing general anesthesia; patients were placed in supine position. After cleaning and draping lower abdomen, a transverse incision was made 2-finger breadth medial and two-finger breadth inferior to anterior superior iliac spine. External oblique was incised along the line of its fiber; internal oblique and transverse abdominis fiber were splitted. Internal spermatic vessels were approached in the retro peritoneum. ligated and trasected. Transverse abdominis and internal oblique muscle were approximated with polyglactin and external oblique sutured with polyglactin. Skin was closed with 3/0 prolene. Bupivacain 0.5% was infiltrated at operation site.

All the patients in both groups were followed clinically by physical examination to assess for persistent varicocele, hydroceles and to analyze testicular growth (using Ultrasonographic measurements) at 3 and 6 month.

Results:

Comparison of two techniques

Outcome	Group A (n= 26)	Group B (n =26)
Recurrence of varicocele	3.8 %	None
Hydroceles formation	7.6 %	11.4 %
Wound Infection	3.8 %	7.6 %
Scrotal edema	7.6 %	11.4 %
Post-operative hospital stay	24 hours	72 hours
Operative time	20 minutes	30 minutes
Post-operative analgesia required	½	1

52 patients underwent varicocelectomies over a period of two years. Group A consisted of 26 patients who had laparoscopic Palomo varicocelectomies (LPV), and group B consisted of 26 patients who had open Palomo varicocelectomies (OPV). The mean age of group A patients was 20 years (range 15—34), and mean age of group B patient was 21 years (range 17-35). Patients having unilateral (left sided) were included in both groups.

In group A(LPV) one out of 26 patients, (3.8%) had recurrence of varicocele 3 months after surgery whereas none of group B (OPV) patients had recurrence of varicocele (p <0.001). The recurrence of varicocele after

laparoscopic ligation was smaller than original varicocele and is currently being observed...

Hydroceles were noted on follow up visits in five out of total 52 patients (9.6%). In group A (LPV) two out of 26 patients (7.6%) developed hydroceles whereas in group B 3 out of 26 patients (11.4%) developed hydroceles (p <0.003). Of the five hydroceles, two were minimal and did not require intervention, the remaining three hydroceles needed Tran scrotal hydrocelectomy..

In-group A one out of 26 (3.8%) patients had superficial wound infection at subumbilical port site, which was treated with antibiotics.

In group B 2 out of 26 (7.6%) patients had wound infection (p <0.001) .In one patient, superficial wound infection settled with parenteral antibiotics, other patient needed drainage of small subcutaneous abscess

In group A (LPV) 2 out of 26 (7.6%) patient developed scrotal edema, which settled on conservative measures. In-group B (OPV) 3 out of 26 (11.4%) developed scrotal edema which settled on conservative measures (p <0.003). 38 out of 52 patients had ipsilateral testicular hypotrophy preoperatively. None of the 52 patients belonging to group A or group B developed testicular atrophy at three and 6 months follow up. Moreover, of the 38 patients, testicular size remained stable in nine patients (five belonging to group A and four belonging to group B) and rest 29 patients developed compensatory growth of ipsilateral testis (16 belonging to group A and 13 belonging to group B) as compared to the volume of testis before surgery.

In group A postoperative hospital stay was 24 hours and in group B patients average hospital stay was 72 hours (range 48-120 hours) which is statistically significant (p < 0.001).

In-group A mean operating time was 20 minutes (15-45 minutes). In-group B patients mean operating time was 30 minutes (range 20-60 minutes) (p< 0.001). Postoperative analgesia required was almost half in-group A as compared to group B that is statistically significant (p < 0.005)

Discussion:

Varicocele has been shown to be a common condition in men and boys with incidence of 15-20% in general population¹. The role of varicocele in male infertility and usefulness of surgical treatment to restore fertility are still debated. However the most popular strategy at present is surgery, when deterioration in semen is observed or when varicocele is symptomatic or as a prophylactic measure in children with testicular hypotrophy⁸.

Attention has been focused in recent years on the optimal method to treat varicocele, to reduce the recurrence as well as complications .A popular method of varicocelectomy first described by Palomo³ involves ligating the internal spermatic vein along with testicular artery. In a comparison of techniques for varicocele repair in adolescent males, Palomo mass high retroperitoneal

ligation of internal spermatic vessels resulted in significant decrease in operative failure rate, compared with the artery sparing procedure and no increase in incidence of testicular atrophy^{9,10}.

In a comparative study, Huk J et al have shown that ligation of testicular vein and artery produced better improvement of semen characteristic and percentage of pregnancies in comparison with artery sparing technique¹¹. Parrot¹² et al have shown that mass high ligation of testicular artery and internal spermatic vein together offers a safe and effective method to achieve a low recurrence rate without compromising the blood supply to testes. Study using Color Doppler ultrasonography confirmed that ligation of testicular artery during laparoscopic varicocele did not compromise the testicular blood supply or testicular volume¹³. Sampaio¹⁴ et al reported that fetal testis is always supplied by at least two arteries in >80% of cases. In children the testicular arteries arise from aorta, travel in retro peritoneum to reach the internal inguinal ring. At the internal inguinal ring cremasteric artery (branch of deep epigastric artery) and the vas deferens artery (a branch of superior vesical artery) join the vessels. In general, there is significant collateral circulation among all major testicular vessels distal to site of laparoscopic varix ligation, which includes anastomosis between branches of vesical and prostatic arteries and between internal spermatic and deferential arteries¹⁵.

The application of laparoscopic technique has gained an important role in all surgical operations including varicocele ligation. In this study, we have compared the laparoscopic Palomo varicocele ligation with open Palomo varicocele ligation. Looking into complication and pitfall of this operation, persistence or recurrences of varicocele after surgery are not uncommon. Rates of recurrence / persistence in adolescent are reported as 0-13%^{16, 17, 18, 19} in the literature.

Riccabona et al²⁰ have shown in their comparative study of different techniques that varicocele recurred in 10% of boys who underwent laparoscopic ligation whereas there was no recurrence in patients who underwent open Palomo operation. Bebars et al noticed the recurrence rate of 3.9% in laparoscopic versus 10.8% in open high ligation²¹. In this study, we have seen 3.8% recurrence of varicocele in laparoscopic group whereas no recurrence is seen in open high ligation. ($p < 0.001$) which is statistically significant.

There are surprisingly many hydroceles formation after varicocele ligation. In previous reviews the reported incidence of this complication had varied greatly with the rate as high as 39% of patients undergoing high ligation²². However, more recently rates in men were reported as 3.1-13%^{23, 24}. Podkamenev et al²⁵ have noticed the incidence of hydroceles after varicocele ligation in laparoscopic group as 0.23% versus 1.82% in open varicocele ligation. Riccabona et al²⁰ have shown the incidence of hydroceles after varicocele ligation to be 5% in laparoscopic group versus

12% in open Palomo ligation group, in their comparative study. Itoh et al²⁶ noticed 5.3% incidence of hydroceles after laparoscopic varicocele ligation, Nyirady et al²⁷ noticed hydroceles formation after laparoscopic varicocele ligation in 5% of patients whereas Mazzoni et al²⁸ have noticed 11.2% hydroceles formation in open Palomo varicocele ligation. In the present study the incidence of hydroceles formation after varicocele ligation in laparoscopic group is 7.6% versus 11.4% in open Palomo ligation ($p < 0.003$) which is statistically significant and is comparable with other studies.

The cause of hydroceles formation is the disruption of lymphatic of testes and tunica vaginalis²³. Oswald et al²⁹ have recommended the perilymphatic injection of isosulphan blue to identify and preserve the lymphatic of the testes and tunica vaginalis during Palomo procedure in adolescent to prevent hydroceles formation. In the present study the wound infection was 3.8% in laparoscopic group versus 7.6% in open varicocele ligation group ($p < 0.001$) which is comparable with other studies^{25, 18}. In this study 7.6% of laparoscopic group patients developed scrotal edema versus 11.4% in open varicocele ligation group ($p < 0.003$) which matches with other studies^{18, 25}.

In spite of the mass ligation of internal, spermatic in the retro peritoneum none of the patients in either group A or group B developed ipsilateral testicular atrophy at 3 and 6 months follow up. Rather 29 out of 38 patients (76%) showed compensatory growth of the ipsilateral testis as compared to the testicular volume before surgery. Gershbein et al³⁰ and Barqawi et al³¹ have highlighted the same in their studies.

Since the invention of laparoscope, postoperative hospital stay of patients has been cut short to minimum. Cohen³² and Kbaier et al³³ were able to send their patients home 6 and 8 hours after laparoscopic varicocele ligation respectively. In this study our patients who had laparoscopic varicocele ligation (LPV) were happy to go home 24 hours after operation whereas patients who had open Palomo varicocele ligation were able to go home after average of 72 hours ($p < 0.001$) which is statistically significant. These results are comparable with results of other series^{18, 25, 21}. The mean operative time in laparoscopic varicocele ligation was 20 minutes (range 15-45 minutes) versus 30 minutes in open Palomo varicocele ligation ($p < 0.001$). These results are comparable with other studies^{17, 25}.

The amount of postoperative analgesia required was nearly half in laparoscopic group as compared to open Palomo varicocele ligation which is statistically significant ($p < 0.005$) This aspect is also comparable with Podkamenev and his colleague's work²⁵.

Conclusion:

Laparoscopic varicocele ligation is safe, effective and minimally invasive. In addition to its better cosmetic results, it allows excellent exposure and control of effected

vessels. Furthermore minimal postoperative pain, short hospital stay, very short convalescence period with resultant financial saving are important advantages in recommending this technique as an efficient alternative to open varicocelectomy.

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