

COMPARATIVE STUDY BETWEEN THE OUTCOME OF LAPAROSCOPIC PALOMO AND OPEN INGUINAL VARICOCELECTOMY

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Abstract:

Background: The ideal method of varicocele treatment is a controversial issue. The present study was designed to compare the outcome of laparoscopic palomo and open inguinal varicocelectomy.

Methods: The present quasi experimental study was conducted in the Department of Urology, Dhaka Medical College Hospital, Dhaka, between July 2010 and June 2012 to compare the outcome of open inguinal and laparoscopic Palomo approach of varicocelectomy. Purposively selected 50 patients were divided into equal two groups, Group A and Group B treated with open inguinal varicocelectomy and laparoscopic Palomo varicocelectomy respectively. Statistical analyses were done by using SPSS and p value <0.05 was considered as significant.

Results: In the present study, mean age of the patients of Group A and Group B were 29.1 ± 2.0 and 28.9±1.5 years respectively. Among the patients of Group A developed neither hydrocele nor testicular atrophy, where as in patients of Group B 20% and 12% developed hydrocele and testicular atrophy respectively. The recurrence rate of varicocele was lower in the Group A than that in the Group B. The findings of semen analysis at 1st and 2nd follow up visits show that there was negligible improvement in semen quality in terms of sperm count, motility and morphology.

Conclusion: Open inguinal varicocelectomy is better than laparoscopic palomo varicocelectomy. Although sooner return to work is achieved by laparoscopic varicocelectomy, complications are more frequent than the open inguinal method.

Key words: Varicocele, laparoscopic palomo varicocelectomy, open inguinal varicocelectomy.

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Introduction:

Varicocele is the most commonly seen and correctable cause of male factor infertility¹⁻⁴. Although the incidence of varicocele in the general male population is approximately 15%, it is implicated as a factor in about one-third of infertile males³⁻⁸. It also causes scrotal pain and discomfort in 2-10% cases which diminishes performance during daily activities to varying degrees in affected men⁹.

The ideal method of varicocele treatment is another debatable issue¹⁰⁻¹². The goal of varicocele surgery is the complete disruption of internal venous drainage of the testis, except the vein of vas deferens, while preserving the internal spermatic arteries, vas deferens, spermatic cord and the lymphatics¹³. Repair of varicocele may halt any further damage to testicular function and may result in improved spermatogenesis as well as enhanced Leydig

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cell function¹³⁻¹⁵. Varicocelectomy as a possible cure for a varicocele causing impaired semen parameters is still the recommended treatment (13Sangrasi et al. 2010). Varicocele may be treated with many different modalities, including radiologic, laparoscopic, and open surgical approaches^{7,10-12,16-18}. Urology had a history as in many other surgical specialties in that various attempts were made to switch the current open surgical techniques into laparoscopic operations, with very different results. Some procedures proved to be awkward experiences, therefore remaining isolated attempts; others were successful although unreliable and non reproducible, whereas most had impressive results¹⁹. The laparoscopic varicocelectomy was first introduced in 1988 by Sanchez de Badajoz²⁰. As laparoscopic varicocelectomy has gained popularity, reports have suggested that laparoscopic varicocele ligation has the potential advantages of reduced morbidity, reduced analgesic requirements and a more rapid rate of return to work compared with the standard open surgical approach^{13,21,22}.

Generally laparoscopic varicocelectomy is believed to offer certain benefits for patients compared to the open operative method. The advantage is particularly evident when the open alternative needs large skin incisions and the patient takes a longer time to recover. The open surgical technique of varicocelectomy requires only a small incision, with the patient recovering in few days, need less operation time, less cost. For these reason, the advantage of the laparoscopic technique in varicocelectomy is still debatable¹⁹. The common complications of varicocele surgery are persistence or recurrence of varicocele and hydrocele development. There is no consensus on which approach is best suited for varicocele surgery. Incidence of complication and outcome depends on procedure performed and desired result is not always achieved. Previous study revealed wide variation ranging from no improvement in semen quality to significant improvement, and variable percentage of spontaneous pregnancy in infertile male after varicocelectomy².

In Bangladesh, infertility is now a growing

problem, and no data are available regarding the outcome of fertility after varicocelectomy. Bangladesh is a developing country and Laparoscopic varicocelectomy is expensive, needs general anesthesia. Consequently, it should be determined which is the best technique regarding cure of the disease, cost-effectiveness, hospital stay, postoperative complication including recurrence. Thus present study was designed to compare the outcome of laparoscopic Palomo and open inguinal varicocelectomy.

Methods:

The present quasi experimental study was conducted in the Department of Urology, Dhaka Medical College Hospital, Dhaka, between July 2010 and June 2012. Purposively selected 50 patients were included in the study. They were divided into two groups, Group A treated with open inguinal varicocelectomy and Group B treated with Laparoscopic Palomo varicocelectomy. Patients with primary varicocele having scrotal pain and/or abnormal semen quality were included in the study and patients with secondary varicocele, recurrent/persistent varicocele, bilateral varicocele and refused to participate were excluded from the study. Data were collected by interviewing the patients and evaluating the relevant investigations before surgery and subsequent two follow up visits. Data collection form included particulars of the patients along with varicocele side, grade, duration and severity of pain, semen analysis report, ultrasonographic finding, and procedure performed. Semen analysis was evaluated for concentration of spermatozoa, percentage of normal morphology and percentage of spermatozoa showing progressive linear motility.

Varicocelectomy technique:

1. Laparoscopic Palomo Varicocelectomy: After placement of urethral catheter, patient was secured in supine position and was under general anesthesia. A 10-mm trocar was introduced into peritoneal cavity through umbilical port. Then, the abdomen was inflated with carbon dioxide gas (11-13 mm Hg), and a 10-mm telescope was inserted through the 10-mm trocar. Under direct vision, 2nd and the

3rd trocars (one 10-mm and one 5-mm) were bilaterally introduced through the incisions located in the two-third internal distance from the umbilicus to the anterior superior iliac spine. Grasping with one hand using scissors in other hand, two perpendicular incisions are made in the peritoneum overlying the left or right internal spermatic veins. By lifting the vascular mass, arterial and lymphatic component should be separated from the vein(s), clipping of the spermatic veins at the site of the internal inguinal ring was done. Always attempt was made to preserve the testicular artery or lymphatics.

2. Open inguinal varicocelelectomy: Inguinal ligation was performed through a small incision over the inguinal canal that follows the skin lines. The inguinal canal was opened through the external inguinal ring along the direction of the fascial fibers to gain access to the cord just below the internal ring. The cord is isolated over a Penrose drain, excluding the ilioinguinal nerve, and is delivered into the wound. Spermatic fascia was incised and contents of cord were explored. The testicular artery was identified and preserved. The veins of the cord, except those associated with the vas, are doubly ligated and divided. Checking for inguinal branches under the spermatic cord was done, but no attempt was made to deliver the testis into the wound to search for gubernacular veins.

Evaluation and follow-up:

All patients were asked to return for follow-up visit at 3 months and 6 months after surgery. Follow up evaluation included a physical examination and ultrasonography to detect recurrence of varicocele or hydrocele formation, assessment of scrotal pain and semen analysis.

Data analysis:

After meticulous checking and editing, data were compiled and statistical analyses were done using SPSS version 13.0. A p value <0.05 was considered as significant.

Results:

The present study intended to compare the outcome between open inguinal varicocelelectomy and laparoscopic Palomo

varicocelelectomy. The outcome was evaluated in terms of pain, intensity of pain and scrotal swelling between the two groups and complications encountered by the patients of two groups.

The mean±SD of age of the patients of Group A and Group B were 29.1±2.0 and 28.9±1.5 years respectively. In the present study 60% of Group A and 68% of Group B were < 30 years old. Majority of the patients in both group (76% in Group A and 68% in Group B) had varicocele for 3-4 years. Left-sided varicocele was slightly higher than the right-sided. All patients in Group A and 84% in Group B complained of pain. In terms of intensity of pain over one-third (36%) of Group A had moderate pain as compared to 19% of Group B. There was difference between the groups with respect to grade of the varicocele with grade-II forming the main bulk in either group (60% in Group A and 56% in Group B). The mean time for operation was significantly lower in Group A than that in Group B. At 1st follow up visit, the complaints of pain present in 24% in Group A and 8% in Group B and all of them had mild pain. Around 24% in Group A and 8% in group B exhibited scrotal swelling. At 2nd follow up, pain and scrotal oedema absent in all patients in both groups. Among the patients of Group A developed neither hydrocele nor testicular atrophy, whereas in patients of Group B developed hydrocele and testicular atrophy 20% and 12% respectively. The recurrence rate of varicocele was a lower in the former group than that in the latter group. The average duration of hospital stay among the patients of Group A and Group B were 5.4±1.0 and 2.6±0.7 days respectively. At baseline sperm count in Group A and Group B were 24.0±8.0 and 26.3±7.8 million/ml respectively. The sperm motility was 4% and 8% in Group A and Group B respectively. The findings of semen analysis at 1st and 2nd follow up visits show that there was negligible improvement in semen quality in terms of sperm count, motility and morphology from their baseline figures. However, sperm count and motility were considerably better in the Group B.

Table-I

Distribution of socio-demographic characteristics of patients by groups

Socio-demographic characteristics	Group		p-value
	Group-A	Group-B	
Age group			
<30	15(60.0)	17(68.0)	
>30	10(40.0)	8(32.0)	
Mean ± SD	29.1 ±2.0	28.9 ±1.5	0.643
Marital status			
Married	24 (96.0)	23 (92.0)	
Unmarried	01 (04.0)	02 (08.0)	
Socioeconomic status			
Below average	19 (76.0)	10 (40.0)	0.010
Average	06 (24.0)	15 (60.0)	

Table-II

Distribution of clinical presentation by groups

Clinical presentation	Group		p-value*
	Group-A	Group-B	
Duration of varicocele (yrs)			
1-2	06(24.0) [#]	08(32.0)	0.412
3-4	19(76.0)	17(68.0)	
Side involved			
Right	11(44.0)	11(44.0)	0.984
Left	14(56.0)	14(56.0)	
Pain	25(100.0)	21(84.0)	0.037
Intensity of pain			
Mild	16(64.0)	17(81.0)	0.203
Moderate	09(36.0)	04(19.0)	
Grade of swelling			
Grade-I	02(08.0)	01(04.0)	
Grade-II	17(60.0)	14(56.0)	0.353
Grade-III	08(32.0)	10(40.0)	

#Figures in the parentheses denote corresponding percentage

*Chi-square (χ^2) Test was done to measure the significance.

Table-III

Distribution of operative and post operative findings by groups

Operative and post operative findings	Group		p-value
	Group-A	Group-B	
Duration of operation (min)			
30-35	20 (80.0)	0 (0.0)	
36-40	05 (20.0)	14 (56.0)	
41-45	0 (0.0)	11(44.0)	
Mean± SD	33.4±2.2	40.5±2.2	<0.001*
Duration of hospital stay (days)			
2-4	05 (20.0)	25 (100.0)	
5-7	20 (80.0)	0 (0.0)	
Mean± SD	5.4±1.0	2.6±0.7	<0.001*
1 st follow up			
Pain	06 (24.0)	02 (08.0)	0.347 [#]
Scrotal edema	06 (24.0)	02 (08.0)	0.347 [#]
Hydrocele	0 (0.0)	05 (20.0)	0.025 [#]
Recurrence of vericocele	01 (04.0)	06 (24.0)	0.049 [#]
Testicular atrophy	0 (0.0)	03 (12.0)	0.117 [#]
2 nd follow up			
Pain	0 (0.0)	0 (0.0)	
Scrotal edema	0 (0.0)	0 (0.0)	
Hydrocele	0 (0.0)	05 (20.0)	0.025 [#]
Recurrence of vericocele	01 (04.0)	06 (24.0)	0.049 [#]
Testicular atrophy	0 (0.0)	03 (12.0)	0.117 [#]

*Figures in the parentheses denote corresponding percentage

*Student's t Test was done to find out the level of significance

#Chi-square (χ^2) Test was done to find out the level of significance

Table-IV

Distribution of semen analysis by groups at baseline, 1st and 2nd follow-up

Semen analysis	Group		p-value
	Group-A	Group-B	
At baseline			
Sperm count (million/ml)	24.0 ±8.0	26.3 ± 7.8	0.314*
Sperm motility (%)	44.7 ± 9.9	52.6 ±6.9	0.002*
Sperm morphology (abnormal)	01(04.0) [^]	02(08.0)	0.552 [#]
1 st follow up			
Sperm count (million/ml)	25.0 ±6.3	28.1 ±8.1	0.137*
Sperm motility (%)	47.9 ±8.9	55.9 ±6.9	0.001*
Sperm morphology (abnormal)	01(04.0)	05(20.0)	0.082 [#]
2 nd follow up			
Sperm count (million/ml)	26.1 ±6.5	28.3 ± 8.0	0.295*
Sperm motility (%)	49.7 ± 8.3	56.8 ±7.2	0.002*
Sperm morphology (abnormal)	02(08.0)	02(08.0)	0.695 [#]

*Figures in the parentheses denote corresponding percentage

*Student's t Test was done to find out the level of significance

#Chi-square (χ^2) Test was done to find out the level of significance

Discussion:

Varicocele may be treated with many different modalities, including radiologic, laparoscopic, and open surgical approaches^{7,10,11,16-18}. However, the most effective and least invasive method in terms of outcome and post operative complication is still not determined. Present study was designed to evaluate and compare the outcome of mostly practiced procedure for varicocele the open inguinal approach and laparoscopic Palomo approach.

The present study included 50 cases of varicocele of different grades. They were assigned to open inguinal varicocelectomy (Group A, n=25) and laparoscopic Palomo varicocelectomy (Group B, n=25). The mean ages of the patients of Group A and Group B were 29.1 ± 2.0 years and 28.9 ± 1.5 years respectively. Sangrasi et al.¹³ their study showed mean age 26.9 ± 7.67 and 26.2 ± 7.08 years in open inguinal and in laparoscopic group respectively.

Varicocele is more common on left side because of several anatomical factors, including the angle at which the left testicular vein enters the left renal vein, the lack of effective antireflux valves at the junction of testicular vein and renal vein. In this study, left-sided varicocele was slightly higher than the right-sided. In the present study 60% patients of Group A and 56% patients of Group B were presented with grade-II varicocele. The effect of varicocele grade on the magnitude of improvement in semen quality after varicocelectomy has been equivocal. Steckel et al. (1993)²³ reported that men with larger varicocele presented with lower sperm densities and had greater relative improvement in semen quality than men with smaller varicocele who presented with a greater mean sperm concentration.

Postoperatively the complaints of pain reduced in both the groups. These findings are comparable with the findings of a retrospective review of 35 patients by Peterson et al.⁹ undergoing different ligation techniques for painful varicocele. The reported complete resolution rate in their study was 86%. But another retrospective study by Biggers and

Soderdah²⁴ showed pain resolution rate 48%. This difference may be due to use of high ligation technique only. In inguinal ligation cremasteric veins can also be ligated. This may contribute to higher success rate in other study. Sangrasi et al.¹³ in their study showed that postoperative pain was significantly less in the laparoscopic group.

The mean operative time was significantly lower for open inguinal approach compared with laparoscopic varicocelectomy. Shamsa et al.²⁵ reported mean operative time 30.0 ± 5.5 minutes for laparoscopies, 27.0 ± 3.5 minutes for open inguinal varicocelectomy under general anesthesia, and 38.0 ± 1.8 minutes for open varicocelectomy under local anesthesia in a comparative study of 30 each cases in above procedures. Ogura et al.²⁶ in a study on 39 patients performed bilateral laparoscopic varicocelectomy reported an operative time of 96.6 minutes. The possible causes for more time are general anesthesia, nasogastric tube suction, Foley catheterization, learning curve which required for laparoscopy. Sangrasi et al.¹³ in their study showed that the average operative time was 34.8 ± 7.89 minutes for open inguinal and 43.8 ± 8.95 minutes for laparoscopic group.

The result of present study showed there was negligible improvement in semen quality in terms of sperm count, motility and morphology from their baseline figures. These findings were similar to that of Shamsa et al.²⁵ who evaluated and compared sperm analysis in three different methods of open and laparoscopic varicocelectomies. Schlesinger et al.² reviewed a reports on the effect of varicocelectomy upon semen parameter, showed significant improvement. However, study by Laven et al.²⁷ have not demonstrated any beneficial effect. The probable cause of failure of treatment was that the preoperative semen parameters of the treated patients of that series were within normal range and another cause was irreversible damage to the testes. Sangrasi et al.¹³ in their study showed statistically significant ($p < 0.001$) improvement in sperm count as well as motility in both groups irrespective of procedure.

Varicocele recurrences, hydrocele formation, injury to testicular artery are common complications of varicocelectomy. Cayan et al.²⁸ reviewed reports on varicocelectomy and found overall recurrence rates of 14.97% in the open Palomo technique and 2.63% in the macroscopic inguinal technique. They also showed overall hydrocele formation rates of 8.24% in the Palomo technique series, 2.84% in the laparoscopic varicocelectomy, and 7.3% in the macroscopic inguinal technique. Shamsa et al.²⁵ in their study showed 6.6% recurrence in laparoscopic group and none in other procedure. Al-Kandari et al.²⁹ in their study reported the recurrence rate 2% with microscopic subinguinal varicocelectomy and 13% and 18% with open inguinal and laparoscopic methods, respectively. Sangrasi et al.¹³ in their study showed that open inguinal procedure had a shorter operating time while laparoscopic varicocelectomy had the advantage of less analgesic requirement and short hospital stay. Hirsch et al.⁸ in their study reported that laparoscopic varicocelectomy has no advantage over open subinguinal technique with respect to hospitalization, seeking analgesic, and going back to work and need longer operative time and had more complications than open subinguinal approach.

Conclusion:

The present study concludes that open inguinal varicocelectomy is better than laparoscopic Palomo varicocelectomy. It also demonstrated that although sooner return to work is achieved by laparoscopic varicocelectomy, complications of this method are more frequent than the open inguinal method.

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