

COMPARATIVE ANALYSIS OF PALOMA OPERATION VERSUS INGUINAL APPROACH IN THE MANAGEMENT OF VARICOCELE

Waqas Ahmed, Khalid Ibrahim, Bushra Aman*, Rabia Mushtaq*, Taseer Ibrahim**

Combined Military Hospital Malir/National University of Medical Sciences (NUMS) Pakistan, *Karachi Institute of Medical Sciences, Karachi Pakistan, **Pak Emirates Military Hospital/National University of Medical Sciences (NUMS) Rawalpindi Pakistan

ABSTRACT

Objective: To compare post-operative results of Paloma operation versus Inguinal approach in the management of varicocele.

Study Design: Quasi experimental study.

Place and Duration of Study: Department of General Surgery, Combined Military Hospital Malir Cantonment, from Jan 2017 to Jun 2018.

Methodology: A total of 76 patients between the ages of 18 to 40 years were included in study. Patients with left sided grade II and III varicocele, right sided varicocele and bilateral varicocele were included in the study. Patients having concomitant inguinoscrotal pathology and presenting with recurrence were excluded from the study. Patients were divided into two groups A and B by lottery method. Group A underwent Paloma operation while group B underwent low ligation via inguinal approach. All patients were followed up at 1, 3 and 6 months.

Results: Age range of patients was 18-40 years with mean age 26 ± 5 years. The frequency of postoperative complications was 18.42% in Paloma operation group versus 55.26% in the inguinal low ligation approach group respectively which was statistically significant ($p=0.002$).

Conclusion: Paloma operation was found to be a better choice for varicocele surgery as compared to inguinal approach in terms of patient's satisfaction and number of postoperative complications.

Keywords: Infertility, Inguinal approach, Paloma operation, Varicocele.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Varicocele is defined as an abnormal dilatation of the pampiniform plexus of veins within the spermatic cord draining the testis¹. The most commonly affected side is the left side constituting about 90% of all cases. The incidence of varicocele in adolescent males is 15% while it is 10-15% in adult men². The disease is broadly classified into two main types depending upon the etiology and pathogenesis into primary and secondary varicocele. Venous reflux from the internal spermatic vein into the pampiniform plexus because of venous valvular incontinence is the mechanism involved in the development of primary varicoceles.

In most of the cases, varicocele remains asymptomatic or the patient may present with a

dragging discomfort. Since the temperature of the testis is higher in patients with varicocele, they may present with infertility. Varicocele is considered to be the most common treatable cause of male infertility³. It is usually diagnosed clinically. Ultrasonography of the scrotum can also be helpful in the diagnosis and confirmation of varicocele⁴.

Various treatment options available for management of varicocele include (a) Embolization or sclerotherapy of the gonadal veins, (b) Open surgical approaches via inguinal, sub-inguinal and high ligation or retro-peritoneal approach also known as Paloma operation (c) Microsurgical techniques and (d) Laparoscopic approach⁵. The two most commonly used open surgical techniques in our setups are the retroperitoneal Paloma operation and the inguinal or the Ivanissevich approach. There is paucity of research protocols comparing the two techniques. The objective of our study was to identify the better treatment

Correspondence: Dr Waqas Ahmed, Department of Surgery, Combined Military Hospital, Malir Pakistan

Email: waqasahmedsurgeon@gmail.com

Received: 22 Mar 2019; revised received: 24 May 2019; accepted: 27 Jun 2019

option for patients presenting with symptomatic varicocele by comparing the surgical outcomes of Paloma operation versus the inguinal approach.

METHODOLOGY

We conducted a quasi experimental study on a total of 76 patients reporting to Department of General Surgery, Combined Military Hospital Malir, from January 2017 to June 2018 with the diagnosis of left sided varicocele after approval from hospital ethical review committee. A written and informed consent was taken from all the patients included in the study. The sample size was calculated by WHO sample size calculator by using the "Estimating the difference between two population proportions" test by taking confidence level of 95%, anticipated population proportion 1 of 11.6% and anticipated population precision 2 of 3.9%. The sample size came out to be 38 patients in each group. Thus the total sample size came out to be $38 + 38 = 76$ patients⁷. Non-probability conservative sampling technique was used.

Patients between the ages of 18 to 40 years were included in the study and randomly divided into two equal groups of 38 patients each by lottery method. Patients reporting to the general surgery department with left sided grade II and grade III varicocele, right sided varicocele and bilateral varicocele were included in the study. Patients having concomitant inguinoscrotal pathologies like hydrocele, inguinal hernia, epididymal cyst etc., and cases presenting with recurrence were excluded from the study. Ultrasonography of abdomen, pelvis and testis was done in all patients pre-operatively. In patients with infertility, semen analysis was done before and after the surgery.

All patients were admitted one day prior to the surgery after completion of baseline investigations including blood complete picture, renal function tests, liver function tests, hepatitis B and C screening, X-ray of chest and ECG. Pre-anesthesia fitness was carried out by the anesthetist. All the operations were carried out under spinal anesthesia. A single dose of prophylactic intravenous Augmentin (Amoxicillin and Clavil-

unate) 1.2 grams was administered in all patients before surgery after administration of test dose.

Group A (n=38) patients underwent varicocele surgery by the Paloma operation (retroperitoneal approach) while group B (n=38) patients were operated via the inguinal approach. In group A, a 4-5 cm transverse incision was given in the mid inguinal line at the level of anterior superior iliac spine. Subcutaneous tissue, external oblique, internal oblique and transverse muscles were dissected. Peritoneum was then pushed medially. Testicular veins were exposed, separated from testicular artery and were ligated. Finally the wound was closed in layers. In group B, skin incision was given 1 cm above the medial part of inguinal ligament. Subcutaneous tissue and sheath of external oblique were incised. Spermatic cord was separated. Spermatic fascia was opened and dilated tortuous veins were separated from vas deferens and testicular artery. The veins were cut and ligated. The wound was finally closed in layers. All patients were discharged on the first post-operative day and were then followed up at 1,3 and 6 months for development of any complications and improvement in semen analysis amongst the infertile patients.

Data of all patients was entered in and analyzed by SPSS version 23.0. Mean and SD were calculated for quantitative variable. Qualitative variables were presented as frequency percentages. Chi-square test with Yates correction was applied to compare post-operative complications, recurrence and improvement in semen analysis in both the groups. *p* value of ≤ 0.05 was taken as statistically significant.

RESULTS

The mean age of patients included in the study was 26 ± 5 years with a range between 18-40 years. Out of the total 76 patients, 50 (65.79%) had left-sided varicocele. Out of the 50 patients, thirty five patients had grade II varicocele while fifteen patients had grade III varicocele. Overall 20 patients (26.32%) included in the study presented with bilateral varicocele. Out of 20 patients, 11 patients had grade II varicocele and 9 patients

had grade III varicocele. While 6 patients (7.89%) presented with right sided varicocele grade II. The distribution of patients according to Age was shown in table-I.

In group A, 7 patients (18.42%) were found to have post-operative complications. The complications included wound hematoma in one patient (2.63%), wound infection in one patient

Table-I: Number of cases in different age groups.

Age Range	Cases	Percentage
18-25 years	26	34.21
26-33 years	33	43.42
34-40 years	17	22.37

Table-II: Summary of post-operative complications.

	Group A (n=38)	Group B (n=38)	p-value
Wound Infection	1 (2.63%)	3 (7.89%)	0.607
Wound Hematoma	1 (2.63%)	5 (13.16%)	0.202
Hydrocele	-	5 (13.16%)	0.054
Testicular Atrophy	-	5 (13.16%)	0.054
Recurrence	5 (13.16%)	3 (7.89%)	0.709
Total	7 (18.42%)	21 (55.26%)	0.002

(2.63%) and recurrence in 5 patients (13.16%). While in group B, 21 patients (55.26%) developed post-operative complications. The complications comprised of wound hematoma in 5 patients (13.16%), wound infection in 3 patients (7.89%), hydrocele in 5 patients (13.16%), testicular atrophy in 5 patients (13.16%) and recurrence in 3 patients (7.89%) respectively.

Semen analysis was carried out at 3 and 6 months in 10 infertile patients. Out of 10 patients, nine patients (90%) showed improvement in sperm count and motility. The improved sperm count was irrespective of the operative procedure with improvement seen in 5 patients in group A and 4 patients in group B with the difference being statistically insignificant ($p=0.723$). At 6 months follow up, pregnancy by spontaneous conception was reported by two patients in each group ($p=1.00$).

Although we found that the difference in the individual complications between the two groups was insignificant i.e. Wound infection ($p=0.607$), wound hematoma ($p=0.202$), hydrocele ($p=0.054$), testicular atrophy ($p=0.054$) and recurrence ($p=0.711$); the overall difference in the post-operative complications between the two groups was found to be statistically significant ($p=0.002$). Post-operative complications of wound infection, wound hematoma, hydrocele development, recurrence and testicular atrophy between the two groups (table-II).

DISCUSSION

Varicocele affects almost all age groups with the youngest case reported in literature being an 18 months old boy. The mean age of patients included in our study ranged from 18 to 40 years with a mean age of 26 ± 5 years. Most commonly left-sided varicocele was found in clinical practice⁶. In our study, the frequency of left-sided varicocele was 65.79% (50 patients), while 26.32% cases presented as bilateral varicocele (20 patients) and 7.89% were having right-sided varicocele (6 patients). A study by Alsaikhan *et al* in 2016 reported that the incidence of left sided, bilateral and right sided varicocele was 65.4%, 25% and 9.6% respectively⁶. Comparable incidence rates were reported in the studies conducted by Arain *et al*⁷, Fazal *et al*⁸, and Al-Kandari *et al*⁹.

In our study, the most common clinical presentation was found to be dragging pain and sensation of discomfort reported in 50 patients (65.79%). Infertility was the presenting complaint in 10 patients (13.16%) while 16 patients (21.05%) presented for getting medical fitness for jobs where one has to stand for long periods like induction in armed forces. Arain *et al* in 2009 also reported clinical presentation with dragging pain and sensation to be the most common complaint with an incidence of 53.9%. The study reported presenting complaints of infertility in 17.3% patients and for seeking medical fitness for various jobs in 28.8% cases. Khan *et al* also reported the clinical presentation consistent with the findings in our study¹⁰.

A detailed history followed by a relevant clinical examination lays down the basis for the diagnosis of varicocele. Clinical examination of the scrotum with inspection of scrotum at rest, during performance of Valsalva maneuver followed by palpation of the worm-like swollen tortuous veins clinches the diagnosis. Ultrasonography of the scrotum is the imaging modality of choice. It not only gives the number and the diameter of veins of the pampiniform plexus but it also helps in evaluating and measuring the regurgitation of blood while patient performs the Valsalva maneuver¹¹.

The grading of varicocele is done according to the World Health Organization (WHO) classification as: a) subclinical: Non-palpable dilatation of the vessels of the pampiniform plexus, even during the Valsalva maneuver, but visible only on ultrasonography of scrotum. b) Grade I: Palpable dilatation of the veins of the pampiniform plexus only while the patient performs the Valsalva maneuver. c) Grade II: Invisible but clearly palpable dilatation of the veins of the pampiniform plexus without performance of the Valsalva maneuver. d) Grade III: Visible and palpable varicocele at rest^{12,13}.

Coming over to the complications, wound hematoma was found to be more in the group of patients undergoing varicocele surgery by the inguinal approach than the Paloma operation. The main reason for the increased frequency of wound hematoma is the increased handling of the spermatic cord and veins in the inguinal approach. While in the Paloma operation, only two or three veins are encountered. In our study, hematoma formation was observed in 13.16% patients of inguinal approach group and in 2.63% patients undergoing Paloma operation which was insignificant ($p=0.200$). The frequency of wound infection was 7.89% in inguinal approach group versus 2.63% in Paloma operation group which was insignificant ($p=0.615$). Arain *et al* reported hematoma formation in 7.7% cases of inguinal approach versus 3.9% cases of Paloma approach. The study reported wound infection in 3.9% cases

of inguinal approach versus 0% cases of Paloma approach⁷.

In our study, the recurrence of varicocele in patients undergoing Paloma approach was 13.16% (5 patients) compared with a recurrence rate of 7.89% in patients undergoing surgery by the inguinal approach (3 patients) which was not significant ($p=0.711$). These findings were comparable with the results of studies by Arain *et al*⁷, Rotker *et al*¹⁴, and Jargiello *et al*¹⁵.

Post-operatively hydrocele occurred in 5 patients (13.16%) in the inguinal approach. Similarly 5 patients (13.16%) developed testicular atrophy in the inguinal approach while none of the patients developed hydrocele or testicular atrophy in Paloma operation approach. These findings were comparable with the studies by Cuda *et al*¹⁶, Smith *et al*¹⁷, and Ficarra *et al*¹⁸.

The morphology of semen has been reported to improve gradually in the postoperative period following varicocelectomy. In our study, the sperm count improved in 9 out of 10 patients (90%) of the infertility group assessed at an interval of 3 months and 6 months in terms of motility, morphology and number of spermatozoa. Studies have reported an improvement in semen quality and fertility between 40 to 70% in patients undergoing varicocele surgery. However the findings of our study did not favor any surgical approach in terms of improving the semen quality. These results were also evidenced by studies conducted by Shamsa *et al*¹⁹ and Said *et al*²⁰. Further research is encouraged on the topic with bigger sample size and wider range of variables like sperm count, semen morphology and long term complications, to ascertain the ideal approach for the management of varicocele.

CONCLUSION

Inguinal/low ligation procedure was associated with a significantly higher rate of complications as compared to the Paloma operation. Paloma operation does not disturb inguinal canal anatomy and is better tolerated by the patients. Thus Paloma operation is a better choice for varicocele treatment. Sperm count increases in all

the cases irrespective of the choice of procedure and therefore all male patients presenting with infertility should be carefully evaluated for presence of varicocele and surgery should be offered to all patients having varicocele.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

REFERENCES

- Baigorri BF, Dixon RG. Varicocele: A Review. *Sem in Intervent Radiol* 2016; 33(3): 170-76.
- Liguori G, Trombetta C, Garaffa G, Bucci S, Gattuccio I, Salamè L. Color Doppler ultrasound investigation of varicocele. *World J Urol* 2004; 22(5): 378-81.
- Will MA, Swain J, Fode M, Sonksen J, Christman GM, Ohl D. The great debate: varicocele treatment and impact on fertility. *Fertil Steril* 2011; 95(3): 841-52.
- Pauroso S, Di Leo N, Fulle I, Di Segni M, Alessi S, Maggini E. Varicocele: Ultrasonographic assessment in daily clinical practice. *J Ultrasound* 2011; 14(4): 199-04.
- Hosseini K, Nejati M, Kabir A. Comparison of the efficacy and safety of Paloma Ivansisevich and Laparoscopic varicolectomy in Iranian infertile men with palpable varicocele. *Int J Fert Steril* 2018; 12(1): 81-87.
- Alsaikhan B, Albeeah K, Delouya G, Zini A. Epidemiology of varicocele. *Asian J Androl* 2016; 18 (2): 179-81.
- Arain GM, Awan WS, Karim F. Varicocele management. A comparison of Paloma versus Inguinal approach by. *Biomedica* 2009; 25(1):10-13.
- Ahmed F, Muhammad W, Uddin QT. Complications associated with Ivansisevich procedure for varicocele treatment. *Gomal J Med Sci* 2014; 12(30): 165-7.
- Al-Kandari AM, Shabaan H, Ibrahim HM, Elshebiny YH, Shokein AA. Comparison outcomes of different varicolectomy techniques open, inguinal, laparoscopic and sub inguinal microscopic varicolectomy: A randomized clinical trial. *Urology* 2007; 69(3): 417-20.
- Khan M, Khan S, Parvez A, Nawaz H, Ahmed S, Tareen S. Evaluation of low ligation and high ligation procedures of varicocele. *J Coll Physicians Surg Pak* 2003; 13(5): 280-83.
- Orda R, Sayfan J, Manor H, Witz E, Sofer Y. Diagnosis of varicocele and postoperative evaluation using inguinal ultrasonography. *Ann Surg* 1987; 206(1): 99-01.
- Macey MR, Owen RC, Ross SS, Coward RM. Best practice in the diagnosis and treatment of varicocele in children and adolescents. *Ther Adv Urol* 2018; 10(9): 273-82.
- Lorenc T, Krupniewski L, Palczewski P, Gołębowski M. The value of ultrasonography in the diagnosis of varicocele. *J Ultrason* 2016; 16(67): 359-70.
- Rotker K, Sigman M. Recurrent varicocele. *Asian J Androl* 2016; 18(2): 229-33.
- Jargiello, Drellich-Zbroja A, Falkowski A, Sojka M, Pyra K, Szczerbo-Trojanowska M. Endovascular transcatheter embolization of recurrent post-surgical varicocele: Anatomic reasons for surgical failure. *Acta Radiol* 2015; 56(1): 63-69.
- Cuda SP, Musser JE, Belnap CM, Thibault GP. Incidence and clinical significance of arterial injury in varicocele repair. *BJU Int* 2011; 107(10): 1635-37.
- Smith R, Kaune H, Parodi D, Madariaga M, Rios R, Morales I, et al. Increased sperm DNA damage in patients with varicocele: relationship with seminal oxidative stress. *Hum Reprod* 2006; 21(4): 986-93.
- Ficarra V, Cerruto MA, Liguori G, Mazzoni G, Minucci S, Tracia A, et al. Treatment of varicocele in subfertile men: The Cochrane Review-A contrary opinion. *Eur Urol* 2006; 49: 258-63.
- Shamsa A, Nademi M, Aqae M, Fard AN, Molaei M. Complications and the effect of varicolectomy on semen analysis, fertility, early ejaculation and spontaneous abortion. *Saudi J Kidney Dis Transpl* 2010; 21(6): 1100-05.
- Al-Said S, Al-Naimi A, Al-Ansari, Younis N, Shamsodini A, A-Sadiq K, et al. Varicolectomy for male infertility. A comparative study of open, laparoscopic and microsurgical approaches. *J Urol* 2008; 180(1): 266-70.