

COMPARISON OF SURGICAL TECHNIQUES USED IN ADULT VARICOCELE

Abdullah Bin Saeed,¹ Shahbaz Ahmed,¹ Javaid Iqbal¹

ABSTRACT

Background: A varicocele is an abnormal dilatation of veins in the pampiniform plexus of the spermatic cord. Several methods have been used for its treatment including open surgical ligation of the spermatic vein as well as laparoscopic and microsurgical varicocelectomy. **Objective:** To compare laparoscopic varicocelectomy with open varicocelectomy techniques in patients of varicocele in terms of operative time, duration of hospital stay, recurrence rate and effect on semen parameters. **Methodology:** Study Design: Randomized clinical trial Setting: Punjab Medical College and affiliated hospitals. Duration: 27th September 2014 to 26th September 2016. A total of 129 patients of varicocele were included in the study. All patients were diagnosed clinically as having varicocele. 43 patients underwent laparoscopic varicocelectomy (group A), 43 open varicocelectomy using retroperitoneal approach (group B) and 43 underwent open inguinal approach (group C). Outcome in terms of operative time, duration of hospital stay, recurrence rate and impact on semen parameters, was compared in three groups. The data was entered and analyzed by using SPSS version 20. **Results** The operative time and hospital stay in the laparoscopic group were significantly shorter than in retroperitoneal and inguinal groups ($P < 0.01$). Recurrence rate was 18.6% in the open inguinal group, 16.27% in the retroperitoneal group, and 4.65% in the laparoscopic group. This lower rate of recurrence was statistically significant in the laparoscopic group ($P < 0.05$). Among the three groups, comparisons between preoperative and postoperative semen parameters revealed improvements in sperm concentration and motility ($P < 0.01$). **Conclusion:** Outcome of laparoscopic varicocelectomy is better than open varicocelectomy techniques in patients of varicocele.

Keywords: Laparoscopic varicocelectomy, Open inguinal, Retroperitoneal, Varicocele, Outcome.

INTRODUCTION

A varicocele is characterized by abnormal dilatation and tortuosity of the veins in the spermatic cord and is a correctable cause of fertility. Treatment option of varicocele is still debatable. Several methods have been used including open surgical ligation of the spermatic vein as well as laparoscopic and microsurgical varicocelectomy. Each technique has its own set of advantages and disadvantages and conflicting results have been obtained by different studies.^{1,2,3,4,5} This study was planned to compare the outcome of these therapeutic options in second and third grade varicocele because varicocele affects adult males and in half of them is the cause of infertility. There are very few studies done regarding the comparison of the two options in second and third grade varicocele and available studies show conflicting results.^{5,6} The objective of this study was to compare the laparoscopic varicocelectomy with open varicocelectomy techniques in patients of varicocele in terms of operative time, hospital stay, recurrence rate and sperm parameters.

METHODOLOGY

Study Design: Randomized clinical trials.

Setting: Punjab Medical College And Affiliated Hospitals, Faisalabad. **Duration Of study:** 27th September 2014 to 26th September 2016. A total of 129 patients of varicocele were included in the study. All patients were diagnosed clinically as having varicocele. Patients were allocated randomly in one of the three groups. 43 patients underwent laparoscopic varicocelectomy (group A), 43 open varicocelectomy using retroperitoneal approach (group B) and 43 underwent open inguinal approach (group C). Outcome in terms of operative time, duration of hospital stay, recurrence rate and impact on semen parameters, was compared in three groups. **Sampling Technique:** Consecutive sampling **Technique Inclusion Criteria:** Patients between 15-60 years of age diagnosed clinically as having varicocele (unilateral or bilateral) on the basis of following criteria: a: Grade 2 and Grade 3 varicocele (Diagnosed clinically) b: Symptoms of pelvic heaviness and dragging sensation in the scrotum (diagnosed clinically). **Exclusion Criteria:** a: Grade 0 and Grade 1 varicocele (grade 0 diagnosed with doppler and grade 1 diagnosed clinically) as this can be managed conservatively. b: Presence of concurrent painful scrotal conditions e.g orchitis, epididymo-orchitis and trauma (diagnosed clinically). Grade 2 and 3 were defined as; **Grade 2:** palpable as a bag of worms without

1. Surgical Unit, Allied Hospital, Faisalabad, University of Health Sciences Lahore, Pakistan.

Correspondence: Dr. Abdullah Bin Saeed, Senior Registrar, Surgical Unit, Allied Hospital, Faisalabad, Pakistan.

E-mail: ixiabixi@hotmail.com

Mobile: +92-322-6248232

Received: 01-02-2017

Accepted: 27-02-2017

Valsalva maneuver,

Grade 3: visible on inspection

Operative time was calculated from the time that lapsed between skin incision to skin closure in the open approach and from trocar insertion to trocar removal in laparoscopic approach.

All patients underwent postoperative evaluations at one week to check the wound and then at 1 and 3 months postoperatively. Thereafter, patients were followed-up every 3 months. The evaluations included physical examination, color Doppler ultrasonography of the scrotum and, in the infertility cases, semen analysis. The recurrence of a clinical varicocele was determined based on the findings from the physical examination and color Doppler ultrasonography. The mean length of the follow-up period was 12 months (range 8 to 15 months). The data was entered and analyzed by using SPSS version 20.

RESULTS

A total of 129 patients were included in the study. The mean age in group A was 30.55 ± 9 years in group B 30.56 ± 8 years and in group C 31.2 ± 8 years. Operative time in group A was 27.44 ± 3.31

minutes, in group B was 32.79 ± 3.49 minutes and group C was 36.5 ± 3.56 minutes. P-value between Group A and B was 0.0001 and Group A and C was 0.0001. Hospital stay in Group A was 2.04 ± 1.25 days, in group B 2.04 ± 1.25 days and in group C was 3.96 ± 1.27 days. P-value between groups A and B was 0.0003 and Groups A and C was 0.0001. (Table I)

Recurrence in group A was 4.65%, in group B, 16.27% and 18.6% in group C. P-value between laparoscopic and retroperitoneal groups was <0.050 while p-value between laparoscopic and inguinal group was <0.030 (Table II)

Comparisons of the mean preoperative and postoperative semen parameters among the three groups showed significant improvement in sperm concentration and motility. (Table III)

DISCUSSION

Currently, popular varicocelectomy methods include the Palomo method, subinguinal method, laparoscopic method and sclerotherapy (internal spermatic vein embolization). The reports on various varicocele treatments with regard to outcomes and

Table I: Comparison of operative time and hospital stay between three groups

Variables	Laparoscopic (A)	Retroperitoneal (B)	Inguinal (C)	P-value (Group A&B)	P-value (Group A&C)
Operative time(mins)	27.44 ± 3.31	32.79 ± 3.49	36.5 ± 3.56	0.0001	0.0001
Hospital stay(days)	2.04 ± 1.25	2.04 ± 1.25	3.96 ± 1.27	0.0003	0.0001

Table II: Recurrence in Three Groups

Recurrence	Group A(n)	Group B(n)	Group C(n)	P-value (Group A&B)	P-value (Group A&C)
Yes	2(4.65%)	7(16.27%)	8 (18.6%)	0.050	0.030
No	41 (95.3%)	36 (83.7%)	35 (81.4%)		

Table III: Semen parameters with three surgical approaches before and after surgery.

Varicocelectomy	Sperm Parameters	Before Treatment	After Treatment (12 months)	P. Value
Laparoscopic	Sperm count ($\times 10^6/\text{mL}$)	29.86 ± 5.06	42.56 ± 5.99	0.01
	Sperm motility (%)	35.88 ± 4.43	49.35 ± 5.05	0.01
Retroperitoneal	Sperm count ($\times 10^6/\text{mL}$)	31.15 ± 3.81	43.30 ± 6.28	0.01
	Sperm motility (%)	36.20 ± 8.78	48.94 ± 6.24	0.01
Open Inguinal	Sperm count ($\times 10^6/\text{mL}$)	24.88 ± 6.78	38.47 ± 5.17	0.01
	Sperm motility (%)	31.45 ± 7.11	47.70 ± 8.45	0.01

terms of the most effective and least invasive method remains unknown.⁷

Mean age of the patients was 30.55 ± 8 years, This study showed that age is not significant factor for outcome of surgery. This fact is supported by different studies.^{7,8,9,10} Esteves et al, also showed mean age of 34.1 ± 7 years consistent with this study.¹¹ Chiba et al showed mean age of 14 (12-17) years.¹² Coutinho et al showed mean age of 18.4 years.¹³ Spinelle et al showed mean age of 14.5 years.¹⁴ Roserlu et al showed mean age of 28.1(18-48) years.¹⁵

This study showed laparoscopic varicocelectomy to be most time-saving procedure. Mean operative time for laparoscopic group was 27.44 ± 3.31 minutes while mean operative time for open varicocelectomy (retroperitoneal) group was 32.79 ± 3.49 minutes and 36.5 ± 3.56 minutes in open varicocelectomy (inguinal) group. This short operative time in laparoscopic group is related to increased magnification and easy access to testicular veins by this method.

Kupis et al, showed operative time of 21 ± 7 (min) with laparoscopic varicocelectomy.⁹ Wang et al showed operative time of 17.2 ± 9.8 (min) with laparoscopic varicocelectomy and 31.02 ± 12.8 (min) with open varicocelectomy.¹⁰

Esteves et al showed shorter operative time of 34 ± 5 (min) with laparoscopic varicocelectomy and longer time of 60 ± 9 (min) with open technique.¹¹

Chiba et al. showed mean operative time of 53(45-65) minutes.¹² Coutinho et al showed operative time of 36.4 ± 10 (min) with laparoscopic technique.¹³

Al-Kandari et al showed operative time of 32 ± 13 (min) with laparoscopic group and 37 ± 10 (min) with open technique which are comparable to this study.¹⁶ Barroso et al showed longer operative time of 53.5 ± 12.02 (min) with laparoscopic technique and a shorter operative time of 30(min) with open technique.¹⁷ Gargollo et al showed shorter operative time of $28 \pm$ (min) with laparoscopic technique.¹⁸

In our study recurrence rate was 4.65% in laparoscopic group, 16.27% in retroperitoneal group and 18.6% in inguinal group. P-value between laparoscopic group and open groups was statistically significant. The incidence of varicocele recurrence following surgical repair varies from 1% to 45%.¹⁹ The rate of recurrence

depends on the type of procedure performed and the use of magnification. Venography has shown that recurrent varicoceles are caused by collateral periarterial, parallel inguinal, mid retroperitoneal, gubernacular and transscrotal veins. Recurrent varicoceles is common complication, which again is understudied when stratified across different surgical approaches. In the largest of meta-analyses, comparing retroperitoneal approach, laparoscopic approach, and the macroscopic inguinal approach showed recurrence rates of 15.0%, 4.3%, and 2.6%, respectively.¹⁹

Recurrence of varicocele treated by the retroperitoneal approach is likely due to the inability to ligate the contributions of the external spermatic vein, which has been found to be dilated in 16 to 74% of cases. With respect to recurrence and complication rates in the inguinal and subinguinal approaches, there also may be a correlation with the degree of magnification used.

One study with 100 patients undergoing repair by both inguinal and subinguinal approaches demonstrated a 0% recurrence with the microscope, 2.9% with loupe magnification, and 8.8% without magnification.²⁰ Two recent studies also compared microscopic varicocelectomy to open and laparoscopic techniques to support these conclusions, reporting a 2 to 3% recurrence rate.^{21,22}

Among the three groups, comparisons between preoperative and postoperative semen parameters revealed improvements in sperm concentration and motility ($P < 0.01$). In several studies, it has been shown that a repair of a varicocele increased serum testosterone, resulting in testicular growth correlating with increased serum testosterone.²³

Nork et al. suggested that the presence of a varicocele in youth is associated with a statistically significant decrease of sperm density, motility, and morphology. Treatment of a varicocele in youth was found to be associated with a statistically significant improvement of sperm density and motility.²⁴

Similar findings have been identified in adults who undergo intervention.²⁵ Agarwal et al. compared preoperative and postoperative semen analysis following varicocelectomy.

The analysis demonstrated an overall increase in sperm density of 9.71×10^6 /mL (95% CI [7.34–12.08]) and motility of 9.92% (95% CI [4.90%–14.95%]). They also demonstrated an increased morphology of 3.16.²⁶

CONCLUSION

Laparoscopic varicocelectomy is simple, shortens the operative time and hospital stay and improves the semen parameters. It also has a low incidence of varicocele recurrence. Though it is associated with complications, its benefits outweigh its complications.

REFERENCES

- Glassberg KI, Poon SA, Gjertson CK, Decastro GJ, Misseri R. Laparoscopic lymphatic sparing varicocelectomy in adolescents. *J Urol*.2008;80:326-30.
- Feber KM, Kass EJ. Varicocelectomy in adolescent boys: long-term experience with the Palomo procedure. *JUrol*.2008;180:1657–60.
- Tu D, Glassbeg KI. Laparoscopic varicocelectomy. *BJU Int*. 2010;106:1094-104.
- Sun H, Liu Y, Yan MB, Li ZD, Gui XG. Comparing three different techniques used in adult bilateral varicocele. *Asian J Endosc Surg*.2012;5.(1):12-16.
- Diegidio P, Jhaveri JK, Ghannam S, Pinkhasov R, Fisch H. Review of current varicocelectomy techniques and their outcomes. *BJU Int*.2011;108:1157-72.
- Sangrasi AK, Leghari AA, Memon A, Talpur KA, Memon AI, Memon JM. Laparoscopic versus Inguinal varicocelectomy. *J Coll Physicians Surg Pak*.2010;20:106-11.
- Shiraishi K, Oka S, Ito H, Matsuyama H. Comparison of the results and complications of retroperitoneal, microsurgical subinguinal, and high inguinal approaches in the treatment of varicoceles. *J Androl*. 2012;33(6):1387-93.
- Choi WS, Kim SW. Current issues in varicocele management: a review. *World J Mens Health*.2013 Apr;31(1):12-20.
- Kupis Ł, Dobroński PA, Radziszewski P. Varicocele as a source of male infertility: current treatment techniques. *Cent European J Urol* 2015;68:365-70.
- Wang J, Xia SJ, Liu ZH, Tao L, Ge JF, Xu CM, et al. Inguinal and subinguinal micro-varicocelectomy, the optimal surgical management of varicocele: a meta-analysis. *Asian J Androl* 2015;17:74-80.
- Esteves SC, Miyaoka R, Roque M, Agarwal A. Outcome of varicocele repair in men with nonobstructive azoospermia: systematic review and meta-analysis. *Asian J Androl* 2016; 18:246-53
- Chiba K, Ramasamy R, Lamb DJ, Lipshultz LI. The varicocele: diagnostic dilemmas, therapeutic challenges and future perspectives. *Asian J Androl* 2016;18:276-81.
- Coutinho K, McLeod D, Stensland K, et al. Variations in the management of asymptomatic adolescent grade 2 or 3 left varicoceles: a survey of practitioners. *J Pediatr Urol*. 2014;10:430-5
- 14-Spinelli C, Di Giacomo M, Lo Piccolo R, Martin A, Messineo A. The role of testicular volume in adolescents with varicocele: The better way and time of surgical treatment. *JUrol* 2010;184:1722–6.
- Resorlu B, Kara C, Sahin E, Unsal A. The significance of age on success of surgery for patients with varicocele. *Int Urol Nephrol* 2010;42:351–6.
- 16-Al-Kandari AM, Shabaan H, Ibrahim HM, Elshebiny YH, Shokeir AA. Comparison of outcomes of different varicocelectomy techniques: open inguinal, laparoscopic, and subinguinal microscopic varicocelectomy: a randomized clinical trial. *Urology*.2007;69:417–20.
- Barroso U, Andrade DM, Novaes H, Netto JMB, Andrade J. Surgical treatment of varicocele in children with open and laparoscopic Palomo technique: a systematic review of the literature. *JUrol* 2009;181:2724–48.
- Gargollo PC, Diamond DA. Current management of the adolescent varicocele. *Curr Urol Rep*.2009;10:144–52.
- Cayan S, Shavakhabov S, Kadioğlu A. Treatment of palpable varicocele in infertile men: a meta-analysis to define the best technique. *J Androl* 2009;30(1):33–40
- Cayan S, Acar D, Ulger S, et al. Adolescent varicocele repair: longterm results and comparison of surgical techniques according to optical magnification use in 100 cases at a single university hospital. *J Urol* 2005;174(5):2003–6
- Lomboy JR, Coward RM. The Varicocele: Clinical Presentation, Evaluation, and Surgical Management. *Semin Intervent Radiol*. 2016 Sep;33(3):163-9.
- Ding H, Tian J, Du W, Zhang L, Wang H, Wang Z. Open non-microsurgical, laparoscopic or open microsurgical varicocelectomy for male infertility: a meta-analysis of randomized controlled trials. *BJU Int*.2012 Nov;110(10):1536-42.
- Tanrikut C, Goldstein M, Rosoff JS, Lee RK, Nelson CJ, Mulhall JP. Varicocele as a risk factor for androgen deficiency and effect of repair. *BJU Int*. 2011;108:1480–1484.
- Nork JJ, Berger JH, Crain DS, Christman MS. Youth varicocele and varicocele treatment: a meta-analysis of semen outcomes. *Fertil Steril* 2014;102:381e387 e6
- I. Schauer, S. Madersbacher, R. Jost, W.A. Hubner, M. Imhof. The impact of varicocelectomy on sperm parameters: a meta-analysis. *JUrol*, 2012;87: 1540–1547
- A. Agarwal, F. Deepinder, M. Cocuzza, R. Agarwal, R.A. Short, E. Sabanegh, et al. Efficacy of varicocelectomy in improving semen parameters: new meta-analytical approach *Urology*,2007; 70; 532-8

Article Citation: Saeed AB, Ahmed S, Iqbal J. Comparison of surgical techniques used in adult varicocele. *JSZMC* 2017;8(1):1101-1104