

OUTCOME OF HIGH VARICOCELE LIGATION; LAPAROSCOPIC VS OPEN METHOD

MIAN UMAR JAVED¹, MUHAMMAD SHABBIR AHMAD², ABU RAIHAN ZABD-UR-REHMAN QURESHI³,
UMAR FAROOQ DAR⁴, MUDDASSIR MUNIR⁵, EJAZ AHMAD LATIF⁶

^{1-3,5,6}*Department of Surgery Unit-1, Jinnah Hospital, Lahore*

⁴*Department of Infectious Diseases, Institute of Public Health, Lahore*

For correspondence: Dr Umar Farooq Dar, e-mail: umardar84@gmail.com

ABSTRACT

Objective: To compare the frequency of scrotal oedema in cases of varicocele ligated either laparoscopically or by open technique.

Subjects and Methods: In this randomized control trial carried out in department of general surgery, Jinnah hospital Lahore, and two hundred diagnosed cases of varicocele were randomly assigned either to laparoscopic or open technique of high varicocele ligation. Patients were followed for post-operative scrotal oedema on day 14.

Results: Out of two hundred patients 2 patients suffered scrotal oedema in laparoscopic group while 11 patients developed scrotal oedema in open technique group ($p=0.01$). There was equal distribution of age in both groups ($p=0.44$).

Conclusion: It is concluded Laparoscopic high ligation of varicocele is associated with less risk of post-operative scrotal oedema as compared to open high ligation.

Keywords: Laparoscopic ligation, Open ligation, Scrotal oedema, Varicocele

INTRODUCTION

Varicocele is the abnormal tortuosity and dilatation of the testicular veins and the pampiniform plexus of the testis. The incidence of varicocele is approximately 16% in the adult population.¹ Varicoceles are common not only in adults, but also in peri-pubertal children and adolescent. Possible causes of varicocele include the length of the gonadal vessels, renal vein to inferior vena cava pressure gradients and the angle of insertion of the left gonadal vein into the left renal vein.² In patients with chronic venous insufficiency, higher body mass index, high levels of smoking, standing occupation, positive family history, longer duration of symptoms and constipation were found as potential factors for varicocele.³

The earliest conventional description of a surgical treatment for a varicocele was performed in 1885 by Barwell.⁴ However, it was just in the last two decades that early adolescent-onset varicoceles were demonstrated to have a negative influence on testicular growth and function⁵ and their presence in adolescent population may represent more than an inconsequential physical finding.⁶ Although the exact relationship between varicocele and impaired spermatogenesis is not clear, about 40% of males with infertility have a varicocele. Correction of the varicocele improves the

semen parameter in over half of these men.⁷ Therefore, in well-verified cases operation is recommended.⁸

Various surgical and radiological treatment techniques have been advocated for managing varicocele. The microscopic sub-inguinal approach has been the standard technique for treating varicocele in many centers for long time with good results and low complication rates. Kass and Marcol⁹ advocated the Palomo technique¹⁰ in which high open retroperitoneal ligation of the spermatic artery and vein is performed as a highly successful technique for the correction of varicocele. This technique yielded superior control of varicocele compared to artery preserving methods.

With the advent of modern laparoscopic surgery, the technique of laparoscopic varicocelectomy has progressively improved. The first laparoscopic varicocelectomy was performed by Sanchez de Badajos et al in 1985.¹¹ The initial reports considered laparoscopic varicocele ligation (LVL) to be a safe and effective technique even in patients who had previously undergone ipsilateral inguinal/scrotal surgeries.

Scrotal edema is a known frequent complication of varicocelectomy in open procedure; it has a reduced incidence in laparoscopic ligation. Ali Shamsa et al¹² described increased frequency of scrotal edema in laparoscopic as compared to open ligation of varicocele

(13.3% Vs 10%). Alaa Hateem described much lower rate (1.8% versus 10.8%)¹³ of scrotal edema in laparoscopic procedure.

Despite the very long history of the disease and many records on different surgical and radiological solutions, the ideal method of spermatic vein ligation for varicocele is still a matter of controversy.¹⁴ The perfect technique would be one that preserves testicular function and eliminates the varicocele with a low rate of complications. We analyzed the outcome of 200 patients treated for varicocele at our department with a laparoscopic and open high approach and compared the efficacy of both in terms of complication of scrotal oedema.

SUBJECTS AND METHODS

This randomized control trial was carried out in surgical floor of Jinnah Hospital Lahore. Two hundred diagnosed cases of varicocele with age ranging from 15 to 50 years were included after informed consent. Varicocele was diagnosed by clinical examination as abnormal tortuosity and dilatation of the veins in upright then supine position (a bag of worms) and Doppler ultrasound scan. Patients with history of recurrent varicocele, previous laparotomy, abnormal hormonal profile, abnormal testicular size (volume <20mL or volume >30mL, determined by ultrasonography) were excluded. The demographic information was recorded (name, age) on a predesigned proforma. In all patients high varicocele ligation was performed by a consultant under general anaesthesia. Laparoscopic high ligation is the technique which involves ligation of testicular vessels laparoscopically just proximal to deep inguinal ring while open technique involved ligation of testicular vessels through lumbar incision. Scrotal oedema was defined as post-operative swelling/thickening of scrotal skin on ultrasonography on day 14. Collected information was entered into statistical package for social scientist SPSS version 21 and analyzed. The variables were age and presence or absence of scrotal oedema in either group. It was hypothesized that there is difference in frequency of development of scrotal oedema in patients undergoing these two techniques. Chi square / Fischer exact test was used to test the hypothesis. Mean age distribution in both techniques was assessed using independent sample t test. P value ≤ 0.05 was considered significant.

RESULTS

Two hundred patients of varicocele were included with mean age of 30.94 ± 7.54 years ranging from 16 to 50 years. Most of these patients were in third and fourth

decade of life. Common presentation in surgical out-door patient department was dragging dull aching pain in scrotum after prolonged standing. On examination there was sense of bag of worms in the scrotum which used to disappear after lying down. All these patients underwent high ligation, after proper assessment and sound diagnosis had been established. 100 patients were treated with laparoscopic high ligation and 100 with open high ligation. Scrotal oedema was observed in 2% patients (2/100) with laparoscopic ligation and in 11% patients (11/100) in open ligation group. Mean age was equally distributed in both treatment groups ($p = 0.139$).

Table 1: Development of Scrotal edema in both techniques for high ligation of varicocele

Technique	Yes	No
Laparoscopic high ligation	2	98
Open high ligation	11	89
Total	13	187
P value	0.018 (Significant)	

DISCUSSION

Varicocele is commonly diagnosed correctable and reversible condition leading to male infertility. Various techniques for varicocele treatment including surgery and embolization have been investigated and reported with regard to outcomes such as complication, recurrence and pregnancy rate. The surgical treatment for varicocele consists of open ligation of spermatic veins and laparoscopic high ligation. Open ligation can be done at sub-inguinal, inguinal and retroperitoneal (high ligation- Palomo technique) level. All of these can be done under local or regional anaesthesia. The widespread concept of 'minimally invasive' technique has stimulated many surgeons to use a simple, safe and efficient laparoscopic technique for the treatment of varicocele. However, the debate concerning the standard technique for varicocelectomy has continued until now. Some previous reports indicated that a laparoscopic approach was less invasive than retroperitoneal high ligation because of its lesser postoperative morbidity.

However, none of the techniques was found absolutely superior to the others. And also, during laparoscopic varicocelectomy, some theoretical but fatal risks such as damage to major vessels and visceral organs on trocar insertion, or CO₂ embolization were threatened. Thus the laparoscopic procedure was not readily acceptable. Nonetheless surgeons did attempt laparoscopic procedure with variable and sometimes contradicting results. The variable and confusing outcomes of some of the studies are discussed below.

In a retrospective study comparing laparoscopic surgery versus antegrade sclerotherapy, May et al¹⁵ reported a higher failure rate with antegrade sclerotherapy (16%) compared with laparoscopic treatment (5%). Although the procedural time and length of stay post-procedure are comparable, laparoscopic treatment has a significantly higher rate of complication (13% vs. 5%), with hydrocele being the most common one (11%). In a retrospective study by Beutner et al¹⁶ comparing laparoscopy, retrograde and antegrade sclerotherapy, it was noted that although the laparoscopic approach has a lower recurrence rate (5% vs. 16% with antegrade and 19% with retrograde sclerotherapy), it is associated with a higher complication rate (15% vs. 5% with antegrade and 9% with retrograde sclerotherapy). There were some reports that showed a significant recurrence rate in retroperitoneal high or laparoscopic methods. However these ligations could be inadequate treatment because these methods deal only with internal spermatic veins, not with external spermatic veins and veins of the vas deferens. Pintus et al⁵ compared retrograde sclerotherapy, open retroperitoneal high ligation (Palomo technique) with or without sparing of the artery and laparoscopic high ligation with or without sparing of the artery, all for the treatment of left-sided varicoceles in the pediatric population. The highest recurrence rate was noted with laparoscopic high ligation with arterial sparing (25%) compared with sclerotherapy (17%), inguinal open varicocelectomy (15%) and open high ligation with arterial sparing. When the arteries were not spared, the recurrence rate was lower for open high ligation (3.4%) and laparoscopic high ligation (0%).⁵

All of these studies have compared different outcomes for comparison. Some discussed recurrence while others focused on complications. Our study compared the complication of scrotal oedema in both techniques. Scrotal oedema is a known frequent complication of varicocelectomy. Oedema is likely to be formed because of venous congestion or obstruction occurring after ligation of testicular veins. Szabo and Kessler reported that lymphatic obstruction was the cause of oedemaformation. However this phenomenon is mostly associated with hydrocele formation. Ali Shamsa et al¹³ described increased frequency of scrotal edema (13.3% Vs 10%) while Alaa Hateem¹⁴ described much lower rate (1.8% versus 10.8%) of scrotal oedema in laparoscopic procedure compared with open high ligation. In our study, 100 patients were treated with laparoscopic high ligation and 100 with open high ligation. Scrotal oedema was observed in 2% patients

(2/100) with laparoscopic ligation and in 11% patients (11/100) in open ligation group.

Our study demonstrated lesser risk of scrotal oedema with laparoscopic technique. Although it generally takes longer operative time and requires additional surgical training, equipment and expertise, many investigators are in favour of the laparoscopic approach as it is associated with a shorter hospitalization period and earlier recovery, lower recurrence and complication rates and possibly higher level improvement in sperm count and motility. However one factor was not taken into account in this study that in both techniques under study (as both involve high ligation), we ligated only internal spermatic veins and not the external spermatic veins and those along vas deferens. So the risk of scrotal oedema would have been a little lower than with other techniques using low ligations. But the higher frequency was found in the open group which reflected that there may be some other factors involved in oedema formation besides venous occlusion or congestion. One of them is excessive dissection done in open surgery which causes more exsanguinations while laparoscopic surgery being the 'minimally invasive technique' avoids wider dissections and it uses the intra-peritoneal space where the spermatic vein is just deep to one-cell-thick layer of peritoneum.

It should however be emphasized that the skills and experience of the surgeons play a tremendous role in the outcomes of the procedures used. For instance, in the hands of skilful laparoscopist, the post-operative outcomes and complication rates can be comparable to other procedures. On the contrary, inexperienced surgeons or other circumstantial factors may result in prolonged surgical time and unusual complications (e.g., urinary retention) that can lead to prolonged hospitalization.

CONCLUSION

This randomized controlled trial concludes that laparoscopic high ligation is better than open high ligation in terms of less scrotal oedema. However, the system and equipment required for this surgery is not readily available and requirement of increased estimated time and cost of surgery makes it unpopular among surgeons.

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