

A prospective randomized comparative trial between open subinguinal and loupe assisted subinguinal varicocelectomy: A single center experience

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Abstract

Introduction: In our study, we reviewed efficacy and complication rates of open subinguinal varicocelectomy (OSV) and loupe assisted subinguinal varicocelectomy (LASV) using seminal and hormonal parameters in a prospective randomized study.

Materials and Methods: We prospectively studied 60 males with Grade 2 and Grade 3 varicocele. Thirty patients underwent OSV and the other 30 patients underwent LASV. Intra-operative and post-operative complications along with pre-operative and post-operative seminal, hormonal parameters and testicular volume were compared between the groups.

Results: Sperm count, motility and morphology increased significantly in both groups, but the improvement was significantly better in LASV group. (Group A – improvement in sperm count, motility and morphology by 25%, 8.5%, 10.3%, respectively and in Group B – improvement in sperm count, motility and morphology by 110%, 68.59%, 71.1%, respectively. Decrease in serum follicular stimulating hormone (FSH), luteinizing hormone (LH) and increase in serum testosterone were significant in both groups, but the improvement was significantly better in LASV group. (Group A – serum FSH and LH decreased by 17.2%, 23%, respectively and serum testosterone increased by 13.7% and in Group B – serum FSH and LH decreased by 56.9%, 56.65%, respectively and serum testosterone increased by 95.9%). The recurrence (OSV = 13.2% and LASV = 0, $P = 0.01$) and complication rates were significantly lower in LASV group.

Conclusion: Our study shows that LASV is significantly better than OSV regarding efficacy and complication rates.

Key Words: Loupe assisted subinguinal varicocelectomy, open subinguinal varicocelectomy, varicocele

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Received: 26.09.2013, Accepted: 10.02.2014

INTRODUCTION

Although usually asymptomatic, deleterious effects of varicoceles on testicular size and function have been reported and they may be associated with male infertility.^[1-4] It has been

found that there is statistically significant relationship between testicular growth arrest and varicocele (Grade 2 and Grade 3) and grades of reflux.^[5] Currently, the most common indications for the operative repair of varicoceles include symptomatic lesions, testicular volume loss ipsilateral to the varicocele, bilateral palpable varicoceles and abnormal semen values.^[6]

There are several varicocele ablative procedures such as open varicocelectomy, loupe assisted varicocelectomy, laparoscopic varicocelectomy, microscopic varicocelectomy. After thorough PubMed and Medline search we found only one prospective randomized study (Abdelrahman *et al.*) that compared open varicocelectomy with loupe assisted varicocelectomy. Therefore,

Access this article online	
Quick Response Code:	Website: www.urologyannals.com
	DOI: 10.4103/0974-7796.198899

we have planned a prospective randomized study to compare the efficacy and complication rate of open subinguinal varicocelectomy (OSV) and loupe assisted subinguinal varicocelectomy (LASV) using seminal and hormonal parameters.

MATERIALS AND METHODS

This prospective randomized study was conducted in VMMC and Safdarjung Hospital, New Delhi. The study period was between June 2010 and June 2012. The study protocol and procedures were approved by the hospital ethical committee and written informed consent was taken from the participants. All patients who fulfilled the inclusion criteria (between 15 and 45 years of age with Grade 2 and Grade 3 varicocele) were included in the study. The study included both infertile men and those with symptoms. Patients with epididymo-orchitis, UTI, testicular tumor, retroperitoneal tumor, RCC, previous varicocele surgery were excluded from the study. Patients were randomized into 2 groups Group A (OSV) and Group B (subinguinal loupe assisted varicocelectomy - LASV) using computer generated randomized table.

Initial evaluation included a detailed clinical history, blood and urine investigations including complete hemogram, liver function test, kidney function test, urine routine microscopy, urine culture sensitivity. Doppler ultrasonography (USG) was used to confirm physical findings and to determine testicular volume (testicular volume = 0.7 × length × breadth × depth). Semen analysis was performed according to World Health Organization guidelines. Serum follicular stimulating hormone (FSH), luteinizing hormone (LH) and testosterone were estimated in all patients by enzyme immunoassay.

Patients in Group A underwent OSV and those in Group B underwent LASV (×2.5) by same surgeon under spinal anesthesia. Post-operatively patients were followed at 1 week and 3 months. At 1 week wound was examined and sutures were removed. At 3 months, semen analysis, hormonal analysis and color Doppler USG were done. The objective of the current study was to compare the two groups in terms of efficacy (seminal and hormonal parameters, failure rates) and complication rate. Statistical analysis was performed using SPSS software version 17 (IBM SPSS Statistics 17.0.3; IBM SPSS, 2009) Students t-test was applied for continuous variables and Chi-square test was applied for categorical variables. All P < 0.05 were considered to be significant.

RESULTS

A total of 89 patients between 15 and 45 years of age with Grade 2 and Grade 3 varicocele reported to our hospital between June 2010 and June 2012. Out of which, 20 patients

were excluded as they failed to satisfy the eligibility criteria. A total of 69 patients were included in the study and were randomized into two groups using computer generated randomization table: 34 patients in Group A (OSV) and 35 patients in Group B (LASV). Nine patients (4 from OSV group and 5 from LASV group) were lost to follow-up. A total of 60 patients were analyzed in the study [Figure 1].

All 60 patients in both group had unilateral varicocele on the left side and all of them underwent operation.

The mean age of patients, distribution of Grade 2 and Grade 3 varicoceles and presenting symptoms (infertility, fullness and swelling in scrotum, scrotal pain) in either group were not statistically different [Table 1].

The effect of both procedures on testicular volume is described in Table 2. The testicular volume at 3 months increased in both groups, but the difference was not statistically significant.

The seminal parameters are described in Table 3. The sperm count sperm morphology and motility significantly improved

Table 1: Age and distribution of symptoms

Parameters	Group A	Group B	P value (NS)
Age	25.63 (±4.53)	26.11 (±5.12)	0.32
Grade 2/3 varicocele	16/14	15/15	0.41
Infertility	20 (66%)	20 (66%)	0.33
Heaviness in scrotum	8 (26%)	7 (22%)	0.51
Scrotal swelling	6 (20%)	7 (22%)	0.21
Scrotal pain	3 (10%)	3 (10%)	0.12

Table 2: Testicular volume (change in testicular volume)

Testicular volume	Group A %	Group B %	P value
Pre-operative	14.58 (±0.58)*	14.7 (±0.64)**	0.41 (NS)*
Post-operative	15.09 (±0.63)*	15.30 (±0.62)**	0.32 (NS)**
Percentage increase	3.6	4.08	0.34 (NS)

*Pre-operative Group A versus post-operative Group A, **Pre-operative Group B versus post-operative Group B

Table 3: Seminal parameters (change in seminal parameters)

Seminal parameters	Group A %	Group B %	P value
Sperm concentration			
Pre-operative	17.13 (±3.1)*	16.59 (±2.8)**	0.21 (NS)*
Post-operative	21.44 (±3.3)*	34.9 (±3.1)**	0.01 (S)**
Percentage increase (P value)	25	110	0.02 (S)
Motility			
Pre-operative	38.6 (±2.2)*	38.53 (±2.1)**	0.41 (NS)*
Post-operative	41.9 (±2.2)*	64.96 (±2.01)**	0.01 (S)**
Percentage increase (P value)	8.5	68.59	0.01 (S)
Morphology			
Pre-operative	40.06 (±2.3)*	40.27 (±2.5)**	0.12 (NS)*
Post-operative	44.2 (±5.5)*	68.96 (±2.01)**	0.01 (S)**
Percentage increase (P value)	10.3	71.1	0.03 (S)

*Pre-operative Group A versus post-operative Group A, **Pre-operative Group B versus post-operative Group B

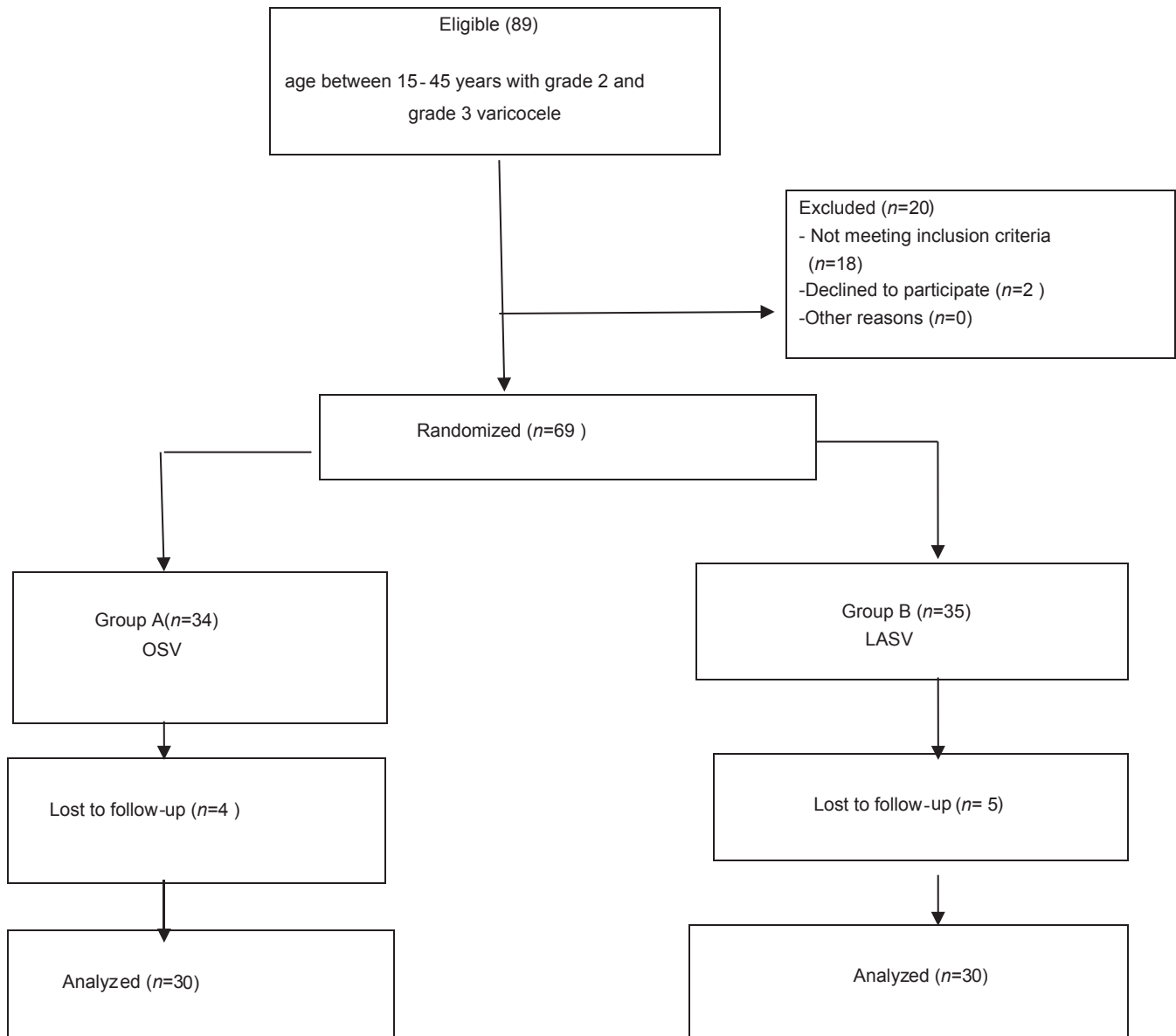


Figure 1: Allocation of patients in the study

in both Group A and Group B post-operatively. Moreover the improvement in Group B was significantly better than Group A. The hormonal parameters are described in Table 4. The rise in serum testosterone value and fall in serum LH and FSH was statistically significant following varicocelectomy in both groups. The results were significantly better in favor of Group B.

We found low complication rate associated with loupe subinguinal varicocelectomy as compared to open subinguinal varicocelectomy; however the former required longer operating time although not statistically significant [Table 5].

Recurrence was significantly higher (13.2%) in the open group as compared to loupe assisted group (0).

DISCUSSION

Open varicocelectomy has long been used for management of varicoceles; however, it is associated with high complication rate 5-30% (including hydrocele, arterial ligation, testicular atrophy and wound infection) and high recurrence rate.^[7] Laparoscopic varicocelectomy is another commonly used modality. Shamsa *et al.*, compared laparoscopic varicocelectomy with subinguinal varicocelectomy and concluded that subinguinal varicocelectomy is better than lap. varicocelectomy in terms of recurrence, hydrocele formation and operative time.^[8] Loupe varicocelectomy (optical magnification) is another promising modality. Cayan *et al.* prospectively reviewed the long-term results of varicocele repair and compared the complication rates of varicocelectomy techniques according to optical

Table 4: Hormonal parameters

Hormonal parameters	Group A %	Group B %	P value
Serum testosterone			
Pre-operative	5.5 (±0.69)*	5.49 (±0.67)**	0.41 (NS)*
Post-operative	6.31 (±0.75)*	10.76 (±0.77)**	0.01 (S)**
Percentage increase	13.7	95.9	0.02 (S)
Serum FSH			
Pre-operative	15.03 (±1.41)*	15.11 (±1.43)**	0.31 (NS)*
Post-operative	12.44 (±0.73)*	6.5 (±0.75)**	0.01 (S)**
Percentage decrease	17.2	56.9	0.01 (S)
Serum LH			
Pre-operative	9.74 (±0.73)*	9.76 (±0.72)**	0.35 (NS)*
Post-operative	7.3 (±0.53)*	4.23 (±0.55)**	0.01 (S)**
Percentage decrease	23	56.65	0.01 (S)

*Pre-operative Group A versus post-operative Group A, **Pre-operative Group B versus post-operative Group B. FSH: Follicular stimulating hormone, LH: Luteinizing hormone

Table 5: Duration of surgery and complications

Operative time and complications	Group A (%)	Group B (%)	Clavien's grading	P value
Duration of surgery (min)	20.03	30		0.32 (NS)
Hydrocele	3 (10)	0	3	0.01 (S)
Hematoma	1 (3.3)	0	1	0.32 (NS)
Recurrence	4 (13.3)	0	3	0.01 (S)

magnification and found that the recurrence rates were 0% in cases managed by microsurgical varicocelectomy, 2.9% in those where loupe magnification was used and 8.8% in those where no magnification was used.^[9] Microsurgical inguinal varicocelectomy is considered as the treatment of choice by many, it is associated with a lower recurrence rate and fewer complications, compared with laparoscopic varicocelectomy or retroperitoneal high-open ligation.^[10-12] However, operating microscope is not readily available in all parts of the world particularly developing countries and most surgeons are not familiar with the use of the operating microscope.

Keeping the above literature and facts in mind, we compared OSV and loupe subinguinal varicocelectomy procedures as we were familiar with the use of loupe due to its use in other reconstructive procedures such as hypospadias, epispadias repair.

Hsiao *et al.* retrospectively reviewed the records of 272 men who underwent microsurgical subinguinal varicocelectomy and found that it resulted in significant increases in sperm concentration, total sperm count and testosterone in all age groups.^[13] Aggarwal and Thomas in a meta-analysis reported that the sperm concentration, motility increased after both microsurgery and high ligation varicocelectomy.^[14] Abdel-Maguid and Othman in a prospective randomized study including 162 patients compared microsurgical subinguinal varicocelectomy with non-magnified subinguinal varicocelectomy and concluded that sperm count and motility improved significantly in both groups and results were better in the microsurgical group. We found that varicocelectomy (both

open subinguinal and loupe subinguinal) was associated with significant improvement in sperm concentration, motility and morphology which is consistent with results of the above mentioned studies.^[15]

Zohdy *et al.* performed microsurgical varicocelectomy in 141 men with clinical varicocele and found that varicocelectomy significantly improves serum testosterone in infertile men, especially those with hypogonadism.^[16] Tanrikut *et al.* found that men with varicoceles had significantly lower testosterone levels and microsurgical varicocele ligation resulted in a significant increase in serum testosterone levels.^[17] In the present study varicocelectomy was associated with significant improvement in hormonal parameters, the rise in testosterone, fall in FSH, LH was significant following surgery which is in concordance with several studies.

Although both open subinguinal and subinguinal loupe varicocelectomy were associated with improvement in seminal and hormonal parameters the improvement in patients who underwent subinguinal loupe varicocelectomy was more and there was a statistically significant difference between the two procedures.

The most common complications of varicocelectomy are hydrocele formation, recurrence and testicular artery injury.^[13] We found markedly low complication rate associated with subinguinal loupe varicocelectomy as compared to open subinguinal varicocelectomy; however the former required longer operating time although not statistically significant [Table 4]. The recurrence rate was significantly lower in Group B (LASV) as compared to Group A (OSV) 0% versus 13.2% which is consistent with the study conducted by Cayan *et al.*

CONCLUSION

LASV has significantly better efficacy and lesser complication rates as compared to OSV.

REFERENCES

1. Steeno O, Knops J, Declerck L, Adimoelja A, van de Voorde H. Prevention of fertility disorders by detection and treatment of varicocele at school and college age. *Andrologia* 1976;8:47-53.
2. Kass EJ, Belman AB. Reversal of testicular growth failure by varicocele ligation. *J Urol* 1987;137:475-6.
3. Paduch DA, Niedzielski J. Repair versus observation in adolescent varicocele: A prospective study. *J Urol* 1997;158:1128-32.
4. Gorelick JL, Goldstein M. Loss of fertility in men with varicocele. *Fertil Steril* 1993;59:613-6.
5. Zampieri N, Zuin V, Corroppo M, Ottolenghi A, Camoglio FS. Relationship between varicocele grade, vein reflux and testicular growth arrest. *Pediatr Surg Int* 2008;24:727-30.
6. Oster J. Varicocele in children and adolescents. An investigation of the incidence among Danish school children. *Scand J Urol Nephrol* 1971;5:27-32.

7. Szabo R, Kessler R. Hydrocele following internal spermatic vein ligation: A retrospective study and review of the literature. *J Urol* 1984;132:924-5.
8. Shamsa A, Mohammadi L, Abolbashari M, Shakeri MT, Shamsa S. Comparison of open and laparoscopic varicocelectomies in terms of operative time, sperm parameters, and complications. *Urol J* 2009;6:170-5.
9. Cayan S, Acar D, Ulger S, Akbay E. Adolescent varicocele repair: Long-term results and comparison of surgical techniques according to optical magnification use in 100 cases at a single university hospital. *J Urol* 2005;174:2003-6.
10. 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.
11. Watanabe M, Nagai A, Kusumi N, Tsuboi H, Nasu Y, Kumon H. Minimal invasiveness and effectivity of subinguinal microscopic varicocelectomy: A comparative study with retroperitoneal high and laparoscopic approaches. *Int J Urol* 2005;12:892-8.
12. Hirsch IH, Abdel-Meguid TA, Gomella LG. Postsurgical outcomes assessment following varicocele ligation: Laparoscopic versus subinguinal approach. *Urology* 1998;51:810-5.
13. Hsiao W, Rosoff JS, Pale JR, Greenwood EA, Goldstein M. Older age is associated with similar improvements in semen parameters and testosterone after subinguinal microsurgical varicocelectomy. *J Urol* 2011;185:620-5.
14. Aggarwal A, Thomas AJ. Proving the value of varicocelectomy as a successful treatment of male subfertility. *Urol News* 2006-2007;15:41-43.
15. Abdel-Maguid AF, Othman I. Microsurgical and nonmagnified subinguinal varicocelectomy for infertile men: A comparative study. *Fertil Steril* 2010;94:2600-3.
16. Zohdy W, Ghazi S, Arafa M. Impact of varicocelectomy on gonadal and erectile functions in men with hypogonadism and infertility. *J Sex Med* 2011;8:885-93.
17. 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;108:1480-4.

How to cite this article: Vyas HG, Bhandari V, Kumar A, Nanda B, Singh H, Bhowmick S. A prospective randomized comparative trial between open subinguinal and loupe assisted subinguinal varicocelectome: A single center experience. *Urol Ann* 2017;9:13-7.

Source of Support: Nil, **Conflict of Interest:** None.