Laparoendoscopic Single Site Varicocele Ligation: Comparison of Testicular Artery and Lymphatic Preservation Versus Complete Testicular Vessel Ligation

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Purpose: We compared postoperative outcomes in patients treated with laparoendoscopic single site varicocele ligation with or without testicular artery and lymphatic preservation.

Materials and Methods: A total of 80 patients with left varicocele were randomly divided into 2 groups and treated with laparoendoscopic single site varicocele ligation with preservation of the testicular artery and lymphatics (40 in group 1) or complete ligation of the testicular vessels and lymphatics (40 in group 2). Operative time, hospital stay, return to normal activity, postoperative visual analog scale pain scores and complications were analyzed. In patients with subfertility preoperative and 3-month postoperative semen analyses were performed. In patients with scrotal pain preoperative and 12-month postoperative visual analog scale pain scores were analyzed.

Results: A total of 35 patients per group completed the study. Hospital stay, return to normal activity and postoperative pain scores did not differ between the groups. No major complications were observed. Mean ± SD operative time was 60.7 ± 10.7 and 48.6 ± 6.0 minutes in groups 1 and 2, respectively ($p < 0.001$). Patients with subfertility, including 22 in group 1 and 21 in group 2, showed improved semen parameters 3 months postoperatively but postoperative values did not differ between the groups. The 17 patients in each group with scrotal pain showed decreased pain scores 12 months postoperatively with no difference between the groups.

Conclusions: Laparoendoscopic single site varicocele ligation is feasible. No differences in postoperative outcomes and complications were observed when preserving or not preserving the testicular artery and lymphatics.

Key Words: testis, varicocele, laparoscopy, ligation, treatment outcome

Abbreviations and Acronyms

LESS = laparoendoscopic single site

LESSVL = LESS varicocele ligation

LVL = laparoscopic VL

VAS = visual analog scale

VL = varicocele ligation

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Study received institutional review board approval.

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VARIOUS treatment modalities have been studied for patients with varicocele who have subfertility or scrotal pain, including percutaneous embolization, open (subinguinal, Ivanissevich or Palomo) VL, subinguinal microsurgical VL and LVL.[1] Because higher magnification allows surgeons to visualize and preserve the testicular artery and lymphatics, and also ligate all testicular veins, open microsurgical inguinal or subinguinal VL is regarded as the treatment of choice. However, the effect of testicular artery preservation is controversial because the testicles have collateral

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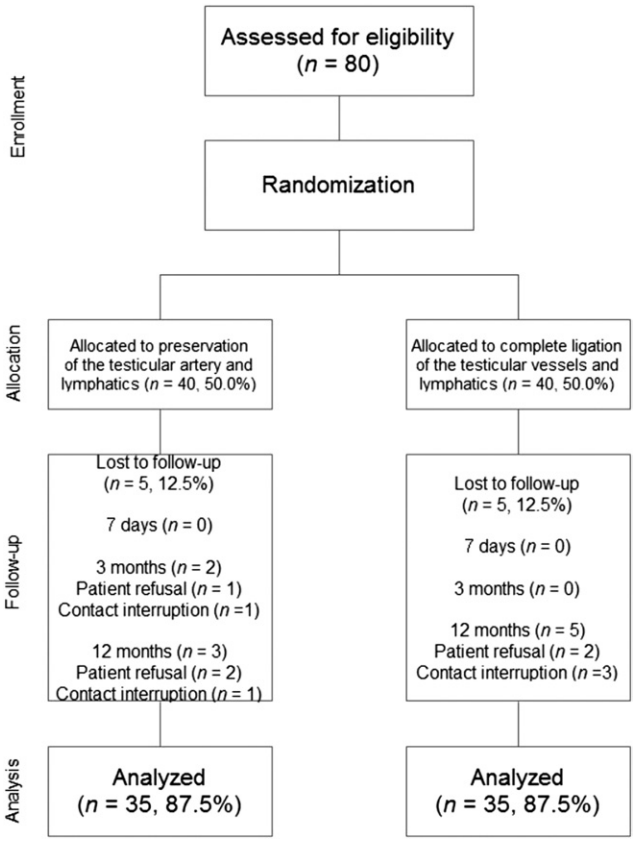

Figure 1. Parallel randomized trial of 2 groups

blood supply. On the other hand, the effect of testicular lymphatic preservation is more definite. The testicular lymphatic vessels drain into the para-aortal and para-caval lymph nodes without important collateral connections to the inguinal nodes and their ligation may lead to lymphostasis and result in hydrocele formation.[2]

The feasibility of LESSVL as a treatment modality has been confirmed, although a large-scale study has not yet been reported. To our knowledge there have been no reports to date of the usefulness of preserving the testicular artery and lymphatics during LESSVL.

To address these issues we investigated the feasibility of LESSVL. In particular, we compared postoperative outcomes and complications in patients who underwent testicular artery and lymphatic preservation or complete testicular vessel ligation during LESSVL.

MATERIALS AND METHODS

Patients

Between April 2009 and December 2010 LESSVL was prospectively performed in 80 patients diagnosed with a varicocele. This study was done at 3 urology centers after institutional review board approval. LESSVL was performed by 3 urologists who were skilled in and experienced with LESS surgery using a standardized protocol. Study inclusion criteria included patients who were 1) diagnosed with a unilateral left varicocele based on physical examination and Doppler ultrasonography with a chronic dragging sensation/pain in the left scrotum or subfertility and 2) willing and able to participate in the study. Exclusion criteria included patients who 1) underwent previous inguinal or scrotal surgery, 2) had a medical history of laparotomy and 3) had subfertility due to other causes. All patients agreed to participate in randomization and provided informed consent.

Patients were randomly divided into 2 groups using a computer random number generator. Patients were treated with LESSVL with preservation of the testicular artery and lymphatics (40 in group 1) or complete ligation of the testicular vessels and lymphatics (40 in group 2) (fig. 1). Varicoceles were classified preoperatively by Dubin and Amelar grade.[3] Preoperative patient characteristics did not differ between the groups (table 1). Patients visited a clinical center 7 days, and 3 and 12 months postoperatively for efficacy and safety measures.

Measures

Efficacy. Operative time, hospital stay, time to return to normal activity, postoperative VAS pain scores and postoperative satisfaction were analyzed. In patients with subfertility preoperative and 3-month postoperative semen analyses were performed to evaluate sperm concentration, motility and morphology. In addition, 12-month postoperative pregnancy rates were analyzed.

In patients with scrotal pain preoperative and 12-month postoperative VAS pain scores were analyzed. Pain severity was classified on a scale of 0—complete lack of pain to 10—the most severe pain.

Safety and satisfaction. Intraoperative, early and 12-month postoperative complications were compared between the groups, as was patient satisfaction postoperatively. Patient satisfaction was analyzed using 4 ratings, including very satisfied, somewhat satisfied, somewhat dissatisfied and very dissatisfied.

Table 1. *Patient characteristics*

	Group 1	Group 2	p Value
No. pts	40	40	
Mean ± SD age	31.9 ± 12.0	32.9 ± 11.1	0.707
Mean ± SD body mass index (kg/m^2)	24.8 ± 2.5	24.5 ± 2.3	0.609
No. grade:			0.874
I	3	4	
II	15	16	
III	22	20	
No. treatment indication:			0.931
Subfertility	20	20	
Pain	15	16	
Subfertility + pain	5	4	