



ORIGINAL ARTICLE

CLINICAL CHARACTERISTICS AND SURGICAL OUTCOMES IN PATIENTS WITH VARICOCELE

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Abstract

Purpose: To compare clinical characteristics and surgical results in adolescents and adults with varicocele.

Materials and Methods: We retrospectively analyzed the characteristics of 77 patients, 26 adolescents (mean age, 14.4±2.1 years) and 51 adults (mean age, 30.4±12.4 years), who underwent surgical repair of varicocele between December 2010 and May 2011 in Al-Azhar university hospital (asuite bransh) and Sohag Hospital. Median follow-up time in all patients was 16.5 months. The most bothersome symptoms, bilaterality, grades, surgical methods, artery-sparing rates, operation times, semen analysis, success rates, and recurrence-free period were compared between the two groups.

Results: The overall success rate of surgical repair was 92.5%. The most bothersome symptoms were scrotal mass, pain, and hypotrophy in adolescents and pain, scrotal mass, infertility, and hypotrophy in adults ($p=0.008$). There were no significant between-group differences in bilaterality, grades, surgical methods, operation times, pre- or postoperative semen analyses, success rates, or recurrence-free periods. Patients who underwent artery-sparing surgery had higher recurrence rates than did those who underwent surgery that did not spare arteries. In adults, semen density increased significantly after surgery, from 35.6 million/ml to 49.6 million/ml ($p=0.046$).

Conclusions: There were no significant differences in clinical characteristics or surgical results between adolescents and adults with varicocele, except for the most bothersome symptoms. Semen density increased after surgery in both groups.

Keywords: Varicocele, treatment outcome, inftrtelity.

INTRODUCTION

The term varicocele was originally coined by British surgeon T.B. Curling in 1843 to describe the pathologic dilation of veins of the spermatic cord.⁽¹⁾ The earliest descriptions of treatment for varicoceles come from the Roman encyclopedist Celsus, who practiced from 25-35 AD. While early varicocelectomy was performed for pain or cosmetic improvement, it was not until 1952 that

the association between varicocele and infertility was recognized. T.S. Tulloch published a case report of a man with testicular biopsy-proven maturation arrest in whom sperm count improved after varicocelectomy.⁽²⁾ Other reports of similar findings soon followed, thus shifting the focus of varicoceles from pain to subfertility. Today approximately 37,000 varicocelectomies are performed annually in the U.S.⁽³⁾

Varicocelectomy is by far the most commonly performed operation for the treatment of male infertility. The indications of varicocelectomy for clinically significant varicoceles include (1) infertility, particularly with impaired semen parameters or sperm quality, (2) hypogonadism, (3) scrotal pain, (4) testicular hypotrophy, particularly in the pediatric population and (5) aesthetic issues with large varicoceles.⁽⁴⁾

Varicoceles develop from a reversal of blood flow within the internal spermatic and cremasteric veins.⁽⁴⁾ There are three main anatomic explanations for the origins of varicoceles.⁽⁵⁾ The first theory emphasizes the fact that the drainage of the testicular veins differs between the right and left. While the right enters directly into the inferior vena cava at an oblique angle, the left joins the left renal vein at a right angle. This difference is thought to result in increased hydrostatic pressure on the left resulting in dilation of the pampiniform plexus. The second theory postulates that an absence of competent valves leads to varicoceles. In fact, in a study of 659 men with varicoceles, 73% were found to have absent venous valves when assessed by contrast venography.⁽⁶⁾ The final theory suggests that compression of the renal vein between the aorta and superior mesenteric artery increases the hydrostatic pressure in the testicular vein via a "nutcracker" effect.⁽⁶⁾

Varicocele occurs in about 15% of the general male population and in 20% to 40% of men presenting to infertility clinics. Varicocele is also detected in 2% to 11% of prepubertal boys, increasing to 15% to 16% in postpubertal adolescent males.⁽⁷⁾

Although varicocele may be treated by selective embolization of the enlarged testicular vessels during antegrade or retrograde venography, it is usually treated surgically. Because varicocele is less common in children and is anatomically smaller, surgical methods in children have been developed only over the past two decades.

New surgical approaches, including subinguinal and laparoscopic varicocelectomy, have gained acceptance, and older approaches, including the Ivanisovich and Palomo techniques, have been modified.

Many reports have compared surgical techniques, the use of magnification, artery and/or lymphatic sparing techniques, and complications.⁽⁸⁻¹²⁾ Postoperative complications are fairly common and may include hydrocele, recurrence, persistence, and testicular atrophy. Most of these studies, however, assessed adults, adolescents, and children separately, with few reports directly comparing clinical outcomes in adolescents and adults with varicocele. We therefore compared the clinical characteristics and surgical results of adolescents and adults who underwent open or laparoscopic surgical repair of varicocele.

PATIENTS AND METHODS

1. Patient characteristics

We retrospectively reviewed the medical records of 77 patients who underwent varicocelectomy between December 2010 and May 2011. Of these 77 patients, 26 were defined as adolescents (mean age, 15 years; range, 13-18 years) and 51 were adults (mean age, 27.25 years; range, 19-62 years). Varicocele was on the left side in 66 patients and was bilateral in 11; it was grade 2 in 10 and grade 3 in 67 (Table 1).

Table 1. Demographic characteristics.

	Adolescents (26)	Adults (51)	total (77)
Mean age (yr)	15 (13 – 18)	40.5 (19-62)	27.25
Laterality			
Left	30	36	66
Bilateral	4	7	11
Grades			
2	4	6	10
3	26	40	67
Operative methods			
Artery sparing	17	20	37
Non artery sparing	9	31	40
Median follow up (months)	17.6	15.4	16.5

Varicocele was diagnosed on the basis of a physical examination in the upright and supine positions using Valsalva's maneuver. Varicoceles were classified as grade 1 (palpable only during the Valsalva maneuver), grade 2 (palpable without the Valsalva maneuver), and grade 3 (visible without palpation).⁽¹³⁾

Preoperative and postoperative testis volumes were measured with an ellipsoid Praderorchidometer (ASSI, Westbury, New York, NY, and USA). If the difference in testicular size was >2 ml or ≥10% on the affected side, it was considered testicular hypotrophy. Semen samples were not obtained from patients with no experience of masturbation or if the patients or parents refused the test. Indications for varicocelectomy were infertility or abnormal semen results, scrotal discomfort or pain, palpable varicocele (grade 2 or 3), testicular hypotrophy, bilaterality, and patient request or anxiety. We excluded patients with additional pathology of the scrotum or urinary tract (e.g., history of urinary tract infection, prostatitis, or epididymitis).

2. Varicocelectomy techniques

All procedures were performed under spinal anesthesia, with the patient in a slight head-down position. Open inguinal or subinguinal varicocelectomy was performed by using standard techniques with ligation of dilated

veins (Image 1). Mean operation time for the surgery was 44.9 ± 20.2 minutes.

All patients were discharged the day following surgery and were examined 1 week later to check the wound. All patients were evaluated at 3, 6, and 12 months postoperatively. The evaluations included physical examination with or without color Doppler ultrasonography of the scrotum. Success was defined as the absence of a varicocele and recurrence was defined as the presence of a varicocele (\geq grade 1) on clinical examination after surgery. All patients were followed up for a minimum of 6 months; the mean follow-up time was 16.5 months.

Image 1

Congested Testicular Vein



3. Statistical analyses

The most bothersome symptoms (pain or discomfort, palpable mass, infertility, and hypotrophy), bilaterality, varicocele grade distribution, surgical methods, internal spermatic artery sparing, operation times (from incision to closure), semen analysis, success rates, and recurrence-free period were compared in adolescents and adults, using independent t-tests, chi-square tests with Fisher's exact tests, and Pearson chi-square tests, as appropriate. All statistical analyses were performed by using SPSS ver. 12.0 (SPSS Inc., Chicago, IL, USA). All statistical analyses were two-sided, with $p < 0.05$ considered statistically significant.

RESULTS

The overall success rate in all 77 patients was 93.5%. No patient experienced testicular atrophy after surgery. Recurrence rates in adolescents and adults were 11.8% and 5.1%, respectively. There were no significant between-group differences in the recurrence rates or operation times (Table 2). The artery-sparing method was used in 37 patients, 17 adolescents and 20 adults, with 2 patients in each group having recurrences, at 3 or 6 months in adolescents and at 3 or 12 months in adults. We found that the patients who underwent artery-sparing surgery had higher recurrence rates but the difference was not statistically significant ($p = 0.249$).

Table 2 mean operation times and overall recurrence rates in Adolescence and adults.

Preoperative and postoperative semen analyses were performed in 31 patients (5 adolescents and 26 adults). There were no significant between-group differences in semen volume, density or motility either before or after varicocelectomy (Table 3). However, in the adults, sperm density significantly increased, from 35.6 million/ml before to 49.6 million/ml after varicocelectomy ($p = 0.046$). Although semen density and motility improved in adolescents after varicocelectomy, these differences were not statistically significant.

Adolescents and adults showed significant differences in the most bothersome symptoms ($p = 0.008$). Of the 26 adolescents, 18 (69%) underwent surgery owing to a palpable scrotal mass, 6 (23%) because of pain or discomfort, and 2 (7%) owing to hypotrophy of the testis. Of the 51 adults, 19 (38%) underwent surgery because of pain or discomfort, 20 (39%) owing to a palpable scrotal mass, 9 (11.6%) owing to infertility, and 3 (5.8%) because of testicular hypotrophy (Table 4). After varicocelectomy, 16 of the 18 adolescents (90%) with a palpable mass no longer had a palpable mass, 5 of the 9 (55.6%) with pain or discomfort no longer had these symptoms, and both (100%) with testicular hypertrophy had increased testicular volume. Of the adults, 17 of 20 (83.4%) with a palpable mass no longer had a palpable mass, 12 of the 19 (63%) with pain or discomfort no longer had these symptoms, 7 of 9 (77.7%) infertile men achieved pregnancy, and the 3 (100%) patient with testicular hypotrophy had an increased testicular volume.

Table 2. Mean operation times and overall recurrence rates in Adolescence and adults.

	Adolescents (26)	Adults (51)	total (77)	P- value
Recurrence/artery-sparing	2/17	2/20	4/37	
Recurrence-free period (mo)	4.5	3		
Recurrence/non-artery-sparing	0/9	0/31	0/41	0.815
Mean operation time (min)	43.9 ± 13	46 ± 28	44.9 ± 20.2	0.625
Recurrence (%)	2 (7.6%)	2 (3.9%)	4 (5.1%)	

Table 3. Preoperative and postoperative semen analyses.

	Adolescents (26)	Adults (51)	P- value
Pre- operative semen analysis	5	26	
Volume (ml)	2.6	3.5	0.838
Sperm count (Million\ MI)	25.7	35.6	0.552
Motility (%)	40.5	47.8	0.883
Post- operative semen analysis			
Sperm count (Million\ MI)	33.1	50.2	0.503
Motility (%)	62	53.2	0.392
p-value	0.122	0.048	

Table 4. Most bothersome symptoms before and symptom-free rates after varicocelectomy.

	Adolescents (26)	Adults (51)	total (77)	P- value
Symptomes befor Operation (%)				0.008
Scrotal mass	18 (69%)	20 (39%)	38 (49%)	
Infertility	0	9 (17.6%)	9 (11.6 %)	
Pain and discomfort	6 (23 %)	19 (38%)	25 (32%)	
Hypotrophy	2(7%)	3 (5.8%)	5 (6.4%)	
Symptomes free rates after operation				0.121
Scrotal mass	16(90.0)	17 (83.4)	33 (86.7)	
Infertility	0	7 (77.7)	7 (77%)	
Pain and discomfort	3 (50)	12 (63)	15 (60)	
Hypotrophy	2 (100)	3 (100)	5 (100)	

DISCUSSION

Varicoceles, the most common cause of secondary infertility in men, is a progressive and surgically correctable disease that causes deterioration in testicular function and semen parameters.^(2,14) Varicocele has been associated with a loss of testicular mass that appears to be progressive with age.⁽¹⁵⁾ Thus, repair of varicoceles at an early age may be recommended to prevent deterioration of testicular function, including size and fertility, with prophylactic treatment considered to be the best therapeutic approach. Varicocele may become apparent peripubertally, and early corrective therapy may prevent damage to an individual's fertility status. Moreover, increased testicular volume after varicocelectomy has been reported in adolescents, however rarely in adults, although adults do experience significant increases in total motile sperm count.⁽¹⁶⁻¹⁸⁾

Accurate comparison of outcomes using different treatment modalities is difficult because of innumerable and inconsistently controlled variables. In our study, although the follow-up time was short (16.5 months), 26

adults showed significant improvements in semen quality, especially in sperm count after varicocelectomy.

In addition, 7 of the 9 infertile men succeeded in having a baby. Mean sperm density in the 5 Adolescents tested improved, from 25.7 million/ml before to 33.1 million/ml after varicocelectomy, although the difference was not statistically significant because of the small number of patients.

Varicoceles are treated in men with severe dilatation of testicular vessels (i.e., grades 2 and 3), testicular atrophy, or bilateral varicocele, although men with symptoms such as discomfort or chronic pain may also undergo surgical repair. About 2% to 10% of men with varicocele have been reported to experience pain or discomfort, although other investigators have reported that 52% of patients with varicocele underwent surgery for pain.^(20,21)

Most of our patients with varicocele had symptoms other than infertility. Of our 77 patients, 43 had pain or

discomfort in the testis or inguinal area. When we compared symptoms in our two patient groups, we found that 18 (69%) of 26 adolescents had a palpable scrotal mass and 6 (23%) had pain or discomfort, whereas 19 (38%) of the 51 adults had pain or discomfort and 20 (39%) had a palpable scrotal mass. Varicocelectomy has been shown to be effective in the control of pain.⁽²²⁾ One study found that, of patients with pain before surgery, 73% had complete or marked resolution and 10% had partial resolution after varicocelectomy, which suggests that surgical treatment is effective for painful varicocele⁽²³⁾ In a Korean study, 78.6% of men experienced complete relief of pain and 9.7% had partial relief, whereas 11.6% had persistent or worsened symptoms. These findings suggest that the postoperative degree of pain relief was affected by the preoperative quality of pain. Of our patients, 76.7% had complete resolution of symptoms after varicocele repair, 55.6% of the adolescents and 82.4% of the adults. The lower success rate in adolescents may have been because of the small number of these patients and their nonreporting of symptoms. Although the reasons for pain remaining after varicocelectomy are unclear, these individuals may also have other causes of testicular discomfort, such as testicular pain syndrome or chronic prostatitis not detected on laboratory tests.

Varicocelectomy requires efforts to preserve testicular arterial blood flow and lymphatic channels while ligating the internal and external spermatic veins. However, the effectiveness and outcomes of artery-sparing and non-sparing varicocelectomy are still controversial.^(24,25,26) In the current study, we found that patients who underwent artery-sparing surgery had higher recurrence rates but the difference was not statistically significant ($p=0.249$).

This study had several limitations, including the small number of patients and the inclusion of patients from a single center. Moreover, there was no control group to assess the effectiveness of varicocele repair.

In conclusions adolescents and adults who underwent varicocelectomy showed no significant differences in bilaterality, grades, surgical methods, artery-saving rates, operation times, success rates, or recurrence-free periods. The most bother-some symptoms were pain or discomfort in adults and scrotal mass in adolescents. Recurrence rates were higher in patients who underwent artery-sparing surgery than in those who did not, but the difference was not significant.

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