

# Two Trocar Laparoscopic Varicocelectomy: Approach and Outcomes

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## ABSTRACT

**Background and Objectives:** The surgical indications and proper management of varicoceles in the pediatric population continue to be controversial. Historically, open surgical approaches have had recurrence rates between 2% to 6% and a low rate of complications. We present a modified laparoscopic technique for the treatment of clinically significant varicoceles.

**Methods:** Consecutive pediatric patients presenting with clinically significant varicoceles between May 2000 and July 2003 were considered for laparoscopic varicocelectomy. A 5-mm 2-port laparoscopic varicocelectomy was performed, with supraumbilical and contralateral lower quadrant placement of the trocars. The Harmonic scalpel was used to fulgurate the spermatic vessels in a nonartery sparing technique.

**Results:** Ten clinically significant varicoceles were identified in 9 patients, all of which were ligated with this technique. One patient was treated for bilateral varicoceles. Average operating room time was 53 minutes (range, 45 to 65). All patients were discharged from the ambulatory surgery unit and returned to their regular physical activity within 2 weeks after surgery. Upon clinical reevaluation 6 weeks post surgery, there was no evidence of varicocele recurrence or hydrocele formation, and all patients were asymptomatic.

**Conclusions:** Our 2-port laparoscopic varicocelectomy is comparable to traditional open surgical approaches in recurrence and complication rates. This laparoscopic repair may be superior to open techniques in operating time, convalescence, and cosmesis. The procedure is easily mastered and does not require microsurgical skills.

**Key Words:** Laparoscopy, Varicocele, Adolescent.

## INTRODUCTION

The adolescent varicocele is a common condition that often presents to the pediatric or general urologist. Its prevalence in the pediatric population approximates 10% to 15%. The prevalence of 15% among adolescents appears to mirror the adult prevalence.<sup>1,2</sup> In addition, it is postulated that the adult varicocele is a persistence of the adolescent finding, rather than a new occurrence. It has been documented as the most common identifiable cause of male factor infertility.<sup>3</sup> Correction of this condition has led to increases in measurable outcomes of fertility including sperm motility and viability, as well as total sperm count.<sup>4</sup> Current practice substitutes testicular size and consistency for semen analysis in the pediatric age group, using ipsilateral testicular atrophy, changes in testicular consistency or persistent orchalgia as indications for varicocele treatment.<sup>5,6</sup> Herein, we describe a modified laparoscopic technique for the treatment of clinically significant varicoceles.

## METHODS

The hospital records of consecutive pediatric patients who presented with clinically significant varicoceles between May 2000 and July 2003 were reviewed. Only those without a history of abdominal or pelvic surgery were eligible for a laparoscopic repair.

The varicocelectomy was performed in a transperitoneal laparoscopic fashion. Two laparoscopic ports were utilized, using the 5-mm Innerdyne (Innerdyne, Inc., Sunnyvale, California) system. Access to the peritoneal cavity was gained by the supraumbilical placement of a Veress needle, where the first 5-mm port was subsequently placed. A second 5-mm port was positioned under direct vision caudal and lateral to the umbilicus on the contralateral side of the varicocele. After identification of the spermatic cord, the gonadal vessels were isolated from the vas deferens by using a combination of blunt and Harmonic scalpel dissection. Fulguration of the spermatic vessels cephalad to the divergence of the vas deferens was then performed with the Harmonic scalpel, with subsequent division of the vessels. No attempt was made to spare the testicular artery or adjacent lymphatics. The port incisions

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were closed with a running absorbable subcuticular suture and the wounds were dressed with steri-strips and sterile op-site.

## RESULTS

Ten clinically significant varicoceles were identified in 9 patients during the study period, all of which were ligated with this technique. One patient was treated for bilateral varicoceles. Open surgical or radiologic techniques for varicocele repair were not performed. The patients had a mean age of 14 years (range, 12 to 17). One patient presented with the primary complaint of scrotal pain, 3 patients presented with ipsilateral testicular atrophy, and 4 patients had both scrotal pain and ipsilateral testicular atrophy. One patient had neither pain nor testicular atrophy of the affected side. One right-sided and 9 left-sided varicoceles were repaired. Nine of the treated varicoceles were grade III and 1 was grade II (**Table 1**).

The 2-port method was utilized in all 10 varicocele repairs. The mean operating room time was 53 minutes (range, 45 to 65). No measurable blood loss occurred in any of the cases. All patients were discharged from the ambulatory surgery unit and returned to their regular physical activity within 2 weeks after surgery. No immediate or delayed complications were noted. Upon clinical re-evaluation 6 weeks post surgery, there was no evidence of varicocele recurrence or hydrocele formation, and all patients were asymptomatic. All patients who presented with pain had complete resolution of their symptoms (**Table 2**).

Patients with ipsilateral testicular atrophy presented due to a noticeable discrepancy in size of the affected testicle. These patients were followed with serial examinations by

**Table 1.**  
Patient Characteristics

Patient	Age (Years)	Presenting Symptom	Varicocele Grade
1	17	Pain and Atrophy	2
2	12	Atrophy	3
3	16	Pain and Atrophy	3
4	13	Atrophy	3
5	12	Atrophy	Bilateral 3
6	14	Pain and Atrophy	3
7	15	Pain	3
8	16	Pain and Atrophy	3
9	14	Enlarged scrotum	3

**Table 2.**  
Operative Results

Case Number	Operative Time (Minutes)	Catch-Up Growth	Resolution of Pain	Complications
1	65	Yes	Yes	None
2	47	Yes	N/A	None
3	49	Yes	Yes	None
4	45	Yes	N/A	None
5	56	Yes	N/A	None
6	60	Yes	Yes	None
8	53	N/A	Yes	None
9	57	Yes	Yes	None
10	49	N/A	N/A	None

the same physician (BPK) for an extended period of time beyond the postoperative period for determination of catch-up growth. Catch-up growth was not measured using an orchidometer, but rather was defined as a significant increase in size of a previously undersized testicle in comparison with the unaffected side. Six of the 7 patients who presented with ipsilateral testicular atrophy demonstrated catch-up growth of the affected testicle with an average total follow-up of 13.5 weeks (range, 6 to 57).

## DISCUSSION

Many studies have demonstrated that varicocelectomy is effective in treating clinically significant varicoceles in the pediatric population.<sup>5,7-10</sup> Currently, it is unknown what the effect of treatment will ultimately have on future fertility, as repair of the adult varicocele in infertile men does not always result in fertility.<sup>11,12</sup> It would seem that some irreversible damage to testicular function results from the presence of a varicocele during adolescence. This would advocate the early treatment of the pediatric varicocele.<sup>13</sup>

Several options for treating the pediatric varicocele are currently available. These include radiological spermatic vein sclerotherapy or embolization, the standard surgical techniques of Palomo or high retroperitoneal ligation, the inguinal microscopic testicular artery sparing approach, and the evolving laparoscopic approach. Factors such as surgeon preference, recurrence and complication rates, and cost influence the decision of which approach is most appropriate.

Controversy exists over whether to spare the testicular artery during varicocele repair. Recurrence rates are related to the ability to ablate as many venous channels as

possible during surgery. Attempts to spare the testicular artery generally increase the recurrence rate by neglecting to ablate the periarterial venous outflow.<sup>14</sup> The recurrence rates for the standard open techniques of Palomo (0% to 2.2%) and microsurgery (0.6% to 2.1%) demonstrate an advantage over radiological intervention (5% to 25%).<sup>15,16</sup>

Proponents of an artery sparing technique argue that damage to the seminiferous tubules may be occurring with testicular artery ligation despite the lack of testicular atrophy at follow-up. However, no advantage in rate of testicular atrophy or catch-up growth for an artery sparing technique has been reported.

The formation of a hydrocele is related to ablation of the lymphatic drainage of the tunica vaginalis.<sup>17,18</sup> Microscopic techniques are required to avoid this undesired outcome and have been reported to limit the rate of hydrocele formation (0% to 1%) compared with standard open techniques (3% to 25%).<sup>10,16,19</sup> Regardless of technique, most patients are able to be treated on an outpatient basis with little recovery time. In our series, no hydrocele formation or varicocele recurrence is reported, and the resolution of scrotal pain occurred in all patients.

The primary concern of the laparoscopic approach to varicoelelectomy has been the high associated cost and required expertise. Our study demonstrates that reasonable operative times can be expected, ranging from 50 minutes to 60 minutes. Reusable trocars can be implemented to decrease equipment costs. Most surgeons are able to master the technique quickly. In our series, resident surgeons performed most of the cases with limited laparoscopic experience under the supervision of a single fellowship trained pediatric urologist (BPK). By using a limited number of 5-mm ports, the laparoscopic approach has the added advantage of improved cosmesis. The advantage of a 2-port system over a 3-port system is the proposed reduced operative time and expense of placing and closing the additional port site. In our series, we did not find it necessary to place a third port for additional hands in achieving hemostatic control, but were prepared to do so if needed.

Three series of laparoscopic varicoelelectomies in the pediatric population have been published. Riccabona et al<sup>19</sup> evaluated 4 operative techniques including an artery sparing laparoscopic approach. The authors concluded that their 4-port laparoscopic system, compared with other methods, was more time consuming, more expensive, carried a higher intraoperative risk, and was technically more involved.

Podkamenev et al<sup>20</sup> reported a series of 654 patients randomly assigned to laparoscopic and open surgical arms. Both operations utilized the Palomo technique, with preservation of the lymphatics and ligation of the testicular artery and veins above the inguinal canal. In contrast to the previous report, the authors concluded that their laparoscopic approach was similar in regards to recurrence rates and superior in regards to hydrocele formation, scrotal edema, operating time, and convalescence.

Esposito et al<sup>15</sup> published their initial experience with the laparoscopic treatment of pediatric varicoeles in a series of 161 patients. They used a combination of techniques including a 2- or 3-port approach with ligation of both the testicular artery and vein by the Palomo technique or ligation of the veins only by using the Ivanissevitch procedure. These authors also concluded that the recurrence and complication rates of the laparoscopic approach are comparable to if not better than those of the open or radiological approach.

## CONCLUSIONS

Our 2-port laparoscopic varicoelelectomy is comparable to traditional open surgical approaches in recurrence and complication rates. This laparoscopic repair is demonstrated to be an acceptable alternative and may be superior to open techniques in operating time, convalescence, and cosmesis. The procedure is easily mastered and does not require microsurgical skills.

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