Laparoscopic varicocelectomy in adolescents – two-port approach

Jerzy Niedzielski[1], Zbigniew Jankowski[2], Mieczysław Miodek[1], Marek Krakós[1]

[1]Department of Pediatric Surgery and Urology and [2]Department of Pediatric Surgery and Oncology University Childrens' Hospital No. 4 in Łódź, Medical University of Łódź, Poland

KEY WORDS

adolescent varicocele ◗ two-part laparoscopic varicocelectomy ◗ morbidity

ABSTRACT

Introduction. To describe the technique of two-port laparoscopic varicocelectomy and to compare results with routine three-port procedure.

Material and methods. 30 boys (group 1.) underwent three-trocar laparoscopic varicocelectomy and 58 patients (group 2) were operated via two-trocar laparoscopy between 1997 and 2008. Operative time, need for conversion from two to three ports or from laparoscopy to open surgery, and incidence of complications were compared in both groups of patients.

Results. The mean operative time, as well as hospital stay were significantly shorter in two-trocar operations ($p = 0.001$, $p = 0.05$). No patients needed conversion to the three-trocar technique or to an open operation. Postoperative complications, varicocele recurrence rate and the number of patients walking on the day of surgery or the day after did not differ in the two groups. Appearance of the postoperative scars was cosmetically more satisfactory in patients after two-trocar varicocelectomy.

Conclusions. Two-port laparoscopic varicocelectomy proved to be comparable to the three-trocar technique in recurrence and complication rates. Shorter operating time, better aesthetic appearance and sparing of one trocar made us recommend the two-port laparoscopic varicocelectomy in adolescents.

INTRODUCTION

Varicocele is the most common correctable cause of male infertility [1]. The incidence of high-grade varicocele is approximately 5% throughout the world [2]. Varicocele is associated with a time dependent growth arrest of the testicle in adolescents and adult males [2, 3]. Historically, adolescent varicocele was left untreated since its relation to infertility was not well known. There is a clear association between varicocele, infertility and testicular growth arrest [4, 5]. A meta-analysis of the literature done by Pryor and Howards showed that two thirds of patients will have improvement in semen analysis after varicocele repair, and 40% of partners will become pregnant [6]. It is also known that repair of varicocele reverses not only the growth arrest, but also improves semen analysis in adolescents and young males [7, 8, 9, 10].

The development of secondary infertility and its reversibility is thought to be a strong argument for early varicocele repair because when left untreated the adolescent varicocele will not only affect testicular volumes, but also affects future spermatogenesis [3, 11]. A decrease in testicular volume of more than 20% measured by ultrasonography is the best indicator for surgical correction of a varicocele [7, 12].

Varicocele repair can be done by surgical ligation and division of testicular veins or intravenous embolization of testicular veins. Three open surgical approaches are currently used: the subinguinal approach (Marmar), inguinal approach (Ivanissevich) and retroperitoneal approach (Palomo). Laparoscopic varicocele ligation often used in adults is now also performed in adolescents with varicocele as a routine procedure [13, 14, 15, 16].

The objective of the present study was to describe the technique of two-trocar laparoscopic varicocelectomy and compare it with the standard three-trocar laparoscopic technique in terms of effectiveness, morbidity, and cosmetics.

MATERIAL AND METHODS

88 consecutive patients with 3rd grade left-sided varicocele (according to Dubin Amelar), aged 12 to 18 years (mean 14.3) at the time of surgery, referred to the Testicle Pathology Clinic of the University Children's Hospital in Łódź, Poland between October 1999 and June 2008 were included in the present study. All boys were diagnosed and qualified for operation by means of the original US protocol [2]. In all patients varicocele repair was done with use of laparoscopy. Initially, from October 1999 to August 2004, 30 boys – group 1. underwent three-trocar laparoscopic varicocelectomy. Next, from August 2004 to June 2008, 58 patients – group 2. were operated via two-trocar laparoscopy (Table 1).

Surgical technique

For the three-trocar varicocelectomy one 5 mm umbilical, one 10mm right lower quadrant (contralateral) and one 5 mm left lower quadrant (ipsilateral) port was used. Both working trocars were placed about 2 cm medial to the right and left anterior superior iliac spines. The operation was done in the typical way as described in literature [15, 17].

For two-trocar varicocelectomy, one 5 mm umbilical and one 10 mm contralateral lower quadrant port was used (Fig. 1). The laparoscopic scissors were inserted through the iliac port and the

Table 1. Number and age of patients.

	No. of ports	No. of patients	Age (yrs)
Group 1	3	30	10-18 (mean 12.0)
Group 2	2	58	10-18 (mean 14.5)
Total	–	88	10-18 (mean 14.3)

Fig. 1. Location of trocars in two-port laparoscopic varicocelectomy.

peritoneum was incised medial and lateral to the spermatic vessels and next over them. Closed scissors were used to clean the exposed vessels from the surrounding fat and connective tissues. The soft grasper replaced the scissors and was used to prepare the spermatic vessels and to make enough space underneath (Fig. 2A). The grasper was then replaced with a 10 mm vascular sealing system (Fig. 2B), one staple was put distal and two staples proximal on the spermatic vessels (Fig. 2C). The scissors were used to divide the tented spermatic vessels in a non-artery sparing technique (Figs. 2D and 2E).

All operations, both two and three-trocar ones, were performed in the same manner via the same approach points, with use of the same equipment. The same surgeons (all four authors) operated on patients from both treatment groups. All patients received routine analgesic treatment in the postoperative period; parenteral administration of Acetaminophen (1 g) and Tramadol (100 mg) alternately every 4 hours during the first 24 hours and oral drugs in the following days, if necessary. After discharge from the hospital all patients were under care of the Testicle Pathology Clinic. The physical check-up and US-Doppler examinations were performed 3, 6 and 12 months after operation.

Operative time, intraoperative morbidity, need for conversion from two to three ports or from laparoscopy to open surgery, and hospital stay was assessed and compared in both groups of patients. Complications (bleeding, hematomas, wound infections) and varicocele recurrence rate were recorded in the postoperative period.

Follow-up period was from 4 and 4/12 yrs to 7 and 2/12 yrs (median of 5 and 5/12 yrs) for group 1. and from 6 months to 4 and 4/12 yrs (median of 2 yrs) for group 2.

For statistical analysis Student's *t* test and chi-square test were used.

RESULTS

The same surgeons (all four authors) operated on patients from both treatment groups.

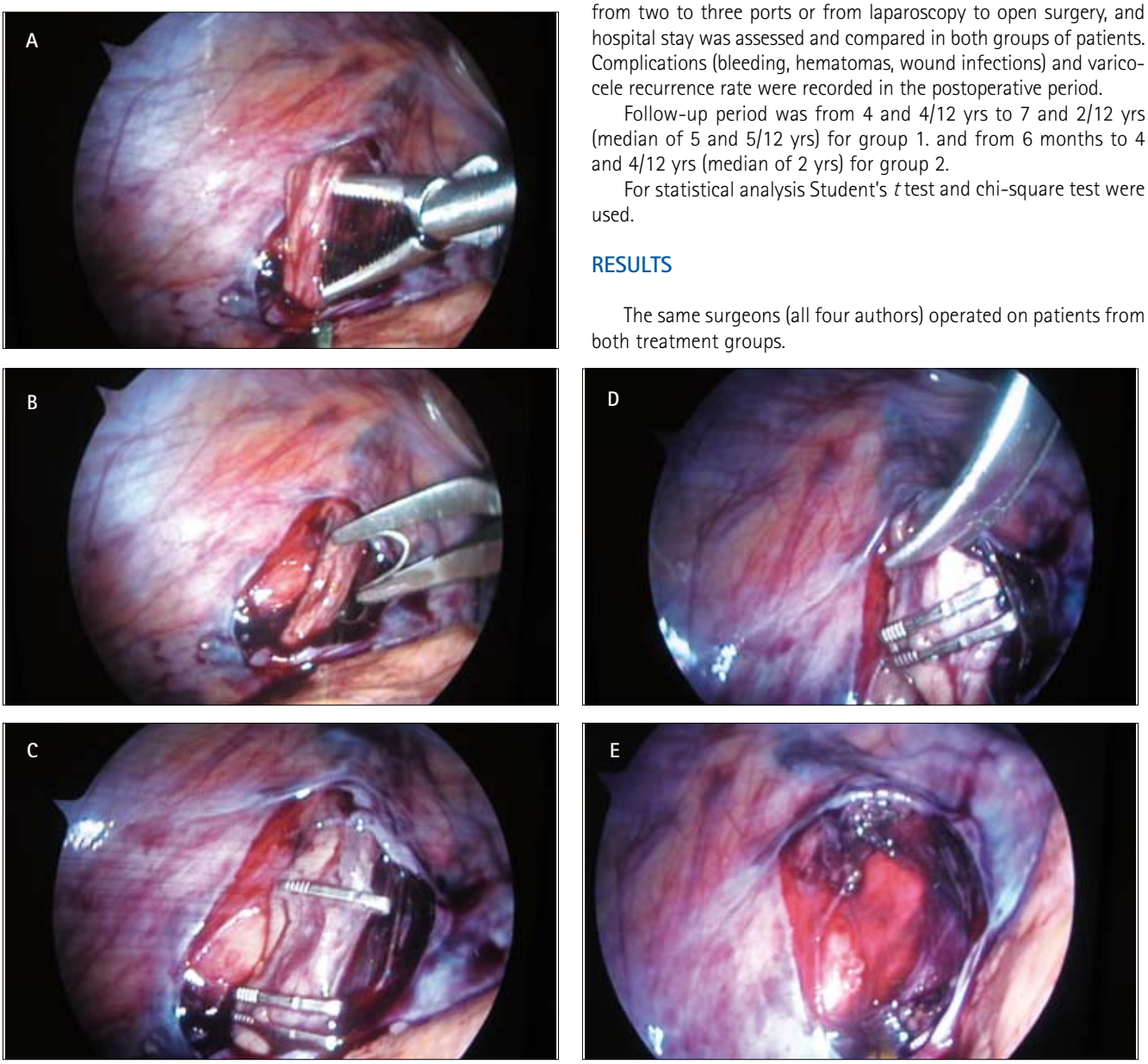

Fig. 2A–E. Intraoperative phases of two-port laparoscopic varicocelectomy. (A) The soft grasper made room under the spermatic vessels. (B) A 10mm vascular sealing system prepared to close the vessels. (C) One staple put distal and two staples proximal on the vessels. (D) The scissors prepared to divide the tented vessels. (E) Stapled and divided spermatic vessels.

Table 2. Morbidity and postoperative outcome.

	3 ports	2 ports		
1. Mean operative time (min.)	58.9 (35-120)	50.1 (30-80)	t = 5.46	p = 0.001
2. Patient walking on day 0 or 1	28 (93.3%)	55 (94.8%)	chi^2 = 0.15	ns
3. Mean hospital stay (days)	2.16 (1-3)	2.0 (1-3)	t = 2.14	p = 0.05
4. Convertion to 3-ports or open surgery	0	0	–	–
5. Postoperative complications	3 (10%)	4 (6.9%)	chi^2 = 0.26	ns
6. Varicocele recurrence	1 (3.3%)	0	chi^2 = 1.95	ns

Characteristics of both groups of patients were similar (Table 1). The mean operative time was significantly shorter in two-trocar operations than that in three-trocar procedures (Table 2). No patients needed conversion to the three-trocar technique or to an open operation. Postoperative complications were observed in 3 patients after the three-trocar operations comparing with 4 boys who underwent the two-trocar varicocelectomy. The complications in group 1. were: superficial umbilical wound infection in 2 (6.7%) and wound hematoma in 1 case (3.3%). In group 2. superficial umbilical wound infection was observed in 2 (3.4%) and wound hematoma in 2 (3.4%) instances. Incidence of postoperative hydrocele creation was not regarded in the present study, because of the additional modification of the operative technique performed in a number of varicocele patients with the intention to prevent postoperative hydrocele. The results were reported in a separate paper [18]. The mean hospital stay was significantly shorter in the two-trocar group of patients. The number of patients walking on the day of surgery or the day after did not differ in the two groups. Recurrence of varicocele was observed in one boy from group 1. compared to no recurrence in group 2 (Table 2). The testicular atrophy observed in both groups of patients before operation was reversed by the laparoscopic repair of the varicocele. The ipsilateral testicle volume caught up with the healthy gonad when assessed by means of US examination 3, 6 and 12 months after varicocelectomy.

Aesthetical appearance of the abdominal wounds was superior in patients after two-trocar laparoscopic varicocelectomy (Fig. 3).

Fig. 3. Appearance of the abdomen after two-port laparoscopic varicocelectomy with almost invisible scars in the umbilicus and right lower quadrant.

DISCUSSION

In the routine laparoscopic varicocelectomy with the use of three trocars, the ipsilateral port is used mainly to help to free the spermatic vessels from surrounding tissues, to lift the vessels while sealed with staples and when tented vessels are divided [17]. The trocar put in this port increases the cost of the operation no matter if disposable or multiple use (sterilized) instruments were used. The wound created by insertion of the third trocar may cause more pain in the postoperative period, increases the risk of potential complications and the number of postoperative scars on the skin of abdomen. For the first three years of our experience with laparoscopy we performed three-port varicocelectomy routinely. Then we decided that the procedure can be done with the use of only two ports and the third ipsilateral trocar is unnecessary and we've been performing the modified operation for the last seven years. We reviewed recent literature and found only two reports with series of patients operated via the two-port laparoscopy [19, 20]. However, one of the described techniques was in fact a three-port operation because instead of the third trocar authors percutaneously inserted the Veress needle to lift up and free the spermatic vessels [19]. The other series consisted of 9 pediatric patients and should be considered as a preliminary report [20]. In the present study, we proved that two-port laparoscopic varicocelectomy can be safely performed in pediatric patients.

The two-trocar technique has advantages in comparison with the three-trocar operation. It is easy to perform, it is as effective as the three-trocar procedure, the operative time is shorter, one trocar less is used, and one scar less is created. The operative time was statistically shorter in the two-port procedure (Table 2), but it should be considered important for reducing operating theater time rather than of any clinical significance. Recurrence of varicocele was observed in one boy of group 1. and in no instances of group 2. However, the recurrence rate in the entire group of 88 patients who underwent laparoscopic varicocele was lower (1.1% *vs.* 2.4%) than in the group of 249 boys operated classically via the open Palomo procedure by one of the present study's authors (J.N.) [21]. The superficial umbilical wound infections and wound hematomas observed in both groups of patients were treated conservatively and did not influenced the postoperative outcome and aesthetic appearance of the scars. We did not convert to the three-trocar operation in any case, although in a number of patients difficulties such as bowel adhesions covering the spermatic vessels or a wide spermatic cord with multiple vessels occurred. The experience with previously performed three-trocar laparoscopies helped us to manage these cases. Thus, we recommend two-trocar laparoscopic varicocelectomy for surgeons who have mastered laparoscopic techniques and who have become familiar with the three-trocar operation. Contrary to the criticism of some authors [16, 22], the results of our series proved that the laparoscopic varicocelectomy is not associated with higher incidence of recurrence and complications when compared with the traditional open surgery technique. Also, the testicular atrophy observed in both groups of patients before operation was reversed by laparoscopic repair as reported after open varicocelectomy [7, 8, 9].

CONCLUSIONS

Our two-port laparoscopic varicocelectomy is comparable to the three-trocar technique in recurrence and complication rates. This laparoscopic repair appeared to be superior in operating time and cosmetics. The procedure is easily mastered and does not require microsurgical skills. We recommend using only two ports whenever the laparoscopic varicocelectomy is indicated in adolescents.

The Bioethics Committee of the Medical University of Łódź approval no RNN/197/09/KB.

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Correspondence

Jerzy Niedzielski
Department of Pediatric Surgery and Urology
36/50, Sporna Street
91-738 Łódź, Poland
phone: +48 42 617 77 11
jerzy.niedzielski@umed.lodz.pl