



Laparoscopic hernia repair in children: Which method is the best?

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ARTICLE INFO

ABSTRACT

Article History

Received 17 / 09 / 2015

Accepted 12 / 10 / 2015

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Keywords:

Hernia

Inguinal

Laparoscopy

Pediatric

Repair

This study aimed to evaluate the outcomes of laparoscopic inguinal hernia (LIH) repair in pediatric patients in our clinic. LIH repairs that are between January 2008 and April 2013 were evaluated retrospectively. LIH repair was performed between in 133 patients with a mean age of 5.57 years (range 1 month-17 years). For the repairs, either the Schier's, Montupet's, or percutaneous internal ring suturing (PIRS) techniques were used. Of the cases, 67 were on the right side (50.4%), 33 on the left (24.8%), and 33 were bilateral (24.8%). Of the patients who underwent laparoscopic surgery for inguinal hernia (133) 70 were male. Schier's method was used in 23 patients, 8 with bilateral hernias. Montupet's was used in 28 patients (4 with bilateral hernias). The PIRS method can be very well considered as the first choice because of it is relatively easy to apply, can be completed in less operative time, and is more cost effective than the other methods. In 7 cases, concomitant umbilical hernias were used as camera ports and repaired at the end of the operation. One femoral hernia was diagnosed and repaired. No complications or recurrences occurred during the mean 48-month (16-76 months) follow up. LIH repair is a safe method in children, it is affordable compared to other laparoscopic operations, and it is advantageous, especially in recurrent hernias, in cases concomitant with umbilical hernias, and in bilateral hernias. The PIRS method may be the first choice because of its lesser operative time, expense, and need for surgical experience.

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1. Introduction

Laparoscopic surgery for pediatric inguinal hernia remains controversial in the literature. Many surgeons do not accept distributing the integrity of the peritoneal cavity for a procedure that can be completed extraperitoneally. However, recently there have been many reports on the efficiency of laparoscopic inguinal hernia (LIH) operations in children (Chan et al., 2007). In this retrospective study, we aimed to evaluate the feasibility, safety, and complication rate of LIH repairs.

2. Materials and methods

LIH operations performed in our clinic from January

2008 to April 2013 were evaluated retrospectively. During this period, 1,897 inguinal hernia operations were performed. LIH repairs comprised 133 of these cases (63 female and 70 male). The mean age of the patients was 5.57 years (range 1 month-17 years).

Three separate techniques were used (Table 1). Group 1 included 23 patients who underwent the Schier's intracorporeal laparoscopic suture technique. Group 2 included 28 patients who underwent the laparoscopic partial excision and purse-string technique described by Montupet. Group 3 included 82 patients who underwent the percutaneous internal ring suturing (PIRS) technique.

Table 1. Demographic and perioperative techniques of patients

	Schier's technique (n = 23)	Montupet's technique (n = 28)	PIRS (n = 82)
Age (years)	6.14	6.12	5.22
Gender (M/F)	18/5	21/7	31/51
Laterality (L/R)	3/12	9/15	25/36
Bilaterality	8	4	21
Mean operation time (min)	27	40	17

M: Male; **F:** Female; **L:** Left; **R:** Right

Surgical procedures

Each procedure was performed with the patient in a supine position under general anesthesia using tracheal intubation. A pneumoperitoneum of 8-10 mmHg was established. A regular 5-mm scope was used for visualization with an angle of view of 30°. For closure of the inner inguinal ring, 5-mm instruments were used. Additionally, two 3-mm trocar were inserted into the abdominal wall bilaterally at the umbilicus level. A regular 3-0 non-absorbable monofilamentous suture was placed in the peritoneal cavity directly through the abdominal wall with a 25-mm half-circle round-bodied needle next to the internal inguinal ring using a regular open surgery needle driver. The internal inguinal ring was closed in an N-shaped fashion in 23 patients as described by Schier (1998). The internal inguinal ring was circumcised with a purse suture in 28 patients, as reported by Montupet and Esposito (1999; 2011).

In 82 patients, no instrument other than the camera was inserted through the umbilical port. The internal ring was closed extracorporally with the PIRS technique introduced by Patkowski et al. (2006) (Wolak and Patkowski, 2014). The internal opening of the inguinal canal was closed using nonabsorbable 3-0 monofilament sutures. The wound in the umbilicus was closed in layers using absorbable 3-0 sutures.

Routinely local infiltration anesthesia was used in the port insertion site; therefore, no additional postoperative analgesia was used in the laparoscopic repairs.

3. Results

The operations were done in 133 (63 female and 70 male) patients. Of the cases, 63 were on the right side (47.36%) and 37 were on the left (27.81%); 33 cases were bilateral (24.8%). Among the 23 patients operated on with Schier's method, eight patients had bilateral hernias. Among the 28 patients that were operated on with Montupet's method, four patients were bilateral, and among the 82 patients that were operated on with the PIRS technique, 21 patients were bilateral (Wolak and Patkowski, 2014).

Nine cases were recurrent hernias. Umbilical hernia concomitantly existed in 7 cases, and these were used as

camera ports and repaired at the end of the operations. In one patient preoperatively diagnosed as recurrent hernia, there was no hernia found during laparoscopic exploration. On the exploration of the internal ring of the two patients diagnosed as bilateral inguinal hernia preoperatively, one patient had unilateral hernia and the other had no hernia. One femoral hernia was diagnosed and repaired. No complications or recurrence occurred in any of our cases. All of the procedures were daytime surgeries. The mean operation times were 27 minutes for Schier's method, 40 minutes for Montupet's method, and 17 minutes for PIRS technique. No recurrence existed during the mean 48-month (16-76 months) follow up. The postoperative cosmetic appearances of the laparoscopically repaired inguinal hernias were excellent, showing almost no incision scarring.

4. Discussion

Inguinal hernia repair is one of the most commonly performed operations in pediatric patients. With the improvement of minimal invasive surgery in these patients, inguinal hernia repair is now performed laparoscopically by many pediatric surgeons. The superiority of the laparoscopic technique is accepted in bilateral and recurrent hernias (Esposito et al., 2009; Yildiz et al., 2012). Another advantage of laparoscopic repair is that allows the repair of all forms of simultaneous inguinal hernias (Matthysens and Philippe, 2009). Recently, there have been many randomized trials on laparoscopic versus open hernia repair. As claimed by Ure (2013) Yang et al. (2011) showed shorter operative times for bilateral hernias and lower rates of metachronic contralateral hernia in the laparoscopy group. Moreover, Toufique Ehsan et al. (2009) discussed the priority of laparoscopic hernia repair in evaluating contralateral groin exploration. From our experience, we concluded the superiority of laparoscopic repair in bilateral, recurrent hernias and in the exploration of contralateral groin.

Chan et al. (2007) reported a near-zero recurrence rate in extraperitoneal LIH repair, a type of PIRS technique. Again, Patkowski et al reported no recurrence in 270 hernias with mean follow-up times of 2-25 months (average 13 months). Our recurrence rate was also zero in the discussed period (Wolak and Patkowski, 2014).

Previously, there have been concerns about the alterations of testicular perfusion after laparoscopic hernia repair. However, recent reports reveal no impairment after both open and laparoscopic techniques (Schier et al., 2008; Parelkar et al., 2011; Çelebi et al., 2012).

Since the onset of the laparoscopic hernia repair, many different techniques have been proposed to make the operation easier or to decrease the complication rate (Yilmaz et al., 2015). We used different methods in our

series to establish standardization. The PIRS technique described by Patkowski et al. (2006) was the simplest and quickest method based on our experience using the 3 different techniques (Wolak and Patkowski, 2014). This method was the best for postoperative cosmetic results, producing no visible scarring. Laparoscopic extraperitoneal repair of inguinal hernia has recently gained popularity among surgeons because of its lower postoperative pain and shorter operation time. Choi et al. (2011) reported 1,065 cases of laparoscopic extraperitoneal repair of inguinal hernia performed by a single surgeon. We especially propose the use of

this extracorporeal method in girls, due to its perfect cosmesis and absent risk of cord structure injury.

The follow-up time for our patients was almost 2 years, which is sufficient time for a recurrence developing. Our results promote laparoscopic surgery in inguinal hernia. LIH repair is a safe method in children. It is especially advantageous in recurrent hernias, in cases concomitant with umbilical hernias, and in bilateral hernias. The PIRS method may be the first choice because of its lesser operative time, expense, and need for surgical experience.

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