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Laparoscopic management of recurrent inguinal hernia in childhood

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ABSTRACT

Background: Open repair of recurrent inguinal hernias [RIH] in infancy and childhood is difficult and there is definite risk of damaging the vas deferens and testicular vessels. Laparoscopic repair of RIH has the benefit of avoiding the previous operative site. The aim of this study is to present our experience with laparoscopic repair of RIH either after open or laparoscopic hernia repair with stress on technical refinements to prevent recurrence.

Patients and methods: This is a retrospective study of laparoscopic repair of RIH. Records of 38 patients with 42 recurrent hernial defects that have been subjected to laparoscopic inguinal hernia repair [LIHR] for RIH were reviewed and evaluated. The primary outcome measurements of this study include; operative time and recurrence rate. The secondary outcomes include intraoperative and postoperative complications, hydrocele formation and testicular atrophy.

Results: In this study 38 children with 42 recurrent hernial defects [4 patients had bilateral recurrent hernia] were operated upon laparoscopically. They were 34 males and 4 females with a mean age of 2.54 ± 1.989 years (range = 0.58–10.00 years). In 35 hernial defects the recurrence developed after open herniotomy, while in 7 hernial defects it occurred after laparoscopic repair. All procedures were completed laparoscopically without any conversion and there were no intraoperative or postoperative complications during this study. Mean operating time was 15 ± 2.3 minutes for unilateral and 20 ± 1.7 minutes for bilateral inguinal hernia. All patients achieved full recovery and were discharged on the same day of admission. Two patients developed hydroceles that responded well to conservative management. At mean follow-up of 12.7 ± 2 months (range = 8–38.4 months), there was no recurrence, no testicular atrophy.

Conclusion: Laparoscopic repair of RIH in infancy and childhood is an attractive option that avoids the difficulties of redo surgery in scarred operative field with delicate structures liable to injury even with expert operator.

Recurrences of congenital inguinal hernia [CIH] are rare complications, typically seen in less than 1% of elective hernia operations in our clinic which is similar to that reported in the literature [1–4]. In cases of strangulated hernia, ascites, and ventriculoperitoneal shunts, the recurrence rate may increase up to 24%.

The delicate structures in the field, namely the vas deferens and testicular vessels are liable to injury with recurrent inguinal hernias and it needs an expert surgeon and careful dissection [5].

Careful dissection to rule out this risk always increases the operative time. The laparoscopic approach offers a great advantage of approaching the defect from a previously untouched field, optical magnification and attacking the exact origin of the defect [5,6]. The great advantage of laparoscopy is that it can detect the associated rare types of hernia like femoral and direct hernias which can be treated simultaneously [7].

In the majority of cases, the cause of hernia recurrence is excessive tension on the repair, missed tear of the hernia sac, the use of absorbable sutures, weak posterior wall of the inguinal canal, or missed concomitant femoral or direct hernias.

With improvement in laparoscopic techniques and understanding of the mechanisms of inguinal hernia and its prevention, we are heading toward the ultimate goal of preventing recurrences completely [5,8].

The aim of this study is to present our experience in laparoscopic repair of RIH either after open or laparoscopic hernia repair with stress on value of laparoscopic technical refinements to prevent recurrence.

1. Patients and methods

This is a retrospective study of laparoscopic repair of RIH. It was conducted at the Department of Pediatric Surgery, Al-Azhar University hospitals, Cairo, Egypt from April 2012 to September 2013. The study protocol was approved by Faculty of Medicine, Al-Azhar University ethics committee. Records of 38 children with 42 recurrent hernial defects that have been subjected to laparoscopic inguinal hernia repair for RIH were reviewed and evaluated regarding demographic data, surgeon in charge [general or pediatric surgeon (senior or junior)], type of repair (open or laparoscopic) and date of recurrence. The primary outcome measurements of this study include; operative time and recurrence rate. The secondary outcomes include; intraoperative and postoperative complications, hydrocele formation, and testicular atrophy. All patients were subjected to thorough history taking, clinical

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examination, routine laboratory investigations, abdominal and inguinoscrotal ultrasound, and laparoscopic hernia repair.

1.1. Operative procedure

After induction of general endotracheal tube anesthesia, the patient was placed supine in Trendelenburg's position. Prophylactic intravenous antibiotic in the form of 3rd generation cephalosporin in a dose of 50 mg/kg body weight was given at time of induction.

Insertion of the main umbilical port was accomplished by the open method. Pneumoperitoneum was established to a pressure of 8 to 12 mm Hg. Laparoscopy was used for initial visualization of the pelvis and internal inguinal rings (IIRs) on both sides. The laparoscopic hernia repair was done by transperitoneal approach as described earlier by Chan et al. [9]. Two 3-mm accessory ports were inserted at the lateral borders of the rectus muscles at the level of the umbilicus (Figs. 1–2 A, B). For boys, normal saline was injected at the extraperitoneal space around IIR to separate the vas deferens and testicular vessels from the peritoneum. A shortened (8-cm long) nonabsorbable 3-0 prolene suture was used in all patients. The needle and thread were passed into the abdomen directly through the abdominal wall. Two 3-mm needle holders were used for insertion of purse-string suture starting at 3 o'clock and passing under the peritoneum along the inferior margin of IIR with picking up of the peritoneum over the spermatic vessels and vas by the left handed instrument. Then the suture was continued along the upper margin of IIR, but in a deeper plane to include the peritoneum and the deeper fascia transversalis. On placing the needle for the purse-string stitch; “needle sign” was emphasized. “Needle sign” is the sign in which the needle could be seen clearly underneath the peritoneum without the vas and the testicular vessel in between. The sign further protected these important structures to be included in the stitch. A complete ring of peritoneum without any skip area was emphasized [complete encirclement of the peritoneum around IIR without any skip area is called complete ring sign]. The stitch ends were pulled before tightening the knot, the scrotum was squeezed and the intraperitoneal pressure was released to expel the gas in the hernial sac and tightened slightly before they were tied together. In some cases the hernia sac was disconnected at the neck of IIR with a purse-string suture of the proximal peritoneum at the level of the IIR. Narrowing of the wide IIR by interrupted stitches was done in some cases [the stitches included the peritoneum and the underlying muscular tissue lateral to the testicular vessels]. Covering the IIR region by the lateral umbilicus ligament after the purse-string knot was done, especially for the patients with wide hernia defect (diameter >2 cm) and age more than 5 years (Fig. 6). The purse-string airtightness was stress tested by raising the intraperitoneal pressure by 50%. The increase in pressure was sustained for about 30 seconds. The patient was monitored carefully during the whole procedure for arrhythmia, change in blood pressure or decreased oxygen saturation. The airtightness was confirmed by the absence of hernia sac enlargement with the intraperitoneal pressure increase. A second purse-string stitch would be added at the low intraperitoneal pressure proximal to the first one if the sac enlarged after the pressure increased. After the pneumoperitoneum was released, the ports were removed. The umbilical wound was closed with absorbable sutures and the lateral ones with steri-strips.

All patients were followed up in the outpatient clinic after 7 days, 2 weeks, 6 months, and 1 year. Parents were advised to contact the Department of Pediatric Surgery, if there were any concerns in the immediate postoperative period. Recurrences of the hernia, hydrocele formation and testicular atrophy were evaluated by clinical and U/S examinations during follow-up period along with the cosmetic results and parent's satisfaction.

2. Results

In this study 38 children with 42 recurrent hernial defects [4 patients had bilateral recurrent hernia] after either open or laparoscopic repair were operated upon laparoscopically at Department of Pediatric Surgery, Al-Azhar University hospitals during the period from April 2012 to September 2013. They were 34 males and 4 females with a mean age of 2.54 ± 1.98 years (range = 0.58–10.00 years). One boy had a twice recurrence. The median time interval between surgery and recurrence was 6 months (range 1 day to 2.5 years). The demographic data, operative data and outcome of all patients are showed in (Tables 1–3).

A total of 5 recurrences occurred medially to the previous prolene suture [skip area over testicular vessels and vas]. Loosening of prolene suture around IIR was the cause of recurrence in 2 cases. The majority of recurrence [25 hernia defects] occurred after general surgeon repair while the recurrence rate after pediatric surgeon was less [17 hernia defects] (Table 2).

Preperitoneal hydrodissection with normal saline was done in all males hernia defects (34/42) 90, 48%. Complete purse-string suture around IIR without any skip area was achieved in all defects. Disconnection and partial excision of the hernial sac and ligation of proximal

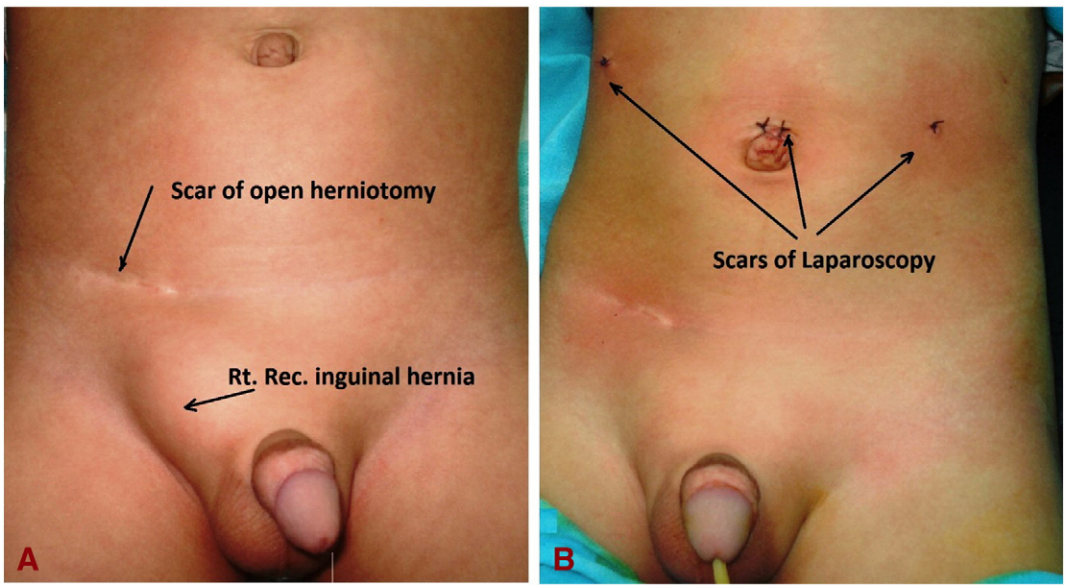

Fig. 1. A: Right recurrent inguinal hernia. B: Postoperative view.