Laparoscopic resection of ileocaecal duplication in children (report of 15 cases)

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INTRODUCTION

Enteric duplication (ED) is a rare congenital anomaly that can occur anywhere along the alimentary tract, with heterogeneous clinical pictures ranging from an asymptomatic course to life-threatening consequences. The location of the lesion is commonly in the ileal and ileocaecal (IC) regions. These lesions should be removed after being diagnosed because the patients usually develop serious complications, such as bowel obstruction secondary to adjacent pressure or mass effect, intussusception, gastrointestinal bleeding or perforation. In the past, children with ED underwent abdominal cyst resection of adjacent bowel or IC by laparotomy, whereas some cases received laparoscopic assisted bowel resection and ileocolic anastomosis, with the exception of 3 cases published recently by Catalano et al.

The purpose of our study was to present the possibility and safety of laparoscopic resection of IC duplication, thus avoiding bowel resection in children with preservation of Bauchin’s valve. From November 2013 to September 2018, 15 patients with IC duplication were treated in our hospital. The aim of our study was to present our experience in successfully resection of IC duplication by laparoscope, thus avoiding bowel resection in children.
total laparoscopic cystectomy was performed for 15 cases of IC duplication in children in our hospital; the approach caused little trauma, the recovery from the procedure was fast and the therapeutic results were good.

MATERIALS AND METHODS

Patients and methods
A retrospective review of the medical records of all patients who underwent laparoscopic resection of IC duplication in the Department of Paediatric Surgery of our hospital between November 2013 and September 2018 was carried out. This study included 15 patients, 8 males and 7 females, whose ages ranged from 3 months to 6 years (average, 4.3 years old). The symptoms were abdominal pain and vomiting in 8 cases and chronic abdominal pain in 3 cases; abdominal cysts were detected by prenatal ultrasound in 2 cases and complications from intussusception were noted in 2 cases. B-ultrasound examination was performed for all 15 cases, and the results showed cystic occupying lesions in the right lower abdomen. Computed tomography (CT) examination suggested the possibility of intestinal duplication deformity.

Surgical procedures
Under general anaesthesia with tracheal intubation, the paediatric patient was in a position with the head lower and feed higher, tilted to the left. A longitudinal 0.5 cm incision was created at the umbilical midline, a 5-mm trocar was placed under direct vision and then a laparoscope was placed. Pneumoperitoneum was established with the pressure of 6–8 mmHg. Additional 0.3 cm incisions were created at the upper right side of the pubic symphysis and the left lower abdomen McBurney point; a 3-mm trocar was placed in each incision. An intestinal clamp and a dissecting forceps were placed. The ileocaecal region was first explored, and the small intestine 100 cm away from the ileocaecal region was probed. The exploration showed that the masses were all extraintestinal cysts near the end of the ileum and approximately 0.8–2.0 cm away from the ileocaecal region [Figure 1]. In most cases, ileocaecal structures are fixed, adhered to the lateral peritoneum and difficult to remove from the umbilical incision. If the cyst had high tension and was difficult to clamp, a fine-needle puncture was performed to extract some cystic fluid so that the cyst collapsed and was easy to grasp. A 2/0 thread with needle was inserted into the abdomen, and the cyst was suspended to maintain a certain tension. To prevent damage to the normal bowel, the edge of the cyst was burned using an electric hook [Figure 2]. Then, the cyst was separated along this boundary, and the excessive muscle layer was excised. The residual mucosa joined at the intestinal wall was electrocauterised [Figure 3]. After complete haemostasis, the wound is sutured continuously.
with a 3/0 absorbable line, and it is necessary to avoid intestinal stenosis caused by excessive varus [Figure 4]. The cyst was removed through the umbilical incision for pathological examination. The umbilical incision was closed using 4/0 absorbable thread, and the remaining two 3-mm incisions were closed with medical glue.

RESULTS

The surgeries in all 15 cases were successful. The intraoperative diagnosis of intestinal duplication was clear. The lesions were located at the end of the ileum near the ileocaecal valve. All 15 cases were extraintestinal cysts, and the cysts were not connected to the intestine that shares a common wall. The operation time was 50–90 min (55 ± 10 min), and the amount of blood loss was 5–20 ml. All paediatric patients recovered well, and the post-operative hospital stay was 5–7 days (average, 6 days). The post-operative pathological diagnosis was intestinal duplication. All patients were followed up for 6–12 months (average, 10 months). No recurrence was detected by abdominal B-ultrasound examination. All paediatric patients showed normal growth and development, and the wound appearance was satisfactory, with no obvious scar on the abdomen.

DISCUSSION

The potential complications of ED can be fatal; thus, early neonatal resection of these duplications has been advocated, even for those that are asymptomatic. In this study, abdominal cysts were diagnosed during prenatal examinations in 2 cases; the postnatal ultrasound and CT suggested the possibility of intestinal duplication deformity, and surgery was completed within 3 months of the age for these 2 cases. The purpose of the surgical treatment is to completely remove the cyst. In recent years, laparoscopic techniques have been widely used in the diagnosis and treatment of abdominal cavity congenital diseases in children. Because of its dual roles of diagnosis and treatment, laparoscopy can solve the dilemma of surgery or further examination, thus reducing unnecessary waiting and resulting complications. Thus, there are few publications describing the role of laparoscopy in ED in children. The chance for excision of IC duplications preserving Bauchin’s valve even in the open approach has not been described until recently.

In this study, total laparoscopic dissection for IC duplication was performed, and our experience is summarized as follows. (1) Laparoscopic exploration has obvious advantages in the diagnosis of IC duplication by avoiding the false positives or false negatives that may exist in auxiliary examinations. (2) Compared with laparoscopic-assisted resection of IC duplication by removing the lesion from an umbilical incision, our method reduces intestinal exposure, which is beneficial for post-operative recovery of intestinal function, thus shortening the hospital stay. (3) For older children and cases of ileocaecal fixation, ileocaecal separation is more difficult, which may damage the intestinal tract and the surrounding organs and may easily cause post-operative intestinal adhesion. In addition, the wall of the intestinal tract in the ileocaecal region is thicker than that of the small intestine of other areas. Therefore, endoscopic mucosectomy is relatively safe. (4) In the past, the umbilical incision needed to be enlarged to at least 2.0 cm for laparoscopic assisted intestinal duplication resection, which had a considerable impact, especially on younger children; the healed umbilical incision may not look nice because an obvious scar around the umbilicus is inevitable. In this study, a 5-mm incision in the umbilical area was made, and the remaining two incisions were 3 mm, which allowed an easy operation with little trauma while retaining the original shape of the umbilicus. (5) In the operation, 2/0 silk thread was used to suspend the cyst so that the operation was easier, which helped to shorten the operation time. In addition, in cases with difficult residual mucosal stripping, a small amount of physiological saline can be injected under the mucosa to increase the gap, thus avoiding damage to the common intestinal wall and reducing residual mucosa and the chance of recurrence.

Laparoscopic resection of IC duplication is a safe option. Although the operation is difficult, it can reduce intestinal exposure, is conducive to post-operative recovery of
intestinal function and can shorten hospitalization time, without IC separation or expansion of the umbilical incision. For those surgeons who are proficient in laparoscopic operation techniques, if suspension traction can be flexibly applied during the operation, the operation time can be effectively shortened. Therefore, this method is worth promoting.

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Conflicts of interest
There are no conflicts of interest.

REFERENCES

1. Ildstad ST, Tollerud DJ, Weiss RG, Ryan DP, McGowan MA, Martin IW. Duplications of the alimentary tract. Clinical characteristics, preferred treatment, and associated malformations. Ann Surg 1988;208:184-9.
2. Patiño Mayer J, Bettolli M. Alimentary tract duplications in newborns and children: Diagnostic aspects and the role of laparoscopic treatment. World J Gastroenterol 2014;20:14263-71.
3. Lima M, Molinaro F, Ruggeri G, Gargano T, Randi B. Role of mini-invasive surgery in the treatment of enteric duplications in paediatric age: A survey of 15 years. Pediatr Med Chir 2012;34:217-22.
4. Laje P, Flake AW, Adzick NS. Prenatal diagnosis and postnatal resection of intraabdominal enteric duplications. J Pediatr Surg 2010;45:1554-8.
5. Catalano P, Di Pace MR, Caruso AM, De Grazia E, Cimador M. Ileocecal duplication cysts: Is the loss of the valve always necessary? J Pediatr Surg 2014;49:1049-51.
6. Correia-Pinto J, Tavares ML, Monteiro J, Moura N, Guimarães H, Estevão-Costa J. Prenatal diagnosis of abdominal enteric duplications. Prenat Diagn 2000;20:163-7.
7. Górecki W, Bogusz B, Zając A, Soltysiak P. Laparoscopic and laparoscopy-assisted resection of enteric duplication cysts in children. J Laparoendosc Adv Surg Tech A 2015;25:838-40.
8. Bhat NA, Agarwala S, Mitra DK, Bhattacharjee V. Duplications of the alimentary tract in children. Trop Gastroenterol 2001;22:33-5.
9. Tiryaki T, Senel E, Atayurt H. Anal canal duplication in children: A new technique. Pediatr Surg Int 2006;22:560-1.