Case Report

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Laparoscopic Desinvagination and Protective Ileocolonic Pexie After Previously Unsuccessful Reduction with the Barium Enema Method in an 18-Month-Old Boy - Case Report

K.Karavdić[1*], N.Džiho[1], A.Muftić[2], E.Škaljić[2], N.Jakirlić[3] and A.Džananović [3]

[1]Pediatric Surgery Clinic, Clinical Center University of Sarajevo

[2]Clinic for Anesthesiology and Reanimatology, Clinical Center University of Sarajevo

[3]Institute for Radiology, Clinical Center University of Sarajevo

*Corresponding author: K.Karavdić. Pediatric Surgery Clinic, Clinical Center University of Sarajevo, Email: kenan.kv@bih.net.ba

Abstract

This is a case report presenting an 18 month old boy, who came to our Clinic with symptoms characteristic for intussusception. After physical examination, ultrasound examination and barium enema study, a diagnosis was determined. After a failed attempt to reduce the intussusception with the barium enema study, laparoscopic surgery was performed. During surgery we performed laparoscopic desinvagination and protective ileocolonic pexie. The postoperative outcome was satisfying.

Keywords: Intussusception, laparoscopy, ileocolonic pexie

Introduction

Intussusception remains a common cause of bowel obstruction in young children and it is accompanied by a significant morbidity and mortality. Intussusception is the prolapse of one part of the intestine into the lumen immediately distal to the adjacent part. The most common type is ileocolic invagination. During intussusception, the mesentery is pressed by the intussusception into the distal lumen and the veins are obstructed leading to edema followed by mucosal bleeding increasing pressure in the region, leading to arterial flow obstruction resulting in gangrene and perforation. Intussusception mostly affects infants between 15 and 19 months of age with only 10–25% of cases after second year of life. 90% of patients with intussusception are children between 3 months and 3 years of age. (1) The major cause of intussusception is idiopathic and may be related to the hypertrophy of peyer's patches after a viral infection. Around 10% of the patients have a lead point, such as Meckel's diverticulum. (2)

Case Report

An 18-month-old boy came to our Clinic due to symptoms which started a few hours before arrival. The disease began with sudden abdominal pain and frequent vomiting. Defecation was normal, without blood in the stool. During the physical examination, the abdomen was discretely painful during palpation. Digitorectal examination showed a rectal ampulla full of the stool without blood. Ultrasound examination showed the target sign of ileocolic intussusception in the ileocolic region. A barium enema study was performed in the radiology department. Barium per rectum was applied. Contrast passed through the distended sigmoid colon, the distended colon descendens all the way to the projection of the middle part of the colon transverse where there was a stop of

the propagation of the contrast content. The contrast could not go further and an attempt at therapeutic radiological desinvagination failed. (Fig 1)

Figure:1 A barium enema study - contrast passed through the distended sigmoid colon, the distended colon descendens until the middle part of the colon transverse where there was a stop.

Then an urgent operative treatment was indicated. The patient was placed in supine position. The abdomen was insufflated through an umbilical ring incision and a trocar 10 mm width was inserted to act as a camera port., using 0 degree telescope. Two other 5 mm working ports for manipulation were placed in the right lower and the left upper quadrant because of the position of the intussusception. Two atraumatic bowel clamps were used for bowel manipulation. The position of the pathological substrate was determined after exploration of the peritoneal cavity. (Fig 2) The reduction is achieved by traction placed on the proximal bowel (intussusceptum) out of the distal segment (the intussuscepiens). (Fig 3) The intussusceptum is slowly mobilized from the intussuscepiens by intestinal forceps. Gentle traction of the terminal ileum was performed until complete desinvagination.

(Fig 4) An impression found on the terminal ileum, was most likely result of by a peyer's plate. (Fig 5, 6) Appendectomy was routinely performed to avoid possible confusion in the future due to postoperative scars. (Fig 7) Consequently, we performed the attachment of the distal ileum to the ascending colon with several interrupted 3-0 sutures. The infant's postoperative course was uneventful. Oral feeding was started immediately, and he was discharged after 3 days of hospital stay. The ileo-ileocolonic pexie is done with an extracorporeally inserted needle (through the anterior abdominal wall) by placing 2 sutures between the tenia libera of the caecum and the terminal ileum's wall using the technique of intracorporeal knot tied to prevent possible recurrence. (Fig 8, 9)

Figure 2. Ileocolic intussusception (the intussuscepiens).

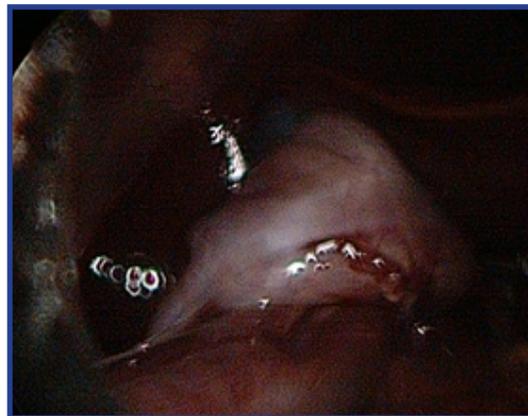**Figure 3. Atraumatic bowel clamp placed out of the distal segment**

Figure 4. Gentle traction of the terminal ileum by atraumatic bowel clamp

Figure 5.6. Impression found on the terminal ileum, after successful reduction represented by a peyer's plate
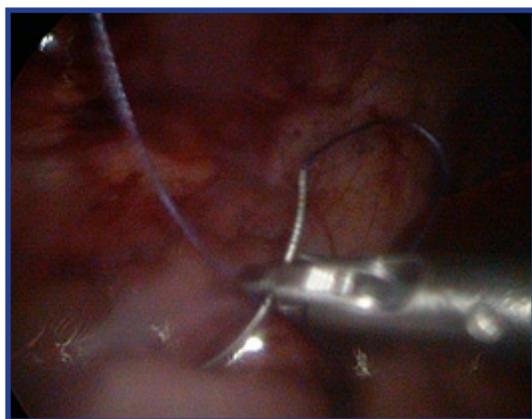
Figure 7. Routine appendectomy

Figure 8, 9 The ileocecal pexie - 2 sutures between the tenia libera of the caecum and the terminal ileum's wall.

The postoperative course was uneventful. The patient had no fever, peristalsis was established in expected time. Oral feeding was started on the first postoperative day, and the patient was discharged from the hospital after 3 days. On the 8th postoperative day, surgical sutures were removed. (Fig 10).

Figure 10 Postoperative wounds

Discussion

The first successful surgical correction of intussusceptions in an infant was described in 1871 by Hutchinson. Currently, the standard treatment for intussusception is an enema reduction using air, barium, saline, and other such an agents. Ravitch and McCune reported success rates of 79~90% with treatment by enema reduction using barium. Non operative treatment of intussusceptions by hydrostatic pressure dates back to the days of Hippocrates, who recommended the use of enemas in all forms of ileus. Reduction of intussusceptions by barium enema under fluoroscopy vision was first reported by Pallin and Olsson, Retan and Pouliquen in France 1927. Ravitch popularized and set the guidelines for the use of barium enema reduction in 1948. (3)

About 20% of the patients require surgery due to failure of reduction, clinical signs (peritonitis, shock/sepsis, and pneumoperitoneum). (4) Fallon et al. reported that the use of hydrostatic enemas for reduction, failure of initial enema reduction, hematochezia, age <1 year, or symptoms that last longer than 48 h were associated with the need for surgery. (5) Ultrasound findings, including a definable lead point, free or inter-loop fluid, and bowel wall thickening, were predictive factors for surgery.

The traditional surgical approach has been through an open laparotomy and manual reduction of intussusception. The introduction of the laparoscopy in the pediatric surgical field has added another dimension to the management of intussusception. In addition to its confirmed general benefits of less pain, better cosmesis outcome, and reduction of low long-term risk of adhesive bowel obstruction. (6,7,8,9)

Wei et al. reported a 13% conversion rate from laparoscopic procedure to laparotomy, which was more common in cases with a long lasting intussusception. (10) Bonnard et al. reported that the risk factors for conversion to laparotomy were directly related to delayed diagnosis (1.6 vs. 3.1 days), symptomatic peritonitis, and the presence of a pathologic lead point. (11)

In previous studies comparing MIS and laparotomy, there was a statistically significant decrease in the duration of the hospital stay and analgesic requirements in MIS group. (12) Wei et al. compared a laparoscopy group and a laparotomy group, and the operating time was longer in the laparoscopy group, but the time to oral intake and hospital stay were significantly shorter compared with the laparotomy group. (10) The fact that a patient who underwent laparoscopic procedure can eat the day after the operation is a clear advantage of laparoscopic surgery over laparotomy.

The main concern raised about this technique is the use of traction to reduce the intussusceptum and the risk of the bowel wall injury. Reduction using an atraumatic bowel grasper is always challenging. Manual reduction of a tight intussusception is also difficult during laparotomy, as it requires increased traction strength, which can cause intestinal tearing or perforation. In contrast, laparoscopy has a significant limitation with regard to tactile sensation and strength delivered if the traction applied is a gentle traction, the incidence of serosal tear appears to be equal to that encountered with manual reduction. The presence of the gas (pneumoperitoneum) may help and ease the reduction during laparoscopy. (13)

The dilemma of whether to do appendectomy or not is not clear. There is little evidence to justify removal or leaving the appendix. Those who remove it are convinced by different reasons. The approach to laparotomy is through an umbilical incision which is similar to laparoscopic appendectomy. This later may cause confusion if appendectomy was not done. Some authors believe that the appendix acts as a reservoir for adenovirus, which in turn, is a major predisposing factor for intussusception and recurrences, as the appendix may acts as a lead point for intussusception so by doing appendectomy they believe that they remove the potential risk of recurrence. In some studies, viral inclusions were seen in the appendices from cases of intussusceptions (in 45% of cases). (14) The blood supply to the appendix often is compromised when reduction is performed for the intussusception which necessitate appendectomy.

The recurrence rate has been reported to be 5 to 13% in non-operative reduction and 1 to 3% in open surgery (15,16) The best method to manage recurrent intussusceptions is still debated. Several methods have been described including radiological reduction, surgical resection, and ileocolonic pexie. (17)

Chang YT et al. treated 6 children with multiple recurrences of ileocolic intussusception by appendectomy and ileocolonic pexie after successful hydrostatic reduction with no recurrence in the follow up period (2 months). (18) Boehm R reported a case with the child aged one and a half year with 3 recurrences treated in the same way and there was no further recurrence within 1 year follow-up period. (19)

The conventional method (open surgery) should be reserved to situations where there is no experience with laparoscopy, difficulty with laparoscopy or complication of laparoscopy. (20)

Conclusions

Laparoscopic reduction of intussusception should be the gold standard for all patients with previously failed pneumatic or barium enema reduction.

Laparoscopic reduction of intussusception brings to patient general benefits of less pain, better cosmesis, and low long-term risk of adhesive bowel obstruction.

The reduction with usage of an atraumatic bowel grasper should be performed gently and the only disadvantage of this procedure is the lack of tactile sensation.

Appendectomy should always be performed because it may cause later confusion if appendectomy was not done.

Although the recurrence rate after surgery reduction is very low, our recommendation is to perform preventive ileocolonic pexie.

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