Recurrent Intussusception: When Should Surgical Intervention be Performed?

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Objective: To determine the optimal timing of surgery for recurrent intussusception.

Methods: We retrospectively reviewed medical records of patients aged from 0 to 18 years old with diagnosis of intussusception in the Pediatric Department at Mackay Memorial Hospital between January 1995 and May 2010.

Results: During the study period, there were 686 children (divided into three age groups: 367 < 2 years, 289 aged 2 to 5 years, 30 > 5 years) with diagnoses of intussusception. Eighty-five of the 686 patients had recurrent intussusception, of whom 56 had two, 16 had three, 11 had four, and 2 had five episodes. The recurrence rate after the first, second, third, and fourth barium enema reductions were 15.7%, 37.7%, 68.4%, and 100.0%, respectively. The incidence of recurrence and failure rate of barium enema reduction did not differ significantly among these three age groups. Surgery was performed in 177 children (146 during the first episode and 31 in recurrent cases). The probability of eventual surgery after first enema reduction was 21.8%, after the second 35.7%, and after the third 70.0%. Lead points were found in 15 children, and all of them were found during surgery for the first episode of intussusception.

Conclusion: The probability of recurrence was 100% after the fourth episode of intussusception in our study. After the third episode of intussusception, the probability of recurrence and eventual surgery were 68% and 70%, respectively. From this study, surgical intervention should be considered at the third episode of intussusception.

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1. Introduction

Intussusception is one of the most common causes of acute intestinal obstruction in infants and young children aged <2 years. Most cases in early childhood are idiopathic. Pathologic lead points such as a tumor, polyp, or Meckel’s diverticulum are more common in neonates and children over 5 years old or in those whose intussusceptions are restricted to the small intestine.\(^1\) The traditional diagnostic approaches to intussusception have been plain radiography and enema examination,\(^3,4\) but ultrasonography is now more commonly recommended.\(^5\) Barium, saline, or gas enemas have been widely used to reduce uncomplicated intussusceptions, but 10% to 30% of patients eventually require surgery.\(^6\) Surgery is definitely indicated when patients present with signs of perforation, shock, or peritonitis, when other attempts at reduction fail, or when a pathologic lead point is suspected. In a previous study in our institution, operative reduction was necessary in 13 of 48 cases studied by ultrasound in which the exterior sonolucent rim was thicker than 1.6 cm.\(^11\)

Recurrent intussusception after barium or air reduction is not uncommon, with a reported incidence of 4.4% to 10.1%.\(^11\) The incidence of recurrence after surgery is reported to be 0% to 5.4%.\(^12,15\) Patients with recurrent intussusception may be subjected to repeated enema reduction or surgical intervention. It is still controversial in the literature when surgery should be recommended in children with recurrences. We designed this retrospective study to analyze the incidence of recurrent intussusception and to try to determine the optimal timing of surgical intervention.

2. Methods

We retrospectively reviewed medical records of patients aged from 0 to 18 years with diagnoses of intussusceptions in the Pediatric Department at Mackay Memorial Hospital between January 1995 and May 2010. For comparison, the patients were divided into three age groups: younger than 2 years, 2 to 5 years, and older than 5 years.

The diagnosis was confirmed either by successful barium enema reduction or by operative findings. Barium reductions were performed by radiologists as soon as possible once the diagnosis was made clinically or sonographically. Criteria for successful reduction were disappearance of the intussusceptum and passage of barium through the ileocecal valve to the terminal ileum. Surgery was performed by pediatric surgeons in all patients who had a toxic presentation (impending shock, peritonitis, or complete intestinal obstruction), or had failed barium enema reduction, or when a pathologic lead point was suspected based on sonography or barium reduction.

Data extracted from the medical records included the age of onset of the first intussusception, results of treatment, episode of recurrences, and surgical findings. The recurrence rate, surgery, and presence of lead points among the groups were compared and incidence of recurrence and the need for surgery after each episode of recurrent intussusceptions calculated. The estimations of the probability that subsequent surgery would be performed after having had a first, second, or third barium reduction was calculated as the case number of surgery after each barium reduction divided by the total number of cases. The study was approved by the Institutional Review Board of Mackay Memorial Hospital.

Categorical variables were described using frequency distributions and reported as n (%). Categorical data were analyzed with a Chi-square test or Fisher’s exact test. A p-value of <0.05 was considered significant. All tests were two-tailed.

3. Results

During the 15-year study period, there were 686 cases of intussusceptions; ages ranged from 2 months to 6.45 years. These patients were divided into three groups, with 367 (53.5%) younger than 2 years, 289 (42.1%) 2 to 5 years, and 30 (4.4%) older than 5 years.

The most common type of intussusception was ileocolic (672 patients, 98.0%); others included five ileoileal, eight ileoileocolic, and one jejunojejunal intussusception. Our medical records indicated that 85 patients had recurrent intussusceptions, including 56 who had two, 16 with three, 11 with four, and two who had five.

Surgery was performed in 177 patients (25.8% of all patients), of whom 35 were acutely ill on presentation and underwent an emergency procedure without barium enema in the first episode of intussusception. Only six of these 35 patients had demonstrable lead points, but 16 received bowel resections. Of the 142 eventual operations, 111 were performed for the first attack, eight at the second, 10 at the third, and 11 at the fourth. Two patients underwent barium reduction four times; the surgeon decided to do surgical reduction when the fifth intussusception occurred under the suspicion of lead points in intestine (Figure 1).

Recurrent enema rates after the first, second, and third enema reductions were 15.7% (85/540), 37.7% (29/77), and 68.4% (13/19), respectively. There was no significant difference between the three age groups in the rate of enema failure (p = 0.377) or frequency of recurrence (p = 0.248). The probability that subsequent surgery would...
be performed after the first, second, and third barium reduction was 21.8%, 35.7%, and 70.0%, respectively (Table 1).

Pathologic lead points were found in 15 of the 177 (8.5%) patients who received operation (Table 2). All of them were found during surgery for the first episode of intussusception, but there was no significant difference between episodes of intussusception and presence of lead points ($p = 0.808$).

Patients aged 2 to 5 years were at the lowest risk of surgical intervention, of presence of lead point, and of bowel resection if surgery was required. The presence of lead point was most common in the older age group ($p = 0.001$). A total of 28 patients (of 177 who needed surgery, 15.8%) underwent bowel resection. Children over 5 years old had the highest risk of bowel resection ($p < 0.001$; Table 3). The presence of a lead point significantly increased the likelihood of bowel resection ($p < 0.001$).

Three patients (3/177, 1.7%) had recurrent intussusception after surgery. Two of these three patients had undergone an operation because of failure of barium enema reduction, one during the first attack and the other during the second.
intussusceptions in older children are more frequently caused by pathologic lead points. Ileal lymphosarcoma in particular should be considered in any child older than 6 years with clinical or radiological evidence of intussusception. Although the practice in many hospitals is to operate immediately in any older child with an intussusception, a retrospective review from Israel suggests this may not be necessary. They reviewed 24 patients aged >3 years who had 26 episodes of intussusception, 18 of whom had successful image-guided reduction and no evidence of a pathologic lead point. Our policy is to attempt barium reduction for any patient, regardless of age, for the first episode, except those with a toxic presentation, failure of attempted reduction, or if a lead point is strongly suspected based on abdominal sonogram. The overall incidence of surgery in our patients (25.8%, 177/686) is similar as that in other reports.

Pathological lead points were found in 15 of the 177 (8.5%) patients who received operation. The presence of a pathologic lead point did not apparently correlate with a higher risk of recurrence or the need for surgery in order to achieve reduction. The incidence of lead points found during surgery did not differ significantly with either the number of previous episodes or among the three age groups. The presence of a pathologic lead point significantly increased the risk of bowel resection.

The retrospective nature of this study is one of its limitations. In addition, the incidence of surgery with each recurrent episode was influenced not only by strictly medical considerations but also by the fact that the pathologic lead points may not be ruled out in cases with repeated enema reductions. Despite these limitations, our results recommend withholding of surgery until the third episode of intussusception, unless immediate surgery is otherwise indicated.

5. Conclusion

In this study, the probability of recurrence was 100% after the fourth episode of intussusception. After the third episode, the probability of recurrence and eventual surgery are 68% and 70%, respectively. Surgical intervention should be considered at the third episode of intussusception.

References