

## Postoperative Intussusception in Children with Enterostomy

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*Postoperative intussusception (POI) is an uncommon but important cause of postoperative intestinal obstruction. We describe three cases of intussusception, which developed after major abdominal surgery. Two of the patients were premature newborns whose conditions were complicated by necrotizing enterocolitis and accepted ostomy. The other case involved a patient with Hirschsprung's disease who had had a previous colostomy and accepted Duhamel pull through procedure. Postoperative intussusception is a rare complication of pediatric abdominal surgery and may occur in premature infants. The ostomy may be the predisposing factor of these patients. (Acta Paediatr Tw 2005; 46:166-9)*

**Key words:** *postoperative intussusception, prematurity, necrotizing enterocolitis, Hirschsprung's disease, enterostomy*

### INTRODUCTION

Postoperative intussusception (POI) is an uncommon but important cause of postoperative intestinal obstruction.<sup>1-5</sup> Since the typical features of intussusception are usually absent and radiological results are frequently non-specific, it is often an overlooked cause of postoperative intestinal obstruction.<sup>3-9</sup> In most cases, POI involves the small bowel.<sup>1</sup> Retroperitoneal diseases, major intra-abdominal surgical procedures, impaired esophageal motility and extra-abdominal surgical procedures may all result in postoperative intussusception.<sup>6,10</sup> The incidence of POI following pediatric laparotomy is low and varies from 0.01% to 0.25%.<sup>4,11</sup> It was also about 5%-10% of cases of postoperative ileus.<sup>4,11</sup> Both sexes are equally affected<sup>12</sup>. There is significant morbidity and mortality if the condition is not detected early. The symptoms start within 1 week of major operation in 64% of patients and within 2 weeks in 90% of patients.<sup>5,8,11</sup> In most cases, a leading point is absent in POI.<sup>5,12,13</sup> The etiology of postoperative intussusception is unknown.<sup>5,6,14</sup> We evaluated three cases of postoperative intussusception at the China Medical University Hospital Medical Center from September 1997 to May 2002. All patients

developed POI after abdominal surgery. Two of the patients were premature newborns and one was a ten-month-old infant. The following conditions were all recorded: (1) basic conditions; (2) initial diagnosis for primary operation and surgical methods; (3) symptoms and signs (distention, feeding intolerance and vomiting, rectal bleeding, irritable crying, abdominal palpable mass, plain abdomen findings), interval between initial surgery and next operation, (4) the site of intussusception and surgical findings.

### PATIENT 1

An eight-day-old premature male newborn (gestational age: 31 wk, birth body weight: 1150 gm), underwent loop jejunostomy for necrotizing enterocolitis (NEC) with jejunal perforation. Postoperative enteral feeding was normal. Thirty-six days after operation, increased nasogastric drainage, abdominal distention, and irritability were noted. Plain abdominal X-ray showed a diffuse ileus compatible with small bowel obstruction (Fig. 1). Under the impression of mechanical ileus, laparotomy was performed on the 37<sup>th</sup> postoperative day and revealed jejunojejunal intussusception.

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Received: May 24, 2004. Revised: April 20, 2005. Accepted: July 23, 2005.

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Fig. 1. Case 1. Plain abdominal X-ray with patient supine demonstrating distended bowel in upper abdomen and rather gasless lower abdomen. The jejunostomy was noted over left-middle area in this film.



Fig. 2. Case 3. The plain abdominal X-ray with patient supine demonstrating steppered like gas pattern compatible with mechanical bowel obstruction. The colostomy was noted over the right lower quadrant area in this film.

#### PATIENT 2

A six-day-old premature female newborn (gestational age: 29 wk, birth body weight: 900 gm), underwent loop ileostomy for NEC with terminal ileum perforation. Postoperative enteral feeding was normal. On the eighth postoperative day, increased nasogastric drainage, abdominal distention, irritability, and abdominal protruded mass via ileostomy were noted. Plain abdominal X-ray showed a diffuse ileus compatible with small bowel obstruction similar to that shown in Fig. 1. Gangrenous change of protruding bowel was also noted. Under the impression of mechanical ileus, laparotomy performed on the eighth postoperative day revealed an ileo-ileal intussusception and necrotic change of ileum.

#### PATIENT 3

A ten-month-old male infant with Hirschsprung's disease had undergone colostomy at age three weeks. The patient received surgical management including Duhamel pull through procedure and colostomy reversion at age ten months. Increased nasogastric drainage, abdominal distention, and irritability were noted two days later. Bilious drainage had been noted since postoperative day five. There was no enteral feeding after ostomy restoration. Plain abdominal X-ray showed a steppered like gas pattern compatible with mechanical bowel obstruction (Fig. 2). Under the impression of acute abdomen, laparotomy was performed on postoperative day six and revealed an ileoileal intussusception.

#### DISCUSSION

Our patients' ages ranged from 6 days to 10 months, and their symptoms appeared from postoperative days 5 to 36. These findings were significantly different from adhesion ileus, in which most symptoms occurred within 2 weeks after major abdominal surgery. In our patients, the symptoms started on postoperative day 36, day 8, and day 5 (Table 1). POI may occur within 2 weeks after abdominal surgery; we should keep this in mind for the surgical problems.

From September 1997 to May 2002, seventeen patients with Hirschsprung's disease were treated in our hospital. Postoperative intussusception occurred in only one case (5.8%). During the same period, twenty-four premature infants had necrotizing enterocolitis in our hospital and all underwent ostomy. Out of the 24 patients, two developed POI (8.3%). The incidence of these two conditions is not enough to predict as few case report and need further observation.

Enteral feeding may be the predisposing factors in these cases and induce bowel ischemia. In a previous study,<sup>5</sup> 75% of the POI patients who underwent surgical procedure regained gastrointestinal function and feedings had been instituted. The possible causes of abnormal bowel peristalsis included general anesthesia, local tissue hypoxia and abnormal electrolytes. Ischemia bowel may induce local tissue hypoxia and abnormal bowel peristalsis. In our cases, both premature newborns with necrotizing enterocolitis and one infant with Hirschsprung's disease all developed intussusception after surgery and accepted ostomy. The intestinal obstruction tends to occur in the proximal segment of ostomy. The ostomy may interfere bowel peristalsis and make the risk of POI.

Table 1. Clinical Presentations of Postoperative Intussusception

	Case 1	Case 2	Case 3
Underlying disease	prematurity with NEC*	prematurity with NEC	Hirschsprung disease
Interval (day)#	37 <sup>th</sup> day	8 <sup>th</sup> day	6 <sup>th</sup> day
Type of intussusception	jejunojejunal	ileo-ileal	ileo-ileal
Distention	+	+	+
Bilious drainage	+	+	+
Irritability	+	+	+
Mass	-	prolapse <sup>+</sup>	-
Rectal bleeding	-	-	-
Feeding intolerance	+	+	-
Plain abdominal X-ray	ileus	ileus	ileus

\* NEC: necrotizing enterocolitis

# Interval between initial surgery and next operation.

+ Protrusion of bowel via ileostomy was noted 8 days after ileostomy

Unlike classical childhood intussusception, which has a strong male predominance, postoperative intussusception occurs equally among boys and girls. The symptoms and signs of postoperative intussusception are the sudden appearance of abdominal distention, bilious drainage, prolonged nasogastric production, and abdominal cramps. A palpable mass or rectal bleeding is relatively rare in patients with postoperative intussusception. The involved areas of POI are also different from classical intussusception. In most cases, a leading point is absent and there is no recurrence after re-laparotomy management. There were the same findings of our cases without leading point or recurrence. In our groups of patients, POI involved the small bowel and typical childhood intussusception involved the large intestine. The first case was jejunojejunal type, and the other two cases were ileo-ileal type. These were different from the typical intussusception, in which ileocecal type was the most common finding. The clinical manifestations of postoperative intussusception in our patients were abdominal distention, bilious drainage, and irritability different from those which present in the classic type of intussusception in children: abdominal pain, abdominal mass and bloody stool (Table 1).

The differential diagnosis of postoperative intussusception and adhesion ileus is difficult by clinical symptoms and signs because the above symptoms could be noted both in POI and adhesion ileus. Two of our premature newborns with necrotizing enterocolitis and complicated with POI had abdominal distention, bilious drainage, and feeding intolerance. These characteristics can occur in the septic condition. Bowel necrosis and sepsis may be included in our differential diagnosis. We should keep in mind that postoperative intussusception may occur in prematurity received

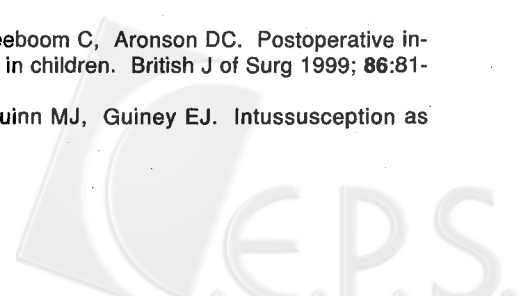
operation.<sup>15,16</sup>

Barium reduction is not a useful diagnostic or therapeutic method because the most common site of POI is the small intestine.<sup>17,18</sup> Abdominal sonography may be the most suitable method for detecting the disease.<sup>7,12,19</sup> The findings showed the outer sonolucent rim and central echogenic area of both the "doughnut" and "pseudo-kidney" sign that are the same as in classic type intussusception. POI occurs most in the small intestine, and the intussuscepted diameter was smaller than in classic type intussusception.<sup>7,19</sup> The approach position may be in the lower or left abdomen, not in the right upper or lower quadrant, the same as classic ileocecal type intussusception.<sup>7,19</sup> Abdominal computed tomography also identifies a "target sign" representing the intussuscepted bowel loop, and provides precise diagnostic information prior to reexploration. The preoperative impressions of our cases were bowel obstruction, and the diagnoses were confirmed by laparotomy. Postoperative intussusception requires immediate surgery. Laparotomy should follow without delay to lower morbidity and mortality.

In conclusion, postoperative intussusception is a rare complication of pediatric abdominal surgery, and it may occur in prematurity. Ostomy may be the cause. It should be suspected when patients have had intra-abdominal operations and show symptoms and signs of intestinal obstruction, especially in the early postoperative period.

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