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MAIN TOPIC

F. Linke · F. Eble · S. Berger

Postoperative intussusception in childhood

Abstract Over a period of 10 years, five children developed postoperative intussusception after intra-abdominal procedures at the Department of Pediatric Surgery of the Johannes Gutenberg University Mainz. Two appendectomies, one ileal resection for a Meckel's diverticulum, one operative procedure for Hirschsprung's disease plus intestinal neuronal dysplasia type B, and one hiatoplasty with jejunostomy preceded the intussusception. Three of the five children were older than 2 years. The clinical symptoms consisted primarily of abdominal distension, diffuse abdominal pain, bilious vomiting, and rectal bleeding in one case. Preoperative diagnosis was achieved in four cases by abdominal ultrasound. Plain abdominal radiographs demonstrated dilated loops of small intestine with air-fluid levels in four of the five cases. In the case without radiographic findings, the jejunojejunal intussusception was missed even by a bowel follow-through. The intussusceptions were ileocolic (3), ileoileal (1), and jejunojejunal (1). A hydrostatic procedure to reduce an ileocolic intussusception was not successful. Operative treatment of the intussusception was performed in three cases within 5 days, once at 32 days, and once 3 months after the primary operation, in all cases by laparatomy and simple manual reduction without intestinal resection. In contrast to idiopathic intussusception, noninvasive hydrostatic procedures are not indicated in postoperative intussusception, since protection of intestinal anastomoses from hydrostatic pressure and exclusion of other causes of postoperative ileus are mandatory.

Key words Intussusception · Postoperative · Childhood

F. Linke (✉) · F. Eble · S. Berger
Department of Pediatric Surgery,
Johannes Gutenberg University,
Langenbeckstrasse 1, D-55131 Mainz,
Germany

Introduction

Detection of a postoperative intestinal obstruction in childhood, especially during the early postoperative phase, can be difficult. In view of the early onset of symptoms following the primary operation, in many instances these findings are confused with adynamic ileus, particularly in the rare cases of postoperative intussusception with atypical clinical findings. The correct diagnosis, however, can easily be overlooked. We therefore evaluated the specific clinical symptoms and diagnostic and therapeutic aspects of postoperative intussusception based on our own observations and previous reports.

Materials and methods

From 1987 to 1996, a total of 2,659 laparotomies were performed at the Department of Pediatric Surgery, Johannes Gutenberg University Mainz; 59 reoperations (2.2%) were required for postoperative intestinal obstruction. These were caused by adhesions in 46 cases (77.9%). Four anastomotic strictures, 3 cases of volvulus, and 1 internal hernia were also found at reoperation. During the same period 212 children presented with idiopathic intussusception; 81 (38.2%) of these underwent a primary operation with manual reduction. In 5 children aged 7 months to 10 years (3 boys, 2 girls) a postoperative intussusception was identified as a cause of intestinal obstruction, representing 8.4% of all obstruction-related reoperations.

Intussusception was seen subsequent to the following operations and respective clinical diagnoses: 2 appendectomies for acute appendicitis, 1 ileal resection due to a bleeding Meckel's diverticulum (MD), 1 sigmoid resection with a descending colostomy in a patient with Hirschsprung's disease and intestinal neuronal dysplasia (IND) type B, as well as 1 hiatoplasty in a tetraspastic boy with gastroesophageal reflux (GER). Because of dysphagia, a jejunal feeding catheter was implanted during the same operation. Three of the children developed early symptoms of intussusception and underwent reoperation within 5 days. Symptoms were delayed in 2 patients, leading to reoperation in 1 child after 32 days. In a 10-years-old girl, reoperation was required 3 months after an appendectomy. The sites of the intussusception were as follows: 3 ileocolic and 1 each ileoileal and jejunojejunal (Table 1).

Table 1 Age, initial diagnosis and procedure, type of intussusception, and interval between initial surgery and next operation

Case no.	Age (years)	Initial diagnosis	Initial procedure	Type of intussusception	Interval (days)
1	6	Gastroesophageal reflux with hiatus hernia Tetraspastic paresis Encephalomalacia	Nissen Fundoplication Pylorotomy Jejunal feeding catheter	Jejunojejunal	32
2	4 1/12	Acute appendicitis	Appendectomy	Ileocolic	2
3	7/12	Hirschsprung's disease Intestinal neuronal dysplasia	Sigmoid resection Colostomy	Ileoileal	5
4	1 1/12	Bleeding Meckel's diverticulum Trisomy	Ileal resection	Ileocolic	5
5	10 8/12	Acute appendicitis	Appendectomy	Ileocolic	90

Table 2 Clinical symptoms and diagnostic methods in five patients with postoperative intussusception

Case	Distension	Pain	Vomiting	Palpaple mass	Rectal bleeding	Radiographic findings (air-fluid levels)	Ultrasound findings
1	+ + +	+	+ + +	0	0	No	Yes
2	+ + +	+ + +	+ +	0	0	Yes	Yes
3	+ + +	+	+ + +	0	0	Yes	No
4	+ + +	+	+ + +	+	+	Yes	Yes
5	0	+ +	+ + +	0	0	Yes	Yes

The most prominent symptoms included abdominal distension and bilious vomiting, or increasing volumes of bilious nasogastric (NG) fluid output. Abdominal pain was usually present, but variable in nature and not characteristic. A palpable abdominal tumor and rectal bleeding were observed only once after an ileal resection because of a MD (Table 2). The intussusception was diagnosed in 4 cases at ultrasound (US) examination (ileocolic 3, jejunojejunal 1). One ileoileal intussusception was not recognized by US. One nonoperative attempt to reduce the intussusception with a saline enema under US control remained unsuccessful. The diagnosis was made when a reoperation was performed because of prolonged postoperative ileus. In 1 case without radiographic signs of intestinal obstruction, the jejunojejunal intussusception was not even discovered by a small-bowel follow-through, which was performed 3 days prior to the second operation (Table 1).

Results

The operative therapy consisted of laparotomy and manual reduction of the intussusception. No bowel resections were necessary since severe tissue damage was never seen. Four children had a postoperative course without complications. As soon as peristalsis reappeared, oral feeding was gradually resumed in all patients.

Discussion

Intussusception accounts for 3%–10% of cases of postoperative intestinal obstruction during childhood according to several reports in the literature [5, 8, 11, 13]. In contrast to adhesions, which occur mainly within 2 years after laparotomy [9], postoperative intussusception occurs in 90% of all cases within less than 14 days, in 64% as early as the first 7 days after the primary operation [13]. Our report includes 3 early intussusceptions that occurred within the first 5 days after a primary laparatomy. One postoperative intussusception that occurred after 32 days in a 6-year-old, tetraspastic boy after an antireflux procedure may have been caused by an underlying motility disturbance of the intestine due to the jejunal feeding catheter. One post-appendectomy intussusception was seen 3 months following the operation, representing a very unusual clinical course.

Unlike idiopathic intussusception, where 65% of the patients are younger than 1 year, only 25% of patients with postoperative intussusception are infants [13]. Our youngest patient was a 7-month-old boy with aganglionosis and IND type B who developed an ileoileal intussusception after a sigmoid resection with a colostomy. Blair et al. [2] reported the case of a 10-day-old premature baby (720 g, 26 weeks of gestation) with ileoileal intussusception 8 days after a sigmoid colostomy for imperforate anus. The causes of postoperative intussusception remained unclear.

There is evidence that the operative procedure leads to an edematous reaction with subsequent perfusion deficits and motility disturbances of the intestine [17]. Other possible causes are extensive operative manipulation with injury to the serosa, long-term compression of the intestine, and prolonged anesthesia with electrolyte disturbances [7, 13, 17]. Even after retroperitoneal operations (e.g., nephroblastoma) or head and neck surgery, postoperative intussusception has been

described [6, 12]. Another trigger mechanism may be the neurotoxic effects of chemotherapy (vincristine) and radiation therapy [6]. The role played by neuroendocrinologic factors is still unknown. It is obvious, however, that surgery for neuroblastoma, Hirschsprung's disease, and GER is associated with a higher incidence of intussusception [4, 5]. The prevalence also seems to be increased in mentally disabled patients: 3 of our patients had mental retardation due to perinatal asphyxia, trisomy, or unknown causes.

While idiopathic intussusception is suggested by the typical triad of painful abdominal cramps, a palpable mass, and rectal bleeding, the clinical symptoms of postoperative intussusception are restlessness, bilious vomiting or increasing volumes of bilious NG fluid output, abdominal distension, and diffuse pain, and therefore are less specific [8, 17]. Mollit et al. [13] defined the clinical symptoms of postoperative intussusception as "prolonged adynamic ileus." Rectal bleeding in a 1-year-old boy with an ileoileal intussusception (Tables 1 and 2) was initially mistaken as a remnant of the bleeding MD that led to the primary operation.

It is rather difficult to differentiate the pain produced by a postoperatively intussuscepted bowel segment from that due to re-establishment of peristalsis or wound pain. Abdominal US can be a helpful tool to determine whether a mechanical obstruction or a paralytic or functional situation causes the symptoms. Detection of intussusception in the small intestine by US is, however, always problematic. The indication for nonoperative reduction (pneumatic or hydrostatic) is usually limited to idiopathic intussusceptions [1, 10, 15, 16]. Only a few authors do not consider a previous abdominal operation a contraindication to nonoperative reduction [10, 14]. One should be very careful using hydrostatic reduction, since possible causes of the intussusception such as adhesions resulting from the primary operation cannot be detected. In early postoperative intussusception, increased intraluminal pressure might disrupt bowel anastomoses, and furthermore, hydrostatic reduction does not work if the intussusception is localized in the jejunum or ileum.

Abdominal radiographs may show only typical air-fluid levels. Contrast studies are diagnostic in up to 95% of cases of small-bowel intussusception [13], and should be used when US is negative. Stone et al. [16] reported two children with jejunal intussusception where contrast medium passed the intussuscepted area prior to complete operative reduction. One of our cases was also not diagnosed by means of a contrast study.

The longer the period of clinical symptoms lasts, the lower is the success rate of hydrostatic reduction, while the incidence of bowel resection rises simultaneously [3]. Whereas previously only 3%–5% of cases of postoperative intussusception were diagnosed prior to reoperation, in our patients the diagnosis was achieved in 4 of 5 children by early US. When early laparotomy follows early diagnosis, manual reduction can be achieved in 96% of cases [4, 6, 8]. For this reason, in our cases resection of the intestine became unnecessary. Complications such as segmental necrosis occur significantly more frequently if the laparotomy has been delayed [2]. West et al. [17] found a mortality for postoperative intussusception of at least 6%–7%.

Postoperative bowel obstruction caused by intussusception is rare and is extremely difficult to identify during the postoperative course. In any atypical postoperative ileus, the early use of US is crucial to avoid intestinal-wall damage and necrosis resulting from an overlooked intussusception. A suspected or diagnosed intussusception may therefore represent the exception to the surgical rule of avoiding early relaparotomy whenever possible. Early US diagnosis and early operative intervention are the keys to limiting the deleterious effects of postoperative intussusception.

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