

Intussusception: Diagnosis and Management According to the Competence of Primary Service Doctors

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Received: December 29, 2021; Accepted: March 29, 2022; Published on line: March 31, 2022

Abstract: Intussusception is defined as the invagination of a bowel segment into another. Intussusception can occur at any age but it is most common in children aged three months to two years. In children, the cause of intussusception is idiopathic and is assumed to be associated with uncoordinated intestinal peristalsis or lymphoid hyperplasia, which may be due to gastrointestinal infection. Clinical findings include intermittent abdominal pain, vomiting, and red currant jelly stools. The diagnosis of intussusception is confirmed by using contrast enema, ultrasound, and CT-Scan. Improving condition must be done before performing a surgery. In conclusion, intussusception has a good prognosis with early diagnosis and treatment. Surgery is an option if the intussusception is followed with complication or if the enema reduction fails.

Keywords: intussusception; invagination

Introduction

Intussusception is defined as the invagination of one bowel segment into another bowel segment.¹ In about 90% of cases, intussusception in children is idiopathic. It is also assumed to be associated with uncoordinated intestinal peristalsis or lymphoid hyperplasia, which may be due to a gastrointestinal infection. The occurrence of intussusception is associated with a history of recent episodes of gastroenteritis virus, upper respiratory tract infections, and even the distribution of rotavirus vaccine, that implicates lymphoid swelling.²

Clinical findings include intermittent abdominal pain, vomiting, and red currant jelly stools.³ The presence of this triad has a positive predictive value of 93% for intussusception. Unfortunately, it occurs in less than 25% of cases. Many patients instead present with various combinations of non-specific symptoms including vomiting, abdominal pain, whining, or lethargy, initially misdiagnosed with other abdominal

and neurologic conditions.⁴

While the gold standard for the diagnosis of intussusception is contrast enema, the use of ultrasound has gained support as an initial study option because it is non-invasive, radiation-free, painless, rapid, and relatively low-cost compared to other radiology.⁴ Ultrasound screening for suspected intussusception improves diagnostic or therapeutic enema results and reduces unnecessary radiation exposure in children with negative ultrasound examinations.⁵ The use of plain abdominal radiographs and ultrasonography can aid in the preoperative diagnosis of intussusception, especially in rural areas where computed tomography scan (CT-scan) is unavailable. Prompt diagnosis and management is required for a better outcome.⁶

Improving the general condition must be done before performing surgery. Patients can be operated on if it is assured that their tissue perfusion has improved. Perform decompression to prevent the aspiration of the way of the breath when vomiting by inserting a

nasogastric tube (NGT). Another way to do this by catheterization for decompression and monitoring of diuresis while rehydrating. Restore electrolytes and treat acidosis if present. If necessary, give prophylactic antibiotics and sedatives, muscle relaxants, or analgesics.^{7,8}

Anatomy

The intestine is the most extensive organ system in the abdominal cavity.⁹ This intestine fills the middle and lower abdomen. The proximal end has a diameter of about 3.8 cm, but as it goes down it gradually decreases in diameter to about 2.5 cm.¹⁰ The small intestine is divided into three parts: duodenum, jejunum, and ileum.⁹ Digestion is initiated in the mouth and stomach by the action of ptyaline, hydrochloric acid, and pepsin on incoming food. The process is continued in the duodenum mainly by pancreatic enzymes which hydrolyze carbohydrates, fats, and proteins into simpler substances.¹¹ The large intestine is a hollow muscular tube about 5 feet (about 1.5 m) long that extends from the cecum to the anal canal. The diameter of the large intestine is definitely larger than the small intestine, average about 2.5 inches (about 6.5 cm), but the closer to the anus it gets smaller.¹¹

Definition

Intussusception is a gastrointestinal obstruction that is often found in children.¹² Intussusception occurs when one loop of bowel invaginates into another.¹³ During bowel invagination, its mesentery is dragged into the intestine, causing venous congestion, lymphatics, and intestinal edema.¹⁴ In children, intussusception is the second most common cause of gastrointestinal obstruction, after pyloric stenosis.¹⁵

Epidemiology

Most cases of intussusception are seen during the first five years of life, with more than half occurring during the first year.² Sixty percent of patients were less than one year of age, and 80% of cases occurred before 24 months of age, rare in neonates. Incidence varies from 1 to 4 per 1000 live

births. The male and female ratio is 3:1.⁵ Adult intussusception is estimated to account for 5% of all intussusception ages and contributes 1-5% of intestinal obstruction.⁶

Etiology

Intussusception by location is categorized into four types, as follows: ileo-ileal, colorectal, ileocecal, and ileocolic. Enteric intussusception or the so-called ileo-ileal invagination is limited to the proximal small intestine enters the distal intestine⁸ and can be found in 43% of patients. The colorectal type occurs in 22% of cases and affects only the large intestine. The ileocecal type occurs when the ileocecal valve acts as the main point of intussusception and is present in 21% of cases. The ileocolic type occurs in 14% of cases. The type defined as the prolapse of the ileum through the ileocecal valve into the colon.⁶

Pathophysiology

Intussusception is usually idiopathic without a clear anatomic starting point and occurs mainly at the ileocecal junction;⁶ this may be related to the amount of lymphoid tissue in the ileocecal area. There is an agreement that hyperplasia lymphoid precedes and is a common cause of intussusception with viral infection (especially adenovirus) in many cases.¹⁶

Clinical Manifestations

The classic presentation of intussusception consists of a triad of colic abdominal pain, bloody stools (usually described as "currant jelly"), and vomiting.⁴ In the typical case, there is a sudden onset in a previously healthy child, such as severe paroxysmal colic pain that recurs at frequent intervals and is accompanied by straining attempts with flexed legs and knees and a loud cry. The baby initially feels comfortable and plays normally between paroxysms of pain, but if the intussusception does not subside, the baby grows weak and lethargic. Sometimes the lethargy is often disproportionate to the abdominal signs. Under these circumstances shock with fever and peritonitis may develop. Vomiting occurs in most cases and is usually

more frequent in the early stages. In the next phase, the vomit becomes bile colored. After this, little or no stool excretion occurs and little or no flatus is passed. Blood usually comes out within the first 12 hours. About 60% of babies pass stools containing red blood and "currant jelly" mucus. The classic triad of pain, a palpable sausage-shaped abdominal mass (Sausage's sign),^{5,7} and bloody jelly or raisin stools are seen in <30% of patients with intussusception. The combination of paroxysmal pain, vomiting, and a palpable abdominal mass had a positive predictive value of >90%; the presence of rectal bleeding increases this to about 100%.⁵

However, this classic triad is rarely seen in adults. The clinical manifestations of adult intussusception are non-specific and variable. The patient presented with right lower quadrant pain, repeated vomiting, and the absence of flatus and bowel movements. As adult intussusception is rare, acute appendicitis and bowel obstruction are often suspected at first. Other non-specific manifestations of adult intussusception are abdominal distension, constipation, fever, hematochezia, cramps, and nausea. Symptoms can manifest as acute or chronic lasting for months to years.⁶

Diagnosis

Diagnosis is based on history, physical examination and radiological examination. On palpation of the abdomen the right lower quadrant may be empty because the cecum has rotated out of its standard position.¹³ Intussusception may be palpated as a slightly tender, sometimes indistinct sausage-shaped mass that may increase in size and firmness during paroxysmal pain and most commonly in the right upper quadrant of the abdomen. Approximately 30% of patients have no palpable mass.^{5,13} The cecum that feels empty is called the "dance's sign". On digital rectal touch, the following can be found: 1) Anal sphincter tone is weak; 2) Invagination may be palpable in the form of a portio/pseudo portio mass (portio like appearance); and 3) If the finger is pulled, it will bleed. mixed with mucus (currant jelly stool's).

Contrast enema indicates a filling or cupping defect in the head of the contrast medium where progress is obstructed by the intussusceptum. A linear column of central contrast medium can be seen in the compressed lumen of the intussusceptum, and a thin margin of contrast can be seen trapped around the intestines that experienced invagination in mucosal folds within the intussusciens (a circular spring sign).⁵

On ultrasonography, some cases will show a pseudokidney that is formed because the intussusception is curved and the mesentery is only visible on one side. On the axial view, there is a circular hypoechoic appearance. The hypoechoic area is the area of the intestinal wall that is edematous. While the layer in the middle is a picture of the mucosal and serous layers of the intestinal segments that enter into other intestinal segments. This picture has several names, namely bulls eye sign, target sign, or donut sign.⁴

In adult intussusception, ultrasonography is less sensitive than CT scan.¹⁷ CT-scan especially with contrast can provide more information regarding the location and cause of the obstruction, possible lead points, surrounding viscera, blood vessels, and possible strangulation. The classic finding for intussusception is a target lesion or sausage-shaped mass.⁴ With CT scans, intussusception is seen more frequently in adults without bowel pathology, thereby increasing the success of non-operative therapy.¹⁷

Differential Diagnosis

It may be particularly difficult to diagnose intussusception in a child who already has gastroenteritis; a change in the pattern of illness, in the character of pain, or in the nature of vomiting or the onset of rectal bleeding should alert the physician. The bloody stools and abdominal cramps that accompany enterocolitis can usually be differentiated from intussusception because in enterocolitis the pain is less severe and less regular, there is diarrhea, and the infant is recognizably ill between pains.⁵

There are several differential diagnoses for intussusception as follows: Meckel's

diverticulum, malrotation with volvulus, Henoch-Schonlein purpura (HSP), and appendicitis. Meckel's diverticulum is the most frequently observed finding is painless rectal bleeding, which occurs as a result of ulceration of the diverticulum or neighboring mucosa by the ectopic tissue. A Meckel diverticulum can act as a lead point in intussusception. The diagnostic study of choice is a radiolabeled bleeding study called a Meckel scan. Malrotation with volvulus has the common manifestation as an acute onset of abdominal pain with bilious emesis. Abdominal distention may or may not be present, depending on the anatomic level of the obstruction. Affected children are usually seen in the first year of life, with the majority of cases occurring within the first week to month. Older children may have a history of intermittent episodes of vomiting and abdominal pain that suddenly become more severe. The Henoch-Schonlein purpura is a vasculitis that predominantly affects the capillaries and small vessels. Abdominal pain occurs in half the patients and is most frequently colicky in nature. The subtype of intussusception associated with HSP is often ileoileal, which is difficult to visualize and reduce with a contrast enema. Appendicitis is typically accompanied by diffuse or periumbilical abdominal pain. Within 8 to 24 hours, vomiting begins, and the pain migrates to the right lower quadrant. Abdominal pain, vomiting, and fever are the classic symptom triad for the disease.¹³

Management

Management of intussusception depends on the part of the intestine involved.¹⁴ Reduction of acute intussusception is an emergency procedure and should be performed immediately after diagnosis in preparation for possible surgery.⁵ Treatment can be done operatively or non-operatively.⁸ The child and parent must be prepared for the necessary surgical procedure and give consent to the procedure. Parents have to be explained why surgery is needed, the anticipated outcome, and the risks and benefits. Moreover, the patient or parent has to be educated regarding signs of infection and recurrence. The risk of

recurrence in intussusception is about 10% and often occurs in the first 48 hours after the procedure.¹⁸

In case of hypovolemia/dehydration, fluids dextrose 5% normal salt 1/3 or Ringer's lactate are needed. Maintenance fluid needs: (1) 10 kg I: 100 ml/kg BW/24 hours, (2) 10 kg II: 50 ml/kg BW/24 hours, (3) 10 kg III: 25 ml/kg BW/24 o'clock. If hypothermia occurs, patient has to be warmed. Children lose temperature more easily than adults because they have a relatively large surface area and poor body protection against heat. This is very important, because hypothermia can affect drug metabolism, anesthesia and blood coagulation. In case of bloating obstruction, NGT has to be applied. Acidosis has to be corrected until rehydration has been completed. In case of infection, antibiotics can be given, either as treatment or prophylaxis.¹⁹

Operation becomes necessary when radiographic reduction is contraindicated, has failed or is incomplete, peritonitis or pneumoperitoneum is detected, or a pathologic lead point is found. The decision to start laparoscopically or perform immediate laparotomy is decided by the surgeon on a case-to-case basis.²⁰

Prognosis

Most infants recover if the intussusception is reduced in the first 24 hr. The recurrence rate after reduction of intussusceptions is approximately 10%, and after surgical reduction it is 2–5%; none has recurred after surgical resection. Most recurrences occur within 72 hr of reduction. Repeated reducible episodes caused by lymphonodular hyperplasia may respond to treatment of identifiable food allergies if present. With adequate surgical management, laparoscopic reduction carries a very low mortality.⁵

Complications

Bowel perforation is the major complication during enema reduction. Most perforations occur in the outer intussusciens and in the absence of necrosis. Risk factors for perforation are infants younger than 6 months

and a longer duration of symptoms (>36 hours).²⁰

Complications after laparotomy and laparoscopy for intussusception include common postoperative problems such as wound infection, fascial dehiscence, and SBO. Reported postoperative complication rates for perforation after barium enema can reach above 50%.²⁰

Conclusion

Intussusception can occur at any age, most often in children. The triad of clinical symptoms includes abdominal pain, vomiting, and bloody stools. If the index of suspicion for intussusception is high, the optimal approach is to proceed directly to ultrasound which can be both diagnostic and therapeutic because it can look for a “target sign” that shows the lining of the intestine within the intestine. In particular, improving the general condition is the initial action for the treatment of intussusception. The prognosis is good with early diagnosis and treatment. Surgery is an option if the intussusception is accompanied by complications.

Conflict of Interest

The authors affirm no conflict of interest in this study.

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