Chapter 2

Clinical Manifestation and Diagnosis of Intussusception

Clinical Manifestation

Clinical manifestations in typical intussusception patients comprise acute onset of two symptoms and two signs. Abdominal paroxysmal colicky pain and vomiting are the classic symptoms while abdominal mass and rectal bleeding are the classic signs. The presence of all four symptoms and signs have nearly 100% positive prediction in diagnosing intussusception in infants and toddlers.[1] However, all of the classic four symptoms and signs are found in less than 30% of cases. The earliest symptom is abdominal pain which accounts for 85%. The characteristic of colicky pain is paroxysmal. Thus, the infants and children will have an episode of wellbeing alternating with cramping abdominal pain. After that, small bowel obstruction will occur and bilious vomiting will be found. Vomiting is found in about 80% of cases and more often in infants than older children. That may be because older children can more clearly express about abdominal pain and early visit. Abdominal mass and rectal bleeding can be found at the same percentage, around 60%.Lethargy, dehydration and sign of bowel obstruction can be found in late presentation. However, the percentage of symptoms and signs of infants and children with intussusception vary according to the studies. Abdominal pain is found in 37 to 100% of cases. Vomiting is found at 38 to 88%, abdominal mass is found at 6 to 81%, and rectal bleeding is found at 9 to 81%.[2-9] The percentage in Chiang Mai University and Siriraj Hospital are shown in Figure 2.1.

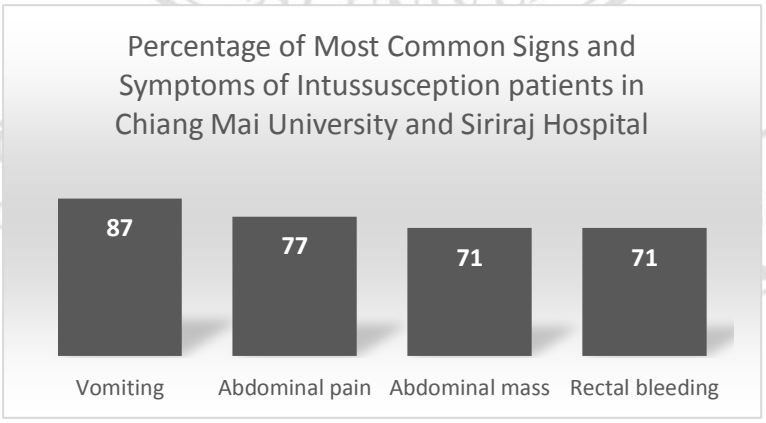

Figure 2.1 The percentage of common signs and symptoms of intussusception in Chiang Mai University and Siriraj Hospital

Diagnosis

Diagnosis of intussusception can be made only with clinical findings in 50% of cases. Radiologic investigation can help to confirm diagnosis in suspected cases and establish diagnosis in infants and children with unknown causes of small bowel obstruction.

The role of plain abdominal X-ray is controversial. The abnormalities that can be found include abdominal mass, meniscus sign, target sign, small bowel obstruction or abnormal distribution of gas especially the absence of cecal gas as shown in Figure2.2 and Figure 2.3. When the gaspervades throughout the colon (from ascending colon through rectum), ileocolic intussusception might be excluded. In some series, intussusception could be diagnosed by plain abdominal X-ray in less than 50% of cases. Most of the plain abdomen shows equivocal findings.[10, 11] Plain abdominal X-ray is still used for free air detection. However, some reports found no occult pneumoperitoneum in plain abdominal X-ray.[12] The use of abdominal radiography depends on the clinical manifestations of patients and judgment by the care team

Figure 2.2 Abdominal radiography of an intussusception patient with soft tissue mass in the colon showing meniscus sign (black arrow). The absence of cecal gas was found with sigmoid colonic air shadow in the right lower quadrant, which is often misinterpreted (white arrow).

Figure 2.3 Plain abdominal radiographic findings in an intussusception patient with small bowel obstruction

Ultrasonography has nearly 100% accuracy, sensitivity and specificity in diagnosing intussusception, especially among experienced examiners.[13] Currently, it is the imaging of choice with the advantages of being portable, less invasive and without radiation.[14] The "Doughnut sign" or "Target sign" can be demonstrated in the transverse view as shown in Figure 2.4 and the "Pseudokidney sign" can be demonstrated in the longitudinal view.[15] In some cases, hyperechoic crescentic lesions can be found inside the intussusception, the so called crescent-in-doughnut sign comprising the mesenteric fat, vessels and lymph nodes, which are pulled inside. Typically, the mass is 3 to 5 cm in size. Small bowel intussusception can be measured about 1.5 cm in the transverse diameter while the diameter of the ileocolic is usually more than 2.5 cm.[14] Another advantage of ultrasonography is that the pathologic leading point can be demonstrated better than contrast enema and air enema. About two thirds of cases (66%) with pathologic leading point are found in sonographic studies.[16] The pathologic leading point can be demonstrated by contrast enema in 40% and air enema in 11% of cases.[17] Moreover, when intussusception is not identified, other abdominal abnormalities could be found. Acute appendicitis, ovarian torsion, urinary abnormalities can also be investigated.

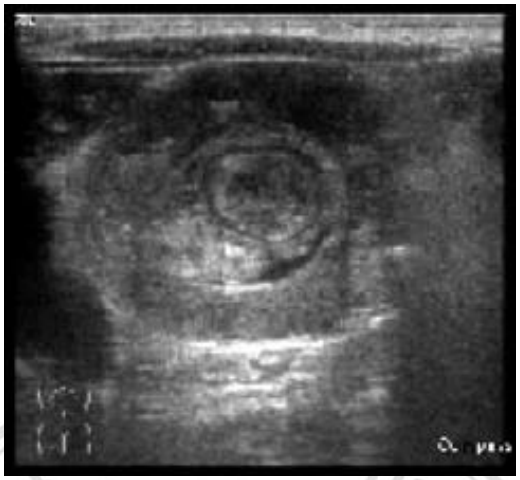

Figure 2.4 Ultrasonographic finding shows doughnut sign of intussusception.

Sonographic study is also used to assess reduction ability. Non-surgical reduction, can be performed where no contraindications are observed. More than the diagnosis, ultrasound signs can predict the chance of reduction. These signs are decreased or absence of blood flow in the intussusception, a thick peripheral hypoechoic rim, free intraperitoneal fluid, trapped fluid within the intussusception and presence of pathologic leading points.[18]The Doppler ultrasound interrogation is shown in Figure 2.5.

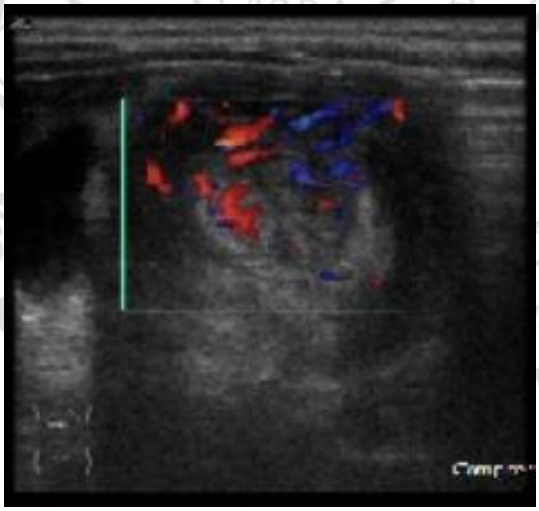

Figure 2.5 Ultrasonography with Doppler signal shows abundant flow in intussusception.

Contrast enema has previously been an investigation of choice before ultrasound. The advantages of this method are accurate diagnosis and ability to use as a therapeutic intervention. However, 50% of the suspected infants and children exhibit negative results.[18] The disadvantages of invasive and radiation exposure are reasons to use ultrasound instead. Some institutes still use contrast enema in highly suspected cases and are usually associated with the therapeutic modality of hydrostatic reduction. The filling defect of intussusception in a barium enema is shown in Figure 2.6.

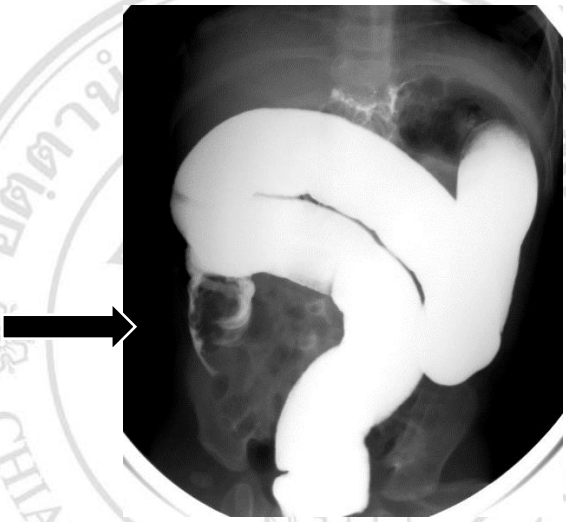

Figure 2.6 Barium enema shows filling defect at ascending colon (arrow), which is the intussusceptum.

Case Definition of Intussusception

In 1998, rotavaccine was licensed and made available in the United States. After that, adverse effects of the vaccine were reported. Intussusception was one of the reasons for suspending the use and the vaccine was withdrawn from the market in 1999.[19] In 2004, Bines reported the clinical case definition of intussusception was under the acceptance of the Brighton Collaboration, an organization concerned about vaccine safety.[20] From this study, the diagnosis of acute intussusception was divided in three levels. Surgical, radiological, autopsy and clinical criteria were set up. The clinical criteria were set as major and minor criteria of intussusception.

Surgical criteria included the finding of bowel within the bowel during surgery. Radiological criteria were the finding of intussusception from the enema (both gas and

contrast) or from ultrasound and confirmed by reduction enema. Autopsy criteria were used in finding intussusception during autopsy.

Three major clinical criteria include :

1) Evidence of bowel obstruction (bilious vomiting and abdominal distension with decreased/absent bowel sound or bowel obstruction demonstrated in abdominal X-ray)

2) One or more of bowel invagination characters (palpable mass, rectal mass, intestinal prolapse, abdominal radiograph with soft tissue mass, computer tomography scan with intussusception)

3) Signs of venous congestion or vascular compromised (bloody stool or currant jelly stool or blood from per rectal examination).

Minor clinical criteria comprised a boy less than 1 year old, with abdominal pain, vomiting, lethargy, pallor, hypovolemic shock and nonspecific bowel gas indicated in the abdominal radiograph.

Definite intussusception (Level 1) is the presence of surgical, radiological or autopsy criteria. Probable intussusception (Level 2) is the presence of two major criteria or one major plus three minor criteria. Possible intussusception (Level 3) is the presence of more than three minor criteria (≥4).[21]

From the case definition, the diagnosis of intussusception is suspected by clinical and plain abdominal radiography and confirmed by ultrasound, contrast enema or surgery. Infants and children who are in the defined age-group with clinically suspected intussusception should be investigated to provide appropriate and early treatment.

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