

Emergency Imaging

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Figure 1



Figure 2

A 3-year-old boy without a significant medical history presents to the emergency department with abdominal pain. Abdominal radiographs and an abdominal ultrasound are obtained; selected images from these studies are shown (Figures 1 and 2). A left lateral decubitus radiograph of the abdomen (not shown) is also obtained, revealing no free air.

What is the diagnosis? What additional imaging examination might be useful in this case?

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ANSWER



Figure 3

The supine abdominal radiograph (Figure 3) reveals a paucity of bowel gas in the right lower quadrant (white arrows) and normal bowel gas in the left abdomen (black arrows). The abdominal ultrasound (Figure 4) reveals a target-like structure in the right mid abdomen with a nonechogenic (dark) outer ring (white arrows), an echogenic (bright) middle ring (black arrows), and a nonechogenic center (white asterisk). These findings indicate the presence of an intussusception.

Intussusception occurs when a proximal segment of intestine, the intussusceptum, telescopes into a more distal segment, the intussusciens. This is one of the most common causes of gastrointestinal obstruction in children.¹⁻³ It occurs most frequently in patients between 3 and 12 months of age, but can occur in older children as well.² The most common type of intussusception seen

in children is ileocolic, with the distal ileum telescoping into the ascending colon. If not promptly treated, intussusception causes venous congestion, leading to bowel edema, necrosis, and perforation.

The classic clinical presentation of children with intussusception is the triad of abdominal pain, vomiting, and bloody stools; the reported frequency of this presentation ranges from less than 25% to up to 65% of cases.^{1,3} The classic triad is seen more commonly in patients under 12 months of age than in older children. However, many patients may present with a subset of these symptoms or with nonspecific symptoms, including decreased appetite and irritability.

Radiographs are highly effective in excluding the diagnosis of intussusception. A study looking at the utility of the three-view radiographic series (supine, prone, lateral decubitus) to exclude intussusception demonstrated a negative predictive value of 100% when air is identified in the right colon on all three views, and a 98.4% negative predictive value when air is seen in the right colon on two out of three views.²



Figure 4



Figure 5

Ultrasonography is being used increasingly in the diagnosis of intussusception, with high sensitivities and specificities reported.⁴ The typical ultrasound appearance, as seen in the case presented, is the doughnut sign or target sign, which represents the wall of the outer loop of bowel (outer dark ring), the mesentery of the inner loop (bright middle ring), and the inner

loop of bowel (dark center). Sometimes this can appear reniform in shape, a finding that has been termed the pseudokidney sign.

Contrast enemas (air or liquid) can both diagnose and treat (reduce) intussusception; successful reduction rates of 74% have been reported.⁴ Reduction using an enema should not be attempted if there are peritoneal signs indicating perforation. Intussusception will recur in approximately 10% of patients who undergo successful contrast reductions.⁴ A liquid contrast enema was performed in this patient; Figure 5 shows the partially reduced intussusceptum (black asterisk) surrounded by contrast. The enema successfully reduced the intussusception and the patient was discharged without complication.

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References

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