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Clinical History:

7 month old female presents to the ER with 2 day history of inconsolable crying episodes lasting from 10 to 15 minutes each. Mother reports loose stools and one episode of vomiting. Only relevant past medical history was an upper respiratory infection (URI) 1 week ago, at the time of exam the URI symptoms had resolved. Remaining medical history is noncontributory. The child was admitted for IV fluids and an abdominal ultrasound was requested for further evaluation. On exam the child is calm, playful, and afebrile.

Ultrasound Images:

Figure 1



Figure 2

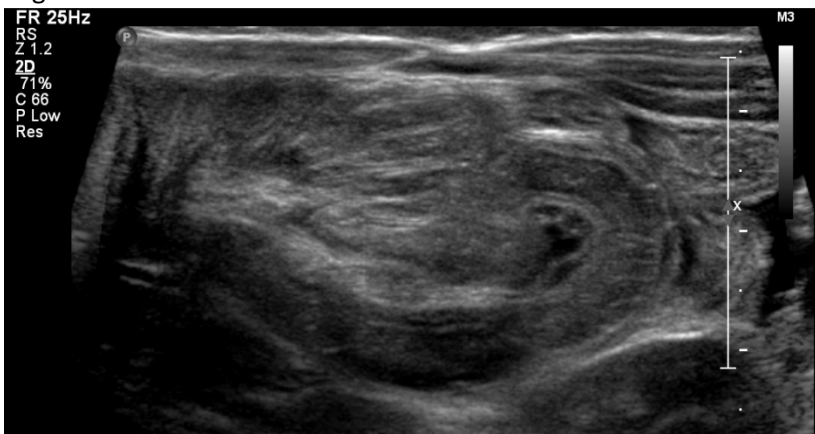


Figure 3

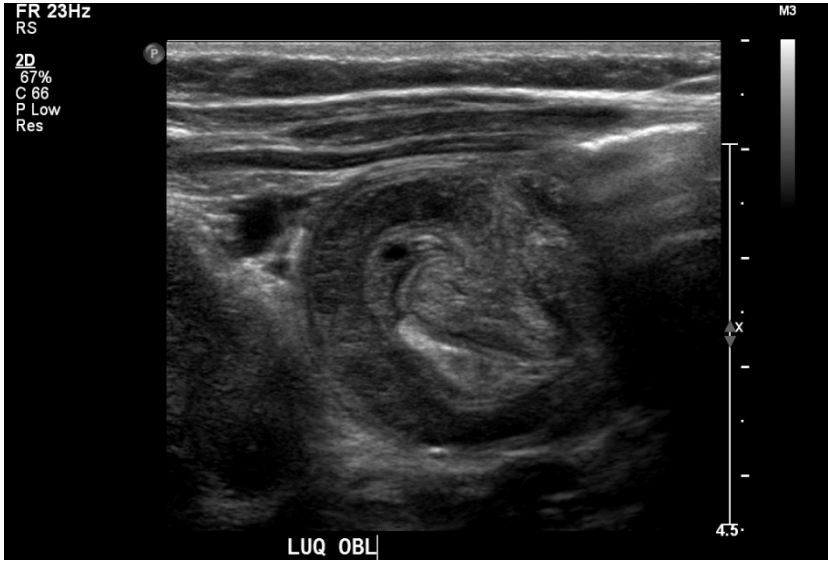


Figure 4



Figure 1: Transverse image of the right lower quadrant in the expected region of the cecum demonstrating hyper and hypo echoic mass. This appearance is often referred to the “pseudokidney” sign.

Figure 2: Image of the left upper quadrant at the splenic flexure using linear 12-5 MHz transducer.

Figure 3: Oblique image of the left upper quadrant at the splenic flexure demonstrating a circular peripherally hypoechoic mass.

Figure 4: Longitudinal image of the left upper quadrant at the splenic flexure demonstrating a circular peripherally hypoechoic mass. This appearance is often referred to as the “donut” sign.

What is the most likely diagnosis in this patient?

- A. Bowel obstruction.
- B. Hydronephrosis.
- C. Ileocolic intussusception.
- D. Abdominal ascites.
- E. Pyloric stenosis.

Answer: Ileocolic intussusception.

Discussion: Intussusception

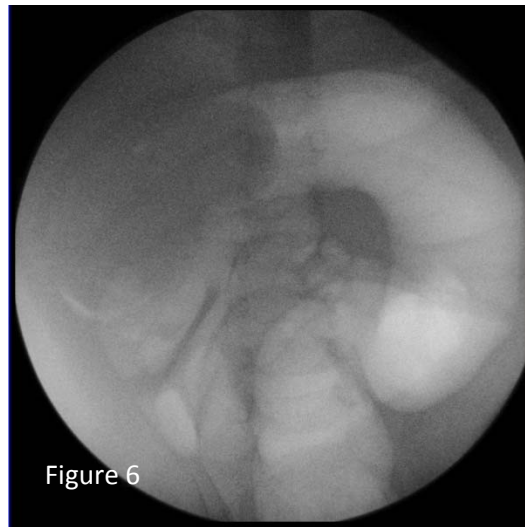
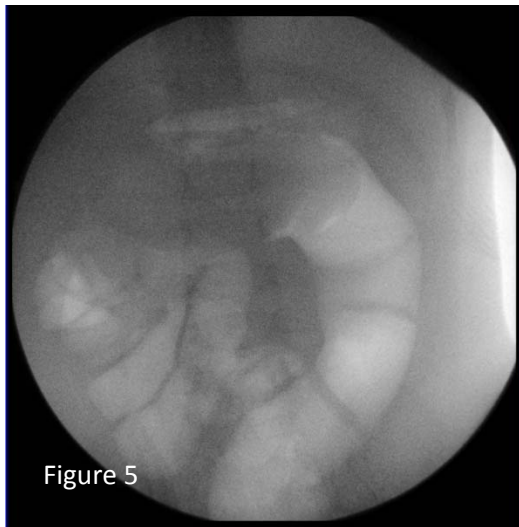
This case proved to be an intussusception which was both confirmed and eventually treated with air contrast enema. Intussusception occurs in 2-4 out of 1000 live births and is the most common abdominal emergency in childhood and the leading cause of acquired bowel disease. [1] Timely diagnosis and recognition of this disease can ensure positive outcomes through prompt treatment to prevent serious complications. Intussusception occurs when there is forward peristalsis of the bowel resulting in invagination of the more proximal bowel (intussusceptum) into the more distal bowel lumen (intussusciens) in a tubular or telescoping fashion. [2] The intussusceptum can consist of the bowel as well as the mesentery which is dragged in an antegrade fashion with the bowel. Three primary causal types of intussusception are defined: idiopathic ileocolic, intussusception secondary to pathologic lead points, and incidentally noted small bowel-small bowel intussusception. [2] Classifications based upon anatomic relationship include ileocolic (75-95%), ileoileocolic, ileoileal, and colocolic. [1] The majority of cases in the pediatric population comprising 95% of cases are the idiopathic type with associated mucosal edema and lymphoid hyperplasia following viral gastroenteritis. [1] Patients will often present during the winter and spring months when viral illness is most common. [2] The age range for presentation is 3 months to 1 year with most cases occurring before 3 years of age. Children presenting with intussusception who are greater than 3 years of age should be evaluated more closely for pathologic lead points which include a number of causes such as lymphoma, duplication cysts, Henoch-Schönlein purpura, and coagulopathy. [2]

The classic presentation of patients with intussusception is crampy, abrupt onset abdominal pain, vomiting, and diarrhea. Hematochezia or “currant jelly” stools are seen in approximately 66% of patients only after greater than 48 hours of symptoms. [1] Radiographs can be useful as a first method to

evaluate the bowel gas pattern. In some cases a gas filled cecum or suspicious bowel gas pattern can help to exclude or include the diagnosis of intussusception. On ultrasound the intussusception appears as a mass with alternating rings of hyper and hypoechogenicity. [2] (Figures 1-4) A classic “donut” appearance in the transverse plan and a pseudokidney appearance in longitudinal plane can be seen with ultrasound. [2] (Figures 3 and 2) Depending on the extent and time of diagnosis, the intussusception can be located anywhere along the course of the colon or be transient. Importance must be placed on examination of all the quadrants of the abdomen during the ultrasound.

Several methods for reduction of the intussusception are available depending on the clinical scenario and personal practice patterns. Options include air insufflation or contrast enema under fluoroscopy, or hydrostatic reduction with ultrasound guidance. At our institution, air contrast enema under fluoroscopy is the mainstay for treatment. In most all cases, surgical consultation should be obtained prior to attempted reduction in the event the patient requires operative reduction or emergent surgical exploration.

The following images were obtained during a subsequent air contrast enema with fluoroscopy.



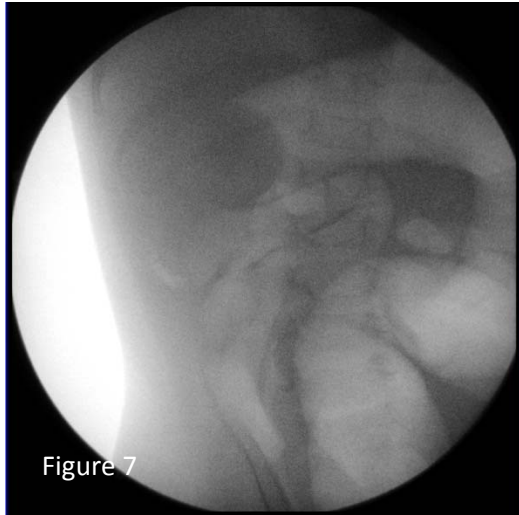


Figure 7

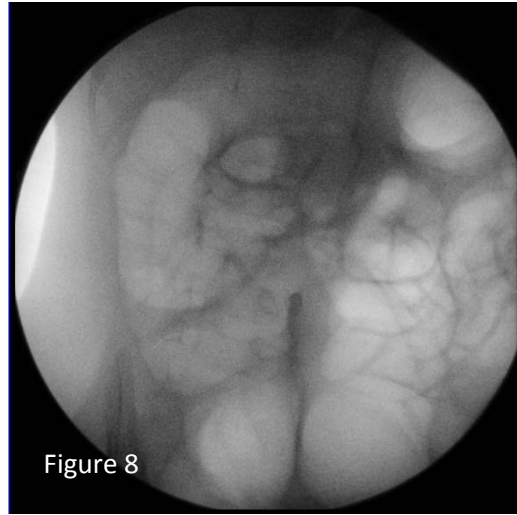


Figure 8

Figures 5-8 demonstrate air contrast enema under fluroscopy. Figure 5 shows a soft tissue mass within the colonic lumen at the level of the spenic flexure. The more distal colon is filled with air. Figures 6 and 7 demonstrate retrograde movement of the mass and subsequent reduction of intussusceptum. Figure 8 shows air within with distal small bowel confirming complete and successfully reduction of the intussusception.

References:

1. Dahnert, W. *Radiology Review Manual* 6th Ed. Philadelphia: Lippincott Williams & Wilkins, 2007:845-846.
2. Donnelly L. Gastrointestinal. In: Donnelly L, (ed). *Pediatric Imaging The Fundamentals* 1st Ed. Philadelphia: Sunders Elsevier, 2009: 103-106.

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