PEDIATRIC ABDOMEN TO R/O INTUSSUSCEPTION

1. **Patient Preparation:** None

11. **Equipment:** Performed with real-time scanner using a linear or curved linear transducer with a frequency of 5.0 MHz or higher.

III. **Clinical Presentation:**

A. average presentation is 6-7 months
B. male to female predominance
C. abdominal pain (may be intermittent)
D. bloody stool (red, currant jelly); diarrhea
E. emesis
F. restlessness; pallor; fever
G. 90-95% are idiopathic (no mass leading to intussusception)
H. Physical Exam
   1. palpable mass (usually RUQ)
   2. may have absence of normal palpable bowel in the RLQ
   3. abdominal distention
I. conventional radiograph may show abdominal mass with varying degree of small bowel distention
J. Different types of intussusception include ileocolonic (most common), ileo-ileocolonic (second most common), ileoileal and colocolonic (uncommon)
K. If intussusception seen, examine for the lead point such as duplication cyst, intestinal polyp, lymphoma, lymphoid hyperplasia, Meckel diverticulum.
L. Ideally scan the patient when he/she is symptomatic as intussusceptions can resolve and recur.

IV. **Procedure Protocol**

A. Perform a thorough exam of the ENTIRE abdomen, beginning in the RLQ. Move in a clockwise fashion using a linear array transducer.
B. Scan the entire course of the colon (with real-time observance of normal bowel peristalsis) and the small bowel.
C. Required Images
   I. longitudinal right kidney w/wo calipers
   2. longitudinal liver/right kidney interface
   3. longitudinal left kidney w/wo calipers
   4. longitudinal spleen/left kidney interface
   5. transverse pancreas with SMA and SMV (normal orientation is the SMV anatomically situated to the right of the SMA; inversion of superior mesenteric vessels often suggests malrotation with midgut volvulus---SMV will appear slightly anterior and to the left of the lateral margin of the SMA---see attached image; distal ileocolic intussusception another cause of inversion of the mesenteric vessels; also abdominal mass,

duodenal atresia, small bowel obstruction; a follow-up ultrasound after reduction of intussuscepted bowel will show normal orientation of mesenteric vessels if inversion due to intussusception)

6. Sonographic image in each of 4 abdominal quadrants showing soft tissue/bowel. (If peristalsis is noted, indicate on image with annotation.)
7. Assess for potential other causes of symptoms, urinary bladder, kidneys, appendix, ovaries, gallbladder, free fluid, mesenteric lymph nodes.

D. Color Doppler Sonography

1 Slow flow settings needed.

2. When color is distributed in both hyperechoic and hypoechoic areas of a sonographically discernible mass, may be a good predictor of reducibility.
3. Lack of color may be indicative of bowel necrosis, and need of surgical intervention/bowel resection. (usually have increased time interval from onset of symptoms to diagnosis)

Sonographic Appearance of Intussuscepted Bowel (Nonspecific):

**Note: Dependent on several factors, including the amount of edema present and the number of "loops" involved Overlying bowel gas may obscure loops of intussuscepted bowel.*

Axial Scan (cross-sectional image):

doughnut sign

- rounded mass with relatively hypoechoic outer rim and central echogenic core – echogenic core mainly represents mesentery
- "crescent" in doughnut sign – crescent is represented by hyperechoic/echogenic mesentery in middle of doughnut; size of hyperechoic crescent increases as base of intussusception is approached
- may see cross-sectional images of dilated mesenteric vessels within echogenic core
- also called the **target sign**
- bulk of hypoechoic outer rim or halo created by edematous bowel - *<6mm hypoechoic rim is indicative of hyperechoic feces rather than intussusception*

multiple concentric ring sign

- multiple concentric rings or loops representing multiple loops of intussuscepted bowel folded on themselves
- represents multiple interfaced layers within area of intussusception
- multilayered or onion skin appearance (with severe edema or ulceration, layers may not be differentiated, may only be seen as one hypoechoic ring-then known as doughnut sign)

Longitudinal or Sagittal Scan:

sandwich or pseudokidney sign

- tubular in shape
- hypoechoic periphery is created by edematous portion of bowel
- hyperechoic center created by mesentery and mucosa

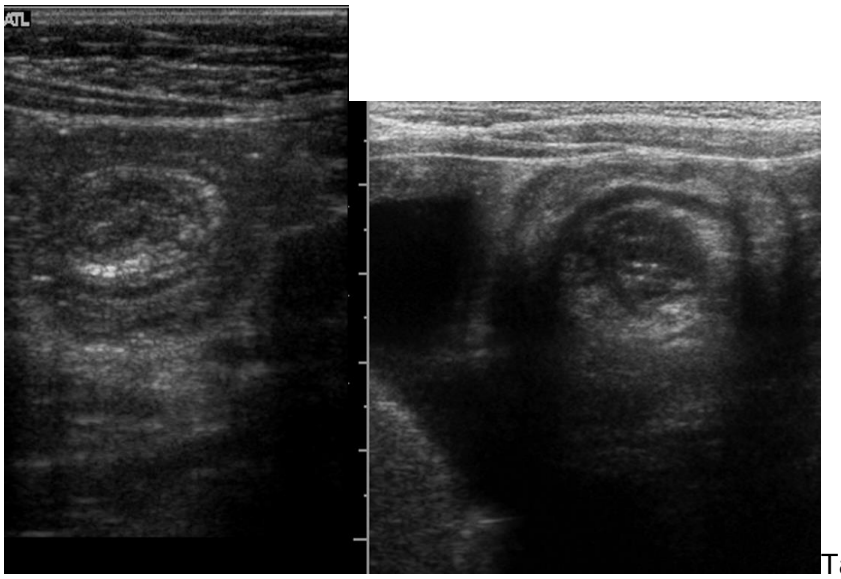
complex mass

- least common sonographic appearance

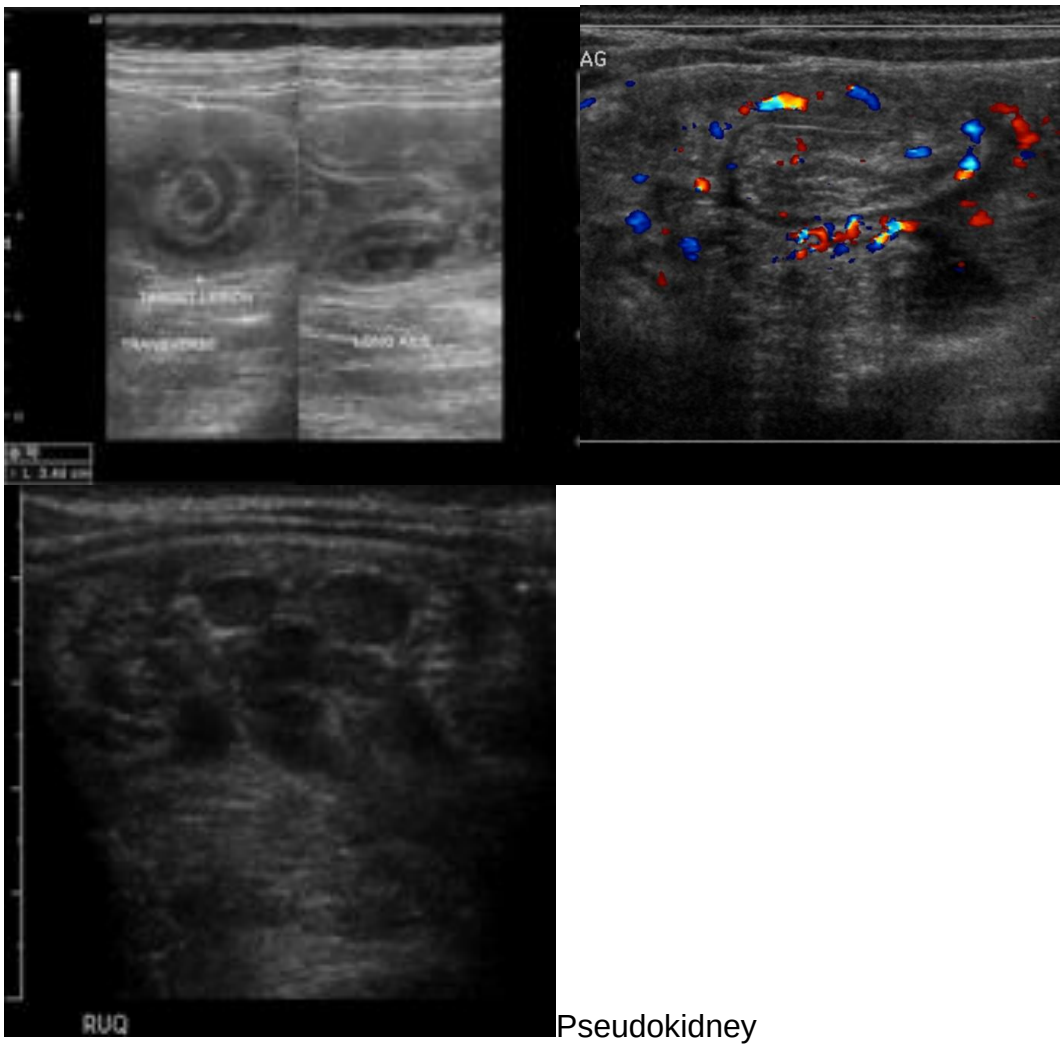
Note:

- majority located in transverse hepatic flexure or ascending colon (subhepatic region)
- Free fluid may be present – not necessarily representative of perforation, represents transudate from edema and venous obstruction associated with intussusception. Small amount of free fluid a relatively common, incidental finding in cases of intussusception, a larger amount present may mean perforation.
- Masses usually range in size from 3-5 cm in diameter.
- May spontaneously regress, clinical symptoms will then disappear-spontaneous regression.

Positive predictive value high, but negative predictive value not reliable. -
feces in colon may mimic intussusception
-transverse psoas muscle may also mimic intussusception



Target



Pseudokidney

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