Interesting Pediatric ultrasound cases

Presented by:
Falguni Patel (RDMS, RVT)
Role of ultrasound to rule out Appendicitis

• **Overview**: Ultrasound is relatively inexpensive, safe and quick solution to rule out appendicitis in children complaining of an abdominal pain. Ultrasound improves accuracy in children with suspected appendicitis.
Scanning techniques to visualize an appendix

• The following techniques may improve visualization of the appendix and permit more accurate diagnosis of appendicitis in children.

• **Posterior compression**: The addition of posterior manual compression to the graded compression can help to identify the appendix.

• **Positional scanning**: Posterior lateral approach and pelvis in addition to the RLQ, may be useful.
Pitfall and limitations of US

• There are number of difficulties with the use of ultrasound for the diagnosis of acute appendicitis.
• Overweight children
• Difficult to identify normal appendix
• Focal inflammation (Tip appendicitis)
• Pain and/or anxiety makes imaging difficult or impossible in some children
• Constipation
Lurie Children’s Hospital of Chicago

• In our practice, ultrasound is the first modality of choice to rule out appendicitis. Our Physician's will only order CT/MRI scan if appendix is not visualized and lab values are abnormal in relation to patient symptoms.

• Male patient: Abdomen limited is order

• Female patient (< 10 years) Abdomen limited with Pelvis complete with Doppler is order to rule out ovarian torsion along with appendicitis
Criteria for Acute Appendicitis

• Transverse measurement of < 6mm
• Noncompressible
• Vascularity of appendix
• Appendicolith
• Perforation
• Abscess
• Periappendiceal fat infiltration
• Periappendiceal fluid
• Adjacent bowel loop peristalising
• Patient tenderness
Patient data: 9 y/o Girl
Clinical Hx: Abdominal pain for one day
Impression: Mild compressible borderline appendicitis
**Patient data:** 10 y/o boy

**Clinical Hx:** Presented to ER with severe Abdominal pain, 4-5 episodes of emesis, significant TTP on exam in lower half of abdomen with abnormal labs.
Impression: Acute appendicitis with appendicolith without evidence of perforation or abscess
**Patient data:** 9Y/O boy

**Clinical Hx:** With RLQ pain for 2 days and abnormal labs
Impression: Acute appendicitis with 2 Appendicololiths
Role of ultrasound to rule out Hypertrophic Pyloric Stenosis

• **Overview**: HPS is commonly encountered in pediatric practice. The typical infant presents with nonbilious projectile vomiting and dehydration if diagnosis is delayed.
• HPS is mostly presents in premature infants at 3-6 weeks from birth.
• HPS mostly occurs in male infants, first born infants and those born to younger mothers.
• HPS is rarely seen in children older than 6 months.
• The earliest case of Pyloric stenosis described in medical literature dates 1717.
Scanning techniques to visualize an Hypertrophic Pyloric Stenosis

• US is a preferred modality in the workup of any vomiting infant. The technique included feeding glucose water to the baby, which improves visualization of the pylorus.
Limitations of techniques to visualize HPS

- Ultrasound has high sensitivity, specificity and accuracy in the diagnosis of HPS. However, errors in diagnosis do occur and relate to false negative and false positive.

**False Negative:**
- Inexperienced operator
- Distended fluid and gas filled stomach, this causes the pylorus to fold backward on itself such that it may remain hidden behind the stomach.
- Over distended antrum may be mistaken for the pylorus.

**False Positive:**
- Pylorospasm, a dynamic process that changes over time.
- Postoperative appearance of the Pylorus can also be misleading.
Criteria for Positive Hypertrophic Pyloric Stenosis

- Muscle wall thickness: Measured as a single hypoechoic layer between serosa and echogenic submucosa
- **Note:** In Preterm infants
- Borderline muscle thickness measurements are more likely to occur in premature infants than in term infants. In preterm infants, the thickness of the pyloric muscle relative to the rest of the stomach and the pyloric canal length is more important than the absolute muscle thickness.

**Pylorus Measurements:**
- Pyloric Channel length <17mm
- Muscle thickness < 3mm
Patient data: 6 weeks old baby girl
Clinical Hx: With two episodes of projectile vomiting
Patient data: 20 days old Babyboy
Clinical Hx: Projectile vomiting for a week
Impression: Hypertrophic Pyloric Stenosis
Role of ultrasound to rule out Intussusception

• **Overview**: Intussusception is a common cause of childhood intestinal obstruction occurring more frequently in children aged 9 months to 2 years and more in male than in females.

• Intussusception is known to occur with greater frequency in children who have undergone recent abdominal surgery, either intraperitoneal or retroperitoneal operations.

• Approximately 90% of Intussusception are Ileocolic in which the terminal ileum is carried through the ileocecal valve into the colon, it may reach the rectum.
Limitations of techniques to visualize an Intussusception

- Radiograph may appear indeterminate or normal therefore ultrasound examination is almost always positive, although overlying loops of air containing bowel may obscure intussusception.
Criteria for Positive Intussusception

• On ultrasound, Intussusception has a very specific characteristics of “Target sign” or sometimes referred as Pseudo kidney appearance. It is usually not mistaken for other bowel abnormalities
Patient data: 5 y/o boy
Clinical Hx: Unspecified abdominal pain
Impression: small bowel-small bowel intussusception with gastrojejunostomy tube visualized within the intussusception
Patient data: 10 months old girl
Clinical Hx: Emesis for 3 days and bloody stool
**Impression:** Pseudokidney appearance in RUQ, likely represents ileocolic intussusception along with some lymph nodes.
Any Questions????

Thanks!!!!