**Abstract**

This presentation reviews a spectrum of common, but critical radiographic and ultrasound findings in the newborn ICU and pediatric emergency department. On-call radiology residents should be familiar with these imaging findings and make a prompt diagnosis. When some findings are equivocal, the on-call resident should be able to recommend an appropriate next step for follow-up.

**Ovarian Torsion**

Most ovarian torsions occur in teenagers. Large ovarian cysts (>5cm) and benign tumors are risk factors. Pelvic ultrasound is the primary modality for diagnosis. Typical ultrasound findings are enlarged and edematous ovaries, which may have lack of flow, especially arterial flow. However, Doppler study is neither sensitive or specific. A normal ovary may have absence of flow.

Right: Enlarged and edematous left ovary, which was surgically proved to be torsion. Right: Surgically proven ovarian torsion due to a 7mm benign non-epithelial cyst.

**Testicular Torsion**

Testicular torsion most commonly occurs in teenagers. Scrotal ultrasound is the primary and effective diagnostic modality. Key findings are lack of vascular flow or asymmetrically decreased flow. Emergent surgical intervention in 6 hours is critical to salvage the testes.

Left: Significantly decreased vascular flow on the left due to torsion/detorsion mechanism. The testsis was not torsed at time of imaging. Right: Enlarged, hypoechoic and heterogeneous testicle without vascular flow on the left – surgical proven testicular torsion with infarction.

**Epiglottitis / Croup**

Epiglottitis is a life-threatening bacterial infection with edema of the epiglottis (red arrow, thumb print sign) and aryepiglottic folds (green arrow). (This patient also has prevertebral swelling, due to cellulitis.) Croup, aka laryngotracheobronchitis – inflammation with subglottic and laryngeal narrowing due to viral infection. Classic steeple sign (black arrow). (This sign can also been seen in other conditions such as epiglottitis, bacterial tracheitis, and angioneurotic edema.)

**Neonatal ICU Chest & Abdomen**

Malpositioned lines/tubes:  
- Fig. A: Umbilical venous catheter projecting over left upper abdomen, possibly in the splenic vein.  
- Fig. B: High positioning at GE junction. Suction tip should be in the stomach.  
- Fig. C: Endotracheal tube in the right main bronchus.

Necrotizing Enterocolitis (NEC) primary affects preterm newborns, and is related to bowel ischemia resulting in intestinal wall necrosis.

**Acute Appendicitis**

Ultrasound is the primary modality to evaluate acute appendicitis. Classic finding is a, blind-ending, non-compressible and hyperemic tubular structure in right lower quadrant. Appendicolith may or may not be seen. If appendix is not identified on ultrasound, the exam is indeterminate.

Right: Mild appendicitis with echogenic appendicolith.  
Left: Classic hyperemic and enlarged appendix – “Sign of fire.”

**Intussusception**

A segment of bowel (intussusception) invaginated into the adjacent distal segment (intussusceptum), causing bowel obstruction and ischemia. Plain film can be diagnostic with a “crecent sign” – crescent of intraluminal air surrounding the rounded mass (top left). Ultrasound is very sensitive, and shows the “target sign” of intussusception on transverse images, and telescoping or sagittal images (right column). Air enema can demonstrate and reduce the intussusception (bottom left).

**Hypertrophic Pyloric Stenosis**

Abdominal thickening/elongation of the pylorus leads to gastric outlet obstruction. This entity presents 4-6 weeks after birth. Ultrasound can be diagnostic.

Top right: Normal pylorus. Bottom right: Thickened and elongated pylorus. Bottom left: Complex – portal venous sign – diffuse patchy echogenic areas in the liver consistent with an array of air bubbles (green arrow) seen traversing in the portal veins.

**Midgut Volvulus**

Twisting of the entire midgut about the axis of the superior mesenteric artery, and is related to malrotation in which the small bowel is in the right abdomen, and the colon in the left, in this case of oral volvulus, the plain film is not obvious (top). CT is revealing and demonstrates the SMA is normally positioned to the left of SMA. This patient also has a horseshoe kidney.

**Conclusion**

This is a succinct pictorial review of critical and important findings in plain films and ultrasound. Some of them are life-threatening or surgical emergencies. Radiology residents on call should be familiar with the above mentioned entities. Prompt notification should be made to the ordering provider. Appropriate follow-up should be recommended and performed in a timely manner to ensure optimal care. The authors would like to extend our sincere thanks to Gerald Rauch for helping locate the relevant cases.

**References**