

**Neonatal
Body Imaging Postgraduate Course - May 16, 2018
SAM References**

High Intestinal Obstruction

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1. Which of the following conditions is associated with pyloric atresia?

- A. Bullous Pemphigoid
- B. Scleroderma
- C. Stevens Johnson syndrome
- D. Epidermolysis Bullosa

Correct Answer: D

Rationale: Isolated pyloric atresia has an excellent prognosis. In almost one half of cases, there may be an associated condition, EB being one, in which case prognosis is worsened.

References:

- Waisbourd-Zinman O, Ben-Amitai D, Cohen AD, et al. Bullous pemphigoid in infancy: Clinical and epidemiologic characteristics. *J Am Acad Dermatol.* 2008 Jan. 58(1):41-8.
- Frech TM, Mar D. Gastrointestinal and Hepatic Disease in Systemic Sclerosis. *Rheum Dis Clin North Am.* 2018 Feb; 44(1):15-28. doi: 10.1016/j.rdc.2017.09.002. PMID: 29149923

2. Which of the following is a recognized cause of a non-classic “double bubble” on abdominal radiograph in an infant?

- A. Jejunoduodenal intussusception
- B. Midgut volvulus
- C. Entero-enteric fistula
- D. Ischemic colitis

Correct Answer: B

Rationale: High grade obstruction due to midgut volvulus will cause a pattern of gastric outlet or high duodenal obstruction resulting in a non-classic “double bubble”. A “double bubble” pattern with distal gas on abdominal radiograph would suggest duodenal stenosis, duodenal atresia (with gas bypassing the atresia via bile ducts) and malrotation with midgut volvulus.

References:

- Knechtle SJ, Filston HC. Anomalous biliary ducts associated with duodenal atresia. *J Pediatr Surg.* 1990 Dec;25(12):1266-9.
- Latzman JM, Levin TL, Nafday SM. Duodenal atresia: not always a double bubble. *Pediatr Radiol.* 2014 Aug;44(8):1031-4. doi: 10.1007/s00247-014-2896-1. Epub 2014 Feb 21. PMID: 24557485

Newborn Low Intestinal Obstruction

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3. Which contrast is recommended for diagnostic enema in a newborn with low intestinal obstruction?

- A. Barium sulfate suspension
- B. Gastrografin (diatrizoate meglumine)
- C. Cysto-Conray (iothalamate meglumine)
- D. Omnipaque (Iohexol 180)



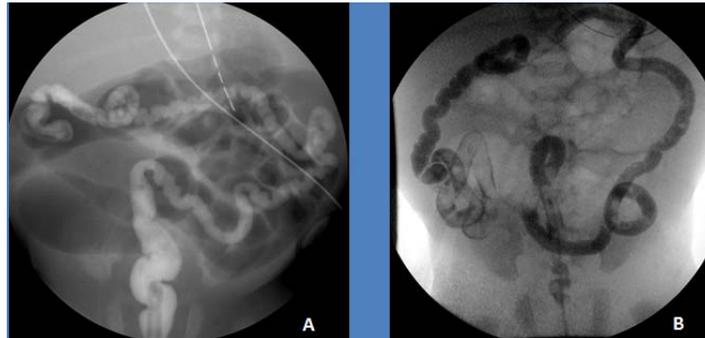
Correct Answer: C

Rationale: Cysto-Conray (Iothalamate meglumine) has near-physiologic osmolality and can therefore be safely administered rectally in newborns.

Reference:

- Callahan MJ, Talmadge JM, MacDougall RD, Kleinman PL, Taylor GA, Buonomo C. Selecting appropriate gastroenteric contrast media for diagnostic fluoroscopic imaging in infants and children: a practical approach. *Pediatr Radiol* 2017; 47(4): 372-381.

4. Which is more likely to be bowel obstruction due to meconium ileus?



- A. Picture A
- B. Picture B

Correct Answer: B

Rationale: In meconium ileus (MI), inspissation of abnormal meconium obstructs the ileum and colon. Contrast enema shows microcolon with meconium filling defects in the ileum with progressive proximal dilation of small bowel. It is almost always associated with CF. The distinction of the MI from IA is crucial because uncomplicated MI can be treated with contrast enemas whereas IA requires surgery.

References:

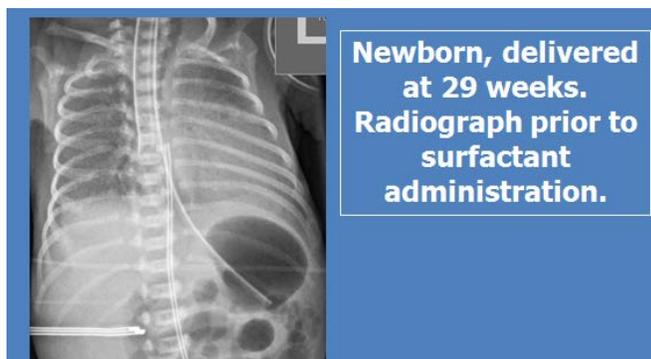
- Reid JR. Practical imaging approach to bowel obstruction in neonates: a review and update. *Semin Roentgenol.* 2012 Jan;47(1):21-31.
- Maxfield CM, Bartz BH, Shaffer JL. A pattern-based approach to bowel obstruction in the newborn. *Pediatr Radiol.* 2013 Mar;43(3):318-29.

Newborn Lines and Tubes – Normal and Abnormal

Pallavi Sagar, MD

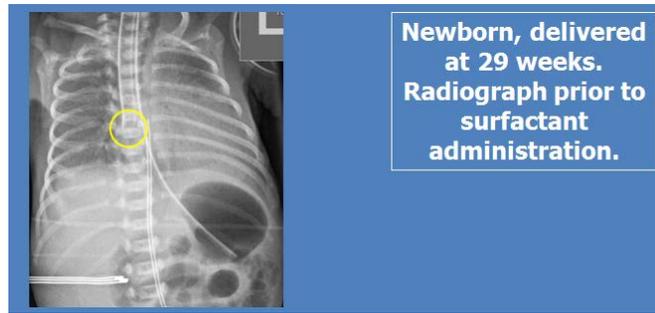
David Saul, MD

5. Please circle and state the most urgent finding.



Diagnosis/Finding: _____

Correct Answer: Endotracheal tube located in the esophagus

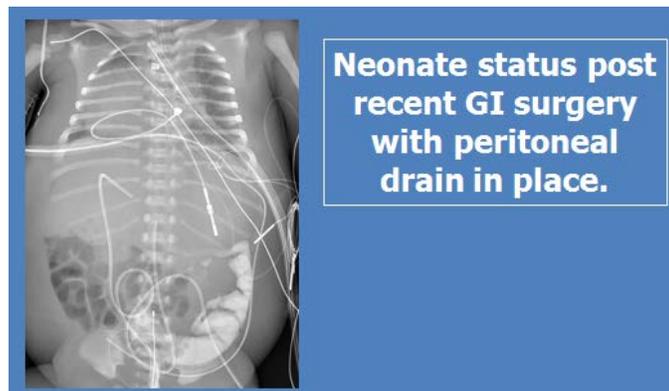


Rationale: Note that the tip of the endotracheal tube is well below the carina. This is only possible with an esophageal intubation. The umbilical venous catheter location is high, but this is much less urgent.

References:

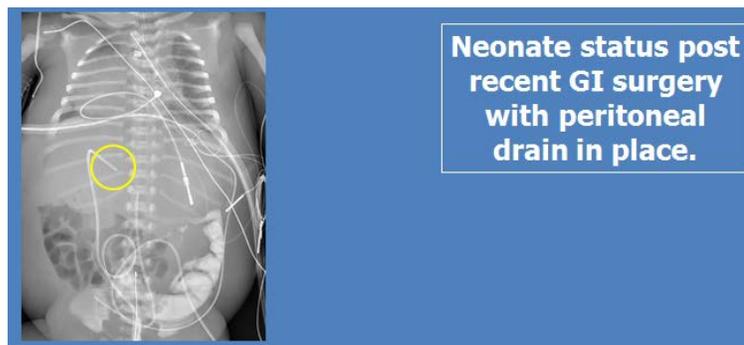
- van Os, S., Cheung, P. Y., Kushniruk, K., O'reilly, M., Aziz, K., & Schmölzer, G. M. (2016). Assessment of endotracheal tube placement in newborn infants: a randomized controlled trial. *Journal of Perinatology*, 36(5), 370.
- Birmingham, P. K., Cheney, F. W., & Ward, R. J. (1986). Esophageal intubation: a review of detection techniques. *Anesthesia & Analgesia*, 65(8), 886-891.

6. Please circle the tip of the malpositioned support device and state diagnosis.



Diagnosis/Finding: _____

Correct Answer: Umbilical venous catheter tip in the left portal vein



Rationale: The umbilical venous catheter should take a relatively straight course in the abdomen with tip at the inferior cavo-atrial junction. Common abnormal positions include left and right portal vein and superior mesenteric vein. Such malposition can lead to thrombosis and perforation.

Reference:

- Schlesinger, A. E., Braverman, R. M., & DiPietro, M. A. (2003). Neonates and umbilical venous catheters: normal appearance, anomalous positions, complications, and potential aid to diagnosis. *American Journal of Roentgenology*, 180(4), 1147-1153.

Anorectal Malformations

Steven J. Kraus, MD, MS, FAAP

D. Gregory Bates, MD

7. This newborn female has a single perineal opening and mid-to-lower abdomen and pelvic distention on physical exam. The above abdominal radiograph was performed in the radiologic workup of cloaca-type anorectal malformation and shows a soft tissue density (arrows) over the pelvis. What is the next best radiologic exam in the radiologic workup of this finding?

- A. Voiding cystourethrogram
- B. Contrast Cloacagram
- C. Pelvic and Urinary Ultrasound
- D. Pelvic and Urinary MRI

Correct Answer: C

Rationale: In a newborn female with clinical diagnosis of cloaca type ARM, the most important diagnosis to confirm is hydrocolpos, since this can cause bilateral distal ureteral obstruction/obstructive uropathy which could lead to vaginal perforation, vaginal infection, or bilateral renal injury. The best next radiologic exam is pelvic and renal US, as it can be done portably, does not require sedation, with no radiation exposure to the patient. During the US, the surgeon may place a vaginal catheter to temporarily relieve the obstructive uropathy.

References:

- Bischoff, et al. Hydrocolpos in cloacal malformations. *Journal of Pediatric Surgery* (2010) 45, 1241-1245
- Kraus, SJ. Radiologic diagnosis of a newborn with cloaca. *Seminars Pediatric Surgery*. 2016 Apr; 25(2):76-81

8. Which of the following has the most important role in the operative planning for cloacal repair and best predicts urinary continence?

- A. Common channel length
- B. Vaginal anatomy (size, location, and presence of hemi-vaginas)
- C. Native urethral length
- D. Distal colonic length and distance from rectal fistula to perineum.

Correct Answer: C

Rationale: The rates of urinary incontinence appear high in patients who undergo TUM with a urethra less than < 1cm and common channel < 3cm (bladder neck essentially placed at perineum) or in patients with a urethra < 1cm and common channel 3-5cm after conversion of a TUM to a urogenital separation because the tissues would not reach the perineum. This results in subsequent urethral loss from diminished blood supply related to both anterior and posterior urethral dissection.

References:

- DG BATES Bischoff, et al. Hydrocolpos in cloacal malformations. *Journal of Pediatric Surgery* (2010) 45, 1241-1245
- Kraus, SJ. Radiologic diagnosis of a newborn with cloaca. *Seminars Pediatric Surgery*. 2016 Apr; 25(2):76-81