AMSER Case of the Month February 2021

Newborn male presenting with respiratory distress

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Patient Presentation

HPI: Newborn male born at 38 weeks via SVD presenting with respiratory distress

Prenatal Hx: Lagging fetal growth EFW: 2.7 kg (~9th percentile)

Birth Hx: SROM with bloody fluid; Presentation: LOA, SVD; Apgars: 5 @ 1min & 8 @ 5min; intubated at 1 min of life

Maternal Hx: 34 y/o white female G3P2002 with hx of anxiety treated with Zoloft and prior precipitous vaginal delivery

Prenatal Labs: RPR nonreactive, Hep B (-), Rubella immune, Gonorrhea (-), Chlamydia (-), HIV (-), HCV unknown, Blood Type: O+ Rh-

Physical Exam & Pertinent Labs

Physical Exam:

Vitals: HR: 130s Wt: 2580g (5lb 8oz) (4th percentile)

Mechanical Respiratory Support: SpO2: >90%, PEEP: 6, RR: 30, FiO2: 50%

Lungs: Moderate subcostal retractions, B/L bowel sounds auscultated, BS over left hemithorax

CV: Normal S1 & S2, RRR, PMI displaced to right, pulses adequate, capillary refill ~3-4 secs

Abd: Soft, flat-scaphoid, no masses or hepatosplenomegaly

Labs: ABG: pH 7.204 PaCO2 44.6 PaO2 45.3 HCO3 17.6

CBC w/ diff: Hgb 12.9, Hct 37.8, RBC 3.40

What Imaging Should We Order?

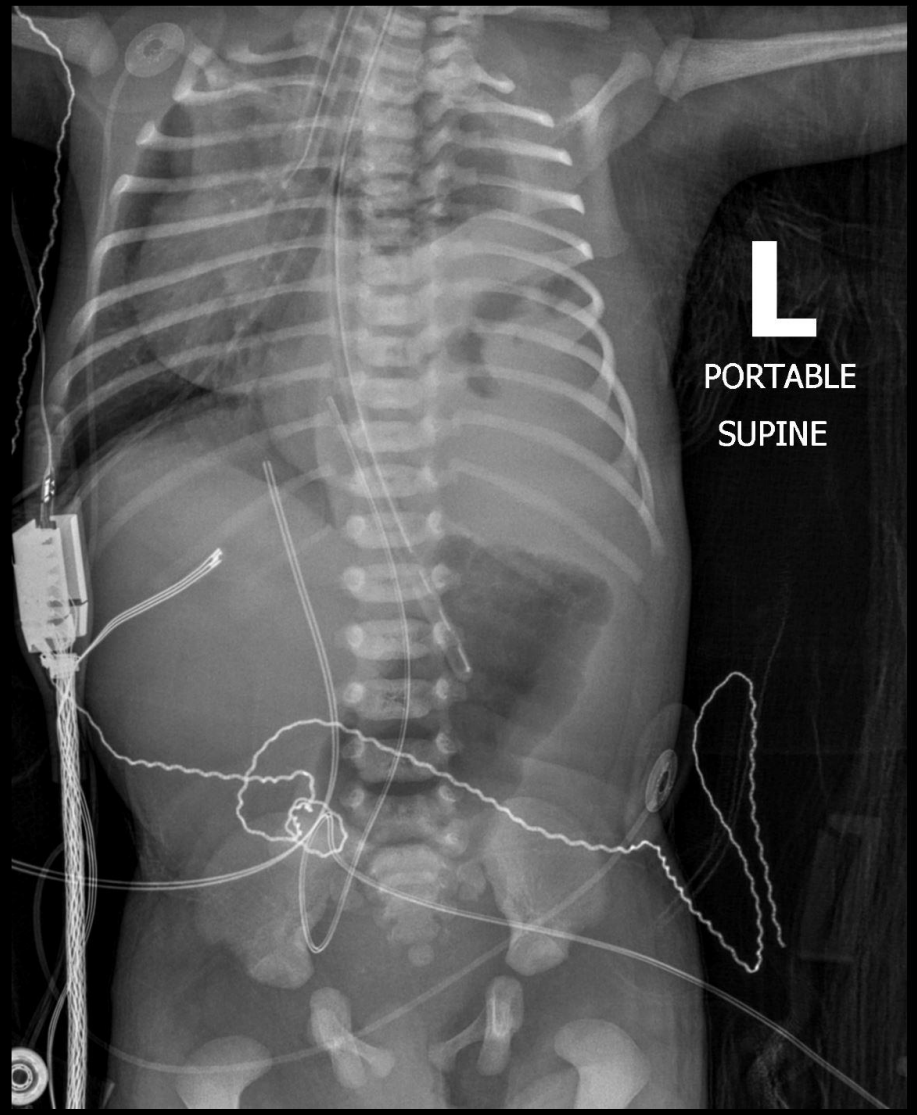
Select the applicable ACR Appropriateness Criteria

Variant 2: **Acute respiratory illnesses in immunocompetent patients with positive physical examination, abnormal vital signs, organic brain disease, or other risk factors. Initial imaging.**

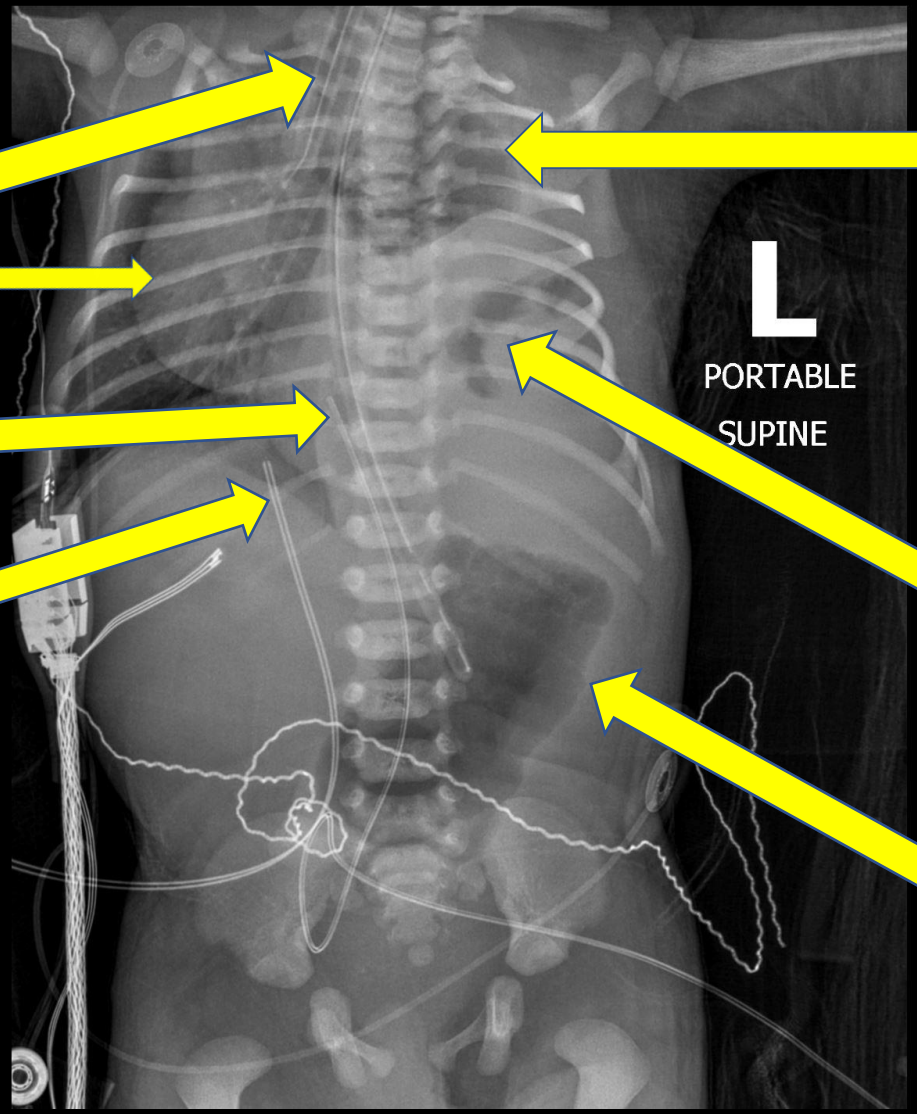
Procedure	Appropriateness Category	Relative Radiation Level
Radiography chest	Usually Appropriate	☢
US chest	May Be Appropriate	O
CT chest with IV contrast	Usually Not Appropriate	☢☢☢
CT chest without and with IV contrast	Usually Not Appropriate	☢☢☢
CT chest without IV contrast	Usually Not Appropriate	☢☢☢
MRI chest without and with IV contrast	Usually Not Appropriate	O
MRI chest without IV contrast	Usually Not Appropriate	O

This imaging modality was ordered by the NICU team along with abdominal radiograph

Chest Abdomen X-Ray (unlabeled)



Chest Abdomen X-Ray (labeled)



Mediastinum & ET tube shifted to right

Umbilical Arterial Catheter in Descending Aorta displaced to right

Umbilical Venous Catheter in IVC displaced to right

Hypoplastic Left Lung

Air-filled bowel loops in left hemithorax

Gaseous distension of stomach (normally positioned)

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Final Dx:

Left-sided Congenital Diaphragmatic Hernia

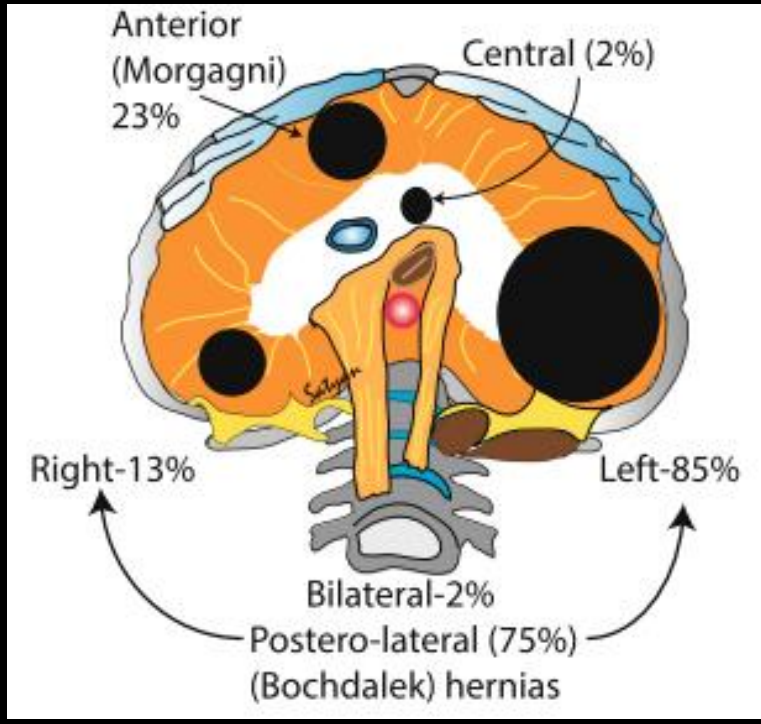
Case Discussion

Congenital Diaphragmatic Hernia: Defect in the diaphragm resulting in abdominal contents moving into the thoracic cavity

Epidemiology: 0.8-5/10,000 births depending on population

Etiology:

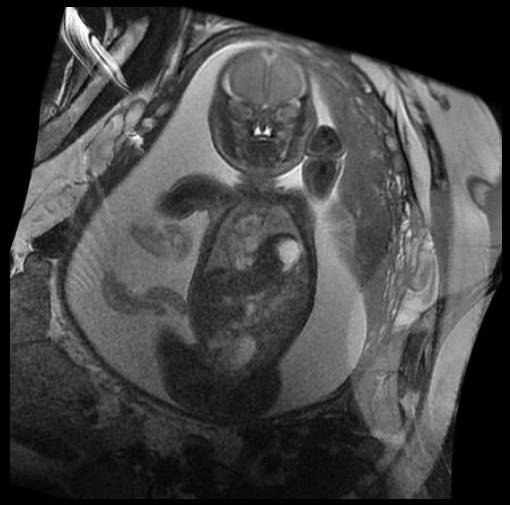
- Multifactorial
- Failure of fusion of a pleuroperitoneal canal during organogenesis
- Can be an isolated defect or associated with pulmonary hypoplasia, aneuploidy, neural tube defects, congenital cardiac anomalies, Cornelia de Lange Syndrome, and Fryns Syndrome



Case Discussion (cont.)

Radiographic Findings:

- Antenatal Ultrasound* – bowel loops absent in abdomen, liver herniating into thorax, decreased abdominal circumference, and stomach and bowel present at same transverse level as heart
- Fetal MRI* – further assess hernia and pulmonary hypoplasia after U/S
- Radiography – after delivery with features of an indistinct diaphragm, scaphoid abdomen, bowel within hemithorax, deviation of lines and tubes, and mediastinal shift



* Can be used to calculate observed-to-expected lung to head ratio to assess for degree of pulmonary hypoplasia and probability of survival

Case Discussion (cont.)

Antenatal Management

- Corticosteroids prior to delivery of preterm infants to help with lung maturation
- Percutaneous fetal endoluminal tracheal occlusion (clinical trial)
- Delivery at tertiary care center with access to NICU, ECMO, and pediatric surgeons

Postnatal Management

- Intubation and mechanical support
- OG/NG tube to decompress bowel
- Manage pulmonary HTN
- Surgical repair (ultimate treatment)

References:

Agrawal, Rishi, Jin, Tee Yu, et al. “Congenital Diaphragmatic Hernia: Radiology Reference Article.” *Radiopaedia Blog RSS*, radiopaedia.org/articles/congenital-diaphragmatic-hernia-1?lang=us.

Chandrasekharan, P.K., Rawat, M., Madappa, R. *et al.* Congenital Diaphragmatic hernia – a review. *matern health, neonatol and perinatol* **3,** 6 (2017). https://doi.org/10.1186/s40748-017-0045-1

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Krisa Van Meurs, M. D., & Short, B. L. (1999). Congenital diaphragmatic hernia: the neonatologist’s perspective. *NeoReviews*, e79.