RADI 403 Case Presentation

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Newborn male born at 41w0d via SVD to a 31 y.o. G5P3023
- Normal anatomy fetal scan at 18w3d
- Initial physical exam normal except for congenital ankyloglossia
- Discharged on DOL2
- Brought to ED on DOL4 with increased WOB
- Tachypnea, initial SpO2 in the 50s (improved to 100 with 100% O2 via face mask)
- Physical exam notable for retractions, intermittent cyanosis of the hands
- EKG with sinus tachycardia
Imaging studies on the neonate

- Bedside echocardiogram (normal)
- XR chest AP and lateral
- XR abdomen 1 view
Imaging studies: CXR
Large left diaphragmatic hernia with bowel in chest. Displacement of mediastinum to the right. No focal opacity in the right lung.
Imaging studies: AXR

AP supine abdominal radiograph
Imaging studies: AXR

- AP supine abdominal radiograph

- Large left CDH

- Enteric tube with tip and side-ports overlying the GE junction / proximal stomach
Thoracoscopic repair on DOL 6
Operative findings:
- 2 cm defect in left diaphragm
- Small bowel and colon herniated into chest
- Evidence of reasonable volume of lung tissue (although the lung tissue did not fill the chest, it appeared well formed with a fissure)
Imaging studies: post op CXR
CXR Findings: Enteric tube with tip in the stomach. Left chest tube. Cardiomediatinal silhouette normal with prominent thymus. Small left pneumothorax. Diaphragmatic hernia has been reduced. Right lung is clear. Lucency in the midshaft of the right clavicle.

Clavicle fracture vs. congenital pseudarthrosis
Normal cardiomediatinal silhouette
Enteric tube
Chest tube
Small L PTX
Imaging studies: POD 16 CXR

Cardiomeediastinal silhouette is normal, with prominent thymus. No focal opacity, effusion, or pneumothorax. Gaseous distention of the stomach. Abdomen otherwise unremarkable. Healing right clavicle fx.
Hospital course and follow up

- Chest tube removed POD 2
- Discharged POD 7

- Returned 7 months later with vomiting and lethargy, found to have recurrent hernia with incarcerated colon and malrotation
  - Ex lap, diaphragmatic hernia repair, partial colectomy, colostomy, Ladd’s procedure
Discussion: CDH

- Congenital diaphragmatic hernia
  - 80-85% left, 10-15% right, <2% bilateral
  - 95% posterolateral (Bochdalek hernia), less commonly anterior (Morgagni hernia)
  - 50-70% isolated but 30-50% with associated anomalies which include chromosomal abnormalities, CNS (neural tube defects), GI (malrotation, oral cleft, omphalocele), CV, GU
  - Spectrum of severity depending on degree of pulmonary hypoplasia and pulmonary hypertension
Prenatal diagnosis of CDH

- **Ultrasound**
  - Mass in chest, peristalsis, mediastinal shift
  - Classic appearance: fetal stomach adjacent to fetal heart on cross-sectional view of the thorax
  - Lung-head ratio (LHR): measurement of contralateral lung area normalized to head circumference
  - Liver herniation $\rightarrow$ poor prognosis
**Discussion: CDH (cont)**

- **Prenatal diagnosis of CDH**
  - Liver herniation is used as a predictor of morbidity.
    Transverse view of the thorax shows the fetal stomach adjacent to the fetal heart, often with displacement of the heart into the right chest.

Left image shows herniation of stomach into chest, liver below level of diaphragm. Right image shows liver herniation through left defect (poor prognosis)

Image source: Posencheg and Wang

Image source: UpToDate
Prenatal diagnosis of CDH

- Ultrasound
  - Sensitivity varies
    - 59% in one study (a European study dated 2002)
  - Higher with associated anomalies, increased GA
- Cost: $109-674
- Radiation dose: none
Discussion: CDH (cont)

- Prenatal diagnosis of CDH
  - Further imaging may be needed
    - Fetal MRI to evaluate degree of pulmonary hypoplasia and liver herniation
    - Fetal echo to exclude associated cardiac anomalies
    - Serial fetal US exams to assess fetal growth and AFV (amniotic fluid volume)
Discussion: CDH (cont)

- **Postnatal diagnosis of CDH**
  - CXR
    - Herniation of abdominal contents into thorax
    - Contralateral mediastinal displacement
    - Decreased or absent air-containing bowel in the abdomen
    - Enteric tube in thoracic cavity
    - Cost: $29-472
    - Radiation dose: 0.1 mSv

(Also, Echo for associated cardiac anomalies and pulmonary HTN)
References