Pediatric Radiology
Case Presentation

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Focused patient history and workup

- Baby girl born precipitously at 25+5 in OSH ED
- APGARs 3/5/7 at 1/5/10 minutes
  - Intubated at 8 minutes of life
- No antenatal steroids
- 1 dose surfactant given at OSH
- At UNC the UVC was replaced and a UAC was placed
  - X-Ray was obtained to evaluate line placement
ETT at thoracic inlet

Diffuse, hazy opacities central > peripheral

UVC at mid/upper RA

UAC at T9-T10

UAC Check DOL 0
DOL 5 – Abdominal Concerns

- s/p OGT placement on DOL #4; “was hard to pass” per NICU provider note
- Physical exam reveals protuberant abdomen and absent bowel sounds
- Differential included sepsis vs obstruction vs NEC
  - Abdominal X-Ray with subsequent LLD
Interval UVC retraction
Interval UAC removal
Enteric tube in place

No portal venous gas

Protuberant abdomen, diminished bowel sounds
DOL 5

Triangular lucency/edge
Rounded lucency

No pneumatosis
No pneumoperitoneum
Triangular and round lucencies in thorax

Enteric tube retroperitoneal?

Protuberant abdomen, diminished bowel sounds

DOL 5
NICU team was concerned with enteric tube location and replaced it
- Abdominal X-Ray was obtained
Diffuse hazy right lung

Irregular lucencies
Triangular lucency
Obscured hemidiaphragm
New enteric tube

Replaced OGT
DOL 5
DOL 6 - Differential Diagnosis

- Working differential: diaphragmatic hernia vs esophageal perforation
  - Pediatric surgery was consulted
Recommendations:
- Remove OGT
- Keep NPO
- Obtain UGI series to evaluate for perforation
- Patient was intubated in preparation for UGI series
  - Chest/abdomen X-ray was obtained
Resolved medial lucency

Lucency

Resolved medial lucency

Enteric tube

Intubation

DOL 6
Post-Barium Swallow
DOL 7
NICU team places inferior PICC for TPN
- Chest/abdominal X-Ray was obtained
Malpositioned inferior PICC

Improved lucencies
“Difficult to pass” enteric tube with subsequent pneumothorax and apparent malposition of tube
  ▪ Supports loculated pneumothorax due to esophageal/pharyngeal perforation

RDS patient on mechanical ventilation
  ▪ Supports pneumothorax due to barotrauma
Neonatal Enteric Tube Placement – Complications

- Prevalence of misplaced enteric tubes reported 21-43.5% \(^1\,2\)
  - Perforation is a more rare, but serious complication

- Can perforate esophagus, stomach, bronchi
  - Usually at pharyngoesophageal junction;
    - lumen is narrowed by cricopharyngeus muscle\(^3\)

- Can cause aspiration pneumonia, tension pneumothorax,
  - tension pneumoperitoneum
Malposition and Pneumothorax

Case #1
Yong, et.al.
Case #2
Hosieh, et al.

Malposition
Case #2
Hosheh, et. al.

Reposition and Pneumothorax
Respiratory Distress hours later due to Pneumothorax
Gastric Perforation
Have a low threshold to obtain imaging after placing any new tube or line, especially if clinical status deteriorates or clinical assessment is equivocal.


Bonus Slides
Lung Disease in the Neonate

- **Respiratory Distress Syndrome**
  - Caused by surfactant deficiency
  - Inversely correlated with gestational age
    - 93% incidence in infants born <28 weeks
    - 0.3% incidence in infants born >38 weeks
  - Antenatal steroids, exogenous surfactant, and CPAP have improved disease course
  - Progressive respiratory failure shortly after birth in combination with
    - characteristic chest radiograph
Diffuse reticulogranular appearance

Low lung volumes (look for ETT)

Air bronchograms
Pulmonary Interstitial Emphysema

- Caused by rupture of overdistended alveoli, most often in mechanically ventilated infants with lung disease
  - Air is trapped in perivascular space
  - Transient finding that often precedes pneumothorax unless
    - Ventilator settings are changed
    - High-frequency oscillation ventilation (HFOV)\textsuperscript{10}
  - Diagnosed via chest radiograph - can be unilateral or bilateral
  - Ipsilateral bronchial occlusion\textsuperscript{11}
Seventy-II

AND

Cenetrally

Hyperinflation

Mediastinal Shift

Coarse non-branching linear
OR
cystic lucencies

Seen peripherally AND centrally
Pneumothorax

- Air in the space between the parietal and visceral pleura
  - High level of suspicion in mechanically ventilated infant with worsening cardiopulmonary function
    - Can be asymptomatic if small
  - Large pneumothoraces are easily seen on supine chest radiograph
  - Smaller pneumothoraces benefit from lateral decubitus imaging
Atelectasis and flattening of the diaphragm

Mediastinal shift

Air between visceral and parietal pleura