# Necrotizing Enterocolitis

Jocelyn Derienne Ursua, MS4 16 Oct 2020 Diagnostic Radiology – RAD 4001 Susan John, MD



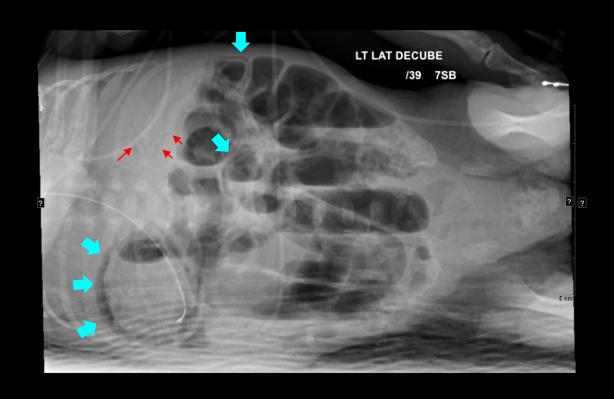
### Clinical History

- 11-day-old preterm male delivered at 25 weeks due to maternal preeclampsia w/ severe features, BW @ 770 g
- H/o PDA and lung disease of prematurity, intubated @ 14h of life; received TPN & expressed breast milk
- Overnight 9/23-9/24, increased gastrointestinal residuals resulting in held feeding.
- Vitals T<sub>max</sub> 98.2F, BP 58-62 mmHg/28-38 mmHg, MAP 37-43 mmHg, HR 149-170 bpm, SpO2 87-95%
- BMP K 7.1C, BUN 40; ABG 7.01C/>97C/34C/26; Coag PT 16.9H, Fibrinogen 244L, aPTT 42.3L

Chest/ABD 1 view, AP supine 9/24/2020 @ 0821



Chest/ABD 1 view, AP supine 9/24/2020 @ 0355



Chest/ABD 1 view, AP LLD 9/24/2020 @ 0835



Chest/ABD 1 view, AP supine 9/24/2020 @ 0355

# Summary of Findings

- LTDs: ETT 1 cm above carina, NGT tip in proximal stomach, LUE PICC line tip in SVC-RA junction
- Lungs/Pleura: increased diffused hazy opacification bilaterally w/o pneumothorax or pleural effusion
- Heart/mediastinum: Normal heart size, pulm vasc not clearly visible
- Abdomen:
  - Gas distention, mildly dilated loops of bowel throughout abdomen
  - Air within intestinal wall & stomach vs. chest/abd 1 view from 0355
  - Portal venous gas (especially in LLD film)
  - No pneumoperitoneum

### Differential Diagnosis

- Necrotizing enterocolitis (NEC) pneumatosis intestinalis on X-ray
  - Occurs in preterm neonates; clinical signs of ab distention & gastric residuals
- Spontaneous intestinal perforation of newborn single intestinal perforation, typically @ terminal ileum or colon
  - Occurs in ELBW infants, similar to NEC
  - No pneumatosis intestinalis on imaging; clinical findings of hypotension, ab distention, <u>bluish discoloration of abdominal wall</u>
- Infectious enteritis due to nosocomial viral infection
  - E.g., rotavirus
  - Can cause gastric residuals, abdominal distention, intestinal dilation

### Necrotizing Enterocolitis

#### Pathophysiology

- Ischemic necrosis of intestinal mucosa
- Assoc. w/ transmural inflammation, enteric gas-forming organism invasion, dissection of gas into portal venous system & muscularis
- Occurs primarily in preterm infants; pathogenesis remains unknown
- Multifactorial process: susceptibility inversely related to GA, select risk factors & triggers, host inflammatory response (TLR of innate immune system)

#### Diagnosis

- Clinical findings (e.g., abdominal distention)
- Imaging: abdominal radiography → pneumatosis intestinalis

### Treatment

- Supportive care: NPO, NG suction, TPN, parenteral fluids, CV/respiratory support
- Antibiotic therapy: broad-spectrum antibiotics after obtaining cultures
- Serial abdominal imaging q8-12h
- Surgery: indicated w/ pneumoperitoneum or persistent clinical deterioration

# Mortality

- 11% percent for term infants w/ NEC & BWs >2500 g
  - Rate attributed to risk factors (e.g., congenital anomalies, chromosomal abnormalities, sepsis)
- Preterm infants: mortality inversely related to gestational age, also increases for pts undergoing surgical intervention
  - Extremely preterm infants who undergo surgery → 59% mortality rate
  - Other factors: mechanical ventilation, treatment w/ vasopressors
  - Fulminant disease factors: portal venous air, anemia, rapid feeding escalation, high banded to total neutrophil ratio, low lymphocyte count

### Aftermath

- Ped surg consulted at 0845 → taken to OR @ 1050 for emergent exlap w/ silo tube placement
- Findings of black, necrotic stomach w/ bowel ischemia/necrosis throughout colon
- Persistent clinical deterioration → pt was extubated per family's request, died 9/24 @ 1845

# Take Home Points / Teaching points

- Abdominal radiography → imaging modality of choice
- Key finding of pneumatosis intestinalis +/- pneumoperitoneum & portal venous air
- Risk & mortality inversely related to GA; worse outcomes w/ surgery

### References

- Kim, JH. Neonatal necrotizing enterocolitis: Pathology and pathogenesis. In: UpToDate, Post, TW (Ed), UpToDate, Waltham, MA, 2020.
- Kim, JH. Neonatal necrotizing enterocolitis: Clinical features and diagnosis. In: UpToDate, Post, TW (Ed), UpToDate, Waltham, MA, 2020.
- Kim, JH. Neonatal necrotizing enterocolitis: Management. In: UpToDate, Post, TW (Ed), UpToDate, Waltham, MA, 2020.

