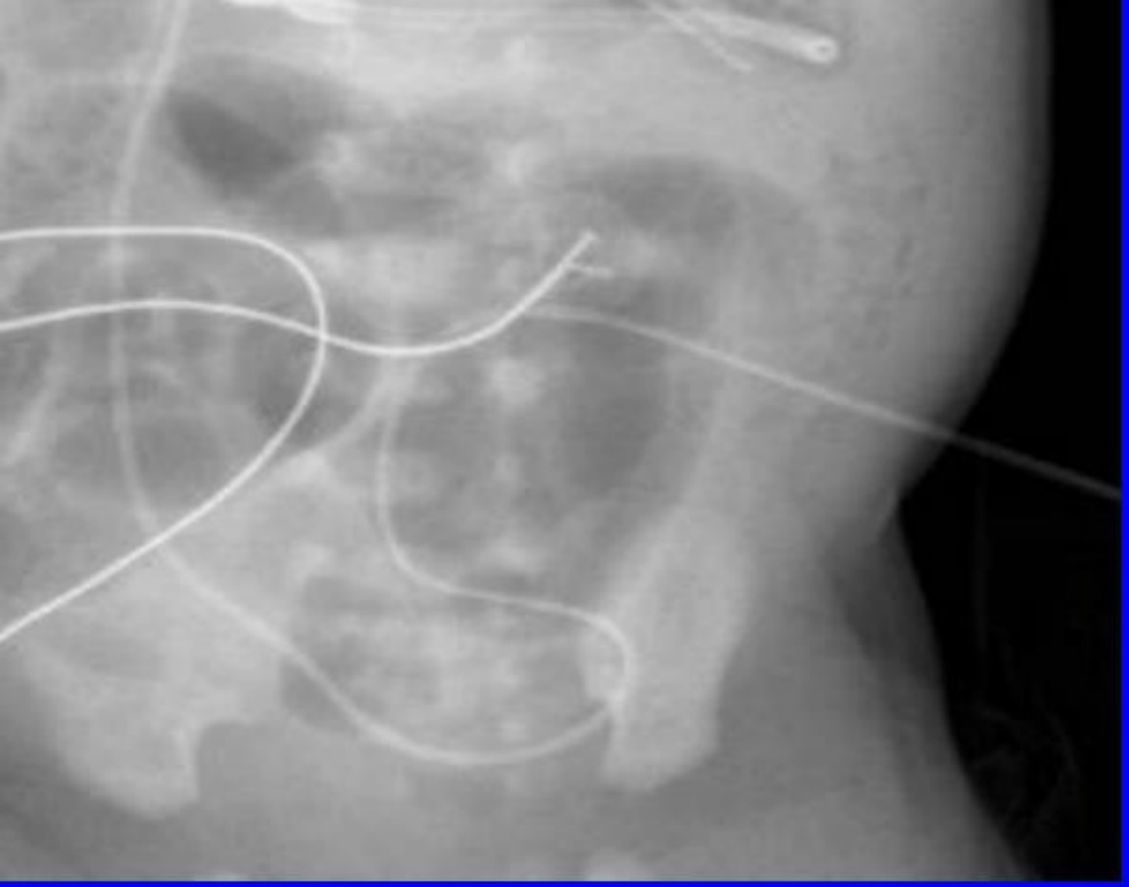
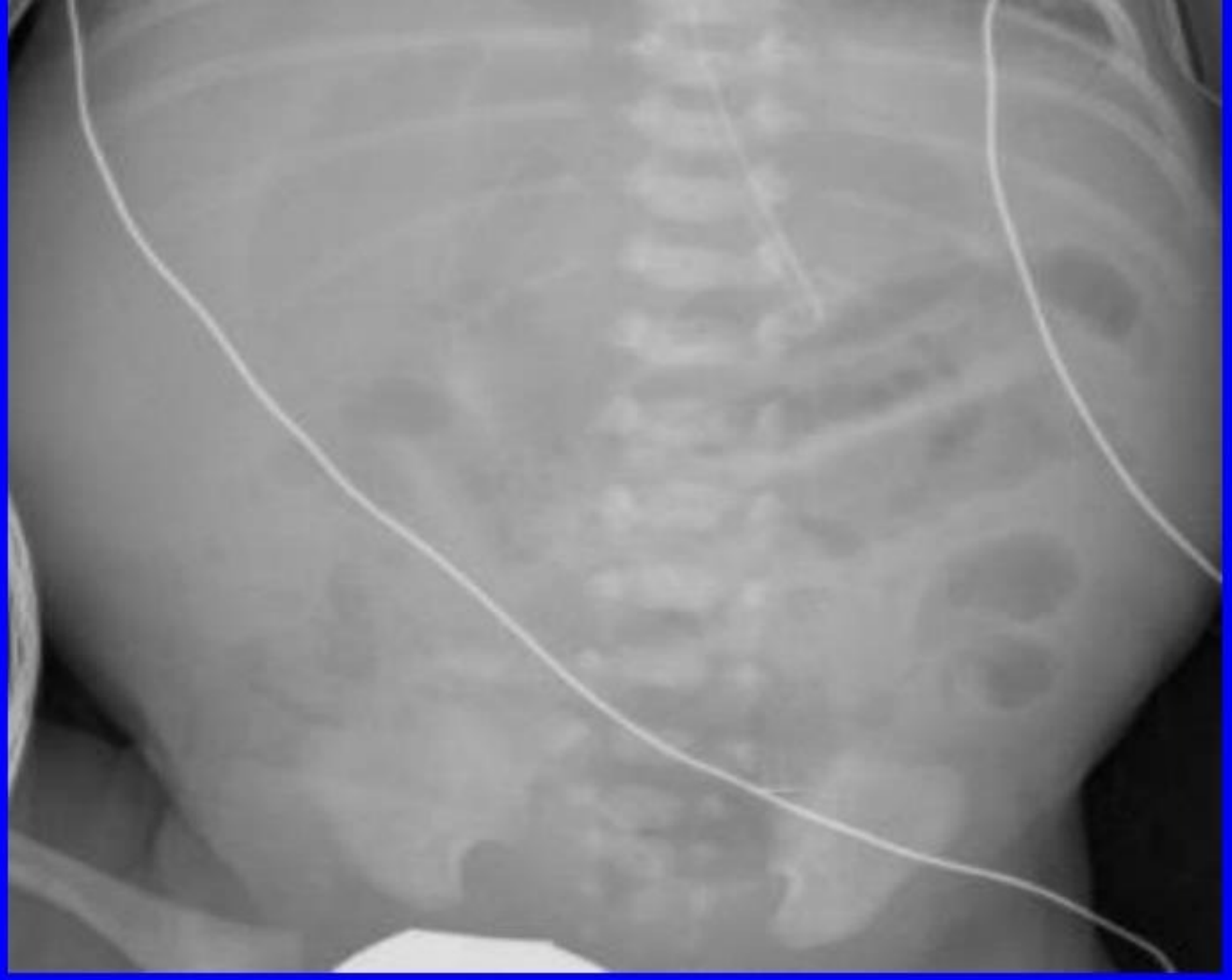
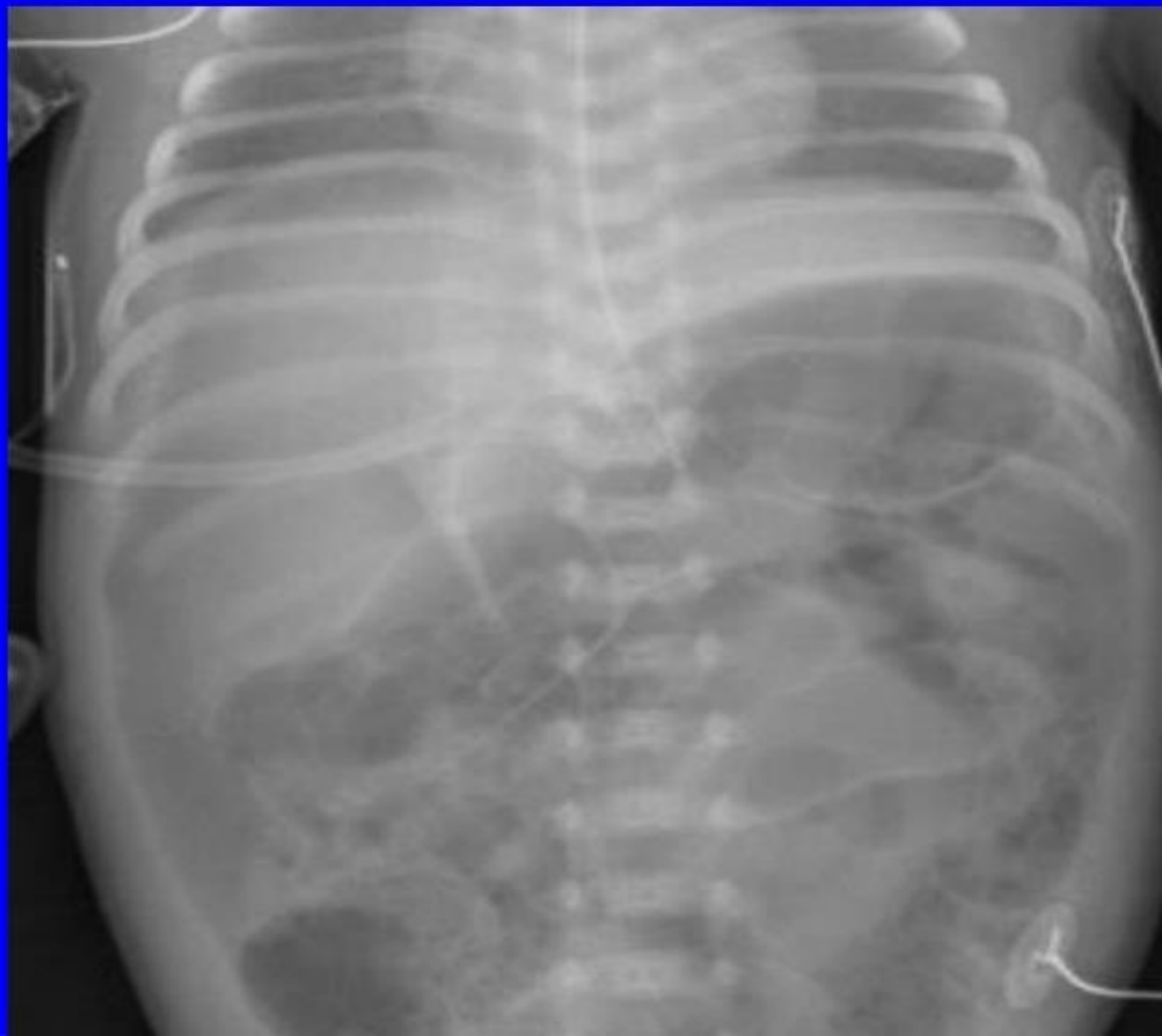


Necrotizing enterocolitis

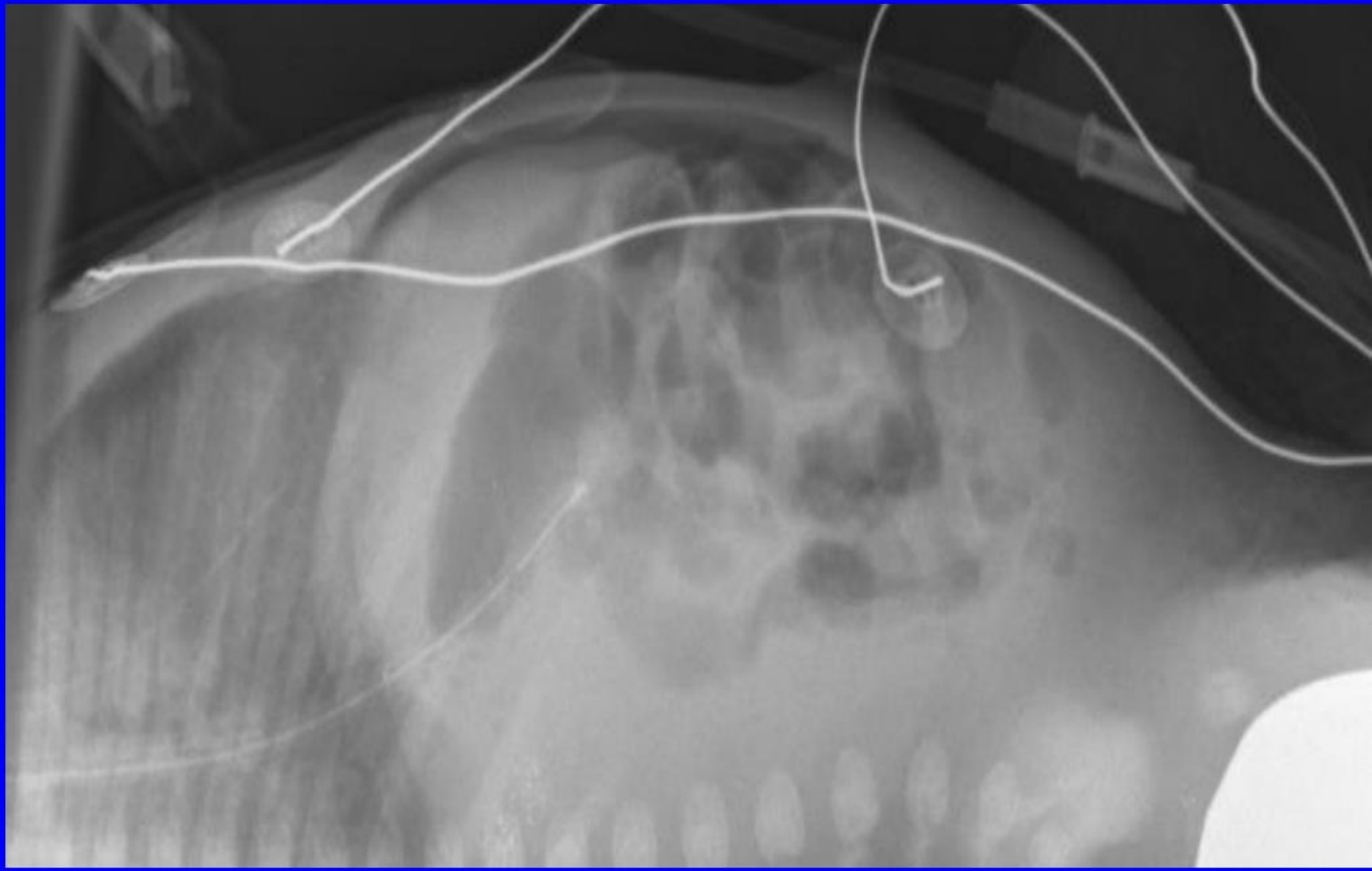
Charlene Crichton, MD





Definition

- An idiopathic coagulation necrosis and inflammation of the intestine in a neonatal patient
- Recognized as an important neonatal disorder since the 1960's



Clinical Manifestations

- Bell's staging criteria

Stage I (suspected NEC)

Stage II (definite NEC)

Stage III (advanced NEC, severely ill)
  IIIA (without perforation)
  IIIB (with perforation)

Clinical manifestations

- **Stage I**
- Systemic signs
  - Temp instability, increased A/B's, lethargy
- Intestinal Signs
  - Increased residuals, mild abdominal distention, emesis
- Radiological signs
  - Normal or mild dilatation or ileus

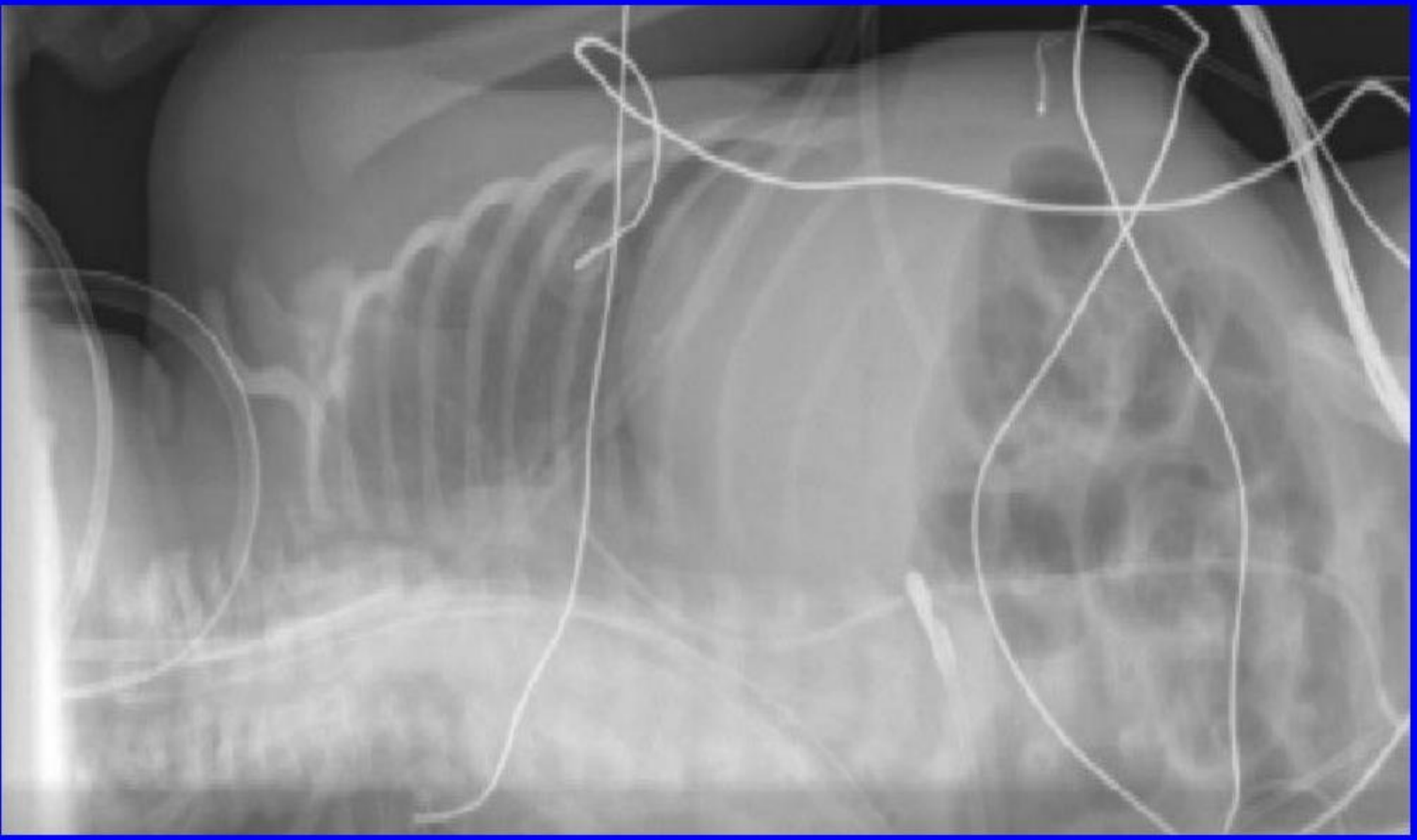
Complications

- Mortality is 30-60%
- Stricture formation is 25-35%
- Bowel obstruction in 5%
- Enterocutaneous fistulas
- FTT secondary to short bowel syndrome and malabsorption
- TPN related cholestasis
- Central line sepsis

Age of Onset

- The age of onset is highly variable but rarely occurs in the first three days of life.

- The lowest GA (24-28 weeks) tend to develop NEC after the second week of life
- Intermediate GA (29-32 weeks) develop it within 1-3 weeks
- Term infants or >32 weeks tend to develop it in the first week of life.



Prevention

- Antenatal steroids decreased the incidence of NEC in randomized blinded studies
- Use of human milk (1.2% incidence vs. 7.2% incidence in formula feed premies)
- GI priming with cautious advancement of enteral feeding

Treatment strategies

- Suspected NEC (Bell's stage I)

→Hold enteral feeds

→Obtain an x-ray to view bowel gas pattern

→Gastric decompression with an OG tube to suction

→ROS with initiation of IV antibiotics

Radiologic findings

- Generalized bowel distention (earliest sign)
- Pneumatosis Intestinalis
- Pneumoperitoneum
- Large distended immobile loop on repeated x-rays
  (persistant loop sign)
  (may indicate a gangrenous loop of bowel)
- Gasless abdomen (perforation and peritonitis)
- Portal venous air

Incidence

- The incidence varies from center to center for unknown reasons
- Affects mostly premature infants (although 10% of cases occur in FT infants)
- Increased incidence with decreasing BW and GA with a sharp decrease at 35-36 PCA
- Supports the hypothesis that the risk of NEC is determined by maturity of the GI tract

Clinical Manifestations

Stage II

- Systemic signs
  - Same as Stage I with metabolic acidosis and mild thrombocytopenia
- Intestinal signs
  - Same as Stage I with decreased bowel sounds and abdominal tenderness
- Radiologic signs
  - Intestinal dilatation, ileus and pneumatosis intestinalis

Clinical Manifestations

Stage III (A & B)

• Systemic signs	• Same as II plus hypotension, severe apnea, DIC, neutropenia, anuria
• Intestinal signs	• Same as II with generalized peritonitis, marked tenderness and distention, and abdominal wall erythema
• Radiologic signs	• Same as II with ±portal vein gas, definite ascites ±pneumoperitoneum

Treatment Strategies

- When is surgery indicated??

→Absolute indications

1) pneumoperitoneum

2) intestinal gangrene

(if the patient is extremely unstable some surgeon opt for peritoneal drains as a bridge to surgery)

→ Relative indications

1) progressive clinical deterioration

2) fixed abdominal mass, portal vein gas, abdominal wall erythema

3) persistently dilated bowel loop

Risk Factors

- In the past it was felt that low APGARS, UAC/UVC's, severe RDS, PDA's (ie gut ischemia) combined with aggressive and early enteral feeding in a premature infant were the factors associated with NEC
- These theories have been dispelled in case-control studies
- These studies found that prematurity (with immature GI tract and host defenses) is the primary risk factor

Treatment Strategies

- Advanced NEC (Bell's Stage III)

→Same management as Stage II with increased monitoring of BP, DIC panels and abdominal films (q6h flat and left lateral decub or cross table lateral films is typical)

→Vigorous fluid resuscitation, inotropes, ventilator support

→Surgery as indicated

Treatment Strategies

- Definite NEC (Bell's stage II)

→Follow serial exams and serial xray's with left lateral decubitus films to screen for perforation

→Frequent labs with correction of metabolic disturbances(acidosis, hyperkalemia, hyperglycemia etc), hypovolemia, thrombocytopenia, and DIC

→Intubation if patient is not on MV

→Consider surgical consult