Surgical Neonatal Vomiting

- Interactive
- Case studies
- Summary of specific surgical conditions

- What is a neonate?
- What is preterm?
- What is term?

Definitions

- Neonate – premature and term babies less that 44 weeks post-conceptional age
- Premature neonate <37 weeks post-conceptional age
- Term neonate 37-40 weeks post-conceptional age
- Post term >40 weeks post-conceptional age

History and Symptoms

History and Symptoms

- Gestation
- Weight
- Antenatal history
- Colour of vomit
- Frequency of vomit
- Bowel opening
- Saliva?
- Associated co-morbidities

Physical Findings

Physical findings

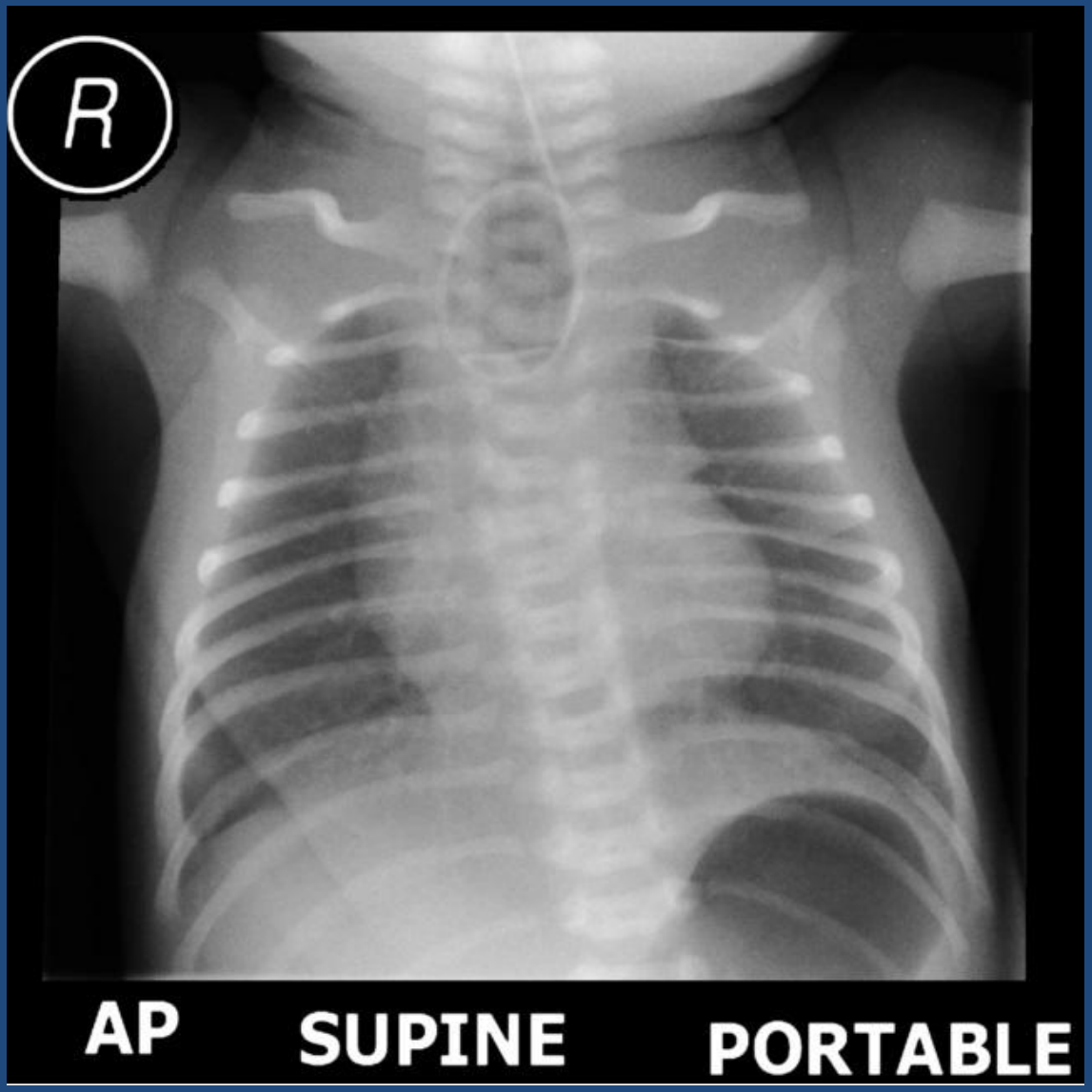
- Observations
- Erythema and bruising
- Distended
- Scaphoid abdomen
- Mass
- Anus – site, size and patency
- Tenderness
- External genitalia – normal? Palpable testes?
- Inguinal hernia

Investigations

- Plain AXR/CXR
- Upper/Lower GI contrast
- Abdominal USS

Case 1

- Term neonate
- 1 day old
- Vomiting
- Relevant points in history
- Relevant examination findings
- Differential diagnosis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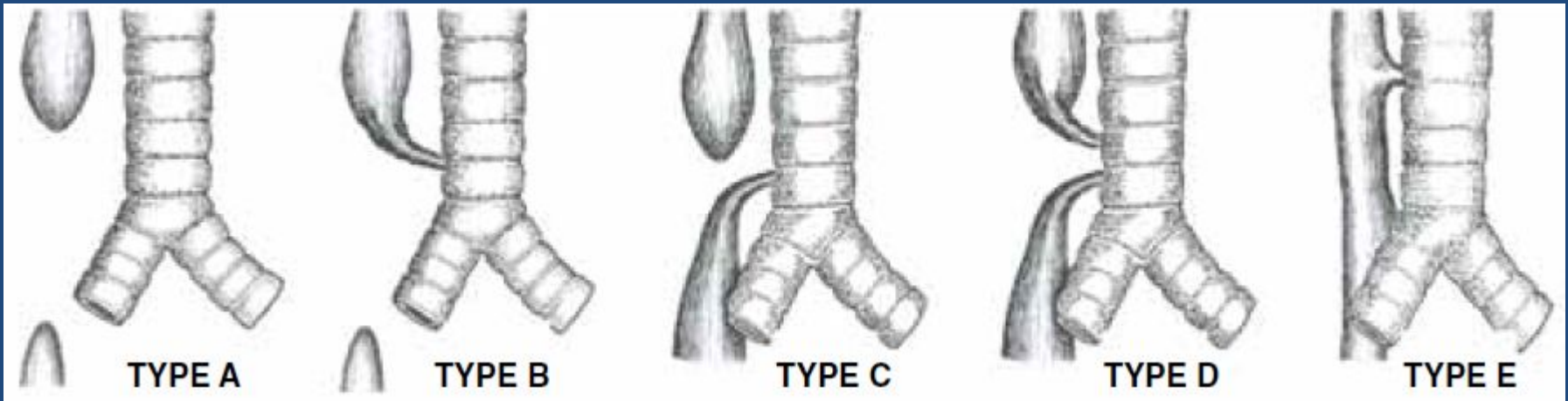
SUPINE
PORTABLE

Oesophageal atresia and tracheo-oesophageal fistula

- 1 in 3500 liveborn births
- Antenatal
  - Polyhydramnios, absent stomach, associated anomalies
- Salivation, cyanosis on feeding
- Inability to pass NGT
- Associated anomalies:
  - Vertebral – butterfly vertebra, rib anomalies
  - Anorectal
  - Cardiac – Tetralogy of Fallot, AVSD, ASD, VSD etc
  - Tracheo-oesophageal fistula
  - Esophageal atresia
  - Renal – dyeplasia, agenesis and other defects
  - Limb – radial ray defects

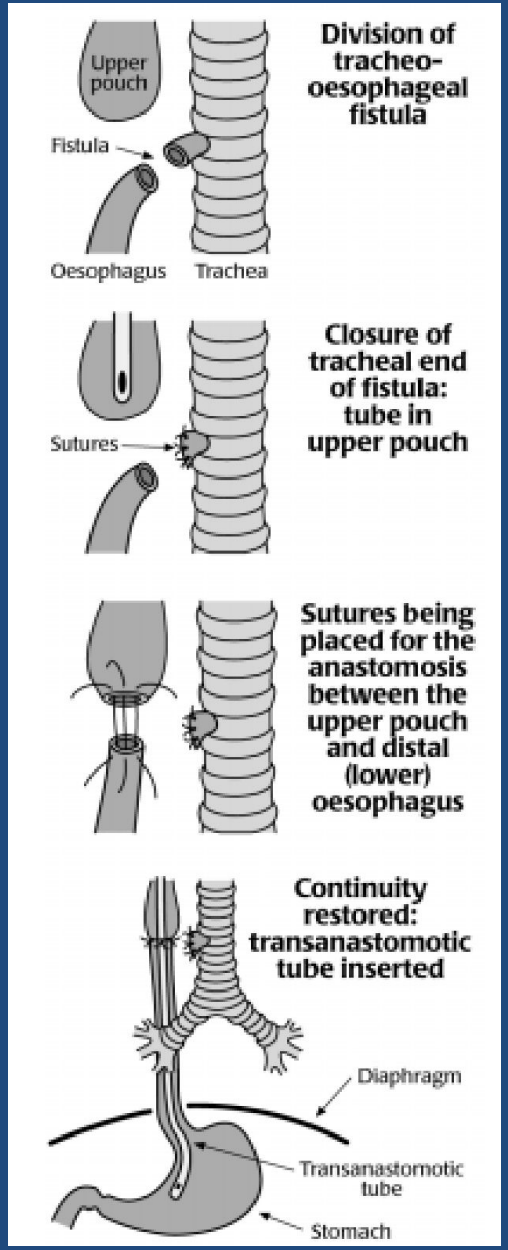
Classification

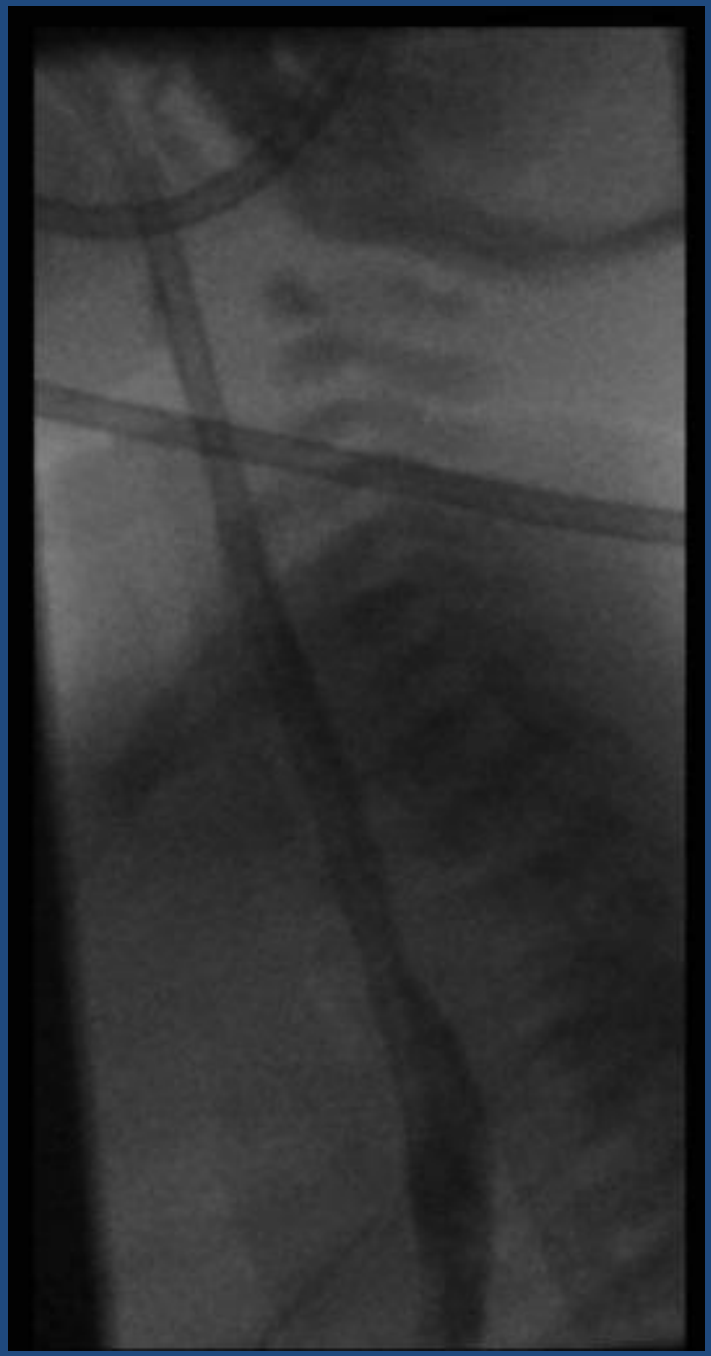


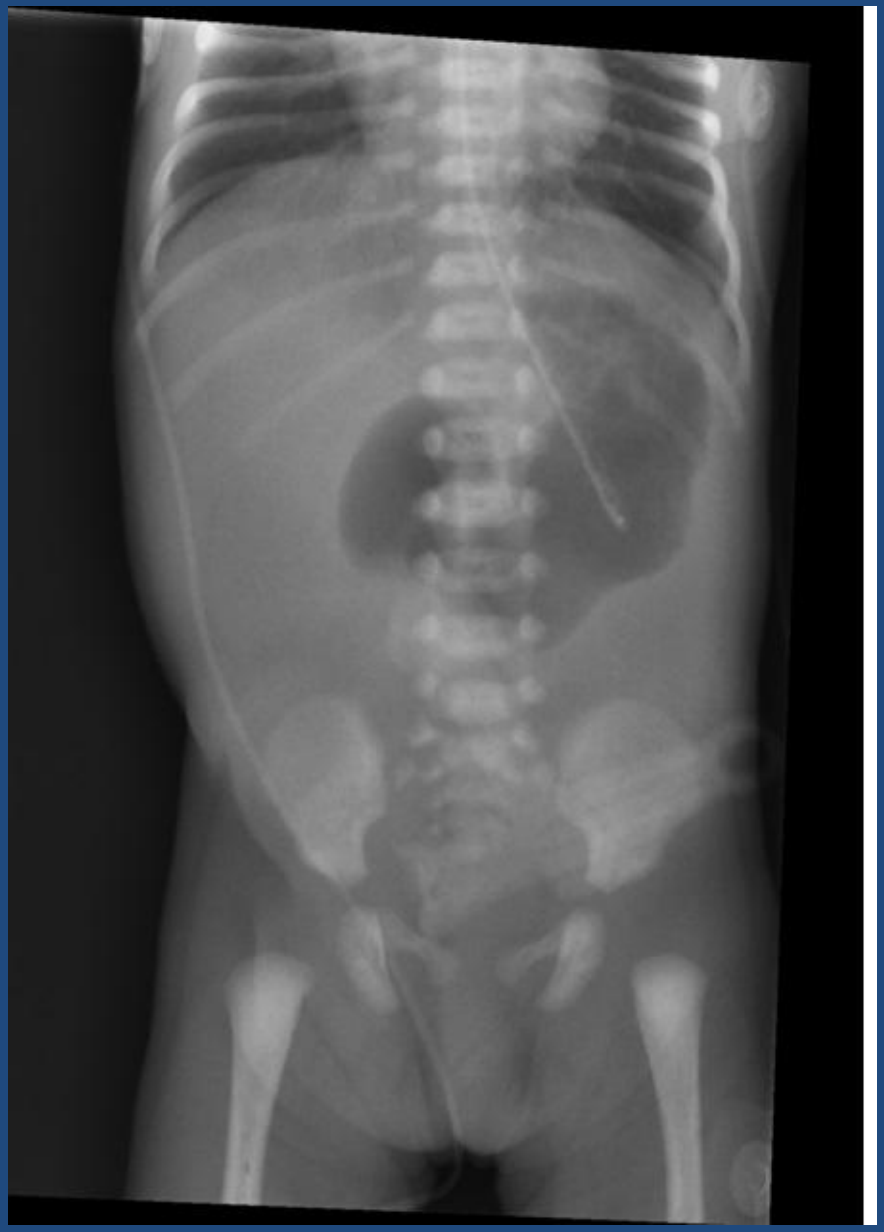
- Type A: 8%, Type B: 1%, Type C: 86%, Type D 1%, Type E: 4%

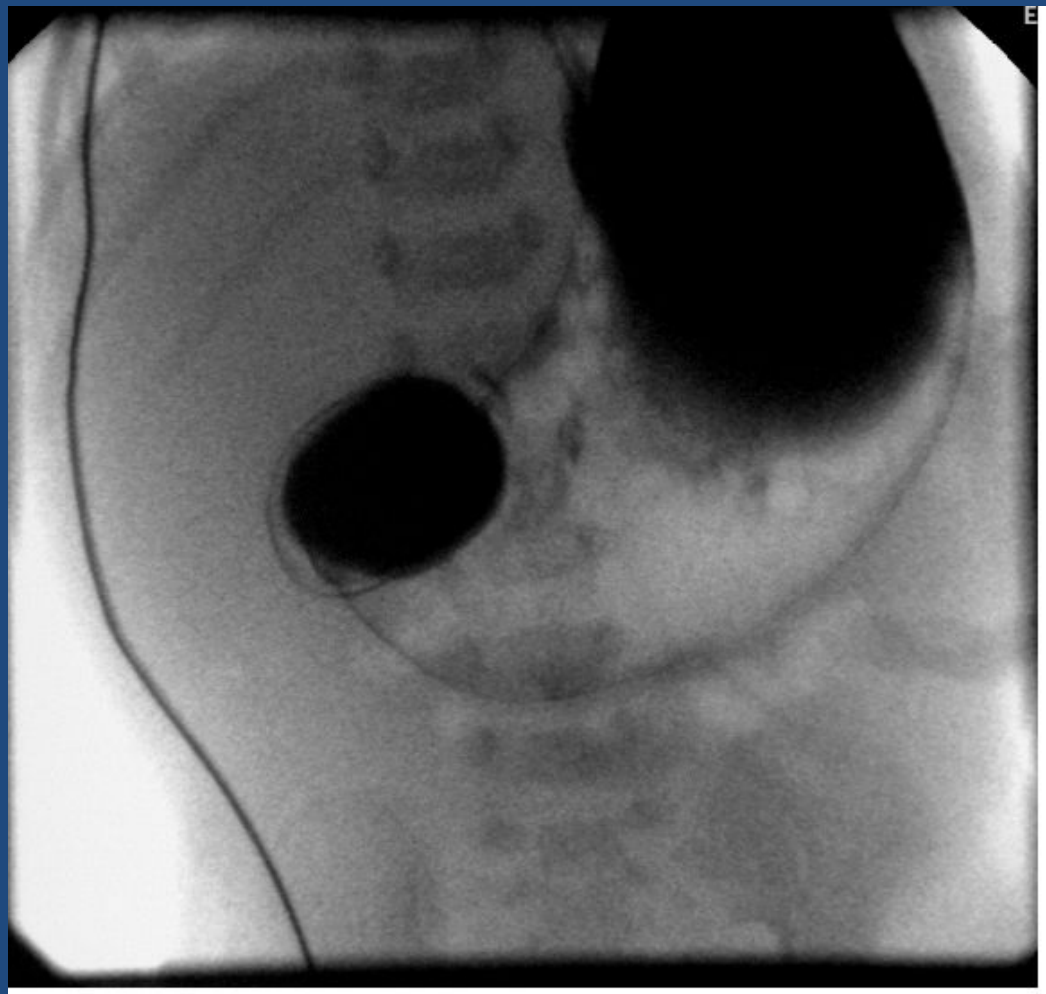
Repair

- Right thoracotomy (usually)
- 4th or 5th intercoastal space
- Extrapleural approach
- +/- division of azygous vein
- Identification of TOF
- Transfixion and division
- Identification of upper pouch
- End to end full thickness anastomosis
- Transanastomotic tube
- +/- post op contrast study



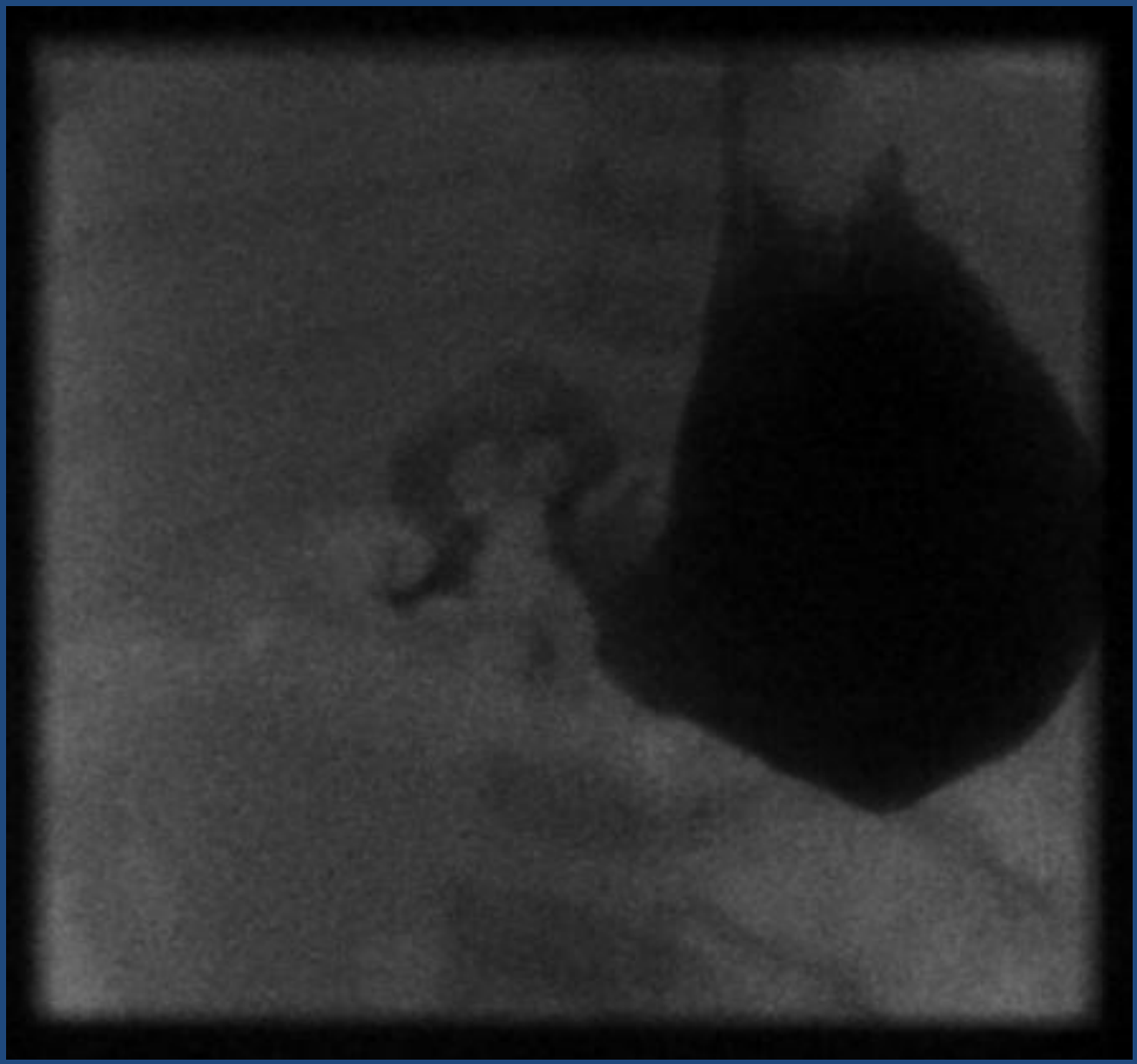




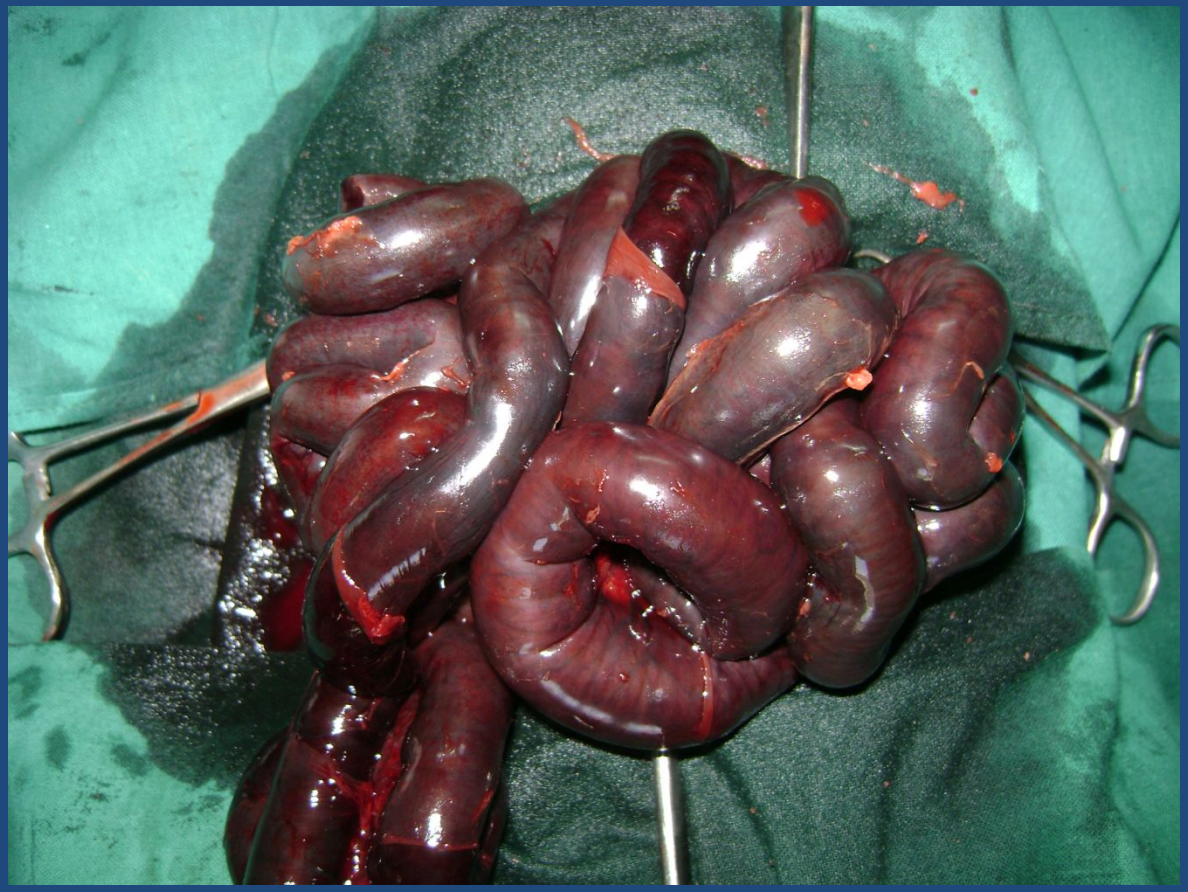


Duodenal Atresia

- 1 in 5000
- Antenatal diagnosis – ‘double bubble’
- Associated with Trisomy 21 - 30%, malrotation
- Milky or bilious vomiting depending on level of obstruction in relation to bile duct
  - 85% obstruction distal to bile duct
- Side to side duodenoduodenostomy

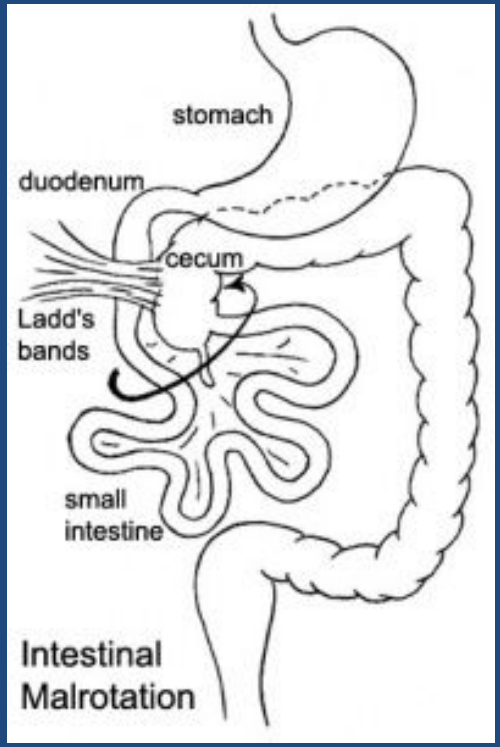


Malrotation +/- volvulus



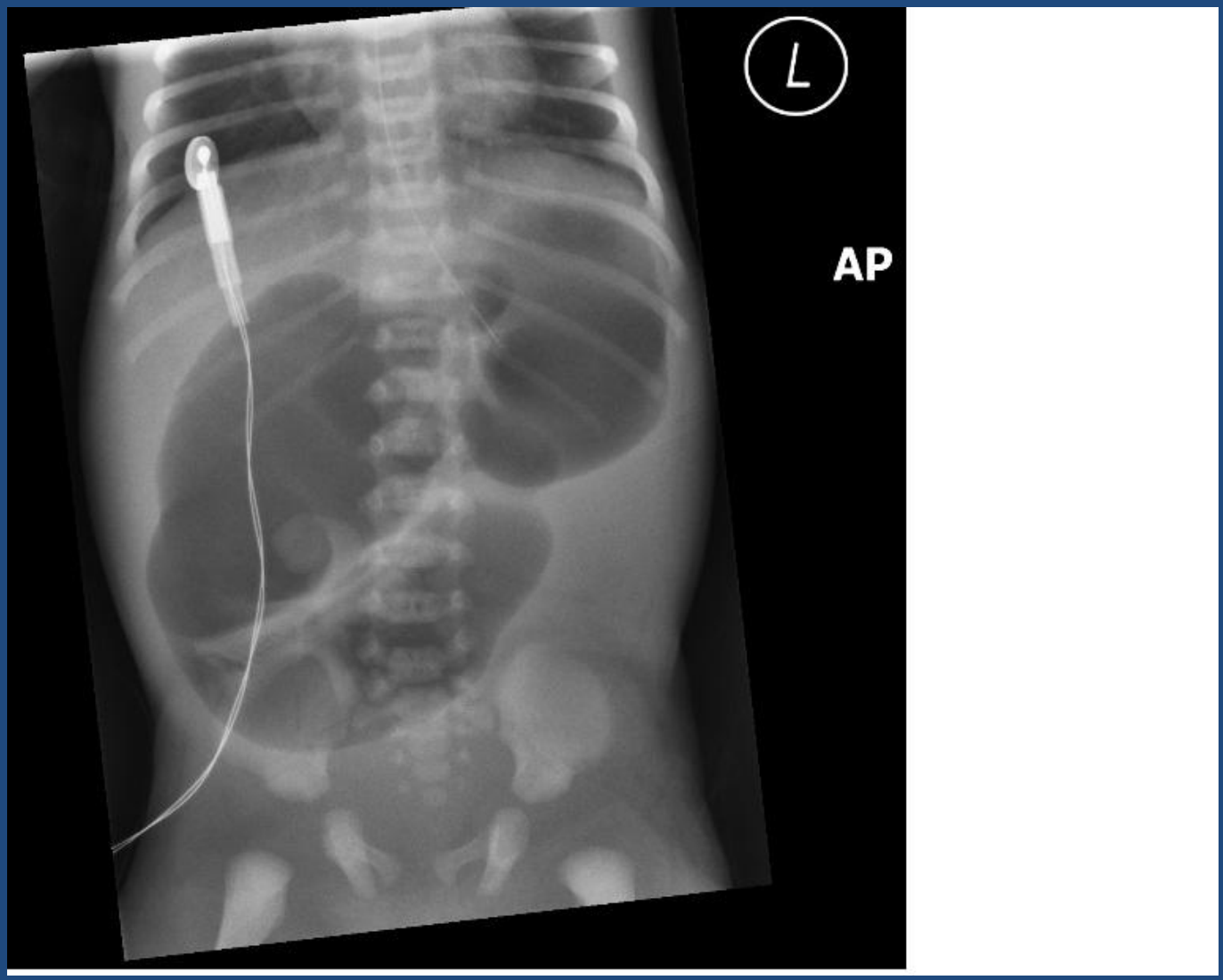
Malrotation

- 1 in 6000 present in babies
  - 0.5% of autopsies show degree of malrotation
- Abnormal duodenal loop
- Narrow mesentery
- Peritoneal band ‘Ladds’ bands from caecum to lateral abdominal wall
- Clockwise torsion of entire midgut



Malrotation + volvulus

- SURGICAL EMERGENCY
- Bilious vomiting in neonate
- Upper GI contrast to diagnose
- Emergency laparotomy to devolve bowel
  - counterclockwise
- Total gut necrosis – life threatening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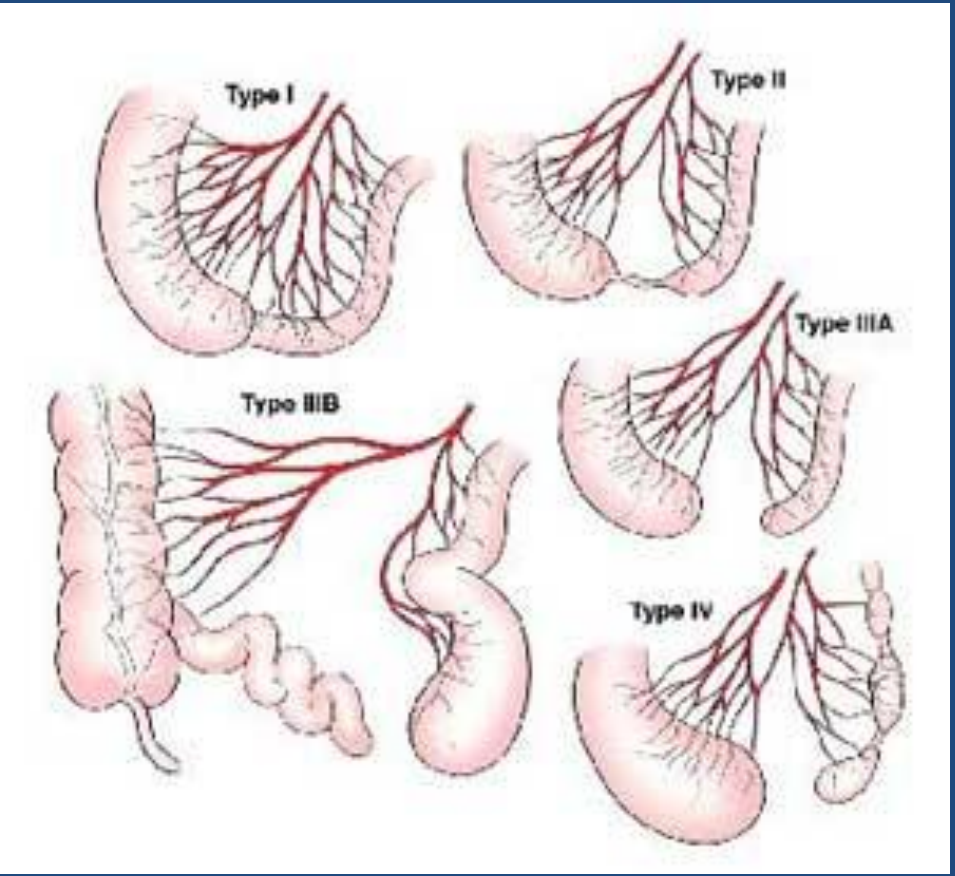
Jejunal/Ileal atresia

- Stenosis – 11%
- Type 1 – 23%
- Type 2 – 10%
- Type 3 – 35%
- Type 4 – 21%



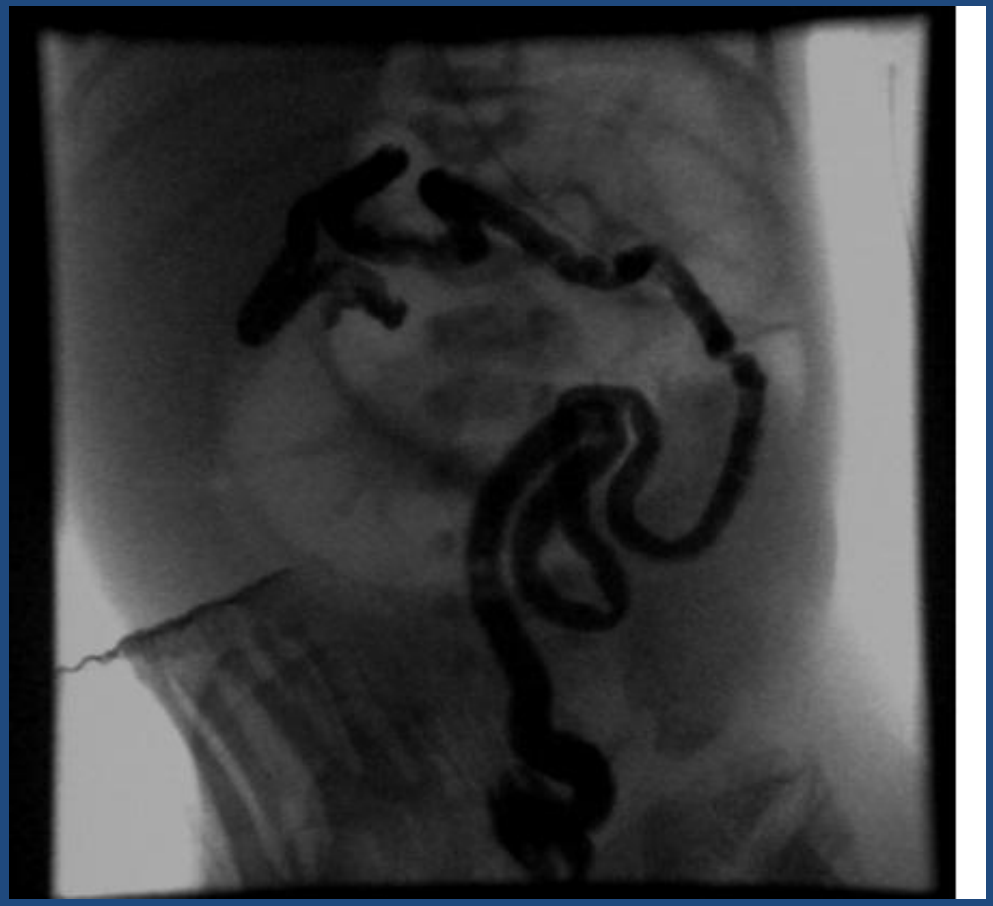
Jejunal/ileal atresia

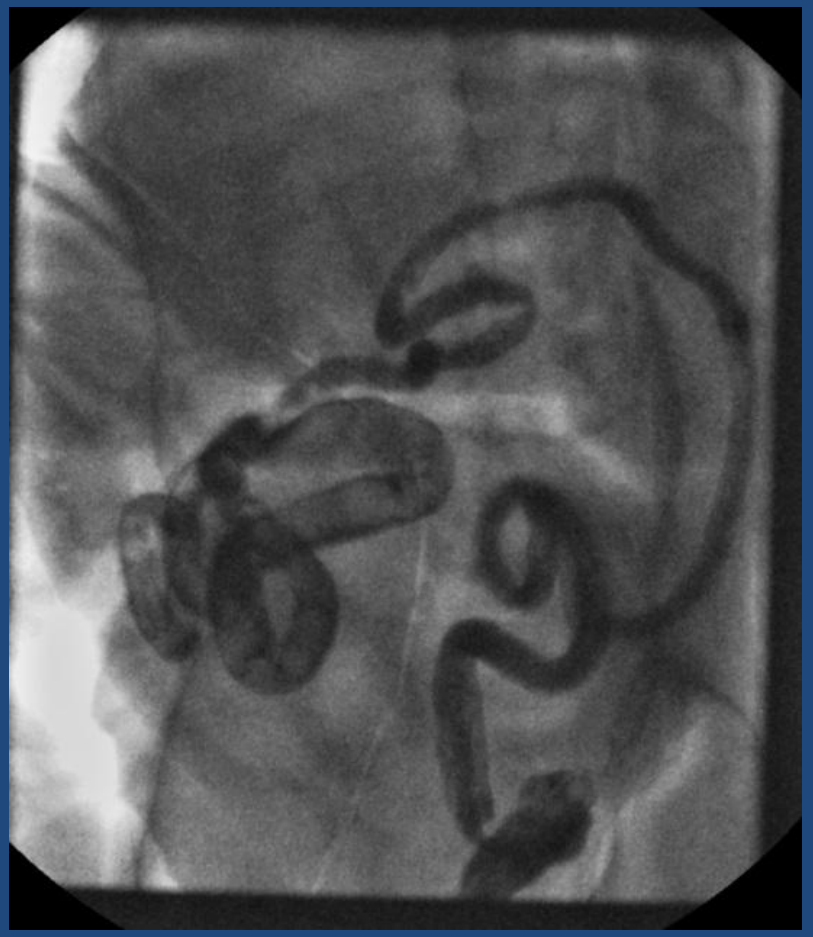
- 1 in 5000 births
- Aetiology – antenatal vascular compromise
- May have short bowel
- Resection and anastomosis
  - May be multiple
  - May require tapering
  - May be end to end or end to side depending on discrepancy

Meconium Ileus

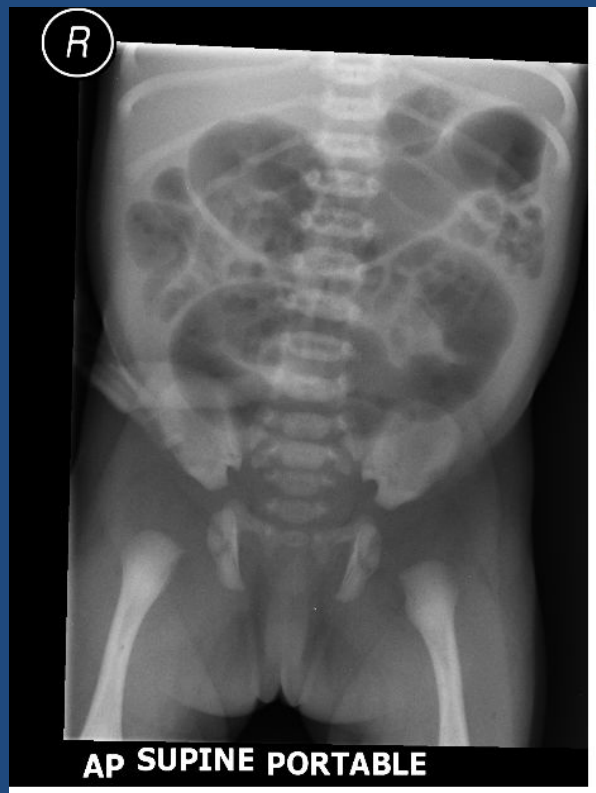
- CF – 1 in 2500 births
- ~16% of babies with CF
- Inspissated sticky meconium
  - Distal small bowel obstruction
  - May be complicated
- Microcolon on contrast enema
  - may be therapeutic
- Contrast enema
- Laparotomy and washout of bowel +/- stoma

Microcolon in Meconium ileus

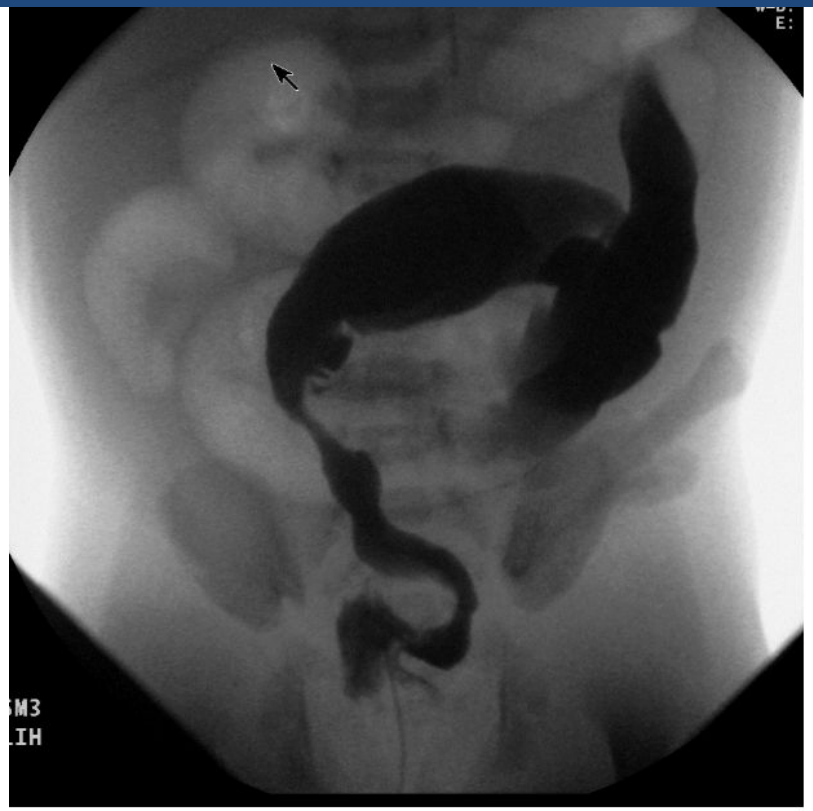




Hirschsprung Disease



Dilated large Bowel loops in baby with bilious vomiting



The rectum and distal sigmoid
colon are narrowed. There is a transition to slightly
dilated colon in the mid-sigmoid colon. There is evidence of mucosal oedema.

Hirschsprung Disease

- 1 in 5000 births
- M:F 4:1
- Associated with Trisomy 21
- Delayed passage of meconium >48hours
- Abdominal distension
- Vomiting – may be bilious
- Diagnosis – rectal biopsy
  - Aganglionosis, thickened nerve trunks, increased acetylcholinesterase

Hirschsprung Disease

- Aganglionosis of bowel
- Variable failure of neural crest cell migration
  - Rectosigmoid – 75%
  - Long (colonic) segment – 15%
  - Total colonic – 5-7%
  - Total interstinal – <5%
- Spastic bowel – failure to relax
- Requires decompression – rectal washouts
- Definitive surgery – pullthrough of ganglionic bowel

Anorectal malformation

Anorectal malformation

- 1 in 4000 births
- Management depends on level of ARM
- Primary anoplasty for low
- Stoma and delayed reconstruction for high
  - Recto-urethral fistula most common in boys
  - Recto-vestibular fistula most common in girls

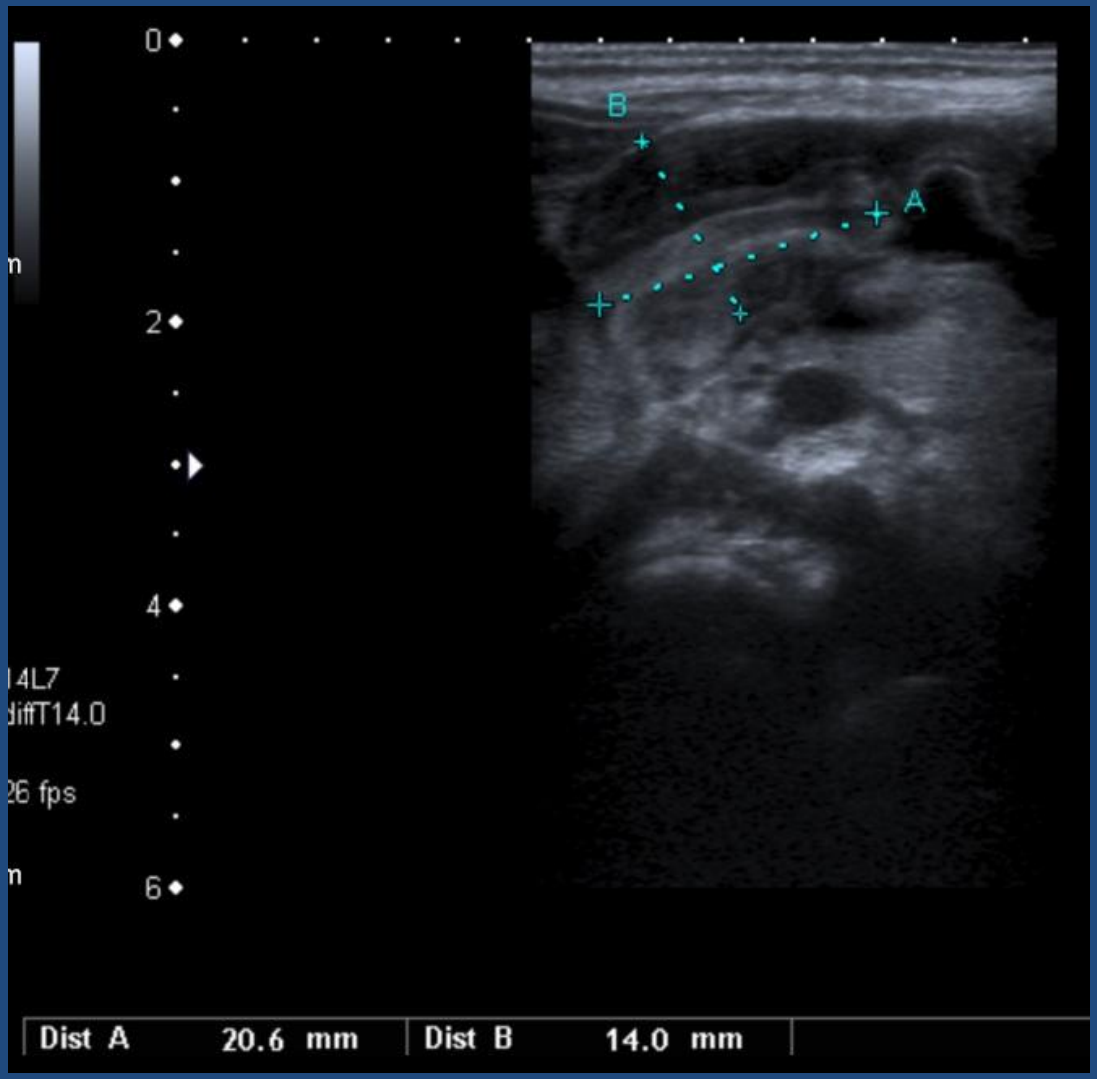
Case 2

- 3 week old term baby
- Relevant points in history
- Relevant examination findings
- Differential diagnosis

Infantile Hypertrophic Pyloric Stenosis

- 1-4:1000, M:F 4:1
- Overgrowth of pyloric muscle
- Gastric outlet obstruction
- Increasing non-bilious vomiting
- Metabolic derangement
  - Hypochloremic
  - Hypokalaemic
  - Metabolic alkalosis
- Medical emergency - rehydration

Pyloric stenosis

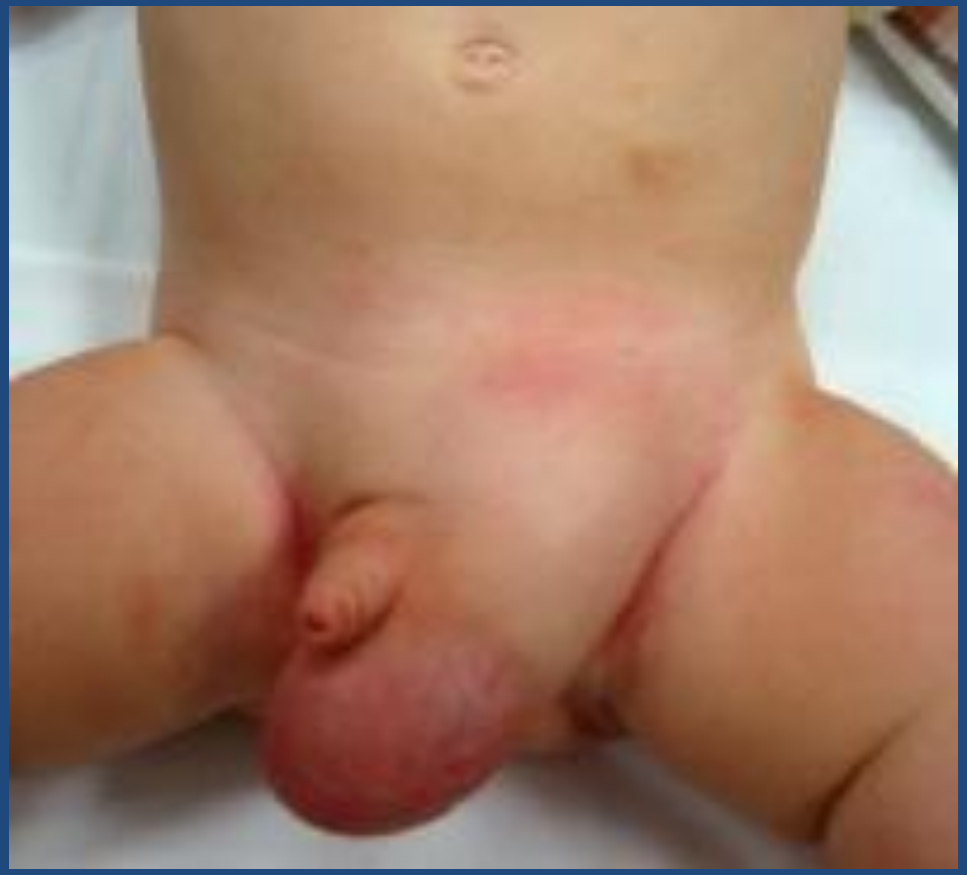


Infantile Hypertrophic Pyloric Stenosis

- Diagnosis – palpable mass on ‘test feed’
- USS
  - Pyloric length >16mm
  - Single muscle thickness >4mm

- Pyloromyotomy
  - Open – supraumbilical or RUQ
  - Laparoscopic

Inguinal hernia

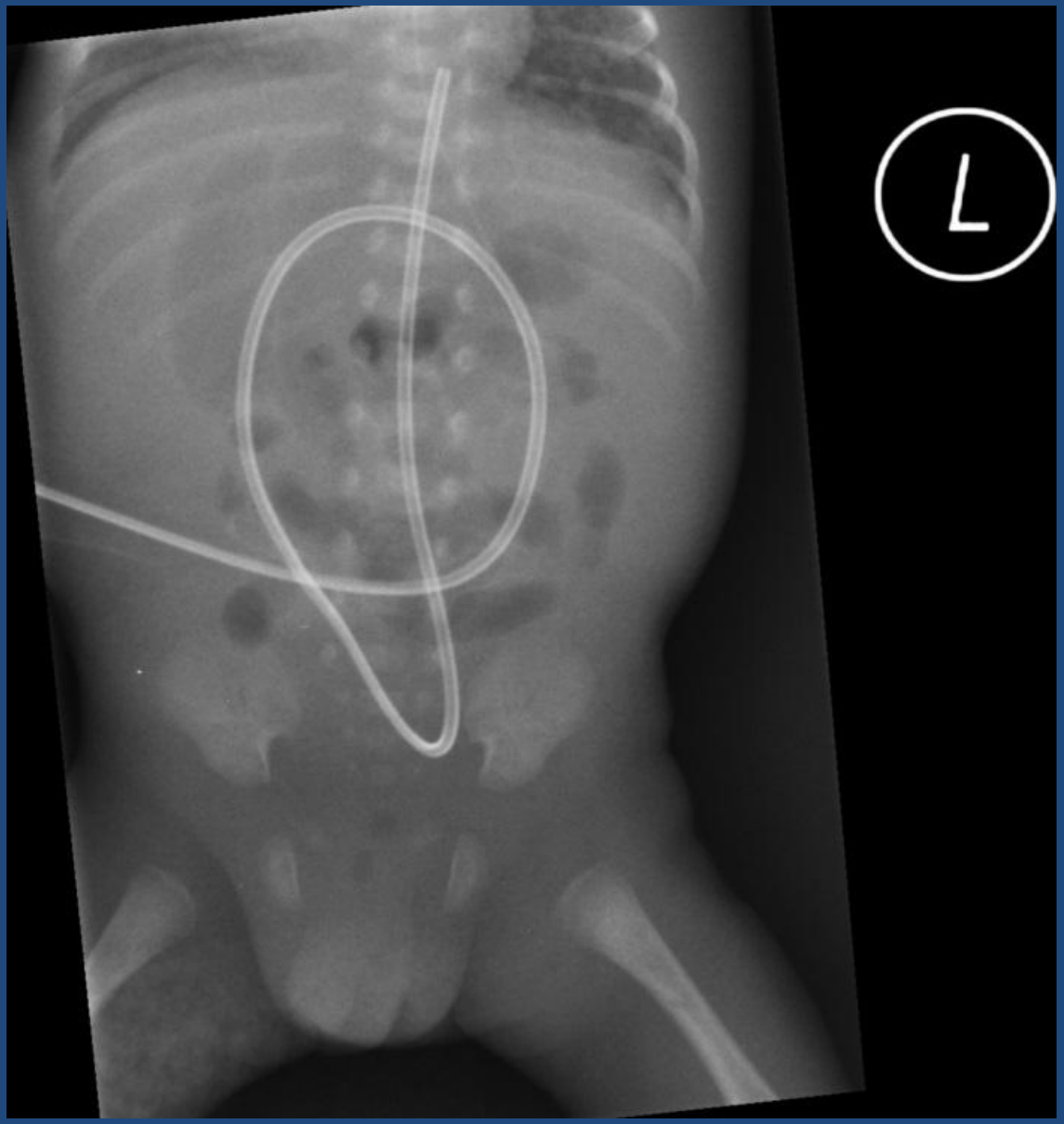


Inguinal hernia

- Usually can reduce
- If truly incacerated – emergency exploration
- Otherwise if premature baby or younger than 4 weeks post birth – repair urgent basis

Case 3

- Preterm neonate – bilious vomiting
- Born 27 weeks gestation
- Weight 1 kg
- 1 week post birth
- Relevant points in history
- Relevant examination findings
- Differential diagnosis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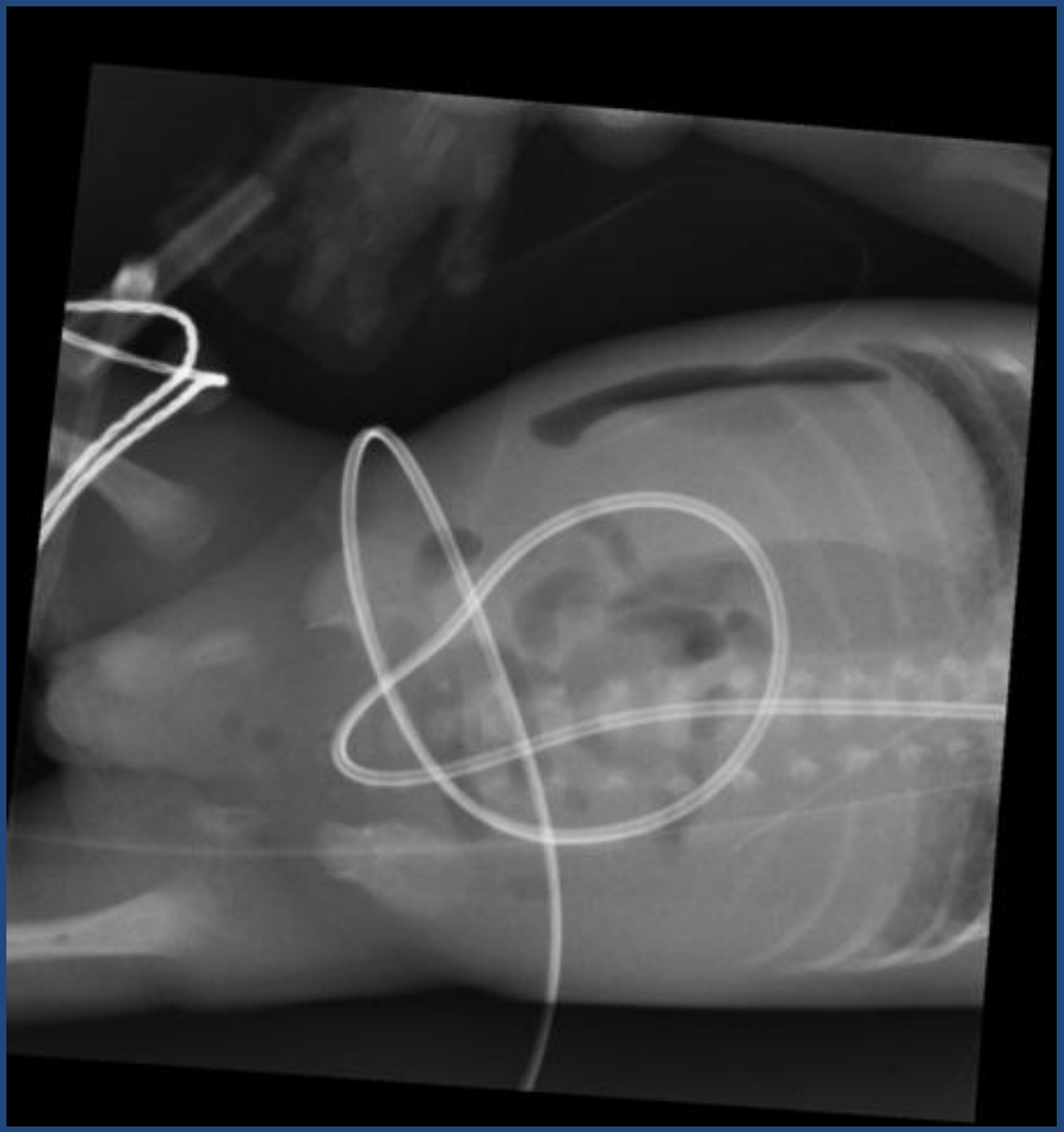

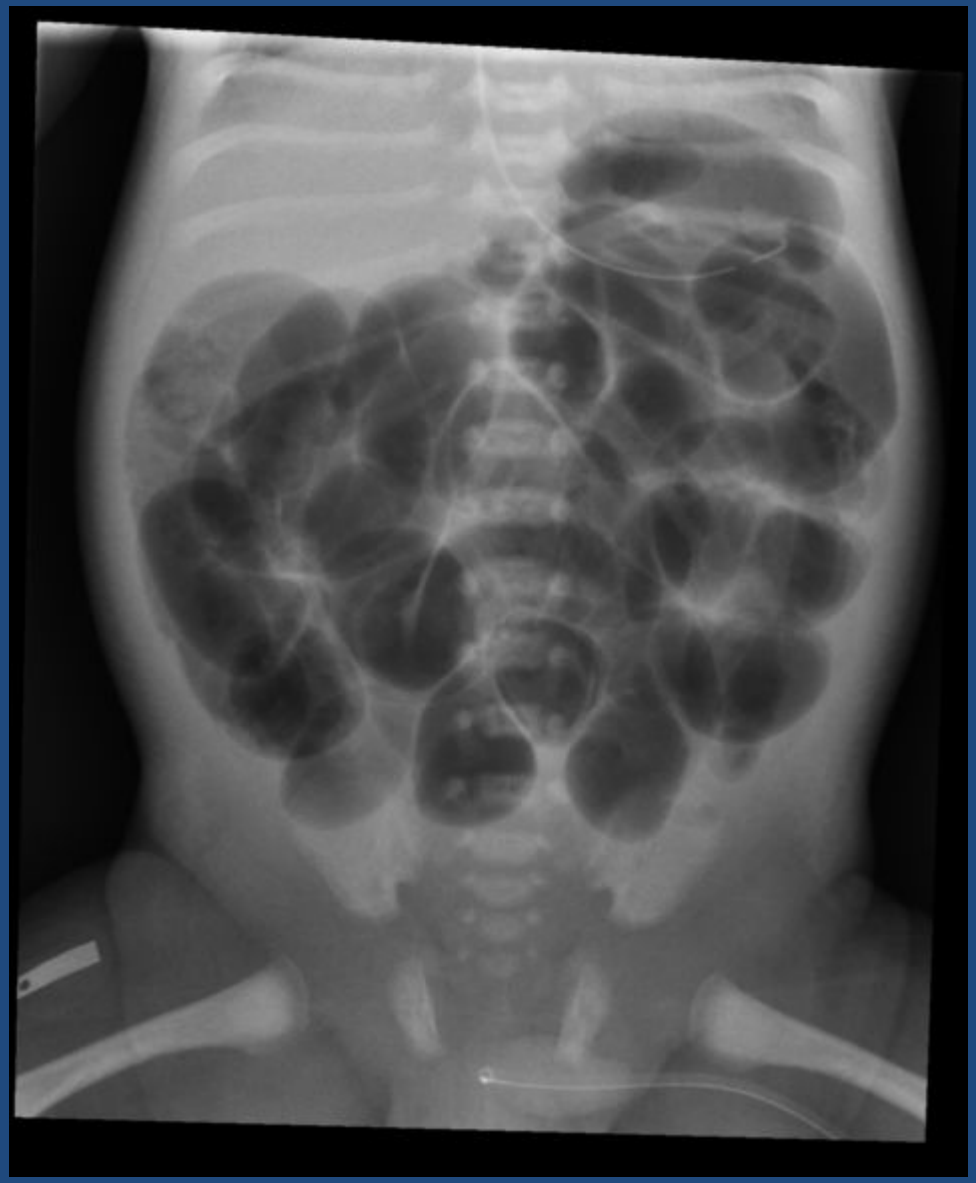

Necrotising Enterocolitis

- 90% in preterm 10% in term babies
- ~5% of all babies admitted to Neonatal Unit
- Multifactorial pathogenesis
  - Inflammation and coagulative necrosis
- 20-40% require surgery
  - Up to 50% mortality reported in those requiring surgery
- Worst outcome extremely low weight preterm babies

Necrotising Enterocolitis

- Surgery indicated for:
  - Worsening clinical condition despite maximal supportive therapy
  - Perforation
- Laparotomy
  - Assess extent of disease - may be total gut necrosis
  - Resection anastomosis – if appropriate
  - Resection and stomas
  - ‘Clip and drop’

Summary

- Many surgical causes of surgical neonatal vomiting
- Congenital obstructive and functional anomalies throughout entire gut
- Green vomiting is malrotation and volvulus until proven otherwise – Emergency