ACUTE GI DISORDERS OF INFANTS AND CHILDREN

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Necrotizing Enterocolitis – Pathogenesis

• Etiology is poorly understood
  – Role of hypoxemia
  – Feeding plays a role – hyperosmolar, early
  – Bacterial overgrowth and invasion

• Risk factors
  – Prematurity
  – Term with CHD
  – Hirschsprung disease
  – UAC

• Spontaneous intestinal perforation (SIP)
  – Very low birthweight infants
  – NSAIDS
NEC – Clinical Features

- Onset 3-6 DOL
- Abdominal distension
- Vomiting
- Metabolic acidosis
- Temperature lability
- Hypotension
- Apnea/bradycardia
Necrotizing Enterocolitis – Pathology

- Ileum and colon most common
- Coagulative and hemorrhagic necrosis
- Dilated, friable bowel
- Submucosal and subserosal gas bubbles
- Complications – perforation, sepsis, stricture
NEC – Radiographic Findings

• Normal intestinal gas pattern of a neonate – uniform polygonal lucencies throughout the abdomen
NEC – Radiographic Findings

• NEC – nonspecific plain film findings
  – Distended loops
  – “Sentinel loop” sign
  – Wall edema
  – Ascites
NEC – Radiographic Findings

- NEC – Specific plain film findings
  - Pneumatosis intestinalis
    - Subserosal – curvilinear
    - Submucosal – bubbly, looks like stool
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  - Portal venous gas
NEC – Radiographic Findings

- NEC – Indication for surgery
  - Free intraperitoneal air

“Football sign”
NEC – Other Imaging

• US
  – Thickened bowel wall
  – Mural gas
  – Portal venous gas - mobile
NEC – Other Imaging

- Contrast enema
  - Contraindicated acutely
  - Late strictures - 20%
Hypertrophic Pyloric Stenosis

- Acquired hypertrophy of antropyloric circular muscle
- Etiology unknown
- Common – 1 in 500 live births in the US
- Males more often affected – 5:1
- First born
- Family history – 5%
HPS – Clinical Features

• Present at 2-9 weeks of age
• Rare after 3 mo
• Uncommon in preemies
• Progressive nonbilious projectile vomiting
• Dehydration
• Failure to thrive
Circular muscle layer undergoes hypertrophy and elongation
HPS – Imaging

- Plain film
  - +/- dilated stomach with little distal gas
  - Gastric hyperperistalsis
HPS – Imaging

- **Ultrasound – diagnostic**
  - Long pyloric channel (>17 mm) with thick muscular wall (> 3 mm)
  - Measure sonolucent part of one wall
  - No passage of fluid through pylorus
HPS – Imaging

• **Ultrasound**
  - Borderline measurements → follow-up in 1 or 2 days
  - Pyloric US is only good for HPS - if US negative, look for other causes of vomiting
    - SMA/SMV inversion
    - Hydronephrosis
  - Pitfalls: overdistended stomach, coapted antrum
HPS – Imaging

• UGI
  – No longer used unless post-op with persistent symptoms
  – Multiple signs – string, double string, beak, tit, shoulder and mushroom

• Ddx: pylorospasm
HPS – Treatment

- Hydration and electrolyte replacement
- Pyloromyotomy – U.S.
- Nonoperative treatment – U.K., Scandinavia, and Japan
Foreign Body Ingestion

- Many are metallic
- Image from nose to anus
- Lateral views and fluoro may help localize
- Follow-up is important
- Complications
  - Magnets – perforation
  - Button batteries – caustic corrosion
  - Large objects – obstruction or volvulus
Inguinal Hernia

- Most common cause of intestinal obstruction in young infants
- Usually a clinical diagnosis
- Incarceration or strangulation can cause bowel obstruction
- Most male - 90%
- May obstruct flow to the testis
- Bowel, fat, fluid, ovaries can herniate
Inguinal Hernia - Imaging

- Plain film – look for air in scrotum or thickened inguinal fold
Inguinal Hernia - Imaging

- Ultrasound
  - Bowel or fat in the inguinal canal or scrotum
  - Color Doppler to evaluate for flow to incarcerated bowel
Intussusception - Clinical

- 90% ileocolic or ileoileocolic
- 90% due to lymphoid hyperplasia – seasonal (winter and spring)
- 6 mo to 3.5 years (peak 5-9 mo)
- Outside that age range consider lead points
- Colicky pain, vomiting, bloody stools, lethargy, palpable mass RLQ
Intussusception - Pathology

- Invagination of one segment of bowel into another
Intussusception - Pathology

- Invagination of one segment of bowel into another
- Edema, congestion, coagulative and hemorrhagic necrosis
- Prominent Peyer patches
Intussusception - Pathology

- 8-10% pathologic lead points
  - Meckel diverticulum if younger
  - Lymphoma if older
  - Polyp
  - Enteric duplication cyst
  - Appendix
  - Henoch-Schonlein purpura
Intussusception - Imaging

- Plain film
  - KUB and left lateral decubitus films
  - No air in cecum or filling defect
  - Air crescent sign
  - SBO possible – especially in infant
Intussusception - Imaging

• US – graded compression
  – Pseudokidney/donut/target sign
  – Ascites – nonspecific
  – Associated findings of viral gastroenteritis-mesenteric adenitis
Intussusception - Ultrasound

• Interloop fluid – the presence of interloop fluid (particularly more than 9 mm) is associated with increased risk of pneumatic reduction failure, lead point, and necrosis

Intussusception Reduction

• Contraindications
  – Free air/peritoneal signs
  – Septic shock
  – Hx >24 hours (relative)

• Preparation
  – Surgical consult – capable surgeon present
  – IV – antibiotics
  – Someone to monitor patient
  – 16-G Angiocath to treat tension pneumoperitoneum
Intussusception Reduction

- Air up to 120 mm Hg\(^1\) (between cries)
- Water soluble contrast
- 3 attempts, 3 minutes each
- Largest tip possible
- Squeeze buttocks when at IC valve
- If losing air, apply forward pressure to tip
- Endpoint is reduction of soft tissue mass AND rush of air into the SB
- 10% recurrence rate

Appendicitis

• Children more often have atypical presentation
• Children have a higher rate of negative laparotomy and of perforation than adults
• Rare in infants
• Similar size as in adults
REFERENCES – Texts

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