Gastrointestinal Bleeding in Children
Clinical Cases

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Some slides courtesy of James Markowitz M.D.
• **Hematochezia** – passage of bright or dark red blood per rectum
  • in general, the redder the blood, the more distal the site of bleeding
• **Melena** – the passage of black, tarry stools
  • indicates likely UGI bleed (proximal to the ligament of Treitz)
• **Hemetemesis** – vomitus containing frank blood or brown-black “coffee grounds”

14th-century illustration of vomiting from the Casanatense *Tacuinum Sanitatis* based on تقويم الصحة from 11th Century Baghdad
Bloody Vomitus does not always mean GI pathology

- Nose Bleed
- Tooth Extraction/abcess
- Throat laceration
- Hemoptysis
- Maternal Blood

Vincenzo Grimaldi, *Tuberculosis*. Sanctuary of the Martyred Saints Alfio, Cirinio, and Filadello, Trecastagni, Sicily 1927
Always ask: “Is it Blood”

- Red Jell-O
- Red Candy
- Beets
- Cranberries
- Tomato Juice, Tomato Soup
- Rifampin
- Moxypen
Is it really Melena?
Case 1

- 6 yr old boy complains that “my poop is red”
  - No previous episodes of red colored stools
  - Healthy child, no underlying conditions
  - No pain, fever, systemic symptoms
  - No recent illness, travel
  - No prescribed or OTC medications
  - No family history GI disease

- **PE:**
  - VS: Pulse 120/min; BP 70/40; + orthostasis
  - Exam otherwise unremarkable
• CBC: Hgb 9 mg/dl Hct 27% Platelets 360k
• BUN 25 Creatinine 1.0
• Impression:
  1. Red blood PR = likely hematochezia
  2. Orthostatic, anemic = significant bleeding
  3. Painless
Differential Diagnosis Case 1

**Hematochezia in a Child**

- Anal fissure
- Juvenile polyp
- Nodular lymphoid hyperplasia
- Infectious colitis
- Hemolytic uremic syndrome
- Inflammatory bowel disease
- Intussusception
- Henoch-Schönlein purpura
- Meckel’s diverticulum
- Intestinal duplication
- Vascular malformations
- Neutropenic colitis
Meckel’s Diverticulum
Meckel’s Diverticulum

- Technetium-99-pertechnetate
- Concentrates in gastric mucosa
- Premedicate with H2 blocker to enhance uptake and minimize risk of stomach or bleeding obscuring the diverticulum
- Can also identify duplications

- ONLY 50% OF PROVEN MECKEL’S HAVE A POSITIVE SCAN
Case 1-2

• 6 yr old boy complains that “my poop is red”
  o No previous episodes of red colored stools
  o Healthy child, no underlying conditions
  o No pain, fever, systemic symptoms
  o No recent illness, travel
  o No prescribed or OTC medications
  o No family history GI disease

• PE:
  o VS: Pulse 120/min; BP 70/40; + orthostasis
  o Exam otherwise unremarkable
• CBC: Hgb 12 mg/dl Hct 36% Platelets 360k

• BUN 5 Creatinine 0.6
Differential Diagnosis Case 1

**Hematochezia in a Child**
- Anal fissure
- Juvenile polyp
- Nodular lymphoid hyperplasia
- Infectious colitis
- Hemolytic uremic syndrome
- Inflammatory bowel disease
- Intussusception
- Henoch-Schönlein purpura
- Meckel’s diverticulum
- Intestinal duplication
- Vascular malformations
- Neutropenic colitis
Juvenile Polyp

- May be single or a few, located throughout the colon; virtually always benign
- Occasionally multiple (juvenile polyposis coli)
  - In JPC, may have potential for adenomatous change

- Diagnosis: Colonoscopy
- Treatment: Endoscopic Polypectomy
VASCULAR MALFORMATIONS
Case 1-3

- 6 yr old boy – Red blood in the stool
  - Previously healthy
  - Cramps, vomiting (nonbloody)
  - Loose, stools mixed with blood and mucus
Differential Diagnosis Case 1

Hematochezia in a Child

- Anal fissure
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Infectious Entero-colitis

- Bacterial infections
  - *Salmonella*, *Shigella*, *Campylobacter*, *E coli*
  - *C. difficile* – may not have clearcut history of antibiotic exposure

- Viral infections - only CMV in the immunocompromised host

- Parasitic - amebiasis
Inflammatory Bowel Disease

• Both Crohn’s and UC can present with bloody diarrhea
• Exclude infectious causes before initiating invasive diagnostic procedures
  o CT/US/MRI evidence of diffuse or segmental bowel inflammation does not preclude an infectious etiology
Intussusception
Case 2 – Painless hematochezia in an Adolescent

• 17 year old girl with streaks of bright red blood PR.
  o Healthy adolescent; not sexually active
  o No weight loss, systemic symptoms
  o Menses regular
  o Solid BM every other day; not hard or large
  o No prescription or OTC meds

• PE: Healthy appearing, VS normal
  o Normal abdominal examination
  o PR?
Hematochezia in the Adolescent

- Anal fissure
- Infectious colitis
- Inflammatory bowel disease
- Meckel’s diverticulum
- Polyps
- Intestinal duplication
- Neutropenic colitis
- Hemorrhoids
- Vascular Malformations
Anal Fissure
• Most common presentation of colitis in adults
• Typically, painless hematochezia is only symptom
  o Tenesmus often mistaken for constipation
• Laboratory evaluation often entirely normal
Anal Lesions

- Hemorrhoids are extremely uncommon in the child and adolescent
- Fleshy rather than vascular lesions should raise the suspicion of Crohn’s disease

External hemorrhoids

Crohn’s anal tags
Polyps

- Polyps are unusual in adolescents
- May indicate a polyposis syndrome, often malignant
  - Familial Adenomatous Polyposis (FAP)
  - Hereditary Nonpolyposis Colon Cancer Syndrome (HNPCC)
Case 3 – Hematochezia in an Infant

- 6 week old girl with streaks of bright red blood PR.
  - Full term, no neonatal problems
  - Breast fed x 2 weeks but changed to intact milk protein formula due to “constipation”
  - At 4 weeks, developed streaks of blood in mucusy stool.
  - Poor intake on all feeds except breast milk (“She didn’t like the taste”), and gained weight poorly
• PE: Irritable but consolable
  o Temp 38°; other vitals normal for age
  o Weight 50% at birth → 25% now
  o Benign abdomen, normal perineal anatomy
Hematochezia in an Infant

- Swallowed maternal blood
- Dietary protein intolerance (Milk/soy)
- Infectious colitis/enteritis
- Necrotizing enterocolitis
- Hirschprung’s Disease
- Coagulopathy
- Vascular Malformations
- Auto-immune conditions (rare)
Milk Protein Allergy

• Presentations
  o Hematochezia – usually in first 3 months of life
    ▪ Diarrhea, irritability, ± poor weight gain
  o Hypoalbuminemia, anasarca
  o “GE reflux”

• Labs
  o Variable eosinophilia in blood and biopsy
  o Skin prick, RAST testing negative

• Treatment
  o Casein hydrolysate or amino acid based formula
Case 3b – Hematochezia in an Infant

- 6 week old girl with streaks of bright red blood PR.
  - Full term, no neonatal problems
  - Breast fed x 2 weeks but changed to intact milk protein formula due to “constipation”
  - At 4 weeks, developed streaks of blood in mucusy stool that persisted when transferred to extensively hydrolized formula.
  - Poor intake on all feeds except breast milk (“She didn’t like the taste”), and gained weight poorly
• PE: Irritable
• Temp 38°; Tachypneic and hypotensive.
• Weight 50% at birth → 25% now
  o Abdomen distended and firm, normal perineal anatomy
  o WBC 25k, Hgb 10, Plt 350k, Albumin 2.8
Hematochezia in an Infant

- Swallowed maternal blood
- Dietary protein intolerance (Milk/soy)
- Infectious colitis/enteritis
- Necrotizing enterocolitis
- Hirschprung’s Disease
  - Coagulopathy
  - Vascular Malformations
- Auto-immune conditions (rare)
Hirschsprung’s Disease

- Failure to pass meconium
- Early constipation
- Poor Weight Gain
- Distended Abdomen

- Surgical treatment
- Importance of early identification
- Enterocolitis may be catastrophic
Intestinal malrotation
Case 4

- 17 year old male with episode of coffee ground emesis
  - Finished 11\textsuperscript{th} grade - 1 week before
    - Denied alcohol or NSAID use
  - 1 month history of postprandial epigastric pain
  - Mother had recurrent ulcers as a young woman

- PE: Mildly dehydrated, minimally tender in epigastrium, no stigmata of chronic liver disease

- Labs: Hgb 10 Hct 30\% Normal LFTs
Case 4 Main Differential

- **Hematemesis/Melena**
  - Esophagitis
  - Gastritis (H. pylori)
  - Gastritis H. pylori negative (infectious, other)
  - Gastric/duodenal ulcer (H. pylori)
  - Mallory Weiss tear
  - Esophageal varices
  - Portal hypertensive gastropathy
  - Pill induced ulcers
    - NSAIDs
  - Alcohol
NSAIDs

Hemorrhagic Gastritis
1. Supportive care
2. Acid suppression (H2 blocker or PPI)

Duodenal Ulcer
Reflux esophagitis

1. Acid suppression (PPI)
2. Weight Loss, low fat diet, gum, low alcohol and caffeine.
3. ? Fundoplication
Helicobacter pylori

Antral nodularity

Duodenal ulcer
• At least 50% of individuals is the world are thought to be infected
  o Frequency: developing > developed world
  o Prevalence increased in areas of the world with lower standard of living, increased population density
  o Infection acquired at all ages

• Therapy
  o Triple therapy: PPI + 2 antibiotics (e.g. amoxacillin, metronidazole, clarithromycin)
Mallory Weiss Tear

Mallory-Weiss tear is a tear in the mucosal layer at the junction of the esophagus and stomach.
Case 5

- 8 y.o. male with 3 large bad smelling tarry stools and one bloody emesis.
- History – born 28 wks premature, 6 weeks in NICU

- Physical Exam
  - Mild Dehydration
  - Liver not palpable, spleen + 4 cm
  - No Jaundice
  - A few Petechiae
• Labs
  o WBC 2.2; Hgb 8 g/dl; Hct 24%; Plts 60K
  o Liver enzymes – normal

• Acute upper GI bleed
Case 5 Differential Diagnosis

- **Hematemesis/Melena in a Child**
  - Esophagitis
  - Gastritis (H. pylori)
  - Gastric/duodenal ulcer (H. pylori)
  - Mallory Weiss tear
  - Esophageal varices
  - Portal hypertensive gastropathy
  - Pill induced esophagitis
Portal Hypertension
Portal Hypertension Causes

- Intrahepatic (e.g. cirrhosis)
- Post-sinusoidal
  - Budd Chiari syndrome (hepatic vein thrombosis)
- Presinusoidal
  - Splenic vein thrombosis
  - Cavernous transformation of the portal vein
Esophageal Varices
Case 6

• One day old full term male with bloody emesis
  o Unremarkable pregnancy
  o Complicated delivery: Apgars 4 and 8
  o Breast feeding, but taking poorly

• PE:
  o Well Developed, 3.5 kg.
  o Anicteric, normal abdominal exam
Case 6 differential diagnosis

- **Hematemesis/Melena in the Infant**
  - Swallowed maternal blood
  - Stress gastritis
  - Intestinal duplication
  - Vascular malformation
  - Vitamin K deficiency
  - Hemophilia
  - Maternal ITP
  - Maternal NSAID use
Case 6 - Evaluation

• Apt test
• Esophagogastroduodenoscopy

• Treatment:
  o Supportive care
  o H2 blocker/PPI

Hemorrhagic “stress” gastritis
GI Bleeding - Treatment
Emergency management of GI Bleeding

• Assess hemodynamic status and stabilize
• Determine Upper vs. Lower
• Establish Differential Diagnosis
Clinical Assessment

- **Appearance of the patient**
  - Worrisome signs: pallor, diaphoresis, restlessness, lethargy, abdominal pain

- **Hemodynamic status of the patient**
  - tachycardia, hypotension, shock?
  - orthostatic changes in heart rate and blood pressure?
    - Drop of 10 mmHg or more in systolic BP and/or an increase of ≥20 beats/min in pulse when moved from supine to sitting

- **Character of the bleeding**

- **Estimate volume of blood lost**

- **Hematocrit**
  - Remember: With an acute bleed, Hct will not drop significantly until intravascular volume is repleted!
Stabilize the Patient (1)

• Insert the largest bore IV catheter possible: the $r^4$ factor
• Omeprazole/Esomeprazole: proton pump inhibitor
  o For Severe Bleed –
    o Adult – 80mg bolus 8mg/hr
    o Children 2mg/kg bolus 0.2mg/kg/hr
  • Non-Severe Bleed
    o 0.5-1mg/kg bid up to 20-40mg (for infants consider Ranitidine 3-6mg/kg/day divided 3/d)

• Octreotide
  o Decreases portal pressure by decreasing splanchnic blood flow
  o Loading dose: 1 μg/kg bolus (maximum of 50 μg)
  o Continuous infusion of 1 μg/kg/hour; can be increased gradually to 4 μg/kg/hour
Upper vs Lower GI Bleed: Role of Nasogastric Lavage

- Diagnostic: Establishes UGI bleed
- Room temperature saline, not iced
  - Iced saline may induce mucosal ischemia and worsen bleeding
- Lavage may reduce clots, allowing better visualization at endoscopy
- Lavage may remove clots, preventing hemostasis
Therapeutic Endoscopic Interventions

- **For varices**
  - Sclerotherapy
    - Sodium morrhuate
    - Sodium tertadecyl sulfate
    - Ethanolamine
  - Band ligation

- **For Mucosal Lesions**
  - Injection therapy
    - Epinephrine
  - Coagulation
    - Heater probe
    - Bipolar probe
    - Laser
  - Mechanical
    - Hemoclip
    - Banding
Additional therapies to be considered when endoscopic techniques fail

• Angiography
  o Embolization
  o Selective vasopressin infusion

• Surgery

ALWAYS INVOLVE THE SURGEON EARLY IN THE COURSE OF MANAGING A SEVERE GI BLEED