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/abscess
- Throat laceration
- Hemoptysis
- Maternal Blood

Vincenzo Grimaldi, *Tuberculosis*, Sanctuary of the Martyred Saints Alfio, Cirinio, and Filadelfo, 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: • Red blood PR = likely hematochezia.
• Orthostatic, anemic = significant bleeding.
• 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-Schonlein 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”
- 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

Differential Diagnosis Case 1

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CBC: Hgb 12 mg/dl Hct 36% Platelets 360k
- BUN 5 Creatinine 0.6
**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**

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Infectious Entero-colitis

- Bacterial infections
  - *Salmonella, Shigella, Campylobacter, E coli*
  - *C. difficile* – may not have a clearcut history of antibiotic exposure
- Viral infections - only CMV in the immunocompromised host
- Parasitic - amoebiasis

Inflammatory Bowel Disease

- Both Crohn’s and UC can present with bloody diarrhea
- Exclude infectious causes before initiating invasive diagnostic procedures
- 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

- Healthy adolescent; not sexually active
- No weight loss, systemic symptoms
- Menses
- Solid BM every other day; not hard
- No prescription or OTC medications

PE: Healthy appearing, VS
- Normal abdominal examination

Hematochezia in the Adolescent

- Anal fissure
- Infectious colitis
- Inflammatory bowel disease
- Meckel’s diverticulum
- Polyps
- Intestinal duplication
- Neutropenic colitis
- Hemorrhoids
- Vascular Malformations

Anal Fissure
Proctitis/Proctosigmoiditis

- Most common presentation of colitis in adults
- Typically, painless hematochezia is only symptom
  - 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

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 o
  Breast fed x 2 weeks but changed to intact milk protein o
  formula due to “constipation”
  At 4 weeks, developed streaks of blood in mucusy stool. o
  Poor intake on all feeds except breast milk (“She didn’t like o
  the taste”), and gained weight poorly

PE: Irritable but •
  consolable
  Temp 38°C; other vitals o
  normal for age
  Weight 50% at birth → o
  25% now
  Benign abdomen, normal o
  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 •
Hematochezia – usually in first 3 months of life ○
Diarrhea, irritability, ± poor weight gain ○
Hypoalbuminemia, anasarca ○
“GE reflux” ○

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

Treatment •
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 ○
Abdomen distended and ○
firm, normal perineal ○
anatomy ○
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
- Importance of early identification
- Enterocolitis may be catastrophic

Intestinal malrotation

Case 4

17 year old male with episode of coffee ground emesis
- Finished 11th 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

- Melena

**NSAIDs**

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

**Reflux esophagitis**

- Antral nodularity
- Duodenal ulcer

- 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 in the world are thought to be infected.

Frequency: developing > developed world

Prevalence increased in areas of the world with lower standard of living, increased population density

Infection acquired at all ages

**Therapy**

Triple therapy: PPI + 2 antibiotics (e.g. amoxicillin, metronidazole, clarithromycin)

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**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**

- WBC 2.2; Hgb 8 g/dl; Hct 24%; Plts 60K
- Liver enzymes – normal
**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 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 •
- Unremarkable pregnancy
- Complicated delivery: Apgars 4 and 8
- Breast feeding, but taking poorly
PE: •
- Well Developed, 3.5 kg.
- 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:
- Supportive care
- 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

Stabilize the Patient (1)

- Insert the largest bore IV catheter possible: the r^4 factor

Remember: With an acute bleed, Hct will not drop significantly until intravascular volume is repleted!
Omeprazole/Esomeprazole: proton pump inhibitor
- For Severe Bleed –
  - Adult – 80mg bolus  8mg/hr –
  - Children 2mg/kg bolus 0.2mg/kg/hr –
- Non-Severe Bleed •
  - 0.5-1mg/kg bid up to 20-40mg (for infants consider Ranitidine 3- 6mg/kg/day divided 3/d)

Octreotide •
  - Decreases portal pressure by decreasing splanchnic blood flow
  - Loading dose: 1 µg/kg bolus (maximum of 50 µg)
  - 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 •
  - Embolization
  - Selective vasopressin infusion
- Surgery •
  - ALWAYS INVOLVE THE SURGEON EARLY IN THE COURSE OF MANAGING A SEVERE GI BLEED