Bloody Stool or Red Herring: What's the Poo Telling You?

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Disclosures

- None

Objectives

- Formulate a differential diagnosis of rectal bleeding based on patient age
- Review the initial evaluation of hematochezia
- Recognize when to admit a patient with hematochezia

Definitions

- Upper GI bleed (UGIB)
  - Proximal to the ligament of Treitz
  - Esophagus, stomach, duodenum
- Lower GI bleed (LGIB)
  - Distal to the ligament of Treitz
  - Jejunum, ileum, colon

Definitions

- Hematochezia
  - Bright red blood per rectum
  - Often suggests a LGIB
- Melena
  - Black, tar-like stools
  - Usually suggests an UGIB

Epidemiology

- Limited studies
- Rising incidence of ED visits
  - Primarily for LGIB
- Most are adolescents (up to 39%)
- Majority are discharged with close PCP follow-up
- Risk factors for admission
  - Young age (<5 yrs)
  - Multiple comorbid conditions
  - Academic institution
  - UGIB

Neonates

- Swallowed maternal blood
- Necrotizing enterocolitis (NEC)
- Hirschsprung-associated enterocolitis
- Coagulopathy
- Anal fissures
- Allergic proctocolitis
- Infectious colitis
- Intussusception
- Meckel diverticulum

- Intestinal duplication
- Malrotation with midgut volvulus

NEC
- Unclear etiology → intestinal necrosis
- Often within 2 weeks of starting enteral feeds
- Majority in preterm infants (>90%)
- Abdominal signs
  - Distention, tenderness, vomiting, hematochezia
- Non-specific systemic signs
  - Apnea, bradycardia, lethargy, poor feeding, temp instability

Hirschsprung Disease
- Motor disorder of the colon
  - Failure of enteric ganglion cells to migrate during early fetal life
  - Aganglionic segment fails to relax → functional obstruction
- 1 in 5,000 live births, males > females
- Trisomy 21 carries 100-fold higher risk of HD
  - ~5% of HD cases
- 90% fail to pass meconium in first 24-48hrs of life
- Rectal biopsy: diagnostic gold standard
- Surgery: definitive treatment

Hirschsprung-Associated Enterocolitis
- Most severe complication of HD
  - Explosive, foul-smelling diarrhea; hematochezia in severe cases
  - Fever, vomiting, distention, abdominal tenderness, lethargy
- Underlying mechanism unclear
  - Stasis + decreased mucin → bacterial overgrowth → bacterial translocation

Hirschsprung-Associated Enterocolitis
- Can occur at any time pre- or post-surgical intervention
- Risk factors: delayed diagnosis, aganglionic segment length, Trisomy 21
- Management
  - Fluids, antibiotics, bowel rest, rectal irrigations
  - Surgery for diversion

Infants
- Anal fissures
- Allergic proctocolitis
- Infectious colitis
- Intussusception
- Malrotation with midgut volvulus
- Ischemic colitis
- Vascular lesions
- Juvenile polyps
- Meckel diverticulum
- Intestinal duplication

Anal Fissure
- Most common cause of rectal bleeding in <2 yrs of age

- Not always seen on exam
    - Often midline and 90% in posterior position
- Streaks of blood on stool surface or on toilet paper/wipes
- Associated with
    - Diarrhea
    - Vigorous wiping
    - Use of suppositories and enemas

Anal Fissure

- Associated with constipation and withholding behaviors
    - Introduction of solids or cow's milk
    - Toilet training
    - School
- Treatment
    - Stool softeners (sorbitol-containing juices, Lactulose, Milk of Magnesia, etc)
    - Miralax in infants >6 months
    - Sitz baths
    - >80% heal with conservative management

Allergic Proctocolitis

- Food protein-induced proctocolitis
- Etiology unclear
    - Immature immune system
    - Impaired intestinal permeability
    - Genetics
    - Gut microbiome
- Non-IgE-mediated inflammatory reaction involving rectum and colon
- Primary food trigger: cow's milk
    - Also soy and egg

Allergic Proctocolitis

- Typically presents in first few months of life
    - Visible or occult blood
    - Loose stools with mucous
    - Otherwise healthy infants
- Cumulative incidence as high as 17% in one study
- Often resolves by 1yr of age
- Management
    - Breast-fed infants: strict maternal elimination of cow's milk
    - Formula-fed infants: extensively hydrolyzed and amino acid-based formulas

Intussusception

- Peak incidence between 4 and 14 months
    - Most idiopathic
- Various anatomic locations: 90% ileocolonic
- 5% have a lead point
    - Lymphoid hyperplasia
    - Meckel diverticulum
    - Polyps
    - Lymphoma
    - Appendicitis

Clinical Presentation

- Symptoms of intestinal obstruction: colicky abdominal pain, bilious vomiting
- Currant jelly stools (late sign)
- Other symptoms: abdominal mass, lethargy, diarrhea
- Ultrasound
    - Often first line test in ED
    - Near 100% diagnostic accuracy
    - "Doughnut" sign

Treatment

- Enema (saline or air)
    - Diagnostic and therapeutic
    - 75-90% success rate
    - Low recurrence rate (air)
    - Risk of perforation 1%
- Open surgical reduction

Children

- Infectious colitis
- Juvenile polyps
- Intussusception
- Meckel diverticulum
- Lymphonodular hyperplasia
- Vascular lesions
- Anal fissures
- Ischemic colitis
- Henoch-Schönlein purpura (HSP)
- Hemolytic uremic syndrome (HUS)
- Pseudomembranous colitis
- Inflammatory bowel disease (IBD)

Infectious Colitis

- Acute presentation
- Self-limited course
- Macroscopically
    - Can resemble Ulcerative Colitis
- Microscopically
    - No architectural (chronic) changes

Common Pathogens

- Clostridium difficile
    - Gram-negative, anaerobic, spore-forming, toxin-producing
    - Normal flora, colonizes infants
    - Altered commensal flora: bystander → pathogen
    - LGIB less common
    - Stool toxin assays or PCR can be diagnostic
    - Gross appearance: Pseudomembranous colitis
    - Treatment: Metronidazole, Vancomycin, Rifaximin, probiotics, fecal microbiome transplant

Other Common Pathogens

- Enterohemorrhagic E. coli (EHEC)
    - Produces Shiga-like toxin → leading cause of HUS

E. coli O157:H7
No antibiotics or antimotility agents

- Shigella
  - Highly contagious (only take 10 organisms)
  - Antibiotics (Ciprofloxacin) can decrease symptoms; recommended in severe disease or in immunosuppressed patients
- Salmonella
  - Leading cause of food-borne disease outbreak in US
  - Only treat high-risk patients

Other Common Pathogens

- Campylobacter
  - 1% incidence in US
  - No antibiotics in self-limited disease
- Yersinia
  - Ileocecal inflammation can mimic Crohn's Disease or appendicitis
  - Antibiotics in severe cases only; most resolve without complications
- CMV
  - Immunocompromised host
  - Can complicate IBD and trigger a flare
  - Treat with Ganciclovir or IVIG (severe cases)

Polyps

- Derived from *polypous* (Greek), meaning "morbid lump"
- Most are benign in children
- Solitary vs familial polyposis syndrome
- Two primary types
  - Hamartomatous
  - Adenomatous

Hamartomatous Polyps

- Most common type in children
- Presentation: hematochezia, anemia, obstipation, small bowel obstruction, often painless
- Solitary juvenile polyp
- Juvenile polyposis syndrome (JPS)
- Peutz-Jeghers syndrome (PJS)
- PTEN-Hamartoma syndrome

Adenomatous Polyps

- Familial adenomatous polyposis (FAP)
- Turcot syndrome
- Gardner syndrome
- Lynch syndrome
- MYH-associated polyposis

Solitary Juvenile Polyp

- Painless rectal bleeding
  - Perianal polyp protrusion (mimics prolapse)
- <5 in number
- Mean age 4yrs
- Location
  - 60-80% rectosigmoid

90% below splenic flexure
- Pedunculated, 1-3cm, smooth red surface
- No risk of CRC

Juvenile Polyposis Syndrome (JPS)
- Multiple hamartomatous polyps → increased risk of GI cancer
- Presentation
  - >5 juvenile colonic polyps
  - Extracolonic juvenile polyps
  - Any juvenile polyp + family history
- Germline mutations: SMAD4, BMPR1A, ENG1
- 3 subtypes
  - Infant (most severe)
  - Colonic only
  - Generalized

Meckel Diverticulum
- Most common GI congenital anomaly
- Rule of "2's"
  - 2% of population
  - 2in in length
  - 2ft from ileocecal valve (antimesenteric border)
  - 2x more common in males
- True diverticulum → mucosa, muscularis, serosa
- Up to 50% contain ectopic gastric mucosa
  - Complications: ulceration, bleeding, perforation

Clinical Features
- Often asymptomatic
- Painless hematochezia
  - Most common presentation
  - Bleeding can be life threatening
- Intestinal obstruction
- Diverticulitis in older patients
- Neoplasia (mostly carcinoid) in 0.5-4%
- Chronic ulceration with abdominal pain is rare

Diagnosis and Management
- 99mTc-pertechnetate scintigraphy (aka "Meckel Scan")
  - Detects ectopic gastric mucosa
  - 85-90% sensitive (children); 95% specific
- Need to maintain a high index of suspicion
- Surgical resection
  - Incidental Meckel → evidence supports removal
  - Risk of surgery 1% vs lifetime risk of complication 4-6%

Adolescents
- Inflammatory Bowel Disease (IBD)
- Infectious colitis
- Pseudomembranous colitis
- Polyps
- Meckel diverticulum

- Vascular lesions
- Anal fissures
- Hemorrhoids
- Ischemic colitis
- Henoch-Schönlein purpura (HSP)
- Hemolytic uremic syndrome (HUS)

Inflammatory Bowel Disease
- Two sub-types: Crohn Disease (CD), Ulcerative Colitis (UC)
- Prevalence 2–4.5/100,000
- Peak age of onset in adolescence (1–17 years)
- Pathogenesis is a perfect storm
    - Immune dysregulation
    - Genetic factors
        - 6-9% risk with a single parent with IBD
        - 33% risk with both parents with IBD
    - Environment
        - Intestinal permeability
        - Microbiome
        - Geography

CD Presentation
- Abdominal pain (67-75%)
- Weight loss (55-65%)
- Diarrhea (30-65%)
- Hematochezia (20-43%)
- Growth failure (30%)
- Perirectal disease (25%)
- Extraintestinal manifestations (25-35%)
    - MSK, dermatologic, hepatobiliary
    - Ophthalmologic, hematologic, renal

UC Presentation
- Diarrhea (74-98%)
    - Nocturnal diarrhea (~45%)
- Hematochezia (83-96%)
- Abdominal pain (43-88%)
- Weight loss (31-42%)
- Extraintestinal manifestations (25%)

Diagnosis
- Endoscopy + Histology
- Labs
    - Blood
    - Stool
- Imaging
    - MRE, CTE
    - US
    - VCE

Management

- Infliximab (Remicade)
- Adalimumab (Humira)
- Ustekinumab (Stelara)
- Vedolizumab (Entyvio)
- Tofacitinib (Xeljanz)
- Upadacitinib (Rinvoq)
- Risankizumab (Skyrizi)

Diagnostic Approach to LGIB
- Is the patient hemodynamically stable?
- Is it blood?
- UGIB or LGIB?
- What are the likely causes based on age?

Initial Assessment - History
- Bleeding pattern
- Look out for Red Herrings
- Food and medications → appearance of blood
    - Red licorice
    - Red dyes
    - Beets
    - Iron
    - Pepto Bismol
    - Cefdinir

Initial Assessment - History
- Associated symptoms
    - Abdominal pain, anorexia, weight loss, fevers
    - Epistaxis, easy bruising, menorrhagia
- Ingestions
    - Foreign bodies (e.g., sharps, magnets)
    - Medications (e.g., NSAIDs)

Initial Assessment - Exam
- Vital signs
    - Tachycardia: 10% blood loss
    - Positive orthostatics: 20% blood loss
    - Prolonged capillary refill: 25% blood loss
    - Mental status changes: 30% blood loss
- "Red Flags"
    - Syncope, pallor, diaphoresis, tachycardia, hypovolemia
- Signs of liver disease
- Skin findings
    - Rash, hemangiomas, telangiectasias, perianal disease

Occult Blood Testing
- Heme catalyzes oxidation of guaiac by hydrogen peroxide
    - Creating a blue quinine compound
- Hemoccult
- Gastroccult

Hemoccult

- False Positives
    - Red meat (beef, lamb, liver)
    - Medications (NSAIDs, corticosteroids)
    - Plant peroxidases (broccoli, cauliflower, radishes, turnips)
    - Iron supplements *do not* cause false positives
- Fales Negatives
    - Excess Vitamin C
    - Ascorbic acid >250 mg/day
    - Citrus fruits and juices

Other Diagnostic Tests

- Laboratory studies
    - CBC: Hgb/Hct, MCV, Platelets
    - PT/INR
    - Hepatic function panel
    - BMP: ↑ BUN may indicate an UGIB
- Stool studies
    - Culture
    - C. difficile toxin
- Apt test
    - Mix stool with water (1:5)
    - Centrifuge mixture
    - Add 1mL of 1% NaOH
    - Wait 5 min
    - Pink (fetal) vs Brown (maternal)

Imaging

- Depends on suspected etiology
- Abdominal radiograph (2-view)
- Ultrasound
- Enema (air or water-soluble)
- CT angiography
- Tagged RBC Scan
- Meckel Scan

Endoscopic Procedures

- Diagnostic Endoscopy
- Diagnostic Colonoscopy
- Balloon Enteroscopy
- Video Capsule Endoscopy

Therapeutic Endoscopy

- Injection
- Thermocoagulation
- Hemostatic clips
- Argon plasma coagulation (APC)
- Hemospray

Injection

- 1:10,000 Epinephrine
- Sclerosing agents

- Initial therapy to slow bleeding
- Used with other modalities

Thermocoagulation
- Current generates heat → tissue coagulation
- Different types of probes
- Effective as monotherapy
- Risk of perforation

Hemostatic Clips
- Various shapes and sizes
- Effective as monotherapy
- Minimal risk of perforation
- Useful for patients with coagulopathy
- Technically difficult to use

APC
- Monopolar current conducted through ionized argon gas
- Superficial coagulation
- Effective on large surface areas
- Risk of pneumatosis from argon gas

Hemospray
- New (cool) kid on the block

Summary
- Differential diagnosis of rectal bleeding
  - Broad and based on age
- Initial evaluation of hematochezia
  - Stool studies, labs, imaging
- When to admit
  - Thorough history and physical