

# GI Bleeding: Lower



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# Differential Diagnosis



## High-Yield ED Impressions for Child with GI Bleeding by Age

	Well	Unwell
<b>Neonate</b>	Allergic Proctocolitis Anal Fissure Swallowed Maternal Blood	Malrotation with Volvulus Necrotizing Enterocolitis Coagulopathy
<b>Infant and Young Child</b>	Allergic Proctocolitis Gastritis Infectious Colitis	Meckel's Diverticulum Intussusception Vascular Malformation
<b>Older Child and Adolescent</b>	Gastritis Esophageal Bleeding Juvenile Polyps	Inflammatory Bowel Disease Cryptic Liver Disease Intestinal Ulceration

# Neonatal: Differential Diagnosis



- Swallowed maternal blood
- Anal fissures
- Hirschprung disease with enterocolitis
- Gastrointestinal duplication cyst
- Necrotizing enterocolitis
- Volvulus
- Coagulopathy

# Neonatal: Swallowed Maternal Blood



- **Swallowed maternal blood**
  - Swallowed in delivery room (0-1 days)
  - Swallowed from bleeding / cracked nipples during breastfeeding (week 1-2)
- **Apt test to differentiate neonatal from maternal blood**
  - Stool + 3 mL water in tube, add NaOH
    - ✦ Adult hemoglobin turns yellow-brown
    - ✦ Fetal hemoglobin stays pink

# Neonatal: Anal Fissures



- Most common cause of rectal bleeding in patients younger than 1 year old and in older children
- Painful defecation with straining, grunting, and leg stiffening
- Can be associated with constipation or diarrhea
  - Treat with stool softeners (older children) and lubricants when associated with constipation
  - Keep area clean and dry when associated with diarrhea



# Neonatal: NEC



- Necrotizing Enterocolitis
- Commonly pre-term infants, but 10% of cases in term infants with median onset 7-12 days of life
- Abdominal distension, feeding intolerance, bilious vomiting, diarrhea, rectal bleeding
- May develop signs of sepsis: fever, hypothermia, lethargy, apnea, shock
- Pneumatosis intestinalis on xray



<https://radiopaedia.org/articles/necrotising-enterocolitis-1?lang=us>

# Neonatal: Other Serious Causes



- **Malrotation and volvulus**
  - Bilious vomiting, abdominal distension, abdominal tenderness, hematochezia, progressing to shock
  - 30% present by 1 month of age
  - Surgical emergency
- **Coagulopathy**
  - Lack of Vitamin K prophylaxis at birth (eg home birth)
  - Congenital bleeding disorder
  - Septic shock

# Neonatal: Hirschsprung Disease

- Failure to have bowel movement in first 2 days of life
- Can present with constipation and diarrhea associated with abdominal distension
- 25% have bloody stools
- Can have squirt or blast sign where there is explosive release of gas and stool after digital rectal exam



Contrast enema shows marked dilation of unaffected colon proximal to aganglionic segment

# Infants and Toddlers: Differential Diagnosis



- Anal fissures
- Milk or soy-protein-induced colitis
- Intussusception
- Infectious colitis
- Meckel's diverticulum
- Lymphonodular hyperplasia
- Gastrointestinal duplication cyst (also in neonates)
- Eosinophilic gastrointestinal disease
- Infantile and very early onset inflammatory bowel disease

# Infants and Toddlers: Milk Protein Sensitivity



- **AKA Dietary Protein-induced colitis**
  - Onset usually 0-6mo, often resolves by 6-18mo
  - Inflammatory reaction caused by ingestion of cow's milk or soy proteins
  - Occurs in formula-fed or rarely breastfed infants due to cow's milk in mother's diet
  - Common cause of bloody stools in infants
  - Unlike true milk protein allergy, not IgE mediated (symptoms limited to GI tract)



Sigmoidoscopy shows friable mucosa and increased eosinophils on biopsy

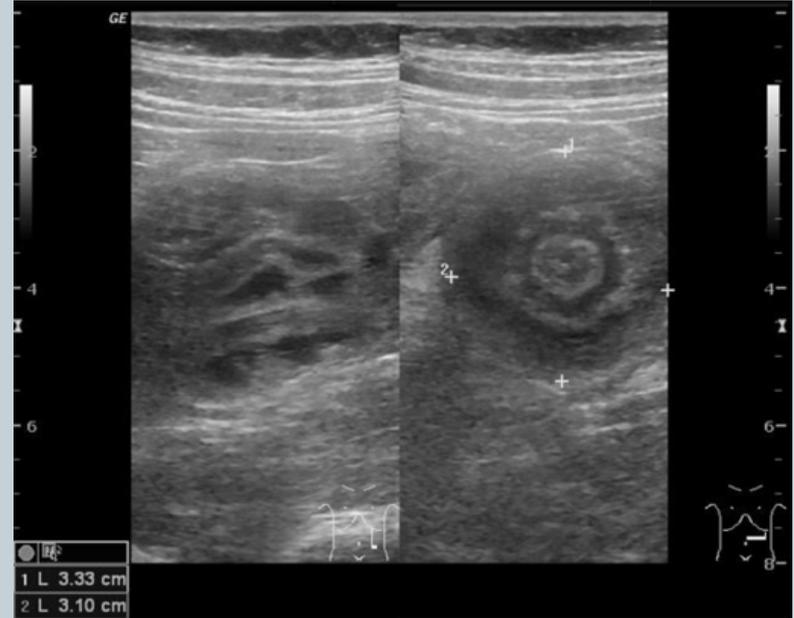
# Infants and Toddlers: Intussusception



- Most common intestinal obstruction between 6 and 36 mos of age
- Most often in ileocecal region
  - 10% ileoileal more commonly with lead point eg HSP, lymphoma, Meckel's, polyp, cyst, AVM
- Acute onset colicky bouts of severe abdominal pain, causing patients to draw up legs
  - Interval periods of normalcy
- Vomiting
- May pass bloody stool with the appearance of “currant jelly” (late finding)

# Infants and Toddlers: Intussusception

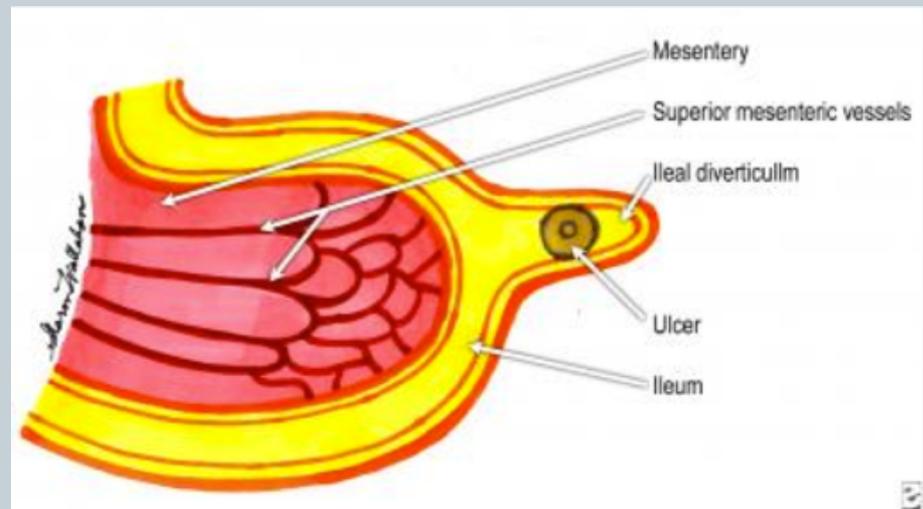
- Sausage-shaped mass palpable on abdominal exam
- Ultrasound diagnostic method of choice: target sign
- Air or water-soluble contrast enema can reduce it in 75-90% of children without presence of lead point



# Infants and Toddlers: Meckel's Diverticulum

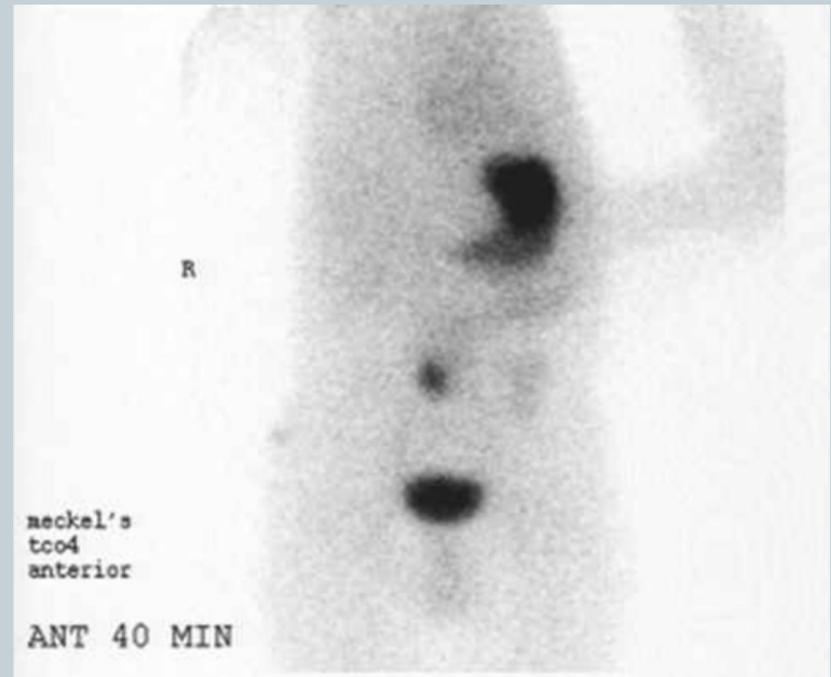


- Incomplete obliteration of omphalomesenteric duct
- PAINLESS rectal bleeding, often BRBPR
- Bleeding caused by mucosal ulceration of small bowel tissue due to acid production by ectopic gastric tissue in diverticulum
- May be chronic or acute
- Symptomatic -> admit
  - PRBC 10cc/kg if needed
- Surgical referral



# Infants and Toddlers: Meckel's Diverticulum

- Rules of 2's
  - ✦ Occurs in 2% of the population with male-to-female ratio of 2:1
  - ✦ Found within 2 feet of the ileocecal valve
  - ✦ Involves 2 types of tissue (gastric and intestinal epithelium)
  - ✦ 2 inches long
- Diagnosis made by Meckel scan
  - ✦ Involves IV administration of  $^{99m}\text{Tc}$  that has affinity for gastric mucosa



# Infants and Toddlers: Other Causes



- **Painless rectal bleeding differential diagnosis**
  - Colonic polyp, hemangioma, AVM, brisk upper GI bleed
- **Lymphonodular hyperplasia**
  - Common in infants and young children who undergo endoscopy or radiographic studies of intestinal tract
  - Occurs frequently in children with food protein induced colitis
  - May lead to mucosal thinning and predisposes to ulceration, causing painless hematochezia
- **Gastrointestinal duplication cyst**
  - Gastric mucosa in cyst can cause ulceration, perforation and fistulas

# Infants and Toddlers: Early Onset IBD



## Early onset Inflammatory Bowel Disease

- Presents before 6 years of age
- Phenotypically and genetically distinct from IBD in older patients
- More severe presentation with rapid progression and poor responsiveness to therapies
- Genetic susceptibility and dysregulated immune response
- Can diagnose with endoscopy, colonoscopy, and whole exome sequencing

# Preschool period: Differential Diagnosis



- Anal fissures
- Intussusception
- Meckel's diverticulum
- Infectious colitis
- IgA vasculitis
- Juvenile polyps
- Very early onset inflammatory bowel disease

# Preschool period: Infectious Colitis



- Consider diagnosis when children present with fever, abdominal pain, tenesmus, and small volume bloody stools
- *Salmonella*, *Shigella*, *Campylobacter*, *E. coli*, *Yersinia*, and *Clostridioides difficile* are most common
- Common in younger children
- Hemolytic uremic syndrome potential serious complication of *E. coli* O157:H7
  - Triad: hemolytic anemia, thrombocytopenia, AKI
- No empiric antibiotics in well-appearing non-immunosuppressed non-neonate until organism identified
  - Increased risk of carrier state / prolongs disease in *Salmonella*
  - Increased risk of HUS in *E. Coli* O157:H7

# Preschool period: HSP



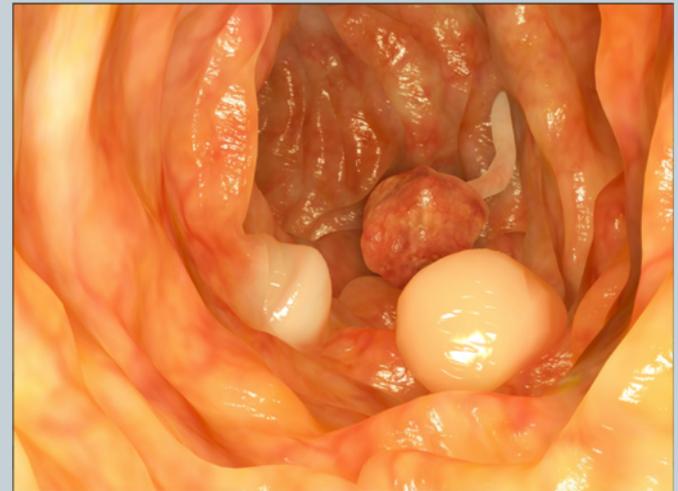
- IgA vasculitis (Henoch-Schonlein purpura)
- Palpable cutaneous purpura, abdominal pain, and arthralgias
- Occurs between 3-15 years of age
- Can cause intussusception due to purpuric lesions in GI tract



# Preschool period: Juvenile Polyps



- Benign hamartomas that occur between 2-10 years of age and peak at 3-4 years of age
- Usually present with painless rectal bleeding
- Adenomatous polyps occur more frequently in older children and adolescents
- Colonoscopy is best to diagnose polyps and permits removal
- Consider familial polyposis syndrome (+FH, 10 or more polyps)



# School-aged Children and Adolescents: Differential Diagnosis



- Anal fissures
- IgA vasculitis
- Meckel's diverticulum
- Infectious colitis
- Juvenile polyps
- Hemorrhoids
- Inflammatory bowel disease
- Solitary rectal ulcer syndrome

# School-aged Children and Adolescents: Hemorrhoids



- Hemorrhoidal veins in submucosal lower rectum
  - Internal proximal to dentate line, not painful
  - External distal to dentate line, painful
- Clinical presentation
  - 40% asymptomatic
  - Painless BRBPR typically coating stool at end of defecation or dripping into toilet
  - Itching or irritation of perianal skin
  - Palpable perianal “lump” of thrombosed hemorrhoid
- Risk factors: prolonged sitting, straining, chronic constipation, pregnancy

# School-aged Children and Adolescents: Inflammatory Bowel Disease



- Comprised of 2 major disorders: Ulcerative Colitis that affects only the colon and Crohn's disease that can involve any part of GI tract
- Most commonly presents with abdominal pain, fever, and diarrhea
- Peak incidence is late adolescence and early adulthood
- Associated with weight loss and growth failure
- Extraintestinal symptoms include: anorexia, arthralgia, and erythema nodosum
- Diagnosis is confirmed with endoscopy, colonoscopy, and biopsy

# Rare Causes of Lower GI Bleeding



- **Vascular malformations**
  - Associated with hereditary hemorrhagic telangiectasia
- **Gastrointestinal stromal tumors**
  - More frequently located in the stomach
- **Typhlitis**
  - Occurs in ileocecal region and associated with neutropenia
- **Malignancies**
  - Associated with familial polyposis syndromes

# References



Patel, Nishaben, and Marsha Kay. “Lower Gastrointestinal Bleeding in Children: Causes and Diagnostic Approach.” *UpToDate*, 28 Aug. 2018, [www.uptodate.com/contents/lower-gastrointestinal-bleeding-in-children-causes-and-diagnostic-approach](http://www.uptodate.com/contents/lower-gastrointestinal-bleeding-in-children-causes-and-diagnostic-approach).

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