

AN APPROACH TO CHILD WITH GI BLEED

Background

- Gastrointestinal (GI) bleeding in infants and children is a fairly common problem, accounting for 10%-20% of referrals to pediatric gastroenterologists.

Definitions

- **Melena** is the passage of black, tarry stools; suggests bleeding proximal to the ileocecal valve
- **Hematochezia** is passage of bright or dark red blood per rectum; indicates colonic source or massive upper GI bleeding
- **Hematemesis** is passage of vomited material that is black (“coffee grounds”) or contains frank blood; bleeding from above the ligament of Treitz

PATHOPHYSIOLOGY OF GI BLEED

- 1. Consequences of blood loss
- 2. Risk of hemorrhagic shock
- 3. Compensatory mechanism

1. PATHOPHYSIOLOGIC CONSEQUENCES OF BLOOD LOSS

- LOSS OF FLUID(BLOOD) → DEC. ECF →
DEHYDRATION → SHOCK → DEC GFR → ANURIA



PRE-RENAL A.R.F (INC. BUN AND NITROGEN)



SMALL VOL CONCENTRATED URINE WITH HIGH
SPECIFIC GRAVITY

2. Higher risk for hemorrhagic shock in children

- Age-dependent vital signs → inaccurate interpretation of early signs
- High ratio surface area to body mass → limited thermoregulation → hypothermia →
→ pulmonary HT → hypoxemia acidosis
- Smaller total body volume
- Lower hematocrit level

3. Sequence of compensatory mechanism

- Loss of less than 15% of BV is compensated by:
 - Contraction of the venous system
 - Fluid shift ECFC → IVFC
 - Preferential direction of blood to the brain and the heart → No hemodynamic changes

- Loss 15%-30% BV
 - Sympathetic stimulation
 - Secretion of aldosterone, ADH, prostaglandins
 - Release of catecholamine
 - Release of ACTH and corticosteroids
 - → → Hemodynamic instability
 - Tachycardia, O₂ consumption, tissue hypoxia
 - → → Maintain blood volume

- Loss of more than 30%
 - Hypotension (Shock), dec. cardiac output →
→ acidosis → tissue damage
 - Acute renal failure
 - Liver failure
 - Heart failure

SYMPTOMS OF UPPER GI BLEED

- Symptoms of upper gastrointestinal bleeding include:
 - vomiting bright red blood (hematemesis)
 - vomiting dark clots, or coffee ground-like material
 - passing black, tar-like stool (melena)

SYMPTOMS OF LOWER GI BLEED

- Symptoms of lower gastrointestinal bleeding include:
 - passing pure blood (hematochezia) or blood mixed in stool
 - bright red or maroon blood in the stool
- Hematemesis : 50% of upper gastrointestinal bleeding cases
- Hematochezia : 80% of all gastrointestinal bleeding.
- Melena
 - 70% of upper gastrointestinal bleeding
 - 33% of lower gastrointestinal bleeding
 - To form black, tarry stools (melena), there must be 150-200 cc of blood and the blood must be in the gastrointestinal tract for 8 hours to turn black

CAUSES

Causes of GI bleed in neonates

- **Upper GI bleeding**
 - swallowed maternal blood
 - stress ulcers, gastritis
 - vascular malformations
 - HDN
 - hemophilia
 - maternal ITP
 - maternal NSAID use
- **Lower GI bleeding**
 - swallowed maternal blood
 - dietary protein intolerance
 - infectious colitis/enteritis
 - necrotizing enterocolitis
 - Hirschsprung's enterocolitis
 - coagulopathy
 - vascular malformations

Causes of GI bleed in infants

- **Hematemesis, melena**

- Esophagitis
- Gastritis
- Duodenitis
- Coagulopathy

- **Hematochezia**

- Anal fissures
- Intussusception
- Infectious colitis/enteritis
- Dietary protein intol.
- Meckel's diverticulum
- Vascular malformation
- Coagulopathy

Causes of GI Bleed in Children 1 -12 yrs

- **Upper GI bleeding**

- Esophagitis
- Gastritis
- Peptic ulcer disease
- Mallory-Weiss tears
- Esophageal varices
- Pill ulcers
- Swallowed epistaxis
- Foreign body
- Coagulopathy

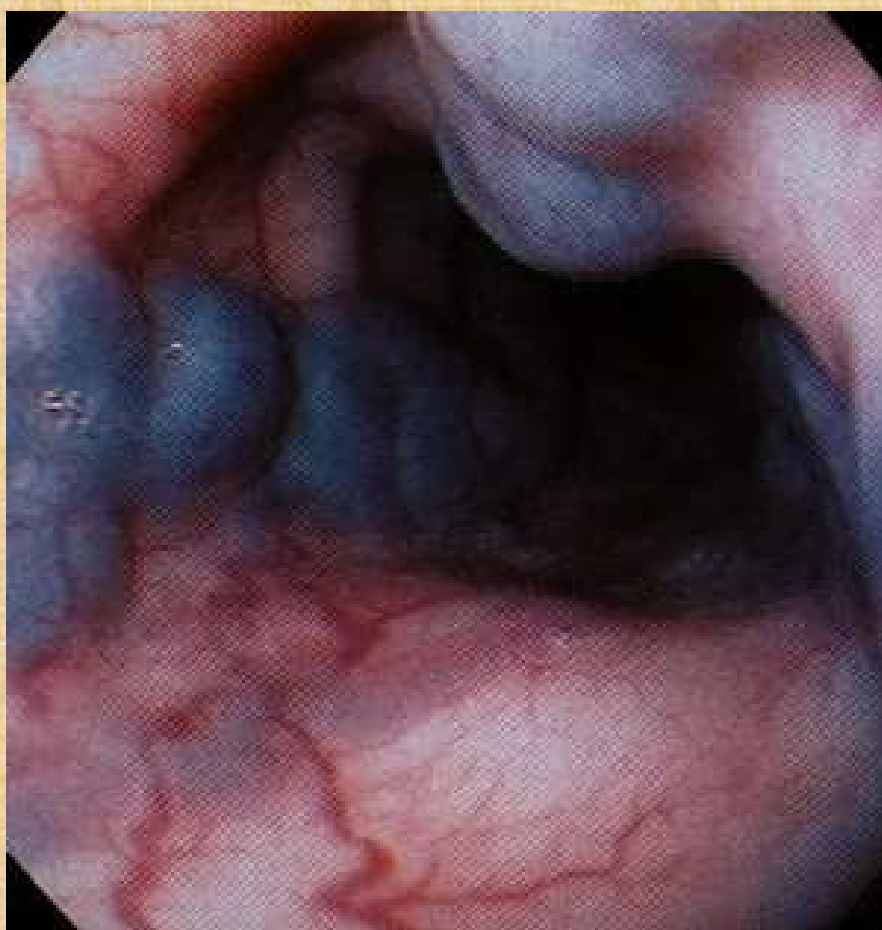
- **Lower GI bleeding**

- Anal fissures
- Infectious colitis
- Polyps
- Lymphoid nodular hyperplasia
- IBD
- HSP
- Intussusception
- Meckel's diverticulum
- HUS
- Sexual abuse
- Coagulopathy

Causes of GI Bleed in Adolescents

- **Hematemesis, melena**
 - Esophagitis
 - Gastritis
 - Peptic ulcer disease
 - Mallory-Weiss tears
 - Esophageal varices
 - Pill ulcers
- **Hematochezia**
 - Infectious colitis
 - Inflammatory bowel disease
 - Anal fissures
 - Polyps

Esophageal varices



Erosive esophagitis



NSAID induced ulcers



Peptic Ulcer



HISTORY

- GENERAL QUESTIONS
 - Acute or chronic bleeding
 - Color and quantity of the blood in stools or vomitus
 - Antecedent symptoms
 - History of straining
 - Abdominal pain
 - Trauma
 - History of foods consumed or drugs

HISTORY

- NEONATE
 - MILK OR SOY PROTEIN ENTERITIS
 - NSAIDs, heparin, indomethacin
 - Maternal medications e.g Aspirin and Phenobarbital
 - Stress gastritis e.g prematurity, neonatal distress, and mechanical ventilation

HISTORY

- CHILDREN AGED 1 MONTH TO 1 YEAR
 - Episodic abdominal pain that is cramping in nature, vomiting, and currant jelly stools (intussusception)
 - Fussiness and increased frequency of bowel movements in addition to lower gi bleed (milk protein allergy)

HISTORY

- CHILDREN AGED 1-2 YRS
 - Upper GI Bleed
 - systemic diseases, such as burns (Curling ulcer), head trauma (Cushing ulcer), malignancy, or sepsis
 - NSAID
 - Lower GI Bleed
 - Polyps :- painless fresh streaks of blood in stools

HISTORY

- CHILDREN OLDER THAN 2 YRS
 - lower GI bleeding occurs in association with profuse diarrhea :- Infectious Diarrhea
 - Recent antibiotic use : antibiotic-associated colitis and *Clostridium difficile* colitis

- A history of vomiting, diarrhea, fever, ill contacts, or travel →infectious etiology
- Sudden onset of melena in combination with bilious emesis in a previously healthy, nondistended baby →INTESTINAL MALROTATION
- Bloody diarrhea and signs of obstruction →VOLVULUS, INTUSSUSCEPTION or NECROTIZING ENTEROCOLITIS, particularly in premature infants
- Recurrent or forceful vomiting → Mallory-Weiss tears
- Familial history or NSAID use → ulcer disease
- Ingested substances, such as NSAIDs, tetracyclines, steroids, caustics, and foreign bodies, can irritate the gastric mucosa enough to cause blood to be mixed with the vomitus
- Recent jaundice, easy bruising, and changes in stool color→ liver disease
- Evidence of coagulation abnormalities elicited from the history →disorders of the kidney or reticuloendothelial system

PHYSICAL EXAMINATION

- Signs of shock
- Vital signs, including orthostatics
- Skin: pallor, jaundice, ecchymoses, abnormal blood vessels, hydration, cap refill
- Abdomen:
 - organomegaly, tenderness, ascites, caput medusa
 - Abdominal Surgical scars, Hyperactive bowel sounds (upper gi bleeding)
 - Abdominal tenderness, with or without a mass(intussusception or ischemic Bowel disease)
- Perineum: fissure, fistula, trauma
- Digital Rectum Examination: polyps, mass, occult blood, evidence of child abuse

Substances that deceive

- Red discoloration
 - candy, fruit punch, beets, watermelon, laxatives, phenytoin, rifampin
- Black discoloration
 - bismuth, activated charcoal, iron, spinach, blueberries, licorice

CONSIDERATIONS

- Place NG tube to confirm presence of fresh blood or active bleed. if confirmed
 - Esophagogastroduodenoscopy – 90%
 - Colonoscopy – 80%
- False negative results in 16 % if duodenopyloric regurgitation is absent

FURTHER ASSESSMENT

- Is it really blood (haemoccult test)
- Apt-Downey test in neonates
 - Used to differentiate between maternal and baby blood. blood placed in test tube → add sterile water (to hemolyse the RBCs yielding free Hb) → mix with 1% sodium hydroxide → if solution turns yellow or brown → maternal blood
- Nasogastric aspiration and lavage
 - Clear lavage makes bleeding proximal to ligament of Treitz unlikely
 - Coffee grounds that clear suggest bleeding stopped
 - Coffee grounds and fresh blood mean an active upper GI tract source

Laboratory studies

- CBC in all cases
 - Normal hematocrit → hypovolemia and hemoconcentration
 - Leukocytosis → infectious etiology
- ESR in all cases
- BUN, Cr in all cases
- PT, PTT in all cases
- Others as indicated:
 - Type and crossmatch
 - AST, ALT, GGTP, bilirubin
 - Albumin, total protein
 - Stool for culture, ova and parasite examination, *Clostridium difficile* toxin assay
 - Plain abdominal Xray (NEC in neonates)

LAB STUDIES (contd..)

- Endoscopy
 - Identifies site of upper GI bleed in 90 % cases
 - FORREST classification
 - I – Active hemorrhage
 - Ia :- bright red bleeding
 - Ib :- slow bleeding
 - II – Recent hemorrhages
 - IIa :- non bleeding visible vessel
 - IIb :- adherent clot on base of lesion
 - IIc :- flat pigmented spot
 - III – No evidence of bleeding

Endoscopy: indications

- **EGD**: hematemesis, melena
- **Flexible sigmoidoscopy**: hematochezia
- **Colonoscopy**: hematochezia
- **Enteroscopy**: obscure GI blood loss

LAB STUDIES (contd..)

- Colonoscopy
 - Identifies site of lower GI bleed in 80 % cases
 - Polyps, FAP syndrome, haemangiomas, vascular malformations, ulceration, biopsy

LAB STUDIES (contd..)

- Barium contrast studies
 - GER, FB, esophagitis, IBD, Polyps, malrotation, volvulus
- Doppler USG (Intussusception)
- Barium enema (IBD, polyps, intussusception)
- H.pylori stool antigen, IgG levels, rapid urease test or mucosal biopsy
- Ultrasound abdomen (intussusception)
- Fasting plasma gastrin level (Z-E syndrome)
- Technetium scan (Meckel's diverticulum)
- Enteroscopy
- Arteriography (helpful when endoscopy has failed)

INITIAL MANAGEMENT

- The initial approach to all patients with significant GI bleed is :
 - to establish adequate oxygen delivery.
 - to place intravenous line.
 - to initiate fluid and blood resuscitation
 - to correct any underlying coagulopathies.

Therapy

- **Supportive care:** begin promptly
 - Bowel Rest and NG decompression (esp in NEC)
 - IV fluids
 - Blood products (FFPs, RCC)
- **Specific care**
 - Barrier agents (sucralfate)
 - H₂ receptor antagonists (cimetidine, ranitidine, etc.)
 - Proton pump inhibitors (omeprazole, lansoprazole)
 - Vasoconstrictors (somatostatin analogue[Octreotide], vasopressin, Beta Blockers)
 - Inj Vitamin K
 - Stool Softeners (Anal Fissure)
 - Prokinetics (to reduce vomiting)
 - Antibiotics (for enteritis, Cl. Difficile ass. Colitis)
 - ~~Withdrawal of offending milk protein (in cases of milk protein allergy)~~
 - H.pylori Eradication (triple therapy)

Therapeutic Procedures

- **Endoscopy:** stabilize and prepare patient first
 - Coagulation (injection, cautery, heater probe, laser)
 - Variceal injection or band ligation
- **Colonoscopy :**
 - To treat colonic polyps, hemangiomas, AV malformations,
- **Barium or saline enema :**
 - Intussusception
- **Arteriography**
- **TIPS (variceal bleeds)**
- **Sengstaken Blakemore balloon tamponade**

Surgical options

- **If all medical measures fail**
 - Laprotomy
 - Laproscopy
 - Vagotomy
 - Pyloroplasty
 - Fissurotomy, fistulectomy
 - Diverticulectomy

Summary

Definitions: Hematemesis, Malena and Hematochezia

Pathophysiology

Causes: In Infant, Children 1-12 yrs, Adolescents > 12 yrs

History/ Presentation

Physical examination

Initial Management- Blood investigations/IVF/Blood

products/O2/Medications/PPI/NG washes/ Specific investigations(USG)

Role of endoscopy- Upper GI/Lower GI

Cause specific treatment

Surgical Options

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