Gastrointestinal bleeding in children

Part one: Upper GI bleeding

Part two: Bleeding per rectum
Upper GI bleeding in children
Upper GI bleeding in children

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Upper GI bleeding in children

- Definition
- Pathophysiology
- Etiology
- Diagnostic approach
- Management
Upper GI bleeding in children

Definition

Hematemesis:
  - vomiting of bright-red or coffee-ground material.
  - Site: above the ligament of Treitz.
Upper GI bleeding in children

Pathophysiology

1. Consequences of blood loss
2. Hemodynamic instability
3. Risk of hemorrhagic shock
4. Compensatory mechanism
Upper GI bleeding in children

1. Pathophysiological consequences of blood loss

- Loss of fluids (blood)
- E.C.F. volume
- Oliguria (anuria)
- G.F.R.
- Pre-renal A.R.F. (BUN and creatinine)
- Small volume concentrated urine with high specific gravity

- Hypotension (Shock)
Upper GI bleeding in children

2. Hemodynamic instability depends on:

Rapidity of blood loss

Degree of hypovolemia:

- Less than 15%: BV maintained by compensatory mechanisms
- 15-30%: inadequate compensation
- More than 30%: hypotension and shock → tissue damage
Upper GI bleeding in children

3. Higher risk for hemorrhagic shock in children
   - Age-dependent vital signs
   - Inaccurate interpretation of early signs
   - High ratio surface area/body mass
   - Limited thermoregulation
   - Hypothermia
   - Pulmonary HT
   - Hypoxemia
   - Acidosis
   - Smaller total body volume
   - Lower hematocrite level
Upper GI bleeding in children

4. 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
Upper GI bleeding in children

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
Upper GI bleeding in children

Loss of more than 30%

Hypotension (Shock) → cardiac output → acidosis → tissue damage

- Acute renal failure
- Liver failure
- Heart failure
- GI ulcers → bleeding → worsening
Upper GI bleeding in children

Etiology

- Esophagogastrical varices
- Peptic ulcer disease
- Mallory-Weiss tears
- Esophagitis
- Gastritis
- Duodenitis
Upper GI bleeding in children

Diagnostic approach

- History
- Physical examination
- Investigations
Upper GI bleeding in children

Diagnostic approach

**History**

- Previous history of liver disease, abdominal pain, blood disease
- Medication history (NSAID, steroids)
- Preceeding symptoms (Epistaxis, vomiting)
- Presence of stress (burn, CNS infection, Sepsis)
- Color and amount of blood
Upper GI bleeding in children

Diagnostic approach

Physical Examination

- State of consciousness, vital signs, wt and ht.
- Pallor, mucocutaneous pigmentations
- Bone/soft tissue tumors
- Hemangiomas, telangiectasia, petechiae, purpura, ecchymosis
- hepatosplenomegaly
Upper GI bleeding in children

Investigations

1. Is it really blood? → hemoccult test
   colored drinks, beats, spinach, bismuth

2. Is it from GIT origin? → Apt Downey test
   • Mother (delivery, breast cracks)
   • Nasopharynx (epistaxis)
   • Hemoptesis
Upper GI bleeding in children

investigations

3. Laboratory tests:

CBC: hgl/hct, follow changes q 4-24h.
Type and cross match for blood
Coagulation profile.
Urea and electrolytes.

↑Bun in upper Gl bleed)
Upper GI bleeding in children

Investigations

4. The nasogastric tube

- Site of bleeding
- Gastric lavage
Upper GI bleeding in children

Investigations

5. Endoscopy

✓ Usually within 24h hours

✓ Emergency only in massive bleeding
## Upper GI bleeding in children

### The yield upper GI endoscopy

<table>
<thead>
<tr>
<th>Age in years</th>
<th>0-12</th>
<th>13-18</th>
<th>0-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abn/total (%)</td>
<td>20/22 (91%)</td>
<td>25/38 (66%)</td>
<td>45/60 (75%)</td>
</tr>
<tr>
<td>No.of proced.</td>
<td>20/22 (91%)</td>
<td>25/38 (66%)</td>
<td>45/60 (75%)</td>
</tr>
<tr>
<td>Gastritis</td>
<td>6</td>
<td>14</td>
<td>20 (44%)</td>
</tr>
<tr>
<td>Esophagitis</td>
<td>9</td>
<td>7</td>
<td>16 (36%)</td>
</tr>
<tr>
<td>PUD</td>
<td>2</td>
<td>1</td>
<td>3 (7%)</td>
</tr>
<tr>
<td>Others*</td>
<td>3</td>
<td>3</td>
<td>6 (13%)</td>
</tr>
<tr>
<td>Total</td>
<td>20 (44%)</td>
<td>25 (56%)</td>
<td>45 (100%)</td>
</tr>
</tbody>
</table>

*Include: Esophageal varices 2, papillotomy site 2, Mallory-weiss tears 1, telangiectasia 1.*
Upper GI bleeding in children
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Upper GI bleeding in children

Diagnostic approach

6. Other investigations

- 24-h esophageal pH study
- Doppler ultrasound
- CT/MRI
- Arteriography
Upper GI bleeding in children

Management

- General measures
- Specific measures: depend on the cause
Upper GI bleeding in children

Thank you for your attention
Bleeding per rectum in children
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Bleeding per rectum in children

Definitions

- Hematochezia.
- Melena.
- Occult bleeding.
Bleeding per rectum in children

Definitions

Hematochezia:

- passage of bright-red or maroon blood per rectum.
- possible sites: - left colon to anorectum.
  - upper GI massive bleed.
Bleeding per rectum in children

Definitions

Melena:

- passage of black, tarry stools.
- possible sites:
  - nasopharynx, oropharynx.
  - upper GI to right colon.
Bleeding per rectum in children

Definitions

Occult GIT bleeding

- All sites.
- Inapparent, invisible.
- Iron deficiency anemia.
Bleeding per rectum in children

Pathophysiology

1. Consequences of blood loss
2. Hemodynamic instability
3. Risk of hemorrhagic shock
4. Compensatory mechanism
Bleeding per rectum in children

1. Pathophysiologic consequences of blood loss

Loss of fluids (blood) → E.C.F volume → s.of dehydration

oliguria (anuria) ← G.F.R ← Hypotension (Shock)

prerenal A.R.F (↑ BUN and creatinine)

Small volume concentrated urine with high specific gravity
Bleeding per rectum in children

2. Hemodynamic instability depends on:

- Rapidity of blood loss
- Degree of hypovolemia:
  - Less than 15%: BV maintained by compensatory mechanisms
  - 15-30%: inadequate compensation
  - More than 30%: hypotension and shock → tissue damage
Bleeding per rectum in children

3. Higher risk for hemorrhagic shock in children

- Age-dependent vital signs $\rightarrow$ inaccurate interpretation of early signs
- High ratio surface area/body mass $\rightarrow$ limited thermoregulation
  $\rightarrow$ hypothermia $\rightarrow$ pulmonary HT $\rightarrow$ hypoxemia $\rightarrow$ acidosis
- Smaller total body volume
- Lower hematocrite level
Bleeding per rectum in children

4. Sequence of compensatory mechanism

Loss of less than 15% of BV is compensated by:

- Contraction of the venous system
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- No hemodynamic changes
Bleeding per rectum in children

Loss 15%-30% BV

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- Release of ACTH and corticosteroids

Hemodynamic instability

Tachycardia, O2 consumption, tissue hypoxia

Maintain blood volume
Bleeding per rectum in children

**Loss of more than 30%**

- Hypotension (Shock) → cardiac output → acidosis → tissue damage
  - Acute renal failure
  - Liver failure
  - Heart failure
  - G I ulcers → bleeding → worsening
# Bleeding per rectum in children

## Etiology

<table>
<thead>
<tr>
<th>Swallowed blood</th>
<th>All upper GI causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coagulopathy (vit K)</td>
<td>Colitis</td>
</tr>
<tr>
<td>NEC</td>
<td>Polyps</td>
</tr>
<tr>
<td>Intestinal obstruction</td>
<td>Meckel</td>
</tr>
<tr>
<td>HSP, HUS</td>
<td>Anal fissures</td>
</tr>
</tbody>
</table>
Bleeding per rectum in children

Diagnostic approach

- History
- Physical examination
- Investigations
Bleeding per rectum in children

History:

- Family history of similar disease.
- Age and duration of symptoms.
- History of weight loss, food allergy, constipation.
- Associated symptoms (fever, vomiting, diarrhea, abdominal pain)
- Type and amount of blood
Bleeding per rectum in children

Physical examination:

- State of consciousness, vital signs.
- Growth parameters.
- Pallor, mucocutaneous pigmentation.
- Bone/soft tissue tumors.
- Hemangiomas, telangiectasia, petechiae, purpura, ecchymosis.
- Abdominal, perianal, and rectal examination.
Bleeding per rectum in children

Investigations

1. Is it really blood ?. \(\rightarrow\) hemoccult test
   - colored drinks, beats, spinach, bismuth, iron

2. Is it from GIT origin ?. \\
   - Mother (delivery, breast cracks) \(\rightarrow\) Apt Downey test
   - Nasopharynx (epistaxis).
   - Hemoptesis.
Upper GI bleeding in children

Laboratory tests

- CBC differential and ESR.
- Stool analysis and culture.
- Type and cross match for blood.
- Coagulation profile.
- Urea and electrolytes.

↑ Bun in upper GI bleed
Upper GI bleeding in children

The nasogastric tube: Site of bleeding

- **Positive** → site above the ligament of Treitz.
- **Negative** → site anywhere below.
Bleeding per rectum in children

Radiology

- Plain abdomen
- Contrast studies
- Ultrasound
- Meckel scan
- Angiography
Bleeding per rectum in children

Endoscopy

Upper or lower ?.
# Bleeding per rectum in children

## The yield of colonoscopy

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Abn/total (%)</th>
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<tbody>
<tr>
<td>0-12</td>
<td>22/32 (69%)</td>
<td>35/57 (61%)</td>
<td>57/89 (64%)</td>
</tr>
<tr>
<td>13-18</td>
<td></td>
<td></td>
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<table>
<thead>
<tr>
<th>Disease</th>
<th>No. proced (%)</th>
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<tr>
<td>Colitis</td>
<td>9</td>
<td>21</td>
<td>30 (53%)</td>
<td></td>
</tr>
<tr>
<td>Polyps</td>
<td>7</td>
<td>8</td>
<td>15 (27%)</td>
<td></td>
</tr>
<tr>
<td>Rectal ulcers</td>
<td>1</td>
<td>2</td>
<td>3 (5%)</td>
<td></td>
</tr>
<tr>
<td>Chr. anal fissures</td>
<td>2</td>
<td>1</td>
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<td></td>
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* Include, colonic trauma 1, telangiectasia 1, and intussusception 1.
### Upper GI bleeding in children

#### The yield of upper GI endoscopy

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<tr>
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Management

General measures: supportive

Specific: depends on the cause
Bleeding per rectum in children

Thank you for your attention