Evaluation of GI Bleeding in the Child

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Scott & White
Goals in Patients with GI Bleeding

- Is child hemodynamically stable?
  - Establish and maintain the Intravascular Volume
- Re-establish the normal oxygen carry capacity
- Determine source and site of blood loss
  - 1. Are you really seeing blood?
  - 2. Where is the blood coming from (upper vs. lower)?
- Stop gastrointestinal bleeding
  - What treatment modality should be considered?
Initial Assessment of GI Bleeding

- Needs to be focused and rapid
  - Volume status
    - Impending shock
  - Likelihood of ongoing bleeding
- Physical exam
  - Overall appearance
  - Mental status
  - Blood pressure and heart rate
- Rapid stabilization
Stabilization of the Bleeding Child

- Immediate stable intravenous access
  - Two large bore peripheral lines
  - Central venous access

- Immediate Blood count, Type and Cross

- Fluid resuscitation
  - 10 to 20 cc/kg of normal saline, plasmamate or lactated Ringer’s over 10 minutes
  - Further boluses titrated to maintain blood pressure and tissue perfusion
  - If over 50 to 70 cc/kg is required over a 4 to 6 hour period then invasive monitoring should be considered

- Correction of coagulation if coagulopathic

- Diagnostic Procedure after stabilization
# Evaluation of GI Bleeding

<table>
<thead>
<tr>
<th>History</th>
<th>Physical Exam</th>
<th>Laboratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past bleeding</td>
<td>Pulse, blood pressure sitting and lying</td>
<td>Type and Cross</td>
</tr>
<tr>
<td>Quality and quantity of blood loss</td>
<td>Examination for Ascites, hepatosplenomegaly</td>
<td>CBC, platelets, reticulocyte count</td>
</tr>
<tr>
<td>Family History</td>
<td>Mucosal Color</td>
<td>PT, PTT, INR</td>
</tr>
<tr>
<td>Feeding History</td>
<td>Examination for Caput Medusa</td>
<td>ALT, AST, BUN</td>
</tr>
<tr>
<td>Allergy history</td>
<td>Skin findings and color, capillary refill</td>
<td>Guaiac, hematest, Immunocult</td>
</tr>
<tr>
<td>Associated disease history</td>
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</tr>
</tbody>
</table>
Upper GI Bleed History

- Recent medication use (NSAIDS, steroids?)
- Recent surgery?
- Is this swallowed maternal blood?
- Maternal nipple discharge?
- Umbilical vein catheterization? (cavernous transformation of portal vein)
- History of facial trauma, nose picking, recurrent emesis?
- Recent abdominal trauma?
- Is this hemoptysis?
Lower GI Bleed History

- Is mucous present (allergic, infectious, etc.)?
- Is bleeding rapid (ex. Meckel’s diverticulum)?
- Is bleeding painful (ex. *Strep* proctitis)?
- Is weight loss present (ex. IBD)?
- Is there associated abdominal pain (ex. IBD, HSP)?
Symptoms Associated with GI Hemorrhage

- Fatigue
- Pallor
- Lightheadedness
- Tachycardia, Palpitations
- Abdominal pain
- Change in mental status
Diffentiating Site of GI bleed

- Signs may help
  - Hematemesis $\rightarrow$ Bleeding proximal to ligament of Treitz
  - Melena almost $\rightarrow$ always upper GI
  - Hematochezia $\rightarrow$ Usually colonic bleeding Usually lower

- May need to use accessory tools
  - Nasogastric aspiration
    - Largest bore tolerable with a decompressing lumen
      - 16% with negative aspirated can have lesion on upper endoscopy
      - No value in occult blood testing of aspirate

- Labs
  - Elevated BUN suggest UGI bleed
Conditions associated with GI bleeding

- Turner syndrome: Venous ectasia, IBD
- Epidermolysis bullosa: Esophageal/colonic stricture
- Ehler-Danlos: Fragile vascular walls
- Down’s: IBD, Hirschsprung’s, Meckel’s
- Hermansky-Pudlak: IBD, platelet dysfunction
- Osler-Weber-Rendu: Vascular malformations
- Klippel-Trenaunay: Vascular malformations
- GSD Ib: IBD
- Blue rubber bleb syndrome: Vascular malformations
Physical Examination

- Vital signs (is patient hemodynamically stable?)
- Nares, hypopharynx, gum line for signs of trauma
- Facial petechiae (coughing?)
- Abdominal pain / rebound / guarding
- Jaundice, hepatomegaly, scleral icterus
- Hepatosplenomegaly (portal hypertension?)
- Cutaneous hemangiomas
- Pupuric rash (HSP?)
- Rectal exam – Always essential (know the 2 contraindications for a pediatric rectal exam)
Two Contraindications for a Pediatric Rectal Exam

- NO FINGER(S)
- NO RECTUM
# Signs of GI Hemorrhage

<table>
<thead>
<tr>
<th>Signs</th>
<th>Cause</th>
<th>Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Splenomegaly, Caput Medusa</td>
<td>Portal Hypertension</td>
<td>Esophageal varices, portal gastropathy</td>
</tr>
<tr>
<td>Jaundice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemangioma, Telangiectasia</td>
<td>multiple hemangioma syndrome</td>
<td>Vascular malformations of GI tract</td>
</tr>
<tr>
<td>Hematemesis or Nasogastric</td>
<td>Bleeding from above the ligament of Trietz</td>
<td>Upper GI tract</td>
</tr>
<tr>
<td>Aspirate gross blood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melena</td>
<td>Bleeding from above the ileocecal valve</td>
<td>Upper GI tract or small intestine</td>
</tr>
<tr>
<td>Hematachezia</td>
<td>Colonic bleeding, massive UGI bleeding</td>
<td>Usually colonic but can occur anywhere in GI tract</td>
</tr>
<tr>
<td>Palpable purpura</td>
<td>Henoch-Schonlein purpura</td>
<td>Vasculitis throughout GI tract</td>
</tr>
</tbody>
</table>
Elements Mistaken for Blood in Stool

- **Hematemesis**: Red dye #2 and 3, swallowed maternal blood, bleeding from nose, mouth, or pharynx.

- **Melena**: Iron, licorice, blueberries, spinach, beets, bismuth, lead, charcoal, dirt

- **Hematochezia**: menstruation, red dye #2 and 3, ampicillin, hematuria.
Diagnostic Techniques

- **Endoscopy**
  - Upper endoscopy
  - Colonoscopy
  - Flexible sigmoidoscopy
  - Small bowel enteroscopy
  - Capsule endoscopy

- **Scintigrahic Studies**
  - Technetium pertechnate (Meckel’s Scan)
  - Technetium Labeled red cell scan

- **Radiologic**
  - Angiography
  - Virtual Endoscopy
  - MRI angiography
The Effect of Endoscopy on the Diagnosis GI Bleeds in Children

<table>
<thead>
<tr>
<th>ERA</th>
<th>Pre-Endoscopy</th>
<th>Endoscopy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age</td>
<td>1</td>
</tr>
<tr>
<td>Number</td>
<td></td>
<td>90</td>
</tr>
<tr>
<td>Esophagitis</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>M-W syndrome</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Gastritis</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Varices</td>
<td>-</td>
<td>11</td>
</tr>
<tr>
<td>Gastric Ulcer</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Duodenal Ulcer</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Unknown</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Death</td>
<td>70%</td>
<td></td>
</tr>
</tbody>
</table>
# Age Related Causes of UGI Bleeding

<table>
<thead>
<tr>
<th>Age group</th>
<th>Common</th>
<th>Less Common</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonates</td>
<td>Swallowed Maternal blood, Gastitis, Duodenitis</td>
<td>Vascular Malformations Coagulopathy, Gastric and Esophageal Duplication cyst</td>
</tr>
<tr>
<td>Infants</td>
<td>Gastitis, Duodenitis Esophagitis Gastric Ulcer</td>
<td>Esophageal Varices, Foreign Body, Aortoesophageal fistulas</td>
</tr>
<tr>
<td>Children</td>
<td>Gastitis, Esophagitis, Duodenal Ulcer, Gastric Ulcer, Mallory-Weiss tear, Nasopharyngeal bleeding, Varices</td>
<td>Leiomyoma, Salicylates, Vascular malformations Hematobilia</td>
</tr>
<tr>
<td>Adolescents</td>
<td>Gastitis, Duodenal Ulcer, Esophagitis Gastric Ulcer, Mallory-Weiss tear, Esophageal varices</td>
<td>Thrombocytopenia, Dieulafoy’s Ulcer, Hematobilia</td>
</tr>
</tbody>
</table>
Key Elements to Note in Upper GI Bleeding

- Hematemesis
- Hemodynamic instability
- History
  - Previous ulcer bleed
  - Nonsteroidal anti-inflammatory drugs
- Elevated blood urea nitrogen
- Melena
- Maroon blood associated with instability
- Liver disease
Upper GI Bleeding Evaluation

- If history of hematemesis, positive NG aspirate or melena is present the UGI source needs to be ruled out
  - Upper Endoscopy is the most accurate diagnostic test
  - If upper endoscopy is unable to visualize or stop bleed then arteriography with embolization is an alternative
  - Sengstaken-Blakemore tube can be used as a temporizing measure especially in variceal bleeds adjacent to the gastroesophageal junction
- Linton-Nachlas tube more useful in gastric varices secondary to larger 600 ml volume of gastric balloon
<table>
<thead>
<tr>
<th>Lesion</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ulcers</td>
<td>30-60%</td>
</tr>
<tr>
<td>Varices</td>
<td>5-30%</td>
</tr>
<tr>
<td>Mallory Weiss</td>
<td>5-10%</td>
</tr>
<tr>
<td>Gastroduodenal erosions</td>
<td>5-10%</td>
</tr>
<tr>
<td>- Gastritis and duodenitis</td>
<td></td>
</tr>
<tr>
<td>Erosive Esophagitis</td>
<td>5-10%</td>
</tr>
<tr>
<td>Vascular Malformations</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>Dieulafoy’s Lesion</td>
<td>&lt;5%</td>
</tr>
</tbody>
</table>
Bleeding Ulcer

- Most common source of UGIB
- Management of Ulcer Bleed
  - Endoscopic Intervention
    - Bipolar coagulation
    - Heater probe
    - Injection
    - Clips
  - Anti-secretory therapy
    - Stable clot formation requires pH 6-7
    - Bolus PPI plus constant infusion
    - PPI very short half life need constant infusion to inhibit newly activated pumps (intermittent bolus slightly less effective)
Bleeding Ulcer
Esophageal Varices

- Risk of bleeding
  - 22% in children with new diagnosis of cirrhosis
  - 38% in children with known varices over a 5 year period

- Grading
  - Grade 1 flattens with insufflation, less likely to bleed
  - Grade 2 not flattened with insufflation healthy tissue between varices, more likely to bleed
  - Grade 3 not flattened with insufflation, varices are confluent, more likely to bleed
Esophageal Varices
Management of Bleeding in Patients with Varices

- Fluid stabilization
- Correction of coagulopathy
  - FFP, vitamin K
- Medication to cause splanchnic vasoconstriction
  - Octreotide 2ug/kg bolus followed by constant infusion at 1-5 ug/kg/hr (71% of patients stop bleeding at a dose of 1-2 ug/hr)
- Endoscopic or surgical therapy
  - Endoscopic
    - Banding variceal ligation (preferred less complications)
    - Sclerotherapy
- Follow up endoscopy with repeat variceal ligation and long term drug therapy
Mallory-Weiss Tears

- 80-90% stop bleeding spontaneously
- Rebleeding uncommon 0-7%
- Endoscopic therapy only if active bleeding
  - Injection therapy (epinephrine/polidocanol)
  - Ligation
  - Clips
  - Heater probe
Mallory-Weiss Tear and Prolapse Gastropathy
Erosive Disease
Esophagitis, Gastritis, and Duodenitis

- Start acid suppression therapy
  - Intermittent bolus or constant PPI infusion therapy
- Endoscopy
  - Diagnosis
  - Intervention only if Medication not effective
    - Argon plasma coagulation
  - Long term therapy dependent on cause
    - H. pylori Triple therapy (PPI plus 2 antibiotics)
    - Zollinger Ellison medical suppressive therapy
Gastritis
Classification of Gastritis

Histologic
- Autoimmune
  - H. pylori
- Eosinophilic
- Special categories:
  - Ménétrier’s disease
  - Gastric lymphoid hyperplasia
  - Crohn’s disease

Endoscopic
- Intrinsic factors
  - Stress
  - Bile reflux
  - Congestive gastropathy
  - Gastric stasis
- Extrinsic factors
  - Medications
  - Corrosives
  - Radiation
  - Infections
H. Pylori in a Gastric Pit
Vascular Malformation and Dieulafoy’s Lesion

- Fluid and Blood product stabilization and support
- Endoscopy for diagnosis and therapy
  - More difficult to diagnose secondary to intermittent nature of bleeding
  - Therapy dependent on lesion
    - AVM
      - Injection, APC, or pressure cautery
    - Dieulafoy
      - Pressure Cautery, clips
Dieulafoy’s Lesion

Exposed arterial vessel that intermittently bleeds
Dieulafoy’s Lesion
### Causes of Lower GI Bleeding

<table>
<thead>
<tr>
<th>Age group</th>
<th>Common</th>
<th>Less Common</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Neonates</strong></td>
<td>anorectal lesions, swallowed maternal blood, milk protein allergy, NEC mid gut volvulus</td>
<td>vascular malformations Hirschprung’s, coagulopathy intestinal duplication cyst</td>
</tr>
<tr>
<td><strong>Infants</strong></td>
<td>anorectal lesions, intussusceptions milk protein allergy, infectious diarrhea Meckel’s diverticulum mid gut volvulus</td>
<td>vascular malformations acquired thrombocytopenia intestinal duplication cyst</td>
</tr>
<tr>
<td><strong>Children</strong></td>
<td>juvenile polyps, Meckel’s diverticulum, intussusceptions, Anal fissure, lymphoid hyperplasia</td>
<td>HSP, HUS, vasculitis (SLE) Inflammatory bowel disease</td>
</tr>
<tr>
<td><strong>Adolescents</strong></td>
<td>Inflammatory bowel disease, polyps, hemorrhoids, anal fissure, infectious diarrhea</td>
<td>HSP, AVM, adenocarcinoma, pseudomembranous colitis</td>
</tr>
</tbody>
</table>
Apt-Downey Test

- In the newborn swallowed maternal blood accounts for 30% of instances of GI bleeding
- Adult hemoglobin is denatured to alkaline globin hematin (appears yellow brown)
- Fetal hemoglobin resist the effect of alkali and imparts a pink color to the solution
- Can be done on stool or gastric contents
Apt-Downey Test

- Mix stool / emesis with water (1:5).
- Centrifuge mixture
- Add 1 mL 0.25N NaOH with 5 mL supernatant.
- Wait 5 minutes.
- Brown or Yellow color → adult Hgb
- Pink color → fetal Hgb
Lower GI Bleed Evaluation

- Massive bleeds are unusual
- Test
  - Fecal WBC’s suggest infection or inflammation
    - Stool culture and O&P exam
  - If melena or maroon stools are present and Upper endoscopy is negative then colonoscopy should be performed
  - If Colonoscopy is negative then Meckel’s scan, bleeding scan, or angiography could be used to locate source
  - Ultrasound or contrast enema useful for picking up intussusception
# Test for Occult Blood in Stool

<table>
<thead>
<tr>
<th>Test</th>
<th>Reagent</th>
<th>False Positive</th>
<th>False Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hematest</td>
<td>Orthotolidine</td>
<td>Red Meats</td>
<td>Ascorbic Acid</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Iron</td>
<td></td>
</tr>
<tr>
<td>Hemoccult</td>
<td>Guaiac</td>
<td>above and tagamet</td>
<td>Hard Stool</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Penicillamine</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Antacids</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ascorbic Acid</td>
</tr>
<tr>
<td>HemoQuant</td>
<td>Porphyrin</td>
<td>Red Meats</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flourescence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immunocult</td>
<td>Antibody</td>
<td>most accurate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>toward human Hgb</td>
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Bleeding Lesions of the Small Bowel

- Meckel’s Diverticulum
- Duplication Cyst
  - Gastric mucosa can ulcerate and bleed
  - Antral duplication cyst cause hypergastrin state that predisposes to ulceration
- Crohn’s disease
- Infectious enteritis
- Lymphonodular hyperplasia
- Intussusception
  - Pathologic lead point in 10%
- Vasculitis

- Vascular Anomalies
  - Hemangiomas
  - Malformations
    - Capillary
      - Osler Weber Rendu
      - Turner’s
    - Venous
      - Klippel-Trenaunay syndrome
      - Blue rubber bleb nevus syndrome
    - Arteriovenous
      - Osler Weber Rendu disease
 Diagnostic Testing

- **Abdominal film**
  - Can see perforation, small bowel dilatation, pneumatosis.

- **Contrast study (Upper GI)**
  - Useful for anatomical anomalies (malrotation, duplication).
  - Sensitivity and specificity poor for detecting PUD in children.
  - Makes endoscopic visualization difficult.
Diagnostic Testing Nuclear medicine scans (nuclear scintigraphy)

- Useful for diagnosing Meckel’s diverticulum
  - Ex. Technetium 99m pertechnetate (Meckel scan)
- Useful to localize lesions that bleed slowly
  - Ex. Technetium 99m-labeled RBC scan
  - Can detect lesions with bleeding rate as low as 0.1mL-0.3mL/minute or 500 mL/day.
  - Labeled RBCs last in circulation up to 5 days.
  - Poor specificity.
Meckel’s Technetium Scan

Tc

Mucus-secreting cells

Ranitidine: ↑ up-regulation of receptor production
Meckel’s Diverticulum

Tc-99m pertechnetate scan (Meckel’s scan)
False Meckel’s Scan Results

- False Positive non-bleeding lesion
  - Ureteral obstruction
  - Sacral meningomyelocele

- False Positive bleeding lesion
  - Intussusception
  - Hemangioma
  - Arteriovenous malformation
  - Inflammatory Bowel
  - Peptic Ulcer

- False Negative
  - Barium
  - Bladder over distention
  - No gastric mucosa in the diverticulum
False-Positive Meckel’s Scan

Left-sided UC with large amounts of bleeding
Nuclear Medicine Scan (Tagged RBC Scan)
Arteriogram

- Used to evaluate obscure bleeds such as AVM’s which have a significant bleeding rate
Intussusception

Currant jelly stool
Intussusception
Bleeding Lesions of the Colon and Rectum

- Anal Fissure
- Rectal Prolapse
  - Ehler Danlos
  - Cystic Fibrosis
  - Constipation
- Inflammatory Bowel Disease
  - Ulcerative Colitis
  - Crohn’s Disease
  - Eosinophilic Colitis
- Infectious
  - C.Difficile
  - Other bacterial colitis
  - Strep proctitis

- Polyps
  - Juvenile
  - Familial Adenomatous Polyposis Coli (APC)
  - Peutz Jehger
  - Cronkite Canada Syndrome
  - Gardner’s
- Hirshprung’s Disease
- Vascular Anomalies
- Lymphonodular hyperplasia
Therapy in Lower GI bleeds

- Dependent on Diagnosis
  - Inflammatory
    - Medical therapy usually effective
    - Surgery for medically unresponsive therapy or precancerous lesion
  - Infection
    - Medical therapy
  - Anatomic lesion
    - Radiologic reduction for intussusception or surgery if not reducible
    - Surgical for most others
  - Colonoscopy
    - Some polyp diseases and venous malformations
Endoscopic therapy effect on Lower GI Bleeding

- Endotherapeutic approaches
  - Bicap Cautery
  - Heater Probe
  - Injection of sclerosing agents
  - Argon tissue plasma coagulation
  - Banding
  - Ligation (Endoloop)
  - Hemoclips
C. Difficile Colitis
Strep Proctitis
Polypectomy

Pre-  Post-
Inflammatory bowel diseases

- Crohn’s disease
  - Crohn’s disease was originally described in 1932
  - Also known as granulomatous colitis, regional enteritis, and Crohn’s ileitis

- Ulcerative Colitis
  - Ulcerative colitis was described over 100 years ago
  - Both conditions are defined empirically based on a combination of clinical, radiologic, historical, endoscopic and laboratory findings
    - Inflammatory bowel disease should not be confused with IBS (irritable bowel syndrome), spastic colitis, or spastic colon
Inflammatory Bowel Disease Incidence

- **Crohn’s**
  - Annual incidence 2-4/100,000
  - Overall incidence is 20 to 30% higher in females but in pediatrics there is a slight male predominance (60%)
  - Bimodal distribution with one peak in the second to third decade of life and the second peak in the sixth decade

- **Ulcerative Colitis**
  - Annual incidence 3-6/100,000
  - Equal incidence in males and females in the pediatric population
  - Bimodal distribution with one peak in the second to third decade and a later peak in the fifth to sixth decade of life
Crohn’s vs. Ulcerative Colitis

- **Crohn’s Disease**
  - Segmental or contiguous
  - Transmural
  - Can occur throughout GI Tract

- **Ulcerative Colitis**
  - Continuous distribution
  - Sub mucosal and mucosal
  - Colonic only
Crohn’s Disease

- Crohn’s Disease
  - Can be a cause of GI bleeding anywhere in the GI tract
  - Inflammation can cause stricturing, perforation, chronic or acute blood loss.
Bowel Distribution in Crohn’s Disease

* Can involve all areas of the GI tract
  * 40% involve the terminal ileum with variable lengths of colon
  * 40% involve the terminal ileum with other small bowel
  * 20% have colonic involvement alone
  * Less than 5% have involvement of the esophagus, stomach and/or duodenal involvement without TI or colonic involvement but 30% to 40% will have involvement of one of these areas with TI and/or colonic involvement
Crohn’s in Children

- Crohn’s peak prevalence is in late adolescence and early 20’s
- Growth alterations are common finding at presentation
Physical findings in Crohn’s disease

- Extra intestinal manifestations can help in the diagnosis of GI bleeds secondary to inflammatory bowel disease
Endoscopy In Crohn’s

- Endoscopic Findings
  - Pseudopolyps
  - Apthous ulcerations
  - Stricture
  - Fistulas
  - Bleeding
Ulcerative Colitis

- Limited to the colon
- Inflammation limited to the mucosa and submucosa
- Histologic and endoscopic finding include crypt abscesses, mucosal ulceration and pseudopolyps
- Inflammation is continuous without skip lesions
Endoscopic appearance of severe ulcerative colitis

- Findings
  - Loss of all normal mucosa
  - Bleeding
  - Pseudopolyps
  - Desquamation of mucosa
  - Exudations
  - Severe inflammation
  - Narrowing of lumen
Causes of Gastrointestinal Bleeding in the Infant

- Upper common
  - Nasopharyngeal bleeding
  - Swallowed maternal blood
  - Esophagitis
  - Peptic Ulcer
  - Gastritis
- Less Common
  - Bleeding disorders
  - Duplication
  - Foreign body
  - Tube trauma
  - Vascular malformation
- Lower Common
  - Anal fissure
  - Enteric infections
  - Intussusceptions
  - Upper GI source
  - Necrotizing enterocolitis
- Less Common
  - Milk allergy
  - Pseudomembranous colitis
  - Duplication Cyst
  - Meckel’s Diverticulum
  - Enterocolitis with Hirschsprung’s
  - Vascular malformations
  - Gangrenous intestine
Hirshprung’s Disease
Radiological Appearance of HD

- The X-ray of the abdomen shows enlarged intestine (arrow). (right) The arrow demonstrates the transition zone on contrast enema.
HD at surgery

- Sigmoid colon showing a transition zone.
  - The big, enlarged colon is normal
  - Smaller colon has the Hirschsprung’s disease.
  - The arrow points to the transition zone.
Angiodysplasia

- Sporadic or syndromal (Klippel-Trenaunay-Weber Syndrome)
- Can occur due to immunodeficiency (Kaposi’s)
- 2 theories as to development:
  1. Degenerative process of aging (venous obstruction)
  2. Chronic mucosal ischemia
- Treatment: Electrocautery, angiography / embolization, surgical resection
Angiodysplasia
Angiodysplasia
Management for Hypovolemia Secondary to GI hemorrhage

- Establish Intravenous Access
  - Two peripheral catheters or central line
- Rapidly infuse saline, lactated Ringer’s or Plasmamate 10-20cc/kg until vital signs normal and support with maintenance fluids until bleeding stabilizes
- Monitor vital signs, CVP, urine output, orthostatic changes and strict I’s and O’s
- Transfuse RBC’s to maintain oxygen carry capacity
- Platelet transfusion if plt < 50,000
Management of GI Bleeds

- NG tube if an active UGI bleed
- IV Ranitidine (2mg/kg/day bid or continuous drip)
- PPI (oral or NG)
- Example: IV Pantoprazole or Nexium 40 mg bolus then 40mg per day as drip or in 4 divided doses
- IV Octreotide (1mcg/kg bolus; 1-5 mcg/kg/hour continuous drip)
- Erythromycin?
Therapeutic Management

- **Endoscopic therapies**
  - Varices → sclerotherapy, banding
  - Bleeding ulcers → injection, electrocautery
  - Polyps → polypectomy

- **Interventional radiology therapies**
  - TIPPS
  - Angiography

- **Surgical therapies**
  - Exploratory laparotomy, hepatic shunt, etc.
Summary of Goals in Patients with GI Bleeding

- Establish and maintain the intravascular volume
- Re-establish the normal oxygen carry capacity
- Coagulation support if coagulopathy is present
- Determine source and site of blood loss
- Stop gastrointestinal bleeding by medical, endoscopic or surgical intervention
- Treat underlying disease and remove exacerbating factors if present
- Take steps to prevent further bleeding episodes
Thank You!

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