Lower Gastrointestinal Bleeding (LGIB) – By Alex Rabinovich

**Definition**
Blood loss from the gastrointestinal tract that is distal to the ligament of Treitz.

**Epidemiology**
- Overall mortality <5%. [Frequency and severity of UGIB > LGIB]
- LGIB is more common in women > men.
- Incidence and prevalence related to specific etiologies.

**Diagnosis**

**Classical Signs and Symptoms**
- Hematochezia (most often painless)
- Anemia
- Occult blood in stool
- Rarely melena (UGIB most common)
- Normal Bowel Sounds, Normal Renal Function (BUN/Cr)
- Nasogastric aspirate usually clear

**Interview & O/E**
- HPI, PHx, PSx, Meds, Allergies, FHx (etiologies), SHx (smoking, alcohol, drugs)
- Vital Signs, Dehydration Status and Mental Status to R/O Shock
- Cardiac, Resp, Kidney, Abdominal, Pelvic, Rectal exams

**Investigations**
- CBC → Anemia, Infection, Thrombocytopenia, Protein Levels, Iron, Crossmatch
- Coagulation
- Hemoccult and Stool cultures
- ECG

**Imaging**
1. Abdominal X-Ray to R/O:
   - Perforation
   - Obstruction
   - “Thumb-printing” = Ischemic/Infectious Colitis
   - Megacolon
2. Nasogastric tube to R/O UGIB (or via EGD)
3. Initial investigation via Colonoscopy
4. Radionuclide imaging if indicated
   a. Technetium Sulfur Colloid
      i. IV injection of labeled colloid
      ii. Will show were active bleeding is occurring
      iii. CON = few minutes in vascular space
   b. 99mTc pertechnate-labeled RBC
      i. IV injection of labeled RBC
      ii. Will show were active bleeding is occurring
      iii. PRO = up to 24 hrs post IV can still scan
5. Mesenteric angiography if indicated
   a. 90% will stop bleeding with vasopressin administration,
      50% will re-bleed with vasopressin cessation
   b. Embolization can also be done, but runs a risk of intestinal infarction.
6. Surgery – Exploratory laparotomy if indicated
   a. Transfusion >4 units in 24 hours
   b. Transfusion >10 units total
   c. Recurrent bleeding episodes
   d. Comorbid conditions significantly affected

Barium studies are not indicated for LGIB, because it does not help visualize the site of bleeding, but only identify anatomical and pathological variances that may or may-not be associated with the LGIB.

<table>
<thead>
<tr>
<th>Technique</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colonoscopy</td>
<td>- Precise localization</td>
<td>- Colon must be prepped</td>
</tr>
<tr>
<td></td>
<td>- Can be therapeutic</td>
<td>- Risks of sedation</td>
</tr>
<tr>
<td></td>
<td>- 70 – 90% accurate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Cecum reached in over 95% of cases.</td>
<td></td>
</tr>
<tr>
<td>Radionuclide</td>
<td>- Noninvasive</td>
<td>- Requires active bleeding of &gt; 0.1 ml/min</td>
</tr>
<tr>
<td></td>
<td>- High sensitivity</td>
<td>- Does not localize site</td>
</tr>
<tr>
<td></td>
<td>- 90+ sensitivity, 80+ specificity</td>
<td></td>
</tr>
<tr>
<td>Angiography</td>
<td>- Precise localization (100% specific)</td>
<td>- Variable sensitivity</td>
</tr>
<tr>
<td></td>
<td>- No bowel prep</td>
<td>- Requires active bleeding of 1 – 1.5 ml/min</td>
</tr>
<tr>
<td></td>
<td>- Therapeutic via Vasopressin infusion or Embolization</td>
<td>- Complications with procedure</td>
</tr>
</tbody>
</table>
## Etiology

### General outline of common causes for LGIB

**Anatomical:** Diverticulosis  
**Vascular:** Angiodysplasia, Radiation induced Telangiectasia  
**Inflammatory:** Infectious, Ischemic, IBD, Radiation  
**Neoplastic:** Polyp, Carcinoma  
**Others:** Hemorrhoid, Ulcer, Post-Polypectomy, Aortoenteric fistula

### Table 1: Causes of LGIB in Adults vs. Children.

<table>
<thead>
<tr>
<th>Adults</th>
<th>Risk Factors</th>
</tr>
</thead>
</table>
| **Diverticulosis (30 - 50%)** | Age (> 40 y.o.)  
| | Low fiber diet  
| | High fiber diet increases stool bulk and decreases wall tension in the colon. High wall tension increases risk of developing diverticula.  
| | Obesity (High fat, low fiber diets usually)  
| | Physical Inactivity  
| | Connective tissue disorders such as Ehlers-Danlos and Marfan’s syndromes.  
| | Men = Women  
| | Location of diverticula is highly dependent on environmental and lifestyle factors.  
| | Westernized → Left sided predominance  
| | Africa/Asia → Right sided predominance  
| | 95% of people have sigmoid diverticula, 35% also have more proximal involvement  
| | LGIB (ARTERIAL) when the diverticula blood supply is damaged (trauma, ischemia, or poor clotting).  
| | 5 - 15 % of people with diverticula will have LGIB.  
| | Bleeding is PAINLESS.  
| **Angiodysplasia (20 - 30%) (or AVM, or Vascular Ectasias)** | Older (65 y.o.) > Younger  
| | End stage renal disease  
| | Von Willebrand’s disease  
| | Aortic stenosis?  
| | Low fiber diet  
| | Obesity  
| | LGIB (VENOUS) is usually occult and PAINLESS.  
| | Cecum 37%, Sigmoid 18%, Ascending 17%, Rectum 14%, Transverse and Descending 7%.  
| **Neoplastic (10- 15%)** | Polyps  
| | Cancer  
| **Inflammatory (15 - 20%)** | Radiation  
| | Intestinal damage due to fibrosis and ischemia.  
| | IBD  
| | Ulcerative  
| | Crohn’s Disease  
| | Infectious (E. Coli 0157:H7, C. Difficile, C. Jejuni …)  
| | Ischemic (Hypoperfusion and Vasoconstriction)  
| | Hypotension, Heart Failure, Arrhythmia  
| | Vasculitis  
| **Others (5 – 10%)** | Post-polypectomy bleeding  
| | Aortoenteric fistula  
| | Coagulation deficiency  
| **Hemorrhoids (< 50 y.o. most common) (5 – 10%)** | Arise from a network of dilated veins called the hemorrhoidal plexus that in turn arise from the superior and inferior hemorrhoidal arteries.  
| | Internal or external based upon whether they are located inside the lower rectum (internal) or under the skin around the anus (external) - DENTATE LINE.  
| **Unknown (10 – 15%)** |  

<table>
<thead>
<tr>
<th>Risk Factors</th>
</tr>
</thead>
</table>
| Low fiber diet  
| Obesity, Physical Inactivity  
| Radiation  
| NSAID or Aspirin usage  
| Advancing age  
| Comorbidities (IBD, Infection, Vasculitis...)

### Children and Young Adults

- **Anal Fissure**  
  - Most often the result of hard stool and prolonged constipation.  
  - After forced hard bowel movement.  
  - Management:  
    - Bulking agents  
    - Increased fluid intake  
    - Topical hydrocortisone  
    - Xylocaine injection for pain

- **Infectious Colitis**  
  - IBD  
  - Crohn’s Disease  
  - Ulcerative Colitis

- **Polyps**

- **Intussusception**  
  - One portion of the bowel slides into the next, like a telescope.  
  - It creates an obstruction in the bowel, with the walls of the intestines pressing against one another.  
  - Causes dangerous inflammation, swelling, and decreased blood flow to the intestines involved.  
  - Most common in infants, with the majority of cases occurring in children between 5 months and 1 year of age.  
  - 1-4 / 1000 infants are affected.  
  - Most common abdominal emergency to affect children under 2 years of age.  
  - Boys = 2 X Girls, in frequency

- **Meckel’s Diverticulum (embryonic diverticulum)**  
  - Rule of 2’s:  
    - 2% of the population  
    - 2% of cases are asymptomatic  
    - 2 feet from the ileocecal valve  
    - 2 inches in length  
    - Often present within 2 years of age

- **Pseudomembranous Colitis**  
  - Complication of antibiotic therapy that causes severe inflammation, irritation and swelling of the colon mucosa.  
  - Almost any antibiotic can cause this condition. *Clostridium difficile*, which occurs normally in the intestine, overgrows when antibiotics are taken. This bacterium releases a powerful toxin which causes the symptoms.  
  - Ampicillin is the most common cause of this condition in children.  
  - Stopping the antibiotic with rehydration therapy and metronidazole is usually used to treat the disorder.
Management

- Resuscitation and initial assessment
- Localization of the site of bleeding
- Conservative Treatments (e.g. Lifestyle, Diet ...)
- Surgical or Medical intervention
  - Medical = Coagulation status fix, Meds, Allergies, Anemia, Liver Disease, Cancer
  - Surgical = Diverticulosis, Ulcers, Angiodysplasias, Hemorrhoids, Polyps, Cancer
    - Embolizing, Ligation, Coagulation, Cryosurgery, Resection,

Summary

- Diverticulosis and angiodysplasia account for approximately 80% of adult patients with LGIB.
- Infectious colitis and IBD are the most common causes of LGIB in children.
- In children under the age of 2 years, massive LGIB is most often a result of Meckel's diverticulum or intussusception.
- CBC and Stool sample are crucial for the management of the condition
- Abdominal X-Ray followed by Colonoscopy is the recommended sequence of investigation.
- If active bleeding, then resuscitate with blood transfusion, conservative treatment if not severe.
- Stop bleeding if causes hemodynamic instability, via medical or surgical techniques.

References

6. www.fpnotebook.com – Family Practice Notebook

Glossary

- **EGD** – Esophagogastroduodenoscopy.
- **PEG** - Polyethylene Glycol.
- **Ligament of Treitz** - Suspensory muscle of the duodenum located in the 4th section of the duodenum and is the location where the duodenum changes from being retroperitoneal to intraperitoneal.
- **Hematochezia** – Maroon or bright red stool or blood via rectum.
- **Ectatic** – Dilated, extended, or distention of organ.
Diverticulosis

As a diverticulum herniates, the penetrating vessel responsible for the wall weakness at that point becomes draped over the dome of the diverticulum, separated from the bowel lumen only by mucosa. Over time, the vasa recta is exposed to injury along its luminal aspect, leading to eccentric intimal thickening and thinning of the media. These changes may result in segmental weakness of the artery, predisposing to rupture into the lumen. Diverticular bleeding typically occurs in the absence of diverticulitis.

Blood vessel within a diverticulum
Endoscopy showing a blood vessel within a diverticulum. The blood vessel is separated from the bowel lumen only by mucosa. Over time, the vessel wall is exposed to injury along its luminal aspect, possibly leading to segmental weakness which predisposes to rupture into the lumen. Courtesy of James B McBas, MD.

Mesenteric artery arteriogram
Angiodysplasia

Inferior mesenteric artery arteriogram
Arteriogram of the inferior mesenteric artery in a patient with diverticular bleeding reveals extravasation of contrast medium into the lumen of the descending colon in panel A (arrow), consistent with a bleeding source in this area. In panel B, the extravasated material has disappeared following an infusion of vasopressin. In addition, there is markedly reduced flow in the left colonic and sigmoidal branches. (Reprinted with permission from Pemberton, JH, Armstrong, DN, Dietzen, CD. In: Textbook of Gastroenterology, 2nd ed, Yamada, T (Ed), Lippincott-Raven 1995.)

Angiodysplasia
Angiodysplasia appears endoscopically as peripherally expanding dilated capillaries with a central origin measuring between 0.1 to 1.0 cm in diameter. Courtesy of Rome Jutabha, MD.
Proposed mechanism for the development of angiodysplasia. This cartoon depicts one possible explanation for the development of gastrointestinal angiodysplasias. Mucosal and submucosal venous drainage is intermittently obstructed by muscular contraction or increased intraluminal pressure (panels A, B, and C). After many years of intermittent obstruction, submucosal veins may become dilated and tortuous (panel D) and involve additional veins and venules draining into the system. Eventually, the capillary ring dilates and the precapillary sphincter becomes incompetent resulting in a small arteriovenous communication (panel E). (Bolay, S.J., Sammartano, R., Adams, R., et al. On the nature and etiology of vascular ectasias of the colon: Degenerative lesions of aging. Gastroenterology 1977; 72:650. Copyright © 1977 W.B. Saunders Company. This material may not be reproduced, stored in a retrieval system, or transmitted in any form or by any means without the prior written permission of the publisher.)

Pseudomembranous Colitis

Ulcerative Colitis

Ulcerative colitis. Endoscopic appearance of ulcerative colitis. Extensive ulceration of the mucosa is the most common endoscopic finding (panel A). The surface is irregular, friable, and erythematous, with loss of the normal vascular markings. Pseudopolyps may form as a reaction to inflammation (panel B); these can become quite extensive (panel C). Courtesy of James B McGee, MD.