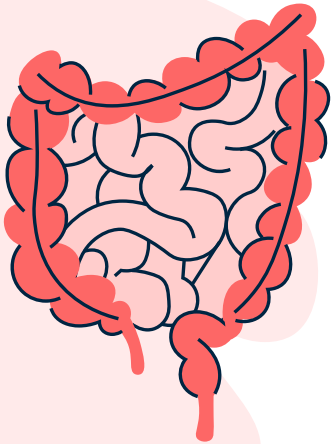
Lower Gastrointestinal Bleeding



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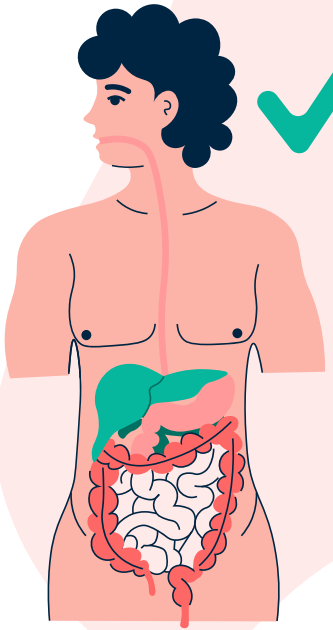

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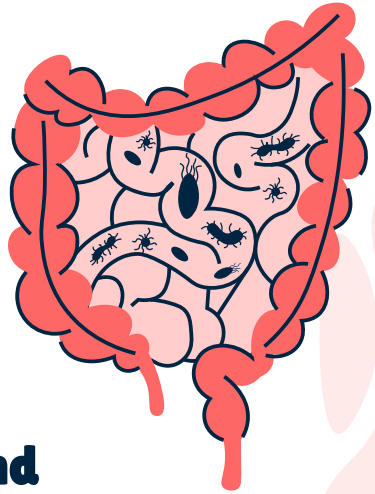
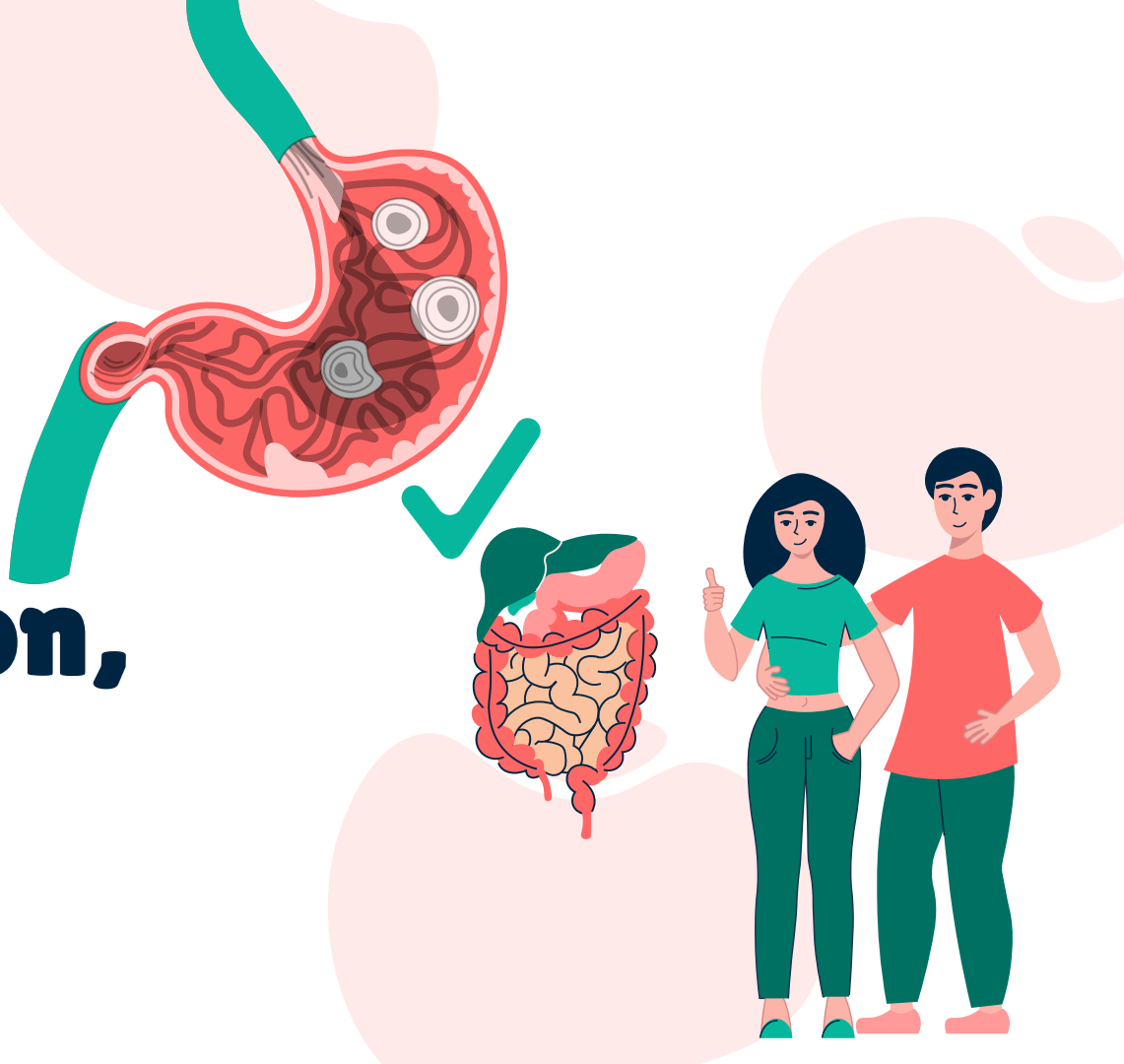


I.

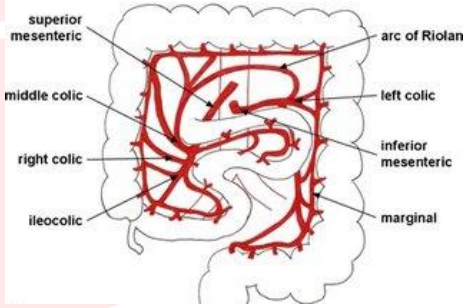
Introduction, Anatomy, Types



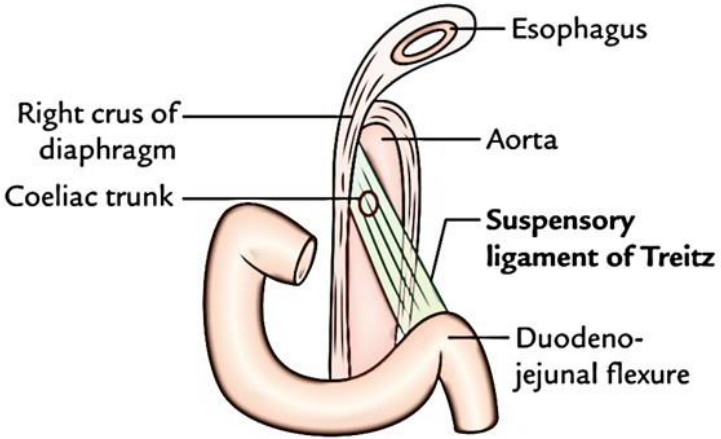
Anatomy

The average length of the large intestine is 135-150 cm. Ascending and descending segments of the colon are fixed to the retroperitoneum. However, the transverse and sigmoid colon are supported by a mesentery.

The ileocolic, right colic, and middle colic branches of the superior mesenteric artery supply blood to the cecum, ascending, and proximal transverse colon, respectively. The superior mesenteric vein drains the right side of the colon, joining the splenic vein to form the portal vein. The inferior mesenteric artery supplies blood to the distal transverse, descending, and sigmoid colon. The inferior mesenteric vein carries blood from the left side of the colon to the splenic vein. A rich network of vessels from the superior, middle, and inferior hemorrhoidal vessels supplies the rectosigmoid junction and rectum.



INTRODUCTION



Lower gastrointestinal bleeding

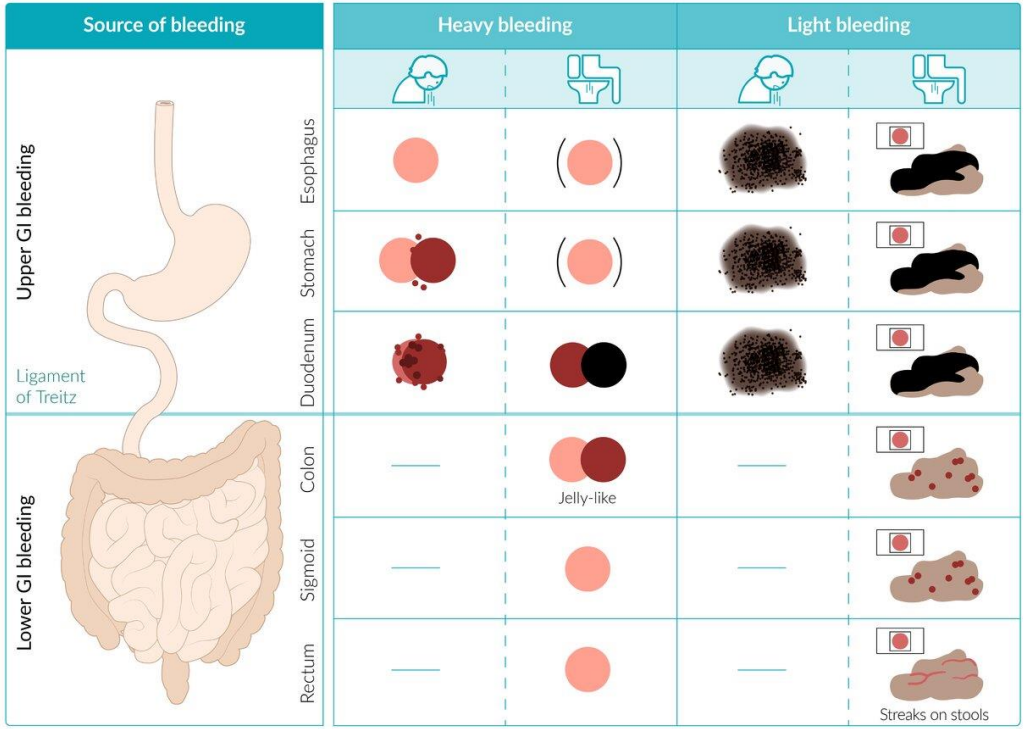
The source of the bleeding is distal to the ligament of Treitz.

The colon is the most common location for the source of LGIB, with only up to 15% located in the anorectal area and 5% in the small intestine.

Background

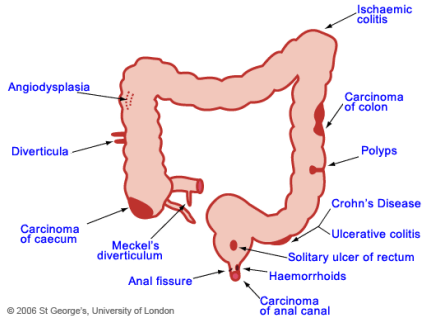
- ~ 20–30% of all GI hemorrhages.
- Annual incidence of about 20-27 cases per 100,000 population in Western countries. However, although LGIB is statistically less common than upper GI bleeding (UGIB), it has been suggested that LGIB is underreported because a higher percentage of affected patients do not seek medical attention. Indeed, LGIB continues to be a frequent cause of hospital admission and is a factor in hospital morbidity and mortality, particularly among elderly patients.

Gastrointestinal bleeding



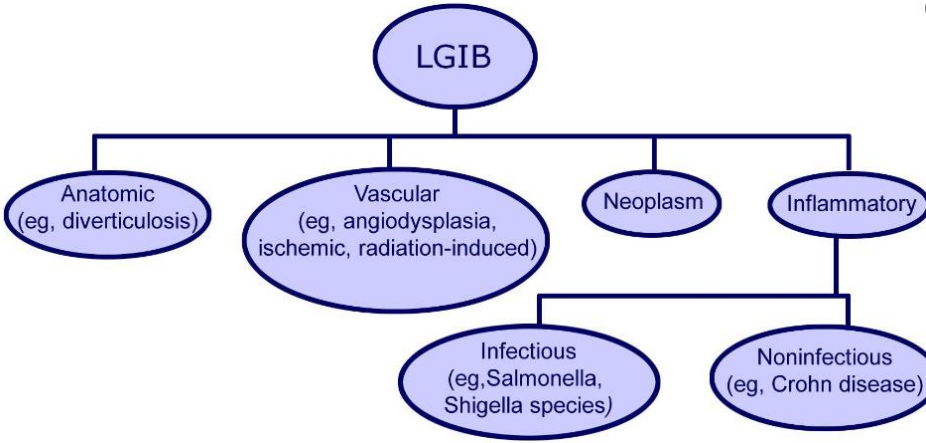
Clinical features of gastrointestinal (GI) bleeding, including hematemesis, melena, and hematochezia, vary depending on source and volume of bleeding.

- Bright red blood
- Dark red blood
- Black blood
- Melena
- Coffee ground vomitus
- Positive fecal occult blood test
- Blood clots
- Hematochezia may occur

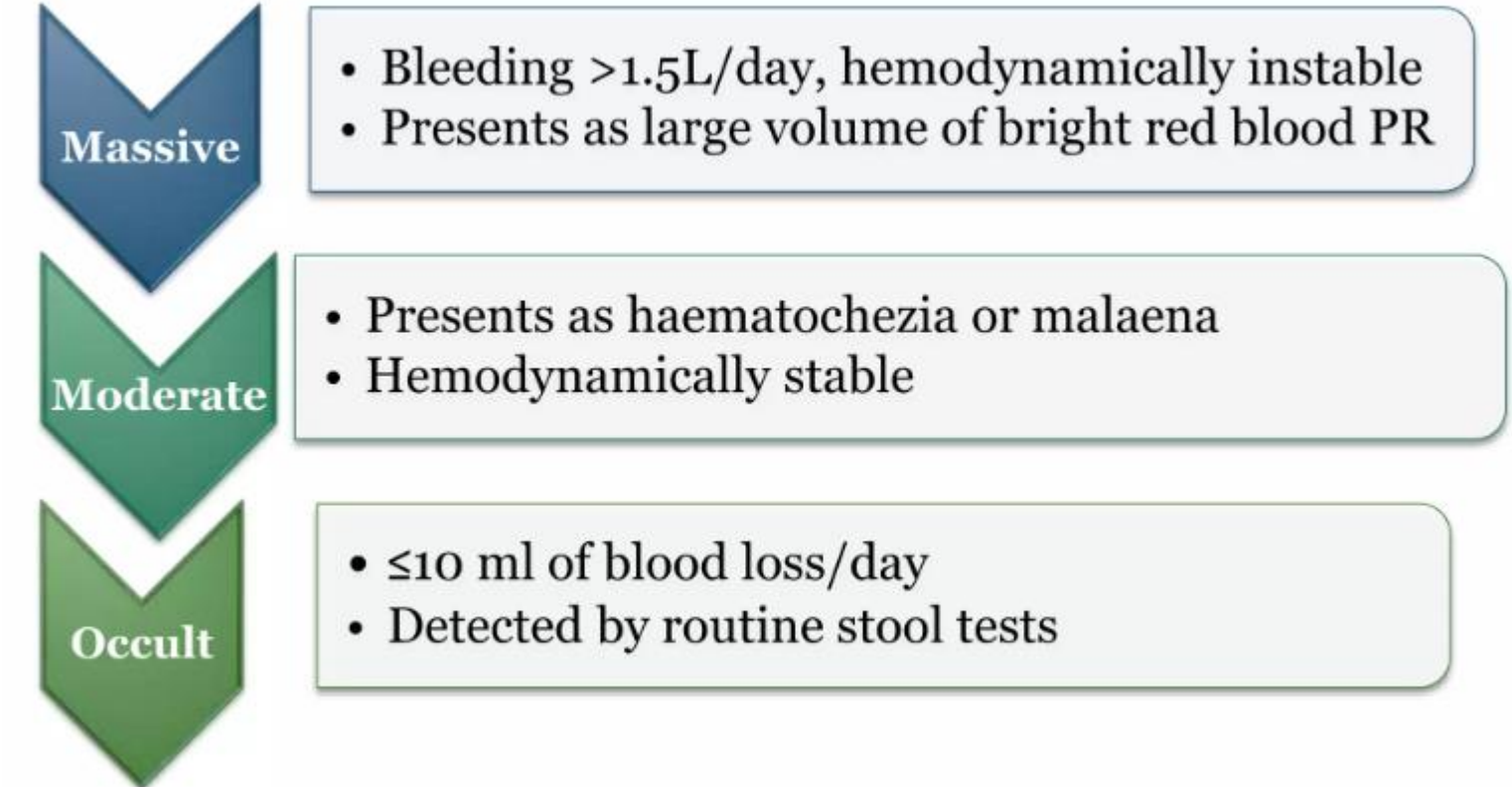


Etiology

- The most common cause of LGIB is diverticular disease (30%), followed by anorectal disease (up to 14% to 20%), ischemia (12%), and neoplasia (10%). Angiodysplasia is a relatively rare cause of bleeding (3%)



Intensity-based classification



Severity–based classification

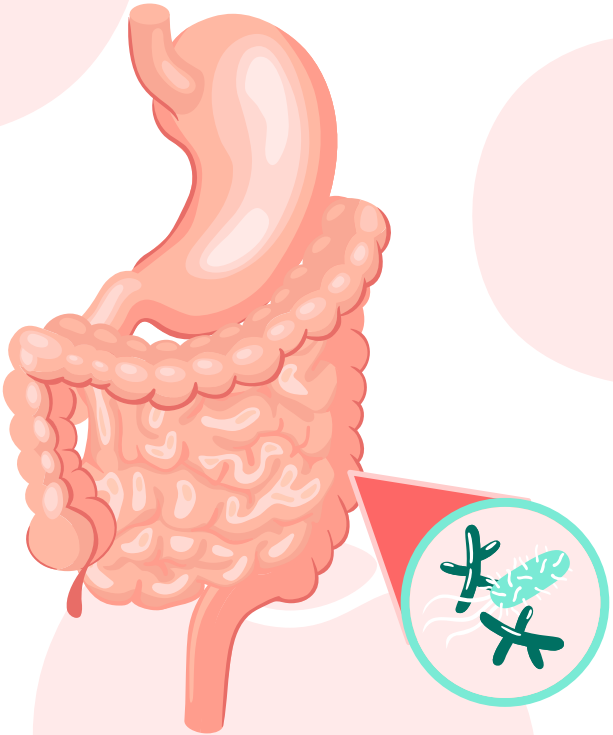
a. Acute lower GI bleeding: Rapid-onset bleeding with significant blood loss, often presenting with hemodynamic instability and requiring urgent intervention.

b. Chronic lower GI bleeding: Persistent or recurrent bleeding over time, which may lead to iron deficiency anemia or other complications.

Acute	Subacute/Chronic
Diverticular disease	Anal disease
Angiodysplasia	Polyps
Meckel's diverticulum	Carcinoma
Ischemic colitis	Solitary rectal ulcer
Mesenteric ischemia	Radiation enteritis

II.

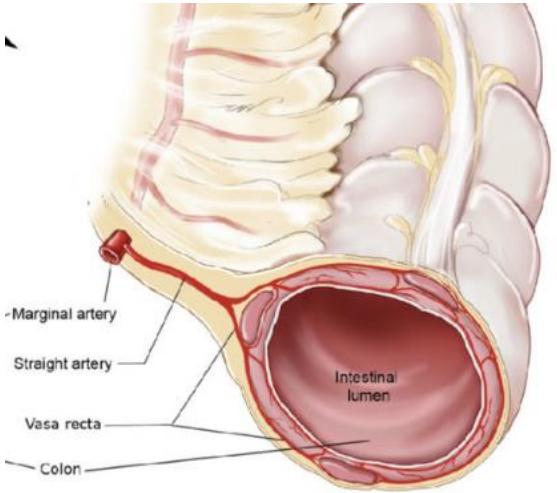
Causes

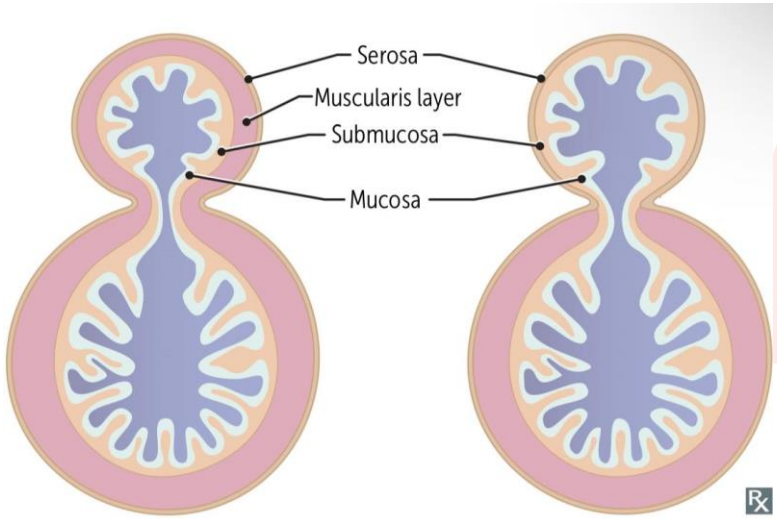


A) Diverticular Disease

Diverticulum: A blind pouch protruding from the GI tract and communicates with the GI lumen.

Mostly acquired and false diverticula. Colonic diverticula occur at weak points, such as when vasa recta perforates muscular layer.





True Diverticulum

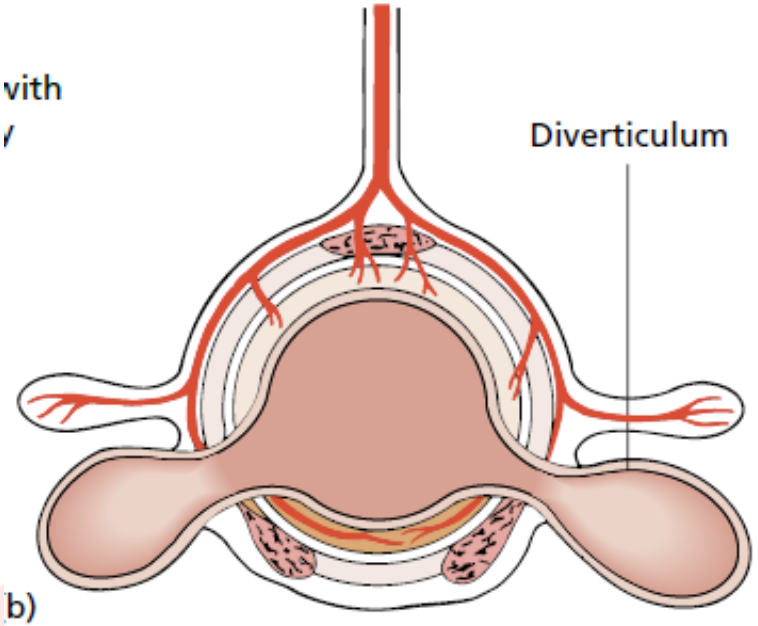
False Diverticulum

A) Diverticular Disease: Pathogenesis

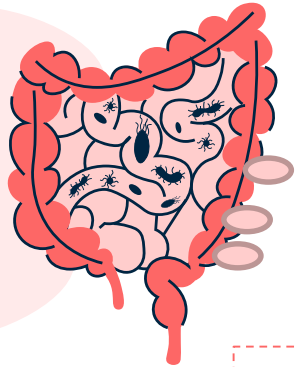
Pathogenesis:
Colon muscle hypertrophy causes increased intraluminal pressure thus pushing the mucosa and submucosa between muscle weak spots.

The diverticula mainly happen next to the tinea coli (vasa recta) and most commonly in the sigmoid colon.

Risk Factors:
- Old age
- Chronic constipation
- Low fiber diet



A) Diverticular Disease: Pathogenesis



Diverticular Disease

Diverticulosis

The presence of or more diverticulum in the colon.
Patient is asmptomatic.
Discovered incidentally.

Symptomatic Uncomplicated

Painful diverticulosis.
Due to severe hypertrophy of colonic muscle.
Leads to luminal narrowing and pencil-thin stool, and colicky pain.

Diverticular Bleeding

The most common cause of colonic bleeding in the elederly.
Usually in the right colon and stops spontneuosly.
Red to dark stools.

Diverticulitis

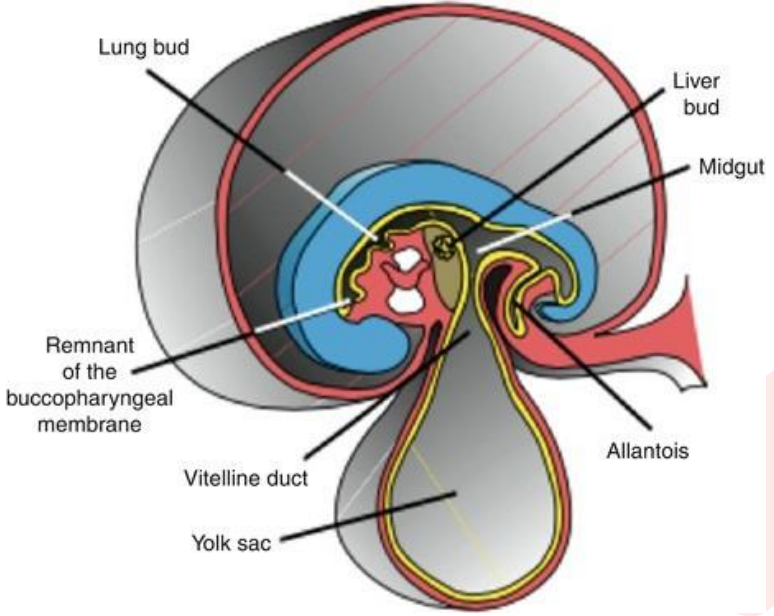
Obstruction of the neck -> acute diverticulitis –> localized or generalized peritonitis fistula, and profound bleeding.

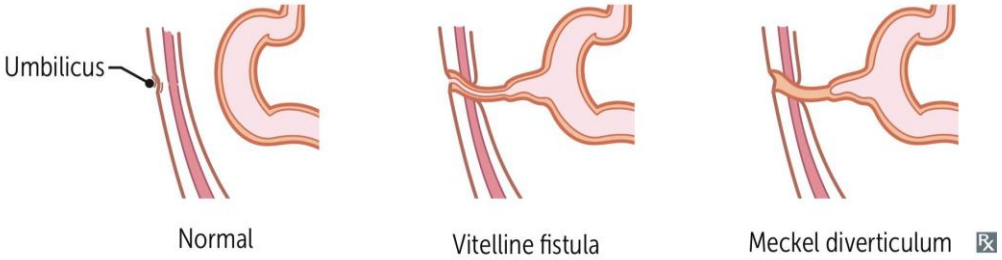
B) Meckel's Diverticulum

A true diverticulum.

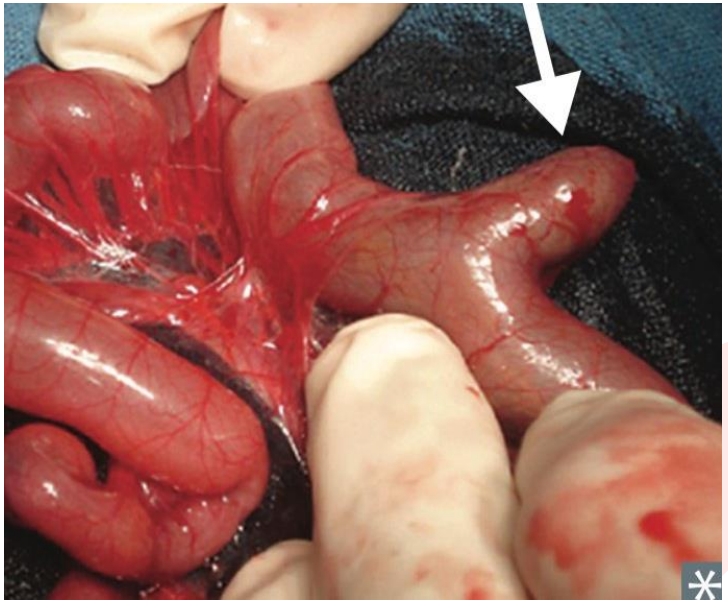
Partial persistence of the vitelline/ omphalomesenteric duct that should obliterate at 7 weeks of gestation.

Rule of **2**:
2 times as likely in males
2 inches long
2 feet from ileocecal valve
Presents in first **2** years of life
May have **2** types of epithelia (gastric/pancreatic).





B) Meckel's Diverticulum

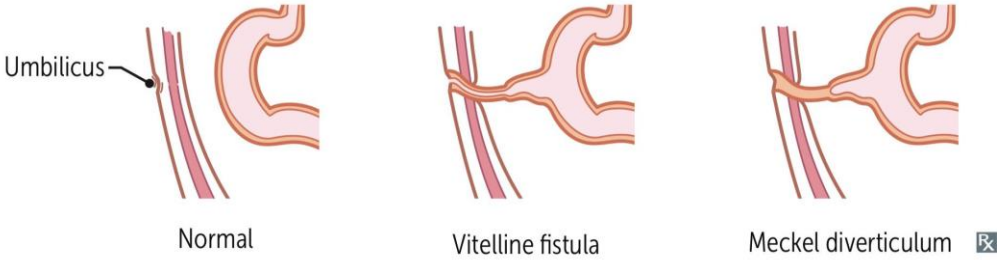


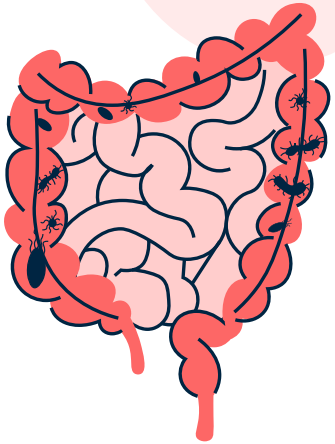
If gastric ectopic tissue is present -> peptic ulcer disease distal to ligament of Treitz -> lower gastrointestinal bleeding s hematochezia or melena.

Other presentation: acute inflammation, perforation, intussusception.

Most common cause of GI tract bleeding in children particularly <2 years.

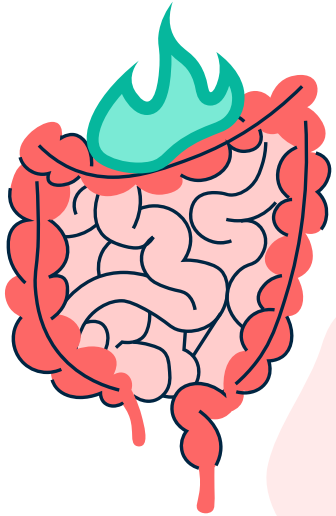
Treatment: Surgical resection.





C) Colitis

Colitis: Inflammation of the colon.



Colitis

Infectious Colitis

E. coli O157:H7
Salmonella
Shigella
Yersinia

Autoimmune

Inflammatory Bowel Disease

Crohn’s Disease
Ulcerative Colitis

Crohn's Disease

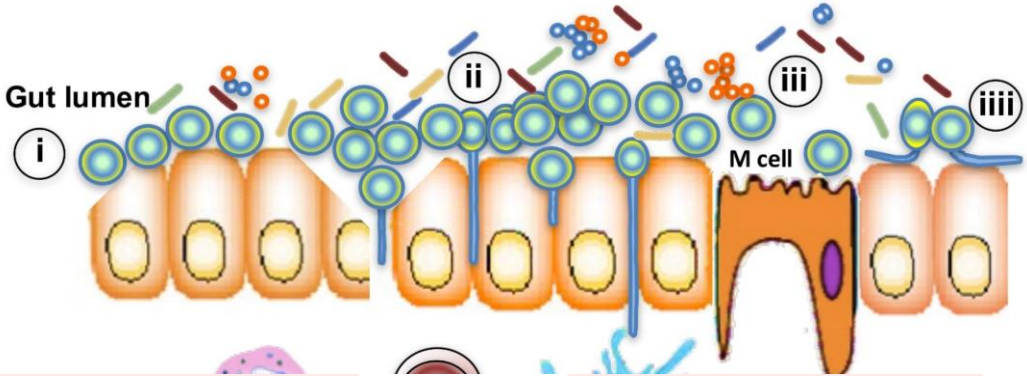
Pathogenesis:

Abnormal innate immune response to yeast in gut microbiota (*Saccharomyces*), this results in infiltration of the yeast into the mucosa and a transmural immune response (this explains the Anti-saccharomyces antibodies present in these patients).

Morphology

Can affect any part of the GI tract, but rectal sparing. If it affects the colon it can result in lower GI bleeding (colitis). Skip lesions are common.

Transmural inflammation -> fistulas and wall thickening. Cobblestone mucosa.



Crohn's Disease

Note:
If the colon is affected in crohn's, there will be bloody diarrhea. If the colon is not affected (only small intestine is affected), there will be watery diarrhea.

Treatment mainly involves immunosuppression.

Ulcerative Colitis

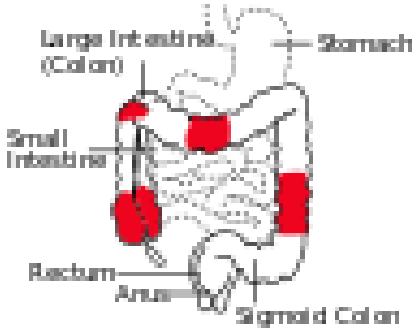
Overview

Autoimmune colitis against an unknown antigen. The inflammation always starts in the rectum and grows proximally with no skip lesions.

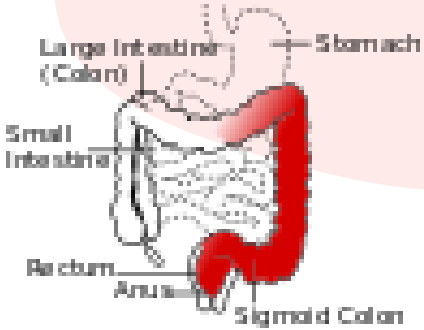
Mucosal and submucosal inflammation only, resulting in friable mucosa, ulcers, and pseudo polyps.

Presentation is bloody diarrhea (usually nocturnal with pain). Mucous per rectum and colicky pain are present.

Treatment mainly involves immunosuppression. Curative treatment is colectemy.



Crohn's Disease



Colitis ulcerosa

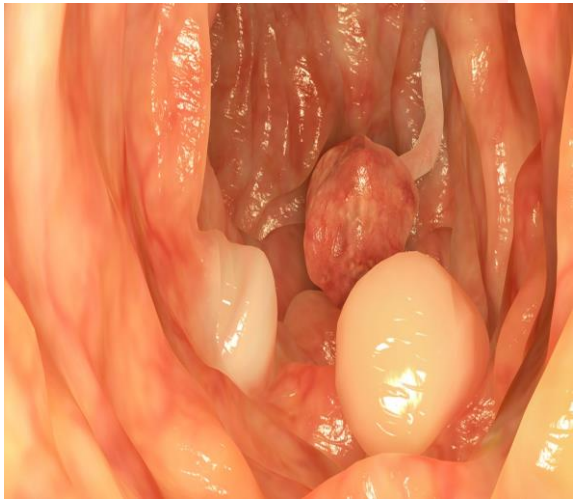
Polyps

Polyp is a nonspecific clinical term that describes any projection from the surface of the intestinal mucosa regardless of its histologic nature.

Polyps are classified as neoplastic (adenomatous polyps) , hyperplastic , inflammatory (pseudopolyps) and hamartomatous polyps . Identifying the type of polyp is important because some types are associated with carcinoma of the colon .

50% occur in the rectosigmoid region .

They are usually asymptomatic , but they can present with bleeding .



Adenomatous polyps

- Classified as villous , tubular , and tubulovillous)
- Those lesions are dysplastic .
- The risk of malignant degeneration is related to the size and type of the polyp.
- Tubular adenoma are associated with malignancy in 5% . whereas villous adenoma may harbor cancer in 40% . Tubulovillous are at intermediate risk of 22%.
- Those lesions should be removed by colonoscopic excision.

Hyperplastic polyps

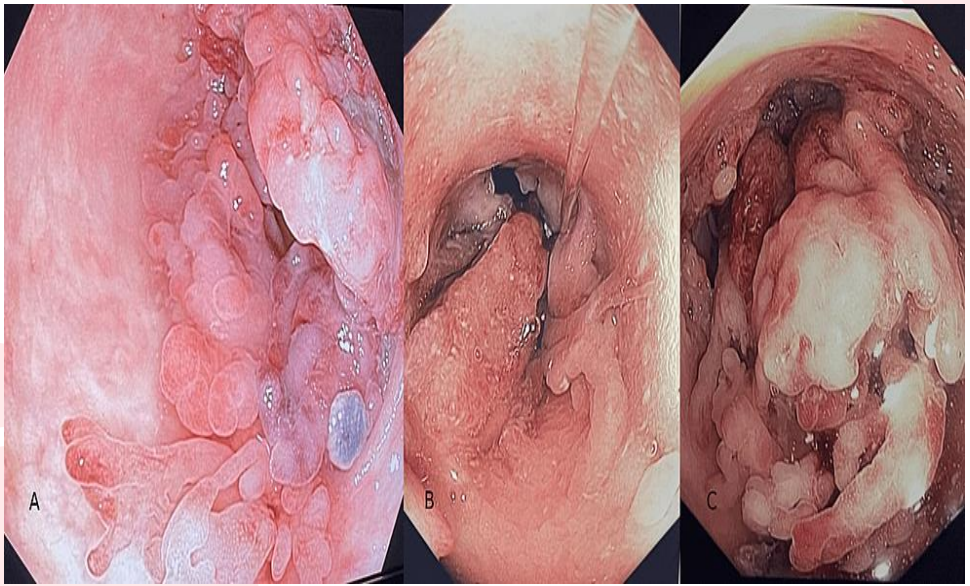
- those polyps show histological characteristic of hyperplasia without any dysplasia
- They are not premalignant
- They are often removed .

Hamartomatous polyps

- They are usually not premalignant
- Mostly seen in children but my occur at any age .
- Bleeding is common and may cause intussusception or obstruction.
- Treated by polypectomy.

Inflammatory polyps

- They occur in the context of inflammatory bowel disease , can occur after amebic colitis , ischemic colitis.
- They are not premalignant
- Microscopic examination shows islands of normal regenerating mucosa surrounded by areas of mucosal loss.



Colorectal cancers

- Colorectal carcinoma is the most common malignancy of the gastrointestinal tract.
- The incidence is similar in men and women .
- Its adenocarcinoma in 95% of cases . Its thought that adenocarcinoma develops from adenomatous polyps which are caused by accumulation of genetic defects and molecular abnormalities associated with the development and progression of colorectal adenomas and carcinoma such as Mutations that cause activation of oncogenes (K-ras) and/or inactivation of tumor suppressor genes (APC, p53).

- Risk factors :

Aging : More than 90% of cases diagnosed are in people older than age 50 years.
Hereditary risk factors : 20% of cases arise in patients with a known family history of colorectal cancer , in addition to those with a familial syndromes that increases the risk of developing colon cancer such as familial adenomatous polyposis syndrome and lynch syndrome .
Dietary factors : colorectal carcinoma occurs more commonly in populations that consume diets high in animal fat and low in fiber, smoking is associated with an increased risk of colonic adenomas
Inflammatory Bowel Disease

Clinical presentaion :

The clinical presentation determined by the location :

patients may be asymptomatic and/or present with unexplained anemia, weight loss, or poor appetite with right sided colon cancer .

Whereas present with obstruction , rectal bleeding and alteranting diarrhea and constipation in the left and sigmoid colon .
Tenesmus occurs in advanced disease .

So, any patient older than 30 with a change in bowel habits or unexplained iron deficiency anemia or rectal bleeding must undergo a complete colonoscopic examination .

Hemorrhoids

- Hemorrhoids are enlarged vascular anal cushions .
- Anal cushions are a specialized submucosal tissue containing venules, arterioles, and smooth muscle fibers that are located in the anal canal.
- Three hemorrhoidal cushions are found in the left lateral, right anterior, and right posterior positions. they are thought to function as part of the continence mechanism and aid in complete closure of the anal canal at rest.
- Excessive straining, increased abdominal pressure and hard stools are predisposing factors .

- Two types :

External hemorrhoids are located distal to the dentate line ,thrombosis of an external hemorrhoid may cause significant pain.

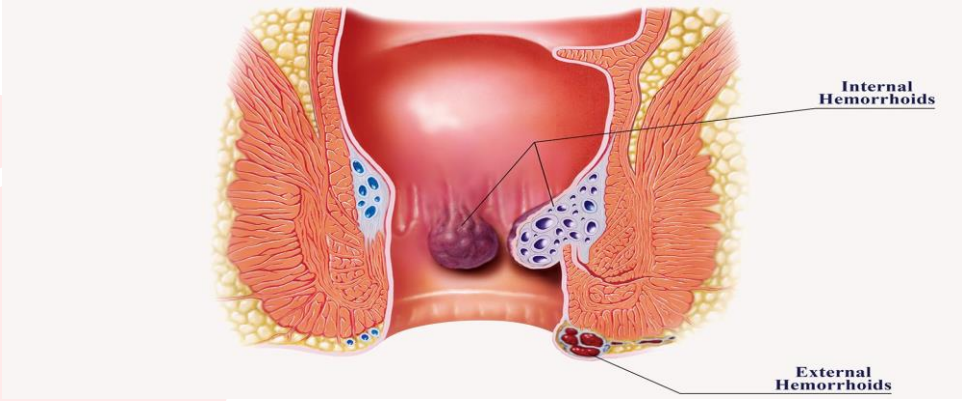
Internal hemorrhoids are located proximal to the dentate line, may prolapse or bleed, but rarely become painful unless they develop thrombosis and necrosis (usually related to severe prolapse, incarceration, and/or strangulation).

Internal hemorrhoids are graded according to the extent of prolapse. **Firstdegree hemorrhoids** bulge into the anal canal and may prolapse beyond the dentate line on straining. **Second-degree hemorrhoids** prolapse through the anus but reduce spontaneously. **Third-degree hemorrhoids prolapse** through the anal canal and require manual reduction. **Fourth-degree hemorrhoids prolapse** but cannot be reduced and are at risk for strangulation.

Clinical presentation :
They could be asymptomatic , or may present with painless bright red bleeding , itchy anus or lump sensation.

treatment options :

- Medical Therapy : addition of dietary fiber, stool softeners, increased fluid intake, and avoidance of straining.
- Rubber Band Ligation
- Infrared Photocoagulation
- Sclerotherapy.
- Operative Hemorrhoidectomy.



Anal Fissure

- is a tear in the anoderm distal to the dentate line.
- is thought to be related to trauma from the passage of hard stool , this tear in the anoderm causes spasm of the internal anal sphincter, which results in pain, increased tearing, and decreased blood supply to the anoderm. This cycle of pain, spasm, and ischemia contributes to development of a poorly healing wound that becomes a chronic fissure.
- The vast majority of anal fissures occur in the posterior midline.
- Anal fissure is extremely common. Characteristic symptoms include tearing pain with defecation and hematochezia
- **Treatment:** Therapy focuses on breaking the cycle of pain, spasm, and ischemia thought to be responsible for development of fissure in ano. **First-line therapy** to minimize anal trauma includes bulk agents, stool softeners, and warm sitz baths.

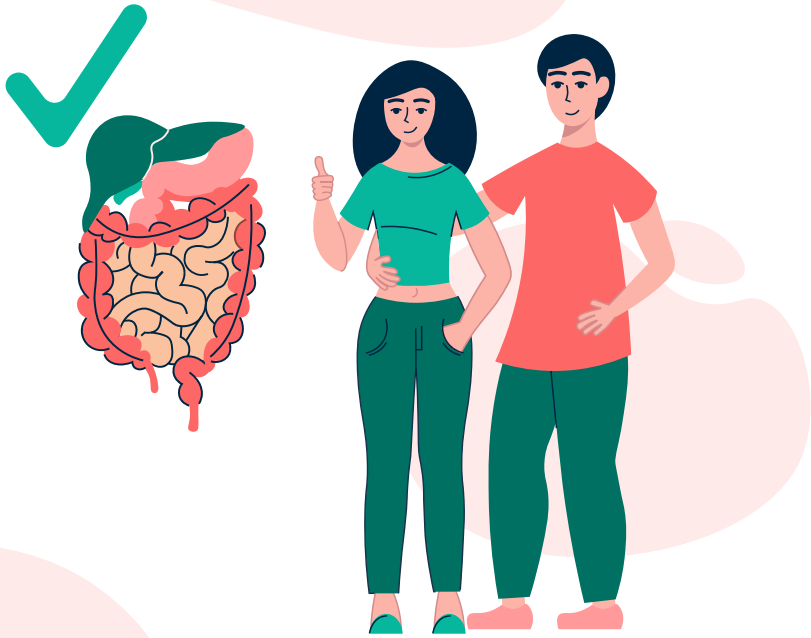
  Others include : Nitroglycerin ointment ,. Both oral and topical calcium channel blockers ,Botulinum toxin (Botox),lateral internal sphincterotomy .

Angiodysplasia

- Its an arteriovenous malformation that is commonly located in the cecum and ascending colon .
- It can be either acquired or congenital (such as hereditary hemorrhagic telangiectasia)
- It can be asymptomatic , or present as painless occult per rectal bleeding or cause acute hemorrhage.
- Diagnosed via colonoscopy and mesentric angiography .
- Persistent or sever bleeding can be treated endoscopically via argon plasma coagulation , laser photoablation , sclerotherapy , electrocautery and others.

III

History and Physical Exam/ Initial Evaluation



Evaluation

- The initial evaluation of lower GI bleed includes history, physical exam, lab tests, and sometimes upper endoscopy to rule out upper GI bleed.

- Goals of evaluation:

Assess the severity of the bleeding

Assess whether the bleeding may be coming from the upper GI tract

Determine if there are conditions present that may affect subsequent management.

History

- Patient’s profile
- Assess presenting complaint with associated symptoms
- Prior episodes of GI bleed
- past medical Hx (comorbidities that may influence the patient's subsequent management)
- Medications anticoagulants, and antiplatelet agents

Cont.

- Systemic symptoms (fever, bloody diarrhoea…) which may indicate an infectious or inflammatory cause.
- Weight loss should raise suspicion for malignancy, especially in older patients who have changes in bowel habits and/or iron-deficiency anaemia.
- Iron-deficiency anaemia in a man or a postmenopausal woman should raise suspicion for malignancy (especially colorectal cancer, particularly if the patient has never had screening).
- Bleeding that follows straining at stool suggests an anorectal cause.
- Tenesmus most often seen with ulcerative colitis and infectious aetiologies.
- Bleeding from diverticulosis and angiodysplasia tends to be painless.
- Abdominal pain (especially in elderly patients) should raise suspicion for ischaemic colitis.

Physical Examination

*The physical examination should include an assessment of hemodynamic stability as well as examination of the patient's stool to confirm the presence of hematochezia or melena.

*Vital signs

*Signs of anemia

*Extraintestinal manifestation for IBD (eye. Skin. joint)

*Assess hemodynamic stability

Cont.

Signs of hypovolemia include:

- Mild to moderate hypovolemia: Resting tachycardia
- Blood volume loss of at least 15%: Orthostatic hypotension

(decrease in the systolic blood pressure of more than 20 mmHg or decrease in diastolic pressure of more than 10 mmHg when moving from recumbency to standing)

- Blood volume loss of at least 40%: Supine hypotension

High Risk Patients

- clinical features that predict the risk of complications in patients with presumed acute lower GI bleeding:

Hemodynamic Instability	Persistent bleeding
comorbidities	Advanced age
Current aspirin use	anemia
Elevated BUN	Low albumin
A prior history of bleeding from diverticulosis or angiodysplasia	

Consider an upper GI bleeding source

- Findings that are suggestive of an upper GI source:
- include hemodynamic instability, orthostatic hypotension, and an elevated blood urea nitrogen (BUN)-to-creatinine or urea-to-creatinine ratio
- A preceding history of prior peptic ulcer disease may suggest the possibility of an upper GI source of bleeding

**If the suspicion for an upper GI source is high, an upper endoscopy should be performed once the patient is appropriately resuscitated

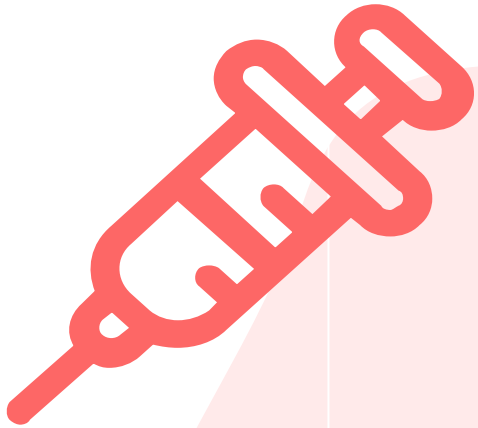
Management

Unstable patient

RESUSCITATION!!!

- Admit to ICU
- ABCDE
- Supplemental oxygen via nasal cannula
- NPO
- Two large bore Ivs
- IV Normal Saline
- After that take CBC(complete blood count)
- Be aware that blood transfusion may be needed
- If hb is less than 7mmgh transfuse blood
- If hb is 10 and patient is still having anemia symptoms, then transfuse blood
- If patient is thrombocytopenic (platelets less than 50000), transfuse platelets

Laboratory studies



1. CBC (RBCs, WBCs, hgb, hct, platelets)
2. Coagulation profile (aPTT,PT,bleeding time)
3. Serum chemistry (electrolytes and creatinine)
4. Liver function tests
5. Fecal occult blood test / FIT test
6. Stool culture
7. Blood typing, cross matching for blood transfusion if needed

Investigations

Diagnosing the source and location of hemorrhage are key, as this will help to guide initial therapy and ultimately the need for, and type of, surgical intervention, if any.

1. Endoscopy
2. CT angiogram
3. Nuclear scan
4. Mesenteric angiography

Endoscopy

1. EGD

It should be considered in any patient with massive LGIB or melena if an UGI source has not already been ruled out.

2. Colonoscopy

It can be both diagnostic and therapeutic, as can EGD. Actively bleeding lesions may be injected with dilute epinephrine solution for vasoconstriction, cauterized or clipped.

CT angiogram

It has become the test of choice. It is relatively quickly obtained and can detect continuous bleeding with a sensitivity of up to 90% at rates >0.35 mL/min. It is more specific in identifying the anatomic location of bleeding when compared to a nuclear scan.
Caution must be used for patients with renal disease as the use of contrast may induce nephropathy.

Nuclear scan

using technetium-99m sulfur colloid or tagged RBCs can identify bleeding sources with rates as low as 0.1 to 0.5 mL/min. Tagged RBC scan can identify bleeding up to 24 hours after isotope injection but is not specific in identifying the anatomic location of the bleeding source

Mesenteric angiography

It should be performed in patients with a positive nuclear scan or CTA to definitively localize (and hopefully treat) the source of bleeding. Angiography can localize bleeding exceeding 1 mL/min. It allows for therapeutic interventions such as vasopressin infusion (0.2 unit/min) or selective arterial embolization, which together achieve hemostasis in 85% of cases with an associated risk of ischemia to the treated bowel segment.

Treatment according to cause

After stabilization

Cause	Treatment
Diverticular disease	High-fiber diet to prevent development
Diverticulitis	Uncomplicated: oral antibiotics, liquid diet slowly advanced as tolerated to low residue diet, and close follow-up. Complicated: surgical intervention/ hartmann procedure
Meckel’s diverticulum	Surgical resection
Ulcerative colitis	Mesalamine, supplemental iron, corticosteroids, immunosuppressives; total colectomy is curative
Crohn’s disease	Mesalamine, broad-spectrum antibiotics, corticosteroids, immunosuppressives; surgical resections of severely affected areas, fistulas, or stricture
Polyps	endoscopic resection, but large polyps sometimes require segmental colectomy.
Colorectal cancer	Surgical resection plus regional lymph node dissection; adjuvant chemotherapy in cases of positive lymph nodes; palliative resections are helpful in metastatic disease to reduce symptoms
Hemorrhoids	warm baths, increase fiber in diet, avoid prolonged straining; sclerotherapy, ligation, or excision can be performed for worsening symptoms
Anal fissure	stool softeners, sitz baths, topical nitroglycerin (second line); partial sphincterotomy may be performed for recurrent fissures

Hartmann procedure

A Hartmann’s procedure* is a sigmoid colectomy with end colostomy formation. Typically performed as an emergency, the procedure is most commonly formed due to sigmoid perforation (e.g. secondary to diverticulitis) or a sigmoid malignancy causing bowel obstruction.

In a Hartmann’s procedure, a descending colon end colostomy is formed and the residual rectal stump is closed. Whilst a Hartmann’s procedure can be performed laparoscopically, they are usually performed via a laparotomy so ensure adequate space to operate and to allow maximum irrigation of any intra-abdominal contamination.