




# Lower Gastrointestinal Bleeding

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## Abstract

Lower gastrointestinal (LGI) bleeding indicates bleeding from colon or anorectum. Typically, patients with LGI bleeding present with bright red blood per rectum or hematochezia, although rarely they can present with melena as well. Alternatively, LGI bleeding is also defined as bleeding from a source within potential reach of a colonoscope, that is, colon and terminal ileum. LGI bleedings have more favorable outcomes than upper GI (UGI) bleeding and less common than UGI bleeding. Any patient presenting with GI bleeding should undergo a detailed history and physical examination for clues that may suggest source and possible etiology. Colonoscopy remains the most widely used and preferred instrument of choice for both diagnosis and therapy. This review will discuss in brief the causes, triaging, and role of colonoscopy in the management of LGI bleeding.

## Keywords

- ▶ colonoscopy
- ▶ hematochezia
- ▶ hemostasis
- ▶ lower gastrointestinal bleeding

## Introduction

Lower gastrointestinal bleeding (LGI) indicates bleeding from colon or anorectum. Typically, patients with LGI bleeding present with bright red blood per rectum or hematochezia, although rarely they can present with melena as well. Alternatively, LGI bleeding is also defined as bleeding from a source within potential reach of a colonoscope, that is, colon and terminal ileum. Acute LGI bleeding is sudden bleeding presenting mostly as hematochezia and is of less than 3 days duration, while chronic LGI bleeding lasts over weeks and can either be obscure or overt.<sup>1</sup> Upper GI bleeding (UGI) bleeding is four times as common as LGI bleeding. LGI bleeding has an approximate incidence of 20 to 27/1,00,000 population. The incidence increases with age and over 85% of these bleedings stop spontaneously.<sup>2,3</sup> As compared with UGI bleeding, the incidence of shock, the drop in hemoglobin, and the need for blood transfusion and hospitalization is lower in LGI bleeding.<sup>4</sup> LGI bleedings have more favorable outcomes than UGI bleeding. The colonic contribution to iron deficiency anemia is 18 to 30%. An UGI

etiology contributes to 11 to 15% and small bowel lesions between 8 and 10% of patients who present as LGI bleeding.<sup>4</sup>

This review will discuss in brief the causes, triaging, and role of colonoscopy in the management of LGI bleeding.

## Triaging of LGI Bleeding

LGI bleeding can be caused by various lesions; it can be life threatening in some patients, and it might be recurrent and self-limiting in majority of patients. Low-risk patients can be managed as outpatients, while high-risk patients require hospitalization and/or intensive care depending upon hemodynamic stability. Patients having recurrent bright red bleeding during defecation that is more likely due to benign anorectal diseases such as anal fissure or hemorrhoids can be managed as outpatients. In patients with hematochezia with hemodynamic instability, hyperactive bowel sounds and elevated urea creatinine ratio UGI source of bleeding should be considered.

The BLEED classification system has been used to triage LGI bleeding. This includes B—ongoing bleeding, L—low systolic

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blood pressure, E—elevated prothrombin time/international normalized ratio, E—erratic mental status, D—unstable comorbid condition. In the absence of these variables, patient can be considered as low-risk groups. The BLEED system can triage patients into low- and high-risk groups, and can predict the recurrence of bleeding. It can also prognosticate the need for surgical intervention as well as mortality.<sup>5</sup>

Artificial neural network and multiple logistics regression take into account 26 nonendoscopic factors that are available at triage. These variables form a computer-based decision and can predict outcomes in acute LGI bleeding.<sup>6</sup>

The clinical predictive factors of severe colonic bleeding include aspirin use, at least two comorbid illnesses, pulse rate greater than 100/minute, and systolic blood pressure less than 110 mm Hg.<sup>7,8</sup> The over mortality of colonic bleeding is “2.4 to 3.9%.” Predictors of higher mortality include age >70 years, intestinal ischemia, and two or more comorbidities.<sup>9–11</sup> Other studies have also revealed the risk factors for poor LGI bleeding outcome and include hemodynamic instability at presentation, ongoing bleeding, comorbidities, older age, requirement of blood transfusion, and concomitant medications such as nonsteroidal anti-inflammatory drugs (NSAIDs), antiplatelets, and anticoagulants.<sup>12</sup> Patients with a self-limited bleeding, no adverse clinical features, and Oakland score of <8 can be evaluated as outpatients to save resources.<sup>13</sup> The issue of triaging for LGI bleeding is, however, debatable and the ESGE recommends that no single risk stratification score should be used in isolation to predict adverse outcomes and/or the need for hospitalization.<sup>13</sup>

## Initial Assessment and Management

Any patient presenting with GI bleeding should undergo a detailed history and physical examination for clues that may suggest source and possible etiology. The important historical points such as medicine use (NSAIDs), recent colonoscopy with polypectomy, prior abdominal/pelvic radiation, prior surgery (anastomotic ulcers), abdominal pain and weight loss (malignancy), and loose stools (colitis) should be noted. The bright red blood is more often seen from anorectal source. Painless severe bleeding with clots is more common with diverticular hemorrhage. Bloody diarrhea indicates ischemic and inflammatory colitides. It is important to consider previous history and cause of LGI bleeding can help to determine the cause of current cause of bleeding in cases of recurrent bleeding such as colonic polyp and inflammatory bowel disease. ► **Table 1** depicts major causes of lower GI bleeding.

A thorough physical examination should be performed to assess severity of hemorrhage, volume status, and the need for resuscitation. About 15% of hematochezia cases are due to UGI bleeding and therefore an UGI endoscopy should be additionally performed in these patients, especially if no bleeding source is found in colonoscopy.<sup>14</sup> Typically melena indicates bleeding from foregut but right colonic bleeding can rarely result in melena.<sup>15</sup> Patients with recurrent bleeding, hemodynamic instability, and significant comorbidities should be hospitalized and evaluated urgently. A restrictive blood transfusion strategy, with a target hemoglobin con-

centration of 7 to 9 g/dL, is desirable in hemodynamically stable patients without history of cardiovascular disease. The more liberal blood transfusion (target hemoglobin > 10 g/dL) should be considered for patients with history of acute or chronic cardiovascular disease.<sup>13</sup> These are the standard of care for the management of all patients with GI bleeding.

## Diagnosis and Therapy

Colonoscopy remains the most widely used and preferred modality of choice for both diagnosis and therapy. Radio nuclear study with Technetium 99m labeled red blood cell (RBC) as well as conventional and computed tomographic (CT) angiography is useful in specific situations in a small number of cases.

### Four Clinical Scenarios Possible with LGI Bleeding

- Minimal self-limiting bleeding—It is present in 75 to 90% of patients. Colonoscope is the instrument of choice.
- Chronic intermittent bleeding of low intensity—Colonoscopy is preferred.
- Severe intermittent bleeding with a normal intervening period—Can use radio nuclear study, angiography, or colonoscopy. It needs a personalized approach.
- Severe continuous bleeding—If colonoscopy is not feasible, then angiography/surgery are both diagnostic and therapeutic modalities.

## Technetium-Labeled RBC

This procedure is useful when the bleeding rate is 0.1 mL/minute. If the scan is positive within 2 hours of administrating the RBCs, the sensitivity is 95%. If it is positive after 2 hours, then the sensitivity drops to 57 to 67%. Its limitation is poor specificity and localization as it can be positive even if bleeding occurs from small intestine.<sup>4</sup>

## Angiography

CT angiography is a promising initial test for acute LGI bleeding especially in unstable patients, as it is commonly available, can be performed rapidly, and may provide diagnostic information to guide subsequent therapy either by conventional angiography or surgery.<sup>16</sup> The procedure is useful in brisk bleeding of 0.5 to 1 mL/minute. Sensitivity is between 95 and 100%. Specificity is 45 to 50% for acute LGI bleeding and 30% for chronic bleeding. The conventional angiography carries the additional benefit of a therapeutic option.<sup>17</sup>

## Colonoscopy

Colonoscopy should be the initial diagnostic procedure for nearly all patients presenting with LGI bleeding.<sup>13,18,19</sup> The diagnostic accuracy of colonoscopy is 42 to 100% and hemostatic therapy can be performed in 10 to 63% of LGI bleeding. Colonoscopy and CT angiography have comparable diagnostic yield; however, colonoscopy does not require active bleeding for diagnosis and avoids radiation exposure and contrast induced toxicity.

**Table 1** Common colonic causes of bleeding

Hematochezia	Chronic blood loss OR IDA
Diverticular bleed	Colonic polyps and neoplasm
Angiodysplasia	Angiodysplasia
Anorectal disorders (anal fissure, SRUS, hemorrhoids)	Drugs
Neoplasm	
Postpolypectomy	
Colitis (infective, inflammatory, ischemic, radiation)	
NSAIDs	

Abbreviations: IDA, iron deficiency anemia; NSAIDs, nonsteroidal anti-inflammatory drugs; SRUS, solitary rectal ulcer syndrome.

### Preparation for Colonoscopy

The whole of the colonic mucosa should be carefully inspected with aggressive attempts made to wash residual stool and/or blood clots. The terminal ileum should be intubated to rule out bleeding from small bowel. Unprepared colonoscopy is not recommended unless acute severe ulcerative colitis is suspected. In hemodynamically stable patient, colonoscopy should be performed after adequate colon cleansing, with 4 to 6 L of polyethylene glycol administered over 3 to 4 hours until rectal effluent is clear of blood and stool.<sup>4,7,13</sup> Nasogastric tube and/or antiemetic agent can be considered to facilitate colon preparation in patients who are intolerant to oral intake or at risk of having aspiration.

### Timing of Colonoscopy

The timing of colonoscopy should be decided according to patient's hemodynamic stability. In high-risk clinical features and signs or symptoms of ongoing bleeding, colonoscopy should be performed within 24 hours of presentation after initial hemodynamic resuscitation. This may improve diagnostic and therapeutic yield. Other patients can undergo elective colonoscopy after appropriate colon preparation.<sup>20,21</sup> The role of early or emergency colonoscopy in improving patient outcomes is debatable and need more evidence to confirm. Retrospective studies showed that early colonoscopy (< 24 hours of presentation) may reduce mortality, need for the surgery, and blood transfusion and hospital stay. However, meta-analysis of randomized controlled trials does not confirm the same.<sup>22</sup>

### Safety of Colonoscopy

Colonoscopy is safe even with acute LGI bleeding. The complication rate is 0.03 to 0.3% in young and 1.5% in the elderly.<sup>22</sup> Over 50% of complications are cardiopulmonary. Colonoscopic therapy for hemostasis should be performed to patients with high-risk stigmata of bleeding.<sup>22</sup>

### Role of Surgery

Surgery for acute LGI bleeding should be considered after failed colonoscopic or radiological interventions.<sup>23</sup> Appropriate localization of the source of bleeding is essential

before attempting surgical intervention to avoid continued or recurrent bleeding from unresected lesion.<sup>22</sup>

## Major Causes and Their Management

### Diverticulosis

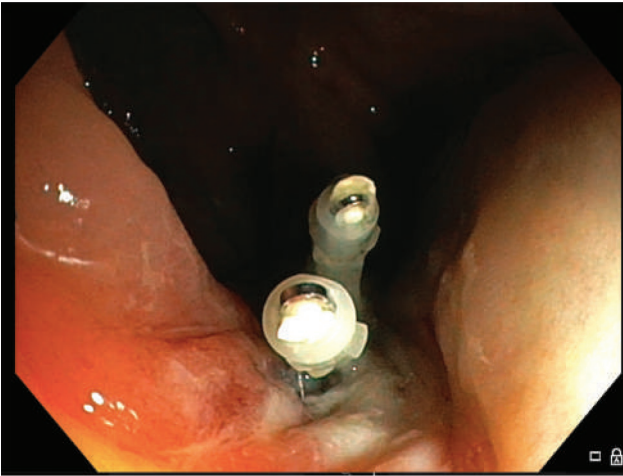
It is herniation of colonic mucosa and submucosa through muscular layers of colon. Majority of diverticula are asymptomatic and the problem is less common in India.<sup>24</sup> However, severe bleeding may occur from vessels at neck or base of diverticulum. Colonoscopic hemostasis can be achieved with hemoclips (preferred), epinephrine injection, and band ligation. Adrenaline can be injected to evert the diverticulum for the better localization of the bleeding point. India ink tattooing or clips can be used as markers in case subsequent procedures are needed for recurrent diverticular bleeding. If colonoscopy interventions are failed, angiographic embolization or surgery should be considered.<sup>25,26</sup>

### Postpolypectomy Bleeding

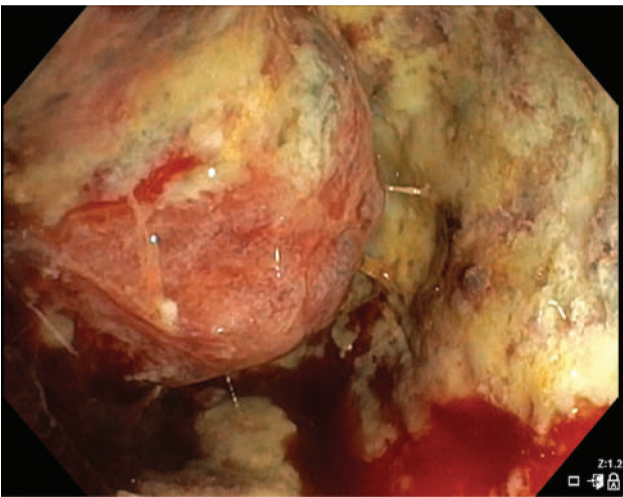
The incidence of postpolypectomy bleeding varies between 0.8 and 1.5%. Risk factors include large size of polyp, flat and laterally spreading lesions, age over 65 years, and presence of comorbidity and expertise of the colonoscopist.<sup>27</sup> Postpolypectomy bleeding occurs due to inadequate coagulation of the base or stalk of the resected polyp. It is mostly arterial. Delayed bleeding can occur 2 to 3 weeks after the procedure and is due to excessive coagulation leading to eschar formation. The dropping off the eschar results in the bleeding. The techniques for colonoscopic hemostasis in such situations include (a) use of hemoclip (► Fig. 1), (b) putting an endoloop over the stalk, (C) injection and heater probe, and (d) banding of the stalk that is the source of bleeding.

### Colonic Neoplasm

Patient with colon polyps and cancer can present with hematochezia or iron deficiency anemia.<sup>28</sup> Diffuse bleedings are commonly seen with ulcerated neoplasms (► Fig. 2). Colonic polyps and early colonic cancers can be removed by colonoscopic polypectomy and/or endoscopic submucosal dissection/ endoscopic submucosal dissection wherever indicated.



**Fig. 1** Hemoclip application for postpolypectomy bleeding.



**Fig. 2** Diffuse bleeding from colonic neoplasm.

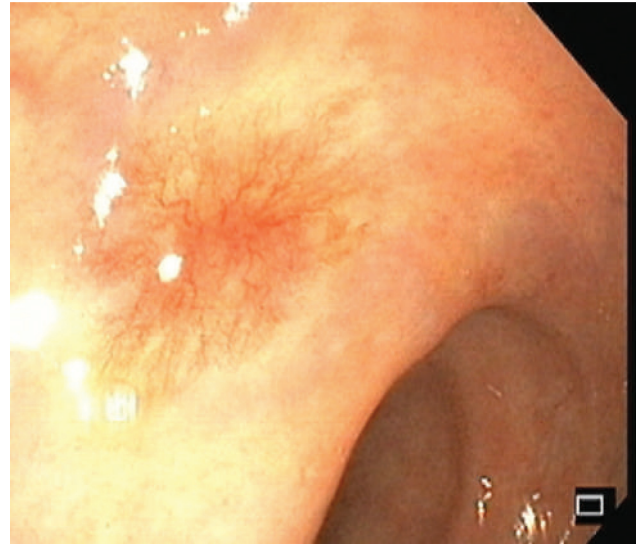
Argon plasma coagulation (APC) or a hemospray can be used for decrease in bleeding from ulcerated neoplasm.<sup>29</sup>

### Angiodysplasia

It is a commonest cause of LGI bleeding especially in the elderly (► **Fig. 3**). Lesions are more common in ascending colon compared with rectum and sigmoid. The lesion has a central vessel with ectatic vessels arising around it. Sedation used during colonoscopy can diminish blood flow in the central vessel and decrease the sensitivity of detection of the lesion.<sup>6</sup> APC is the procedure of choice and the central vessel should be targeted first and then the peripheral vessels. If an electrocautery is being used, the procedure is to be done from periphery to center.<sup>30</sup> There is high incidence of recurrence of angiodysplasia in new areas especially in elderly and with comorbidity.

### Radiation Proctitis

The lesions are generally diffuse and extensive and can occur months to years after radiation. Earlier argon or YAG laser



**Fig. 3** Colonic angiodysplasia.

and heater probes were used. APC is now the standard of care. Multiple sessions may be required and it is advisable to call the patients 2 weeks after the earlier session.<sup>2</sup>

### Dieulafoy's Lesion

This is an arterial bleeding occurring through a minute mucosal defect. As bleedings are intermittent, they are likely to be missed. Hemoclip application of the visible vessel is the therapy of choice. Injection and thermal probe are the other alternative options.

In absence of randomized controlled trials, various case series showed immediate bleeding control in 88 to 100% with various hemostatic sprays.<sup>31</sup> However, rate of rebleeding is quite high. There are certain advantages of these agents such as easy application, does not require en face position of bleeding, and helpful when surface area of bleeding is large with inability to localize exact bleeding site. These agents can be used for primary or a salvage or adjuvant therapy.<sup>31</sup> Despite multiple advantages of hemostatic sprays, future randomized controlled trials comparing with conventional methods are required to establish them into therapeutic algorithm.

### Conclusion

LGI bleedings are less common and morbid as compared with UGI bleeding. Colonoscope is the instrument of choice both for diagnosis and management. Proper selections of tools with correct technique and expertise will achieve successful outcomes. Interventional radiology and surgery are the rescue modalities when colonoscopy is unsuccessful in either diagnosing or achieving adequate hemostasis.

### Conflict of Interest

None.

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