UpToDate® Official reprint from UpToDate®
www.uptodate.com ©2019 UpToDate, Inc. and/or its affiliates. All Rights Reserved.

Wolters Kluwer

# Approach to acute lower gastrointestinal bleeding in adults

**Author:** Lisa Strate, MD, MPH
**Section Editor:** John R Saltzman, MD, FACP, FACG, FASGE, AGAF
**Deputy Editor:** Shilpa Grover, MD, MPH, AGAF

All topics are updated as new evidence becomes available and our peer review process is complete.

**Literature review current through:** Sep 2019. | **This topic last updated:** Sep 06, 2018.

## INTRODUCTION

Acute lower gastrointestinal (GI) bleeding refers to blood loss of recent onset originating from the colon. The causes of acute lower GI bleeding may be grouped into several categories: anatomic (diverticulosis), vascular (angiodysplasia, ischemic, radiation-induced), inflammatory (infectious, inflammatory bowel disease), and neoplastic. In addition, acute lower GI bleeding can occur after therapeutic interventions such as polypectomy. (See "Etiology of lower gastrointestinal bleeding in adults" and "Management and prevention of bleeding after colonoscopy with polypectomy".)

This topic will review the clinical manifestations, diagnosis, and initial management of acute GI bleeding thought to be coming from the colon. The etiology of lower GI bleeding and the treatment of specific causes of bleeding, as well as approaches to patients with upper GI bleeding, minimal rectal bleeding, suspected small bowel bleeding, and occult GI bleeding, are discussed separately. (See "Etiology of lower gastrointestinal bleeding in adults" and "Colonic diverticular bleeding" and "Angiodysplasia of the gastrointestinal tract" and "Management and prevention of bleeding after colonoscopy with polypectomy" and "Approach to acute upper gastrointestinal bleeding in adults" and "Approach to minimal bright red blood per rectum in adults" and "Evaluation of suspected small bowel bleeding (formerly obscure gastrointestinal bleeding)" and "Evaluation of occult gastrointestinal bleeding".)

## OVERVIEW

Patients with acute lower gastrointestinal (GI) bleeding typically present with hematochezia, although hematochezia may also be seen in patients with massive upper GI or small bowel bleeding. Rarely, patients with right-sided colonic bleeding will present with melena. The bleeding will stop spontaneously in 80 to 85 percent of patients, and the mortality rate is 2 to 4 percent [1]. (See 'Clinical manifestations' below.)

In patients suspected of having acute lower GI bleeding, the approach to diagnosis and management includes (algorithm 1):

- General management, including obtaining adequate intravenous access, triaging the patient to the appropriate level of care, and providing supportive measures such as supplemental oxygen (see 'Initial evaluation and management' below)
- Resuscitation, which should occur in parallel with the diagnostic evaluation (see 'Fluid resuscitation' below and 'Blood transfusions' below)
- Exclusion of acute upper GI bleeding with nasogastric lavage and/or upper endoscopy if indicated (eg, in a patient with massive hematochezia and signs of hemodynamic compromise) (see 'Consider an upper GI bleeding source' below)
- Evaluation for a lower GI source of the bleeding, typically with colonoscopy (see 'Diagnostic studies' below)

The approach to subsequent treatment depends on the source of the bleeding. If bleeding or stigmata of recent hemorrhage are identified during colonoscopy or angiography, attempts can be made to control the bleeding. However, frequently, active bleeding is not seen, and a presumptive diagnosis is made regarding the source of the bleeding (eg, diverticular bleeding in a patient with diverticula and no other potential sources). In those cases, the management approach will vary depending on the type of lesion (eg, endoscopic treatment is appropriate for angiodysplasia, but not for nonbleeding diverticula). If no source is identified the patient may need to be evaluated for upper and mid-GI bleeding. (See "Angiodysplasia of the gastrointestinal tract", section on 'Nonbleeding angiodysplasias in patients with GI bleeding' and "Colonic diverticular bleeding", section on 'Endoscopic therapy' and "Management and prevention of bleeding after colonoscopy with polypectomy", section on 'Management'.)

## CLINICAL MANIFESTATIONS

A patient with lower gastrointestinal (GI) bleeding typically reports hematochezia (passage of maroon or bright red blood or blood clots per rectum). Blood originating from the left colon tends to be bright red in color, whereas bleeding from the right side of the colon usually appears dark or maroon colored and may be mixed with stool. Rarely, bleeding from the right side of the colon will present with melena.

The initial hemoglobin in patients with acute lower GI bleeding will typically be at the patient's baseline because the patient is losing whole blood. With time (typically after 24 hours or more), the hemoglobin will decline as the blood is diluted by the influx of extravascular fluid into the vascular space and by fluid administered during resuscitation. It should be kept in mind that overhydration can lead to a falsely low hemoglobin value.

Patients with acute bleeding should have normocytic red blood cells. Microcytic red blood cells or iron deficiency anemia suggest chronic bleeding. Unlike patients with acute upper GI bleeding, patients with acute lower GI bleeding and normal renal perfusion should have a normal blood urea nitrogen (BUN)-to-creatinine or urea-to-creatinine ratio (<20:1 or <100:1, respectively) [2].

## INITIAL EVALUATION AND MANAGEMENT

The initial evaluation and management of a patient with suspected acute lower gastrointestinal (GI) bleeding should occur in parallel. The goals are to determine if the bleeding is coming from the lower GI tract, determine the severity of bleeding, triage patients to the appropriate setting, provide general supportive measures, and to initiate resuscitation. Once these steps are complete, additional diagnostic studies (eg, colonoscopy) can be obtained (algorithm 1). Our approach to the management of lower gastrointestinal bleeding is consistent with the 2016 guidelines from the American College of Gastroenterology [3]. (See 'Diagnostic studies' below.)

**Initial evaluation** — The initial evaluation includes a history, physical examination, laboratory tests, and in some cases, nasogastric lavage or upper endoscopy. The goal of the evaluation is to assess the severity of the bleeding, assess whether the bleeding may be coming from the upper GI tract, and determine if there are conditions present that may affect subsequent management.

**History** — Patients should be asked about prior episodes of GI bleeding, and the patient's past medical history should be reviewed to identify potential bleeding sources and to identify comorbidities that may influence the patient's subsequent management. Patients should be asked about medication use, particularly agents that are associated with bleeding or that may impair coagulation, such as nonsteroidal antiinflammatory agents, anticoagulants, and antiplatelet agents. Patients should also be asked about symptoms that may suggest a particular etiology for the bleeding (eg, painless hematochezia with diverticular bleeding, change in bowel habits with malignancy, abdominal pain with colitis). (See "Etiology of lower gastrointestinal bleeding in adults".)

**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. (See 'Clinical manifestations' above.)

Signs of hypovolemia include [4]:

- Mild to moderate hypovolemia: Resting tachycardia
- Blood volume loss of at least 15 percent: Orthostatic hypotension (a 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 percent: Supine hypotension

The presence of abdominal pain suggests the presence of an inflammatory bleeding source such as ischemic or infectious colitis or a perforation (eg, a perforated peptic ulcer in a patient with severe upper GI bleeding).

**Laboratory tests** — Laboratory tests that should be obtained in patients with acute GI bleeding include a complete blood count, serum chemistries, liver tests, and coagulation studies. The initial hemoglobin level should be monitored every two to eight hours, depending on the severity of the bleed. In the setting of acute lower GI bleeding, patients' hemoglobin values should be at their baseline, with normocytic red blood cell indices (provided the patient did not have preexisting anemia). (See 'Clinical manifestations' above.)

**Consider an upper GI bleeding source** — The primary consideration in the differential diagnosis of hematochezia is upper GI bleeding since 10 to 15 percent of patients with severe hematochezia will have an upper GI source [1]. 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 (>20 to 30:1 or >100:1, respectively) [2,5-11]. On the other hand, blood clots in the stool decrease the likelihood of an upper GI source [11].

If the index of suspicion for an upper GI source is high, an upper endoscopy should be performed once the patient is appropriately resuscitated. If the suspicion for upper GI bleeding is moderate, a nasogastric lavage may help identify patients with upper GI bleeding. In addition, the nasogastric tube can be used to facilitate rapid colon preparation [12]. (See 'Initial management' below.)

Findings on nasogastric lavage that suggest upper GI bleeding include the presence of coffee-ground material or bright red blood in the lavage fluid [12]. However, lavage may not be positive if the bleeding has ceased or if it arises beyond a closed pylorus. The presence of bilious fluid suggests that the pylorus is open and, if lavage is negative, that there is no active upper GI bleeding proximal to the ligament of Treitz. If the results of the lavage are positive or if they are indeterminate (eg, no blood or bile seen) and there is still concern that the source could be from the upper GI tract, upper endoscopy should be performed. (See "Approach to acute upper gastrointestinal bleeding in adults", section on 'Nasogastric lavage'.)

**Initial management** — The initial management of a patient with suspected acute lower GI bleeding includes triage to the appropriate setting for management (outpatient, inpatient, intensive care unit), general supportive measures (eg, oxygen, establishment of adequate intravenous access), appropriate fluid and blood product resuscitation, and management of coagulopathies, anticoagulants, and antiplatelet agents.

**Triage and consultations** — Visible rectal bleeding occurring in adults warrants an evaluation in all cases [13,14]. The timing and setting of the evaluation depends upon the severity of bleeding and the patient's comorbid illnesses. A gastroenterology consultation should be obtained early in the hospital course of patients with acute lower GI bleeding. General surgery and interventional radiology should also be involved in cases of massive hematochezia or those who are at high risk for complications.

Patients with high-risk features including hemodynamic instability (shock, orthostatic hypotension), persistent bleeding, and/or significant comorbid illnesses should be admitted to an intensive care unit for resuscitation, close observation, and possible therapeutic interventions. Close observation includes automated blood pressure monitoring, electrocardiogram monitoring, and pulse oximetry. Most other patients can be admitted to a regular medical ward. We suggest that all patients admitted to a regular medical ward receive electrocardiogram monitoring.

Several studies have identified clinical features that predict the risk of complications in patients with presumed acute lower GI bleeding. These features can be used to help categorize patients as either low or high risk. [15-19] . High-risk features include:

- Hemodynamic instability (hypotension, tachycardia, orthostasis, syncope)
- Persistent bleeding

- Significant comorbid illnesses
- Advanced age
- Bleeding that occurs in a patient who is hospitalized for another reason
- A prior history of bleeding from diverticulosis or angiodysplasia
- Current aspirin use
- Prolonged prothrombin time
- Hypoalbuminemia
- A non-tender abdomen
- No diarrhea
- Anemia
- An elevated blood urea nitrogen level
- An abnormal white blood cell count

The number of high-risk features present correlates with the likelihood of a poor outcome [17,19].

Outpatient management may be appropriate for some low-risk patients (eg, a young, otherwise healthy patient with minor, self-limited rectal bleeding and no hemodynamic compromise). The extent of evaluation (flexible sigmoidoscopy versus colonoscopy) in these patients depends, at least in part, upon the patient's age [20].

A large study in 143 hospitals in the United Kingdom identified patients with acute lower GI bleeding who could be safely managed without hospital admission. Age, sex, prior history of lower GI bleeding, presence of blood on rectal exam, heart rate, systolic blood pressure and hemoglobin concentration were the features used to determine safe discharge. A score of ≤8 predicted a 95 percent probability of safe discharge [21]. (See "Approach to minimal bright red blood per rectum in adults", section on 'Clinical assessment'.)

**General supportive measures** — Patients should receive supplemental oxygen by nasal cannula and initially should receive nothing per mouth in the event urgent upper endoscopy is needed. Two large caliber (18 gauge or larger) peripheral intravenous catheters or a central venous line should be inserted for intravenous access, and placement of a pulmonary artery catheter should be considered in patients with hemodynamic instability or who need close monitoring during resuscitation, such as those with heart failure or valvular disease. (See "Pulmonary artery catheterization: Indications, contraindications, and complications in adults".)

**Fluid resuscitation** — Adequate resuscitation and stabilization is essential in patients with acute GI bleeding [22]. Patients with active bleeding should receive intravenous fluids (eg, 500 mL of normal saline over 30 minutes) while being typed and cross-matched for blood transfusion. Patients at risk of fluid overload may require intensive monitoring with a pulmonary artery catheter. If the blood pressure fails to respond to initial resuscitation efforts, the rate of fluid administration should be increased and urgent intervention (eg, angiography) considered. (See 'Angiography' below.)

**Blood transfusions** — Review of pertinent laboratory data is an essential step during resuscitation to assess the need for blood product transfusion. The decision to initiate blood transfusions must be individualized, and specific thresholds for transfusion have not been delineated. Young patients without

comorbid illness may not require transfusion until the hemoglobin falls below 7 g/dL (70 g/L) [23]. On the other hand, older patients and those who have severe comorbid illnesses such as coronary disease require packed red blood cell transfusions to maintain a higher hemoglobin level (eg, 9 g/dL [90 g/L]) [24]. We do not have an age cutoff for determining which patients should have a goal hemoglobin of ≥9 g/dL, and instead base the decision on the patient's comorbid conditions. In addition, patients with active bleeding and hypovolemia may require a blood transfusion despite apparently normal hemoglobin. (See "Practical aspects of red blood cell transfusion in adults: Storage, processing, modifications, and infusion".)

Studies in patients with acute upper GI bleeding suggest that using a lower hemoglobin threshold is associated with improved outcomes. (See "Approach to acute upper gastrointestinal bleeding in adults", section on 'Blood product transfusions'.)

**Management of coagulopathies, anticoagulants, and antiplatelet agents** — Decisions regarding the management of anticoagulants and antiplatelets agents in patients with acute lower GI bleeding should be individualized. Typically, patients with active bleeding and a coagulopathy (prolonged prothrombin time with international normalized ratio greater than 1.5) or low platelet count (less than 50,000/microL) should be transfused with fresh frozen plasma (FFP) and platelets, respectively. Platelet and plasma transfusions should also be considered in patients who receive massive RBC transfusions (>3 units of packed RBCs within one hour). In patients with an INR of 1.5-2.5, endoscopic hemostasis may be performed before or concomitant with the administration of reversal agents. However, in patients with an INR >2.5, reversal agents should generally be administered before endoscopy. In all cases, the risk of reversing or holding anticoagulation should be weighed against the risk of continued bleeding without reversal. In some cases (eg, stopping aspirin in a patient who is taking it solely for primary prevention of cardiovascular disease), the decision to stop these agents may be straightforward. However, in more complicated cases, consultation with the provider who prescribed the medication may be needed. In general, aspirin should be continued for secondary prophylaxis in patients with high-risk cardiovascular disease. Dual antiplatelet therapy should not be discontinued in patients with an acute coronary syndrome within the past 90 days or with a bare-metal stent placed within the preceding six weeks or drug-eluting stents within the preceding six months [25]. In studies of patients with peptic ulcer bleeding and cardiovascular disease, discontinuation of aspirin is associated with increased all-cause mortality [26,27]. (See "Management of anticoagulants in patients undergoing endoscopic procedures", section on 'Urgent procedures' and "Gastrointestinal endoscopy in patients with disorders of hemostasis" and "Massive blood transfusion", section on 'Platelet count' and "Management of antiplatelet agents in patients undergoing endoscopic procedures".)

When to resume these medications once hemostasis has been achieved will also depend on the patient's risks for thrombosis and recurrent bleeding. (See "Management of anticoagulants in patients undergoing endoscopic procedures", section on 'Resuming anticoagulants after hemostasis'.)

## DIAGNOSTIC STUDIES

Once an upper gastrointestinal (GI) bleeding source is excluded, colonoscopy is the initial examination of choice for the diagnosis and treatment of acute lower GI bleeding (algorithm 1) [13]. Other diagnostic

procedures that may be useful include radionuclide imaging, computed tomographic (CT) angiography (multidetector row helical CT), and mesenteric angiography (table 1). These radiographic procedures require active bleeding at the time of examination in order to identify a bleeding source and are therefore reserved for the subset of patients with severe, ongoing bleeding. Recommendations regarding the evaluation of patients with lower GI bleeding are based largely on clinical experience and the characteristics of the individual tests; no large randomized trials have demonstrated a clear advantage of a particular strategy. (See 'Consider an upper GI bleeding source' above.)

**Colonoscopy** — Advantages of colonoscopy compared with other tests for lower GI bleeding include its potential to precisely localize the site of the bleeding regardless of the etiology or rate of bleeding, the ability to collect pathologic specimens, and the potential for therapeutic intervention [7,9,28]. Disadvantages of colonoscopy include the need for bowel preparation, poor visualization in an unprepared or poorly prepared colon, and the risks of sedation in an acutely bleeding patient. Complications are reported in fewer than 2 percent of colonoscopies performed for lower GI bleeding [29].

The colonic mucosa should be carefully inspected during both insertion and withdrawal. Aggressive lavage may be needed to localize the bleeding site. The terminal ileum should be inspected to rule out bleeding from a proximal lesion in the small bowel. A definitive or potential bleeding source is visualized in 45 to 90 percent of patients undergoing colonoscopy for lower GI bleeding [30]. Visualization of a potential bleeding site that is not actively bleeding does not exclude the presence of a more proximal source. The identification of more than one potential bleeding site is common (eg, diverticulosis and hemorrhoids). Furthermore, a bleeding site is not always identified [31,32]. In the case of diverticular bleeding, blood and clots may be seen in numerous nonbleeding diverticula, making identification of the bleeding diverticulum difficult.

Endoscopic therapy can be used to treat many causes of lower GI bleeding, including diverticula, angiodysplasia, hemorrhoids, postpolypectomy bleeding, and radiation telangiectasia or proctitis [12,33-41]. The approach to treatment of these lesions is discussed in detail elsewhere. (See "Colonic diverticular bleeding" and "Angiodysplasia of the gastrointestinal tract", section on 'Endoscopic treatment' and "Management and prevention of bleeding after colonoscopy with polypectomy".)

**Timing of colonoscopy** — In patients with ongoing bleeding or high-risk clinical features, a colonoscopy should be performed within 24 hours of presentation after adequate colon preparation to potentially improve diagnostic and therapeutic yield. Our approach is to perform colonoscopy as soon as the patient has been resuscitated and an adequate bowel preparation (typically 4 to 6 liters of polyethylene glycol) has been given. (See 'Bowel preparation' below.)

The benefit of performing urgent colonoscopy (less than 12 hours from admission) with regard to outcomes such as rebleeding, need for surgery, length of hospital stay, and mortality is unclear. Some studies have suggested that urgent colonoscopy with endoscopic treatment can reduce the risk of rebleeding and surgery in patients with severe diverticular hemorrhage compared with patients treated conservatively [12]. In addition, observational studies have found an association between early colonoscopy (within 24 hours) and reduced length of hospital stay, largely due to the efficient triage of low-risk patients, although endoscopic therapy was also more likely to be performed during early examinations [42-45].

On the other hand, while a randomized trial of patients with a variety of causes of lower GI bleeding found that a strategy of urgent colonoscopy improved detection of the source of bleeding compared with expectant/elective colonoscopy alone or with radiographic interventions, it did not significantly reduce mortality, hospital stay, transfusion requirements, or the need for surgery [46]. A second randomized trial found no difference in outcomes between urgent and delayed colonoscopy [10]. However, the lack of statistically significant findings in these two trials may have been the result of small sample sizes (100 and 72 patients, respectively).

**Bowel preparation** — Some clinicians perform colonoscopy on an unprepared bowel since blood is cathartic [47]. However, studies of colonoscopy without preparation for lower GI bleeding generally report low cecal intubation rates, and blood or stool in the colon lumen can obscure the bleeding source [7,28]. Cleansing the colon of stool and blood with 4 to 6 liters of polyethylene glycol over three to four hours as tolerated by the patient is preferred [7,48]. Patients unable to take the preparation orally and are at low risk of aspiration may require a nasogastric tube. The preparation is continued until the effluent is clear. (See "Bowel preparation before colonoscopy in adults".)

Studies using rapidly administered, large volume bowel preparations report high rates of successful endoscopic therapy [12]. Caution should be used in patients at risk of aspiration or fluid overload. Some authors recommend metoclopramide (10 mg) at the start of the bowel preparation to facilitate intestinal transit and minimize the risk of nausea and vomiting, though this is not our practice [12]. During colonic lavage, the bleeding rate may appear to increase due to the rapid clearance of blood from the colon. However, there is no evidence that rapid bowel preparation reactivates or increases the rate of bleeding. Radiographic studies should be obtained prior to colonic preparation if perforation or obstruction is suspected.

An experimental approach using water-jet pumps and mechanical suction devices ("hydroflush colonoscopy") has been described as an alternative to administering an oral lavage [49]. In a series of 12 patients with severe lower GI bleeding who underwent 13 hydroflush colonoscopy procedures, the examination was completed to the cecum in 9 of 13 procedures (69 percent), with adequate visualization for a definite or presumptive diagnosis reported in all 13. A definite source of bleeding was identified in five patients (39 percent). It is our opinion that this technique is best used as an adjunct to oral bowel preparation.

**Radiographic imaging** — An advantage of all radiographic tests for GI bleeding is the ability to diagnose bleeding throughout the GI tract, including small bowel sources. In addition, treatment of the bleeding site can be attempted during angiography (but not radionuclide imaging or CT angiography). However, these studies all require active bleeding at the time of the study in order to detect a bleeding site. In patients with severe bleeding who cannot be stabilized for colonoscopy or with severe ongoing bleeding despite colonoscopy, nuclear imaging may be used to select patients with active bleeding for subsequent angiography. However, the patient may stop bleeding by the time the scan is completed, thereby missing the opportunity to localize a lesion by angiography. (See "Angiographic control of nonvariceal gastrointestinal bleeding in adults".)

**Radionuclide imaging** — Radionuclide scanning detects bleeding that is occurring at a rate of 0.1 to 0.5 mL/minute, and it is the most sensitive radiographic test for GI bleeding [50]. Two types of nuclear

scans have been used: technetium-99m (99mTc) sulfur colloid and 99mTc pertechnetate-labeled autologous red blood cells. Both techniques are noninvasive and sensitive for GI bleeding.

- Technetium sulfur colloid is rapidly cleared from the intravascular space. Scans are obtained shortly after intravenous injection, looking for evidence of extravasation. However, the short half-life of the colloid within the circulation means that patients must be actively bleeding during the few minutes that the label is present in the vascular space, and repeat scanning for intermittent bleeding is not possible without reinjection.

- After injection of 99mTc pertechnetate-labeled red cells, abdominal images are obtained frequently over 30 to 90 minutes, and then, if necessary, every few hours for up to 24 hours (image 1). An advantage of this technique is that patients with intermittent bleeding can be scanned several times over a 24-hour period. For this reason, labeled red cells are most commonly used in practice and are most helpful in patients with obscure, intermittent bleeding.

A major disadvantage of radionuclide imaging is that it requires active bleeding to detect a source and can only localize bleeding to a general area of the abdomen. Furthermore, accuracy rates have varied substantially across reports ranging from 24 to 91 percent [51-54]. Poor localization occurs because blood can move in either a peristaltic or antiperistaltic direction. In addition, localization to an area of the abdomen is not equivalent to identifying a specific site. As an example, bleeding in a redundant sigmoid colon may appear as extravasated blood in the right lower quadrant, suggesting right colon bleeding. These difficulties were illustrated in a study of 203 patients undergoing 99mTc-labeled red cell scintigraphy for lower GI bleeding [55]. The scan was positive and suggested a site of bleeding in 52 cases (26 percent). However, the scan was incorrect in 13 of these 52 patients (25 percent), and 8 patients had unwarranted surgical procedures.

**CT angiography** — Several reports have described CT angiography for the localization of active hemorrhage [56-62]. CT angiography is an appealing diagnostic modality because it is widely available, fast, and minimally invasive. In addition, it provides anatomic detail that may be helpful for subsequent interventions such as angiography.

Bleeding at a rate of 0.3 to 0.5 mL/minute can be detected with CT angiography [63]. CT angiography is typically performed using multidetector row helical CT. Compared with single-detector row helical CT, multidetector row helical CT permits markedly increased resolution and shortens scanning time. This allows for improved identification of extravasated contrast material into the intestinal lumen.

Several studies have examined CT angiography for the detection of GI bleeding:

- A meta-analysis of 22 studies with 672 patients found that CT angiography had a sensitivity of 85 percent and a specificity of 92 percent for detecting active GI bleeding [64].

- In a review of 124 cases, the accuracy of CT angiography was 100 percent [29].

- In a study of 161 patients who underwent angiography, CT angiography was similar to radionuclide imaging for detecting bleeding on subsequent angiography (sensitivity of 90 percent, specificity of 20 percent), but it was more precise when it came to localizing the site of the bleeding [62].

However, CT angiography lacks therapeutic capability, requires radiation exposure, and utilizes intravenous contrast, which can be associated with nephropathy and allergic reactions [57]. Like the other radiographic tests for GI bleeding, a positive scan requires active bleeding. In one study of 44 patients undergoing CT angiography immediately followed by radionuclide scanning for lower GI bleeding, nuclide scanning identified more cases of active bleeding [65]. Further studies are needed to clarify the role of CT angiography as an initial test in the evaluation of patients with lower GI bleeding. (See "Pathogenesis, clinical features, and diagnosis of contrast-induced acute kidney injury".)

**Angiography** — Angiography requires active blood loss of 0.5 to 1.0 mL/minute under optimal conditions for a bleeding site to be visualized [66]. Angiography is typically reserved for patients in whom endoscopy is not feasible due to severe bleeding with hemodynamic instability [13].

In the absence of prior localization (eg, radionuclide imaging), the superior mesenteric artery is generally examined first in patients with presumed lower GI bleeding because bleeding sources tend to occur in bowel supplied by this artery (image 2) [67]. If this test is negative, the inferior mesenteric and celiac vessels are studied. The success rate varies widely from 25 to 70 percent, depending on the timing relative to the episode of bleeding and local expertise [7,68-70]. (See "Angiographic control of nonvariceal gastrointestinal bleeding in adults".)

Some studies suggest that the frequency of negative arteriograms can be reduced by using radionuclide imaging to screen for active bleeding [71,72]. However, other studies have found no difference in the proportion of positive studies with or without preceding radionuclide imaging [73]. The incidence of negative tests is increased by the delay inherent in performing nuclear scans [68]. There are no randomized trials that compare the relative value of angiography guided by radionuclide imaging versus angiography alone, and results from case series are mixed [72,73].

The advantages of angiography over other tests for lower GI bleeding are that it does not require bowel preparation and anatomic localization is accurate. It also permits therapeutic intervention. Intra-arterial vasopressin infusion via the angiography catheter is one technique to stop or temporize bleeding. However, complications can be serious, including cardiac arrhythmias and bowel ischemia, and the rebleeding rate is as high as 50 percent [68]. (See "Angiographic control of nonvariceal gastrointestinal bleeding in adults", section on 'Intra-arterial vasopressin'.)

Transcatheter embolization is a more definitive means of controlling hemorrhage and has largely replaced vasopressin infusion. Superselective embolization of distal vessels using coaxial catheters decreases the risk of bowel infarction. In patients found to have active bleeding, superselective embolization is feasible in 80 percent, and bleeding is successfully controlled in 97 percent [29]. However, superselective embolization is associated with a risk of intestinal infarction of up to 20 percent, as well as other serious complications including arterial injury, thrombus formation, and renal failure [70,74,75]. (See "Angiographic control of nonvariceal gastrointestinal bleeding in adults", section on 'Embolization'.)

**Additional testing if the bleeding site is not identified** — A bleeding site may not be evident in some patients despite lower GI evaluation. If not already done, an upper endoscopy with push enteroscopy should be considered in those with severe, ongoing bleeding since up to 15 percent of such patients have a bleeding site in the upper digestive tract [10]. Push enteroscopy (endoscopy using a pediatric

colonoscope or a dedicated enteroscope) allows visualization of approximately the proximal 60 cm of the jejunum [76].

Bleeding sites can also arise in more distal segments of the small bowel. There are several methods to evaluate the small intestine, such as capsule endoscopy and deep small bowel enteroscopy. (See "Evaluation of suspected small bowel bleeding (formerly obscure gastrointestinal bleeding)".)

In some patients, bleeding may have stopped, making efforts to identify the site more difficult. Such patients should be observed for 24 to 48 hours. An urgent CT angiogram/tagged red blood cell scan can be obtained to localize the region of bleeding if bleeding resumes. (See 'Radionuclide imaging' above.)

Provocative challenges with vasodilators, anticoagulants, and/or thrombolytics have been reported to aid in the diagnosis of elusive bleeding [77-79]. However, the risk of serious complications including refractory bleeding and death is substantial, and these methods should be used extremely rarely and only by expert centers after careful planning.

## TREATMENT OF THE BLEEDING SITE

The treatment of lower gastrointestinal (GI) bleeding depends on the source of the bleeding. In many cases, the bleeding can be controlled with therapies applied at the time of colonoscopy or angiography. Rarely, patients with exsanguinating lower GI bleeding will need immediate surgery. The morbidity and mortality associated with colectomy in the absence of preoperative localization of a bleeding site are higher than in patients who have a bleeding site identified prior to surgery [80,81]. Thus, all efforts should be made to identify the bleeding source prior to surgery.

The treatment of lower GI bleeding is discussed in detail elsewhere. (See "Angiodysplasia of the gastrointestinal tract", section on 'Treatment' and "Colonic diverticular bleeding", section on 'Management' and "Management and prevention of bleeding after colonoscopy with polypectomy", section on 'Management' and "Argon plasma coagulation in the management of gastrointestinal hemorrhage" and "Angiographic control of nonvariceal gastrointestinal bleeding in adults", section on 'Angiographic therapies'.)

## RECURRENT LOWER GI BLEEDING

In patients with significant, early (during the initial hospitalization) recurrent lower gastrointestinal bleeding, a repeat colonoscopy should be performed with endoscopic hemostasis if indicated [3]. Factors associated with rebleeding include the presence of underlying comorbidities, antiplatelet/anticoagulant/NSAID use, source of bleeding, and the initial modality of hemostasis [82,83].

## SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See "Society guideline links: Gastrointestinal bleeding in adults".)

## INFORMATION FOR PATIENTS

UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5th to 6th grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10th to 12th grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s) of interest.)

- Basics topics (see "Patient education: Colonoscopy (The Basics)" and "Patient education: Upper endoscopy (The Basics)" and "Patient education: Bloody stools (The Basics)" and "Patient education: GI bleed (The Basics)")
- Beyond the Basics topics (see "Patient education: Colonoscopy (Beyond the Basics)" and "Patient education: Upper endoscopy (Beyond the Basics)" and "Patient education: Blood in the stool (rectal bleeding) in adults (Beyond the Basics)")

## SUMMARY AND RECOMMENDATIONS

- Acute lower gastrointestinal (GI) bleeding refers to blood loss of recent onset originating the colon.
- A patient with lower GI bleeding typically reports hematochezia (passage of maroon or bright red blood or blood clots per rectum). Blood originating from the left colon tends to be bright red in color, whereas bleeding from the right colon usually appears dark or maroon colored and may be mixed with stool. Rarely, bleeding from the right side of the colon will present with melena. (See 'Clinical manifestations' above.)
- The initial evaluation includes a history, physical examination, laboratory tests, and in some cases, nasogastric lavage or upper endoscopy (algorithm 1). The goal of the evaluation is to assess the severity of the bleed, assess whether the bleeding may be coming from the upper GI tract, and determine if there are conditions present that may affect subsequent management. (See 'Initial evaluation' above.)
- The initial management of a patient with suspected acute lower GI bleeding includes triage to the appropriate setting for management (outpatient, inpatient, intensive care unit), general supportive measures (eg, oxygen, establishment of adequate intravenous access), appropriate fluid and blood product resuscitation, and management of coagulopathies, anticoagulants, and antiplatelet agents. (See 'Initial management' above.)

- Once an upper GI bleeding source is excluded, colonoscopy is the initial examination of choice for the diagnosis and treatment of acute lower GI bleeding (algorithm 1). Mesenteric angiography with or without preceding radionuclide scanning or CT angiography, depending on institutional expertise, is appropriate in the small subset of patients with massive bleeding that cannot be stabilized for colonoscopy (table 1). (See 'Diagnostic studies' above.)

- The treatment of lower GI bleeding depends on the source of the bleeding. In many cases, the bleeding can be controlled with therapies applied at the time of colonoscopy or angiography. Rarely, patients with exsanguinating lower GI bleeding will need immediate surgery. The treatment of lower GI bleeding is discussed in detail elsewhere. (See "Angiodysplasia of the gastrointestinal tract", section on 'Treatment' and "Colonic diverticular bleeding", section on 'Management' and "Management and prevention of bleeding after colonoscopy with polypectomy", section on 'Management' and "Argon plasma coagulation in the management of gastrointestinal hemorrhage" and "Angiographic control of nonvariceal gastrointestinal bleeding in adults", section on 'Angiographic therapies'.)

Use of UpToDate is subject to the Subscription and License Agreement.

## REFERENCES

1. Farrell JJ, Friedman LS. Review article: the management of lower gastrointestinal bleeding. Aliment Pharmacol Ther 2005; 21:1281.

2. Mortensen PB, Nøhr M, Møller-Petersen JF, Balslev I. The diagnostic value of serum urea/creatinine ratio in distinguishing between upper and lower gastrointestinal bleeding. A prospective study. Dan Med Bull 1994; 41:237.

3. Strate LL, Gralnek IM. ACG Clinical Guideline: Management of Patients With Acute Lower Gastrointestinal Bleeding. Am J Gastroenterol 2016; 111:459.

4. Cappell MS, Friedel D. Initial management of acute upper gastrointestinal bleeding: from initial evaluation up to gastrointestinal endoscopy. Med Clin North Am 2008; 92:491.

5. Palmer ED. The vigorous diagnostic approach to upper-gastrointestinal tract hemorrhage. A 23-year prospective study of 1,4000 patients. JAMA 1969; 207:1477.

6. Richards RJ, Donica MB, Grayer D. Can the blood urea nitrogen/creatinine ratio distinguish upper from lower gastrointestinal bleeding? J Clin Gastroenterol 1990; 12:500.

7. Jensen DM, Machicado GA. Diagnosis and treatment of severe hematochezia. The role of urgent colonoscopy after purge. Gastroenterology 1988; 95:1569.

8. Zuckerman GR, Trellis DR, Sherman TM, Clouse RE. An objective measure of stool color for differentiating upper from lower gastrointestinal bleeding. Dig Dis Sci 1995; 40:1614.

9. Wilcox CM, Alexander LN, Cotsonis G. A prospective characterization of upper gastrointestinal hemorrhage presenting with hematochezia. Am J Gastroenterol 1997; 92:231.

10. Laine L, Shah A. Randomized trial of urgent vs. elective colonoscopy in patients hospitalized with lower GI bleeding. Am J Gastroenterol 2010; 105:2636.

11. Srygley FD, Gerardo CJ, Tran T, Fisher DA. Does this patient have a severe upper gastrointestinal bleed? JAMA 2012; 307:1072.

12. Jensen DM, Machicado GA, Jutabha R, Kovacs TO. Urgent colonoscopy for the diagnosis and treatment of severe diverticular hemorrhage. N Engl J Med 2000; 342:78.

13. Zuccaro G Jr. Management of the adult patient with acute lower gastrointestinal bleeding. American College of Gastroenterology. Practice Parameters Committee. Am J Gastroenterol 1998; 93:1202.

14. Davila RE, Rajan E, Adler DG, et al. ASGE Guideline: the role of endoscopy in the patient with lower-GI bleeding. Gastrointest Endosc 2005; 62:656.

15. Kollef MH, O'Brien JD, Zuckerman GR, Shannon W. BLEED: a classification tool to predict outcomes in patients with acute upper and lower gastrointestinal hemorrhage. Crit Care Med 1997; 25:1125.

16. Velayos FS, Williamson A, Sousa KH, et al. Early predictors of severe lower gastrointestinal bleeding and adverse outcomes: a prospective study. Clin Gastroenterol Hepatol 2004; 2:485.

17. Strate LL, Orav EJ, Syngal S. Early predictors of severity in acute lower intestinal tract bleeding. Arch Intern Med 2003; 163:838.

18. Das A, Ben-Menachem T, Cooper GS, et al. Prediction of outcome in acute lower-gastrointestinal haemorrhage based on an artificial neural network: internal and external validation of a predictive model. Lancet 2003; 362:1261.

19. Aoki T, Nagata N, Shimbo T, et al. Development and Validation of a Risk Scoring System for Severe Acute Lower Gastrointestinal Bleeding. Clin Gastroenterol Hepatol 2016; 14:1562.

20. Lewis JD, Brown A, Localio AR, Schwartz JS. Initial evaluation of rectal bleeding in young persons: a cost-effectiveness analysis. Ann Intern Med 2002; 136:99.

21. Oakland K, Jairath V, Uberoi R, et al. Derivation and validation of a novel risk score for safe discharge after acute lower gastrointestinal bleeding: a modelling study. Lancet Gastroenterol Hepatol 2017; 2:635.

22. Baradarian R, Ramdhaney S, Chapalamadugu R, et al. Early intensive resuscitation of patients with upper gastrointestinal bleeding decreases mortality. Am J Gastroenterol 2004; 99:619.

23. Villanueva C, Colomo A, Bosch A, et al. Transfusion strategies for acute upper gastrointestinal bleeding. N Engl J Med 2013; 368:11.

24. Wu WC, Rathore SS, Wang Y, et al. Blood transfusion in elderly patients with acute myocardial infarction. N Engl J Med 2001; 345:1230.

25. ASGE Standards of Practice Committee, Acosta RD, Abraham NS, et al. The management of antithrombotic agents for patients undergoing GI endoscopy. Gastrointest Endosc 2016; 83:3.

26. Sung JJ, Lau JY, Ching JY, et al. Continuation of low-dose aspirin therapy in peptic ulcer bleeding: a randomized trial. Ann Intern Med 2010; 152:1.

27. Derogar M, Sandblom G, Lundell L, et al. Discontinuation of low-dose aspirin therapy after peptic ulcer bleeding increases risk of death and acute cardiovascular events. Clin Gastroenterol Hepatol 2013; 11:38.

28. Van Gossum A, Bourgeois F, Gay F, et al. Operative colonoscopic endoscopy. Acta Gastroenterol Belg 1992; 55:314.

29. Strate LL, Naumann CR. The role of colonoscopy and radiological procedures in the management of acute lower intestinal bleeding. Clin Gastroenterol Hepatol 2010; 8:333.

30. Strate LL. Lower GI bleeding: epidemiology and diagnosis. Gastroenterol Clin North Am 2005; 34:643.

31. Angtuaco TL, Reddy SK, Drapkin S, et al. The utility of urgent colonoscopy in the evaluation of acute lower gastrointestinal tract bleeding: a 2-year experience from a single center. Am J Gastroenterol 2001; 96:1782.

32. Chaudhry V, Hyser MJ, Gracias VH, Gau FC. Colonoscopy: the initial test for acute lower gastrointestinal bleeding. Am Surg 1998; 64:723.

33. Savides TJ, Jensen DM. Colonoscopic hemostasis for recurrent diverticular hemorrhage associated with a visible vessel: a report of three cases. Gastrointest Endosc 1994; 40:70.

34. Foutch PG, Zimmerman K. Diverticular bleeding and the pigmented protuberance (sentinel clot): clinical implications, histopathological correlation, and results of endoscopic intervention. Am J Gastroenterol 1996; 91:2589.

35. Foutch PG. Angiodysplasia of the gastrointestinal tract. Am J Gastroenterol 1993; 88:807.

36. Jensen DM, Jutabha R, Machicado GA, et al. Prospective randomized comparative study of bipolar electrocoagulation versus heater probe for treatment of chronically bleeding internal hemorrhoids. Gastrointest Endosc 1997; 46:435.

37. Trowers EA, Ganga U, Rizk R, et al. Endoscopic hemorrhoidal ligation: preliminary clinical experience. Gastrointest Endosc 1998; 48:49.

38. Barbatzas C, Spencer GM, Thorpe SM, et al. Nd:YAG laser treatment for bleeding from radiation proctitis. Endoscopy 1996; 28:497.

39. Maunoury V, Brunetaud JM, Cortot A. Bipolar electrocoagulation treatment for hemorrhagic radiation injury of the lower digestive tract. Gastrointest Endosc 1991; 37:492.

40. Jensen DM, Machicado GA, Cheng S, et al. A randomized prospective study of endoscopic bipolar electrocoagulation and heater probe treatment of chronic rectal bleeding from radiation telangiectasia. Gastrointest Endosc 1997; 45:20.

41. Zuckerman GR, Prakash C. Acute lower intestinal bleeding. Part II: etiology, therapy, and outcomes. Gastrointest Endosc 1999; 49:228.

42. Strate LL, Syngal S. Timing of colonoscopy: impact on length of hospital stay in patients with acute lower intestinal bleeding. Am J Gastroenterol 2003; 98:317.

43. Schmulewitz N, Fisher DA, Rockey DC. Early colonoscopy for acute lower GI bleeding predicts shorter hospital stay: a retrospective study of experience in a single center. Gastrointest Endosc 2003; 58:841.

44. Navaneethan U, Njei B, Venkatesh PG, Sanaka MR. Timing of colonoscopy and outcomes in patients with lower GI bleeding: a nationwide population-based study. Gastrointest Endosc 2014; 79:297.

45. Nagata N, Niikura R, Sakurai T, et al. Safety and Effectiveness of Early Colonoscopy in Management of Acute Lower Gastrointestinal Bleeding on the Basis of Propensity Score Matching Analysis. Clin Gastroenterol Hepatol 2016; 14:558.

46. Green BT, Rockey DC, Portwood G, et al. Urgent colonoscopy for evaluation and management of acute lower gastrointestinal hemorrhage: a randomized controlled trial. Am J Gastroenterol 2005; 100:2395.

47. Rossini FP, Ferrari A, Spandre M, et al. Emergency colonoscopy. World J Surg 1989; 13:190.

48. Machicado GA, Jensen DM. Acute and chronic management of lower gastrointestinal bleeding: cost-effective approaches. Gastroenterologist 1997; 5:189.

49. Repaka A, Atkinson MR, Faulx AL, et al. Immediate unprepared hydroflush colonoscopy for severe lower GI bleeding: a feasibility study. Gastrointest Endosc 2012; 76:367.

50. Dusold R, Burke K, Carpentier W, Dyck WP. The accuracy of technetium-99m-labeled red cell scintigraphy in localizing gastrointestinal bleeding. Am J Gastroenterol 1994; 89:345.

51. Nicholson ML, Neoptolemos JP, Sharp JF, et al. Localization of lower gastrointestinal bleeding using in vivo technetium-99m-labelled red blood cell scintigraphy. Br J Surg 1989; 76:358.

52. Imbembo AL, Bailey RW. Diverticular disease of the colon. In: Textbook of Surgery, 14th ed, Sabisto n DC Jr (Ed), Churchill Livingstone, 1992. p.910.

53. Olds GD, Cooper GS, Chak A, et al. The yield of bleeding scans in acute lower gastrointestinal hemorrhage. J Clin Gastroenterol 2005; 39:273.

54. Feingold DL, Caliendo FJ, Chinn BT, et al. Does hemodynamic instability predict positive technetium-labeled red blood cell scintigraphy in patients with acute lower gastrointestinal bleeding? A review of 50 patients. Dis Colon Rectum 2005; 48:1001.

55. Hunter JM, Pezim ME. Limited value of technetium 99m-labeled red cell scintigraphy in localization of lower gastrointestinal bleeding. Am J Surg 1990; 159:504.

56. Scheffel H, Pfammatter T, Wildi S, et al. Acute gastrointestinal bleeding: detection of source and etiology with multi-detector-row CT. Eur Radiol 2007; 17:1555.

57. Yoon W, Jeong YY, Shin SS, et al. Acute massive gastrointestinal bleeding: detection and localization with arterial phase multi-detector row helical CT. Radiology 2006; 239:160.

58. Ernst O, Bulois P, Saint-Drenant S, et al. Helical CT in acute lower gastrointestinal bleeding. Eur Radiol 2003; 13:114.

59. Tew K, Davies RP, Jadun CK, Kew J. MDCT of acute lower gastrointestinal bleeding. AJR Am J Roentgenol 2004; 182:427.

60. Sun H, Jin Z, Li X, et al. Detection and localization of active gastrointestinal bleeding with multidetector row computed tomography angiography: a 5-year prospective study in one medical center. J Clin Gastroenterol 2012; 46:31.

61. Martí M, Artigas JM, Garzón G, et al. Acute lower intestinal bleeding: feasibility and diagnostic performance of CT angiography. Radiology 2012; 262:109.

62. Jacovides CL, Nadolski G, Allen SR, et al. Arteriography for Lower Gastrointestinal Hemorrhage: Role of Preceding Abdominal Computed Tomographic Angiogram in Diagnosis and Localization. JAMA Surg 2015; 150:650.

63. Kuhle WG, Sheiman RG. Detection of active colonic hemorrhage with use of helical CT: findings in a swine model. Radiology 2003; 228:743.

64. García-Blázquez V, Vicente-Bártulos A, Olavarria-Delgado A, et al. Accuracy of CT angiography in the diagnosis of acute gastrointestinal bleeding: systematic review and meta-analysis. Eur Radiol 2013; 23:1181.

65. Zink SI, Ohki SK, Stein B, et al. Noninvasive evaluation of active lower gastrointestinal bleeding: comparison between contrast-enhanced MDCT and 99mTc-labeled RBC scintigraphy. AJR Am J Roentgenol 2008; 191:1107.

66. Walker TG. Acute gastrointestinal hemorrhage. Tech Vasc Interv Radiol 2009; 12:80.

67. Reinus JF, Brandt LJ. Vascular ectasias and diverticulosis. Common causes of lower intestinal bleeding. Gastroenterol Clin North Am 1994; 23:1.

68. Browder W, Cerise EJ, Litwin MS. Impact of emergency angiography in massive lower gastrointestinal bleeding. Ann Surg 1986; 204:530.

69. Udén P, Jiborn H, Jonsson K. Influence of selective mesenteric arteriography on the outcome of emergency surgery for massive, lower gastrointestinal hemorrhage. A 15-year experience. Dis Colon Rectum 1986; 29:561.

70. Cohn SM, Moller BA, Zieg PM, et al. Angiography for preoperative evaluation in patients with lower gastrointestinal bleeding: are the benefits worth the risks? Arch Surg 1998; 133:50.

71. Steer ML, Silen W. Diagnostic procedures in gastrointestinal hemorrhage. N Engl J Med 1983; 309:646.

72. Gunderman R, Leef J, Ong K, et al. Scintigraphic screening prior to visceral arteriography in acute lower gastrointestinal bleeding. J Nucl Med 1998; 39:1081.

73. Pennoyer WP, Vignati PV, Cohen JL. Mesenteric angiography for lower gastrointestinal hemorrhage: are there predictors for a positive study? Dis Colon Rectum 1997; 40:1014.

74. Colacchio TA, Forde KA, Patsos TJ, Nunez D. Impact of modern diagnostic methods on the management of active rectal bleeding. Ten year experience. Am J Surg 1982; 143:607.

75. Guy GE, Shetty PC, Sharma RP, et al. Acute lower gastrointestinal hemorrhage: treatment by superselective embolization with polyvinyl alcohol particles. AJR Am J Roentgenol 1992; 159:521.

76. ASGE TECHNOLOGY COMMITTEE, DiSario JA, Petersen BT, et al. Enteroscopes. Gastrointest Endosc 2007; 66:872.

77. Bloomfeld RS, Smith TP, Schneider AM, Rockey DC. Provocative angiography in patients with gastrointestinal hemorrhage of obscure origin. Am J Gastroenterol 2000; 95:2807.

78. Kim CY, Suhocki PV, Miller MJ Jr, et al. Provocative mesenteric angiography for lower gastrointestinal hemorrhage: results from a single-institution study. J Vasc Interv Radiol 2010; 21:477.

79. Malden ES, Hicks ME, Royal HD, et al. Recurrent gastrointestinal bleeding: use of thrombolysis with anticoagulation in diagnosis. Radiology 1998; 207:147.

80. McGuire HH Jr. Bleeding colonic diverticula. A reappraisal of natural history and management. Ann Surg 1994; 220:653.

81. Gianfrancisco JA, Abcarian H. Pitfalls in the treatment of massive lower gastrointestinal bleeding with "blind" subtotal colectomy. Dis Colon Rectum 1982; 25:441.

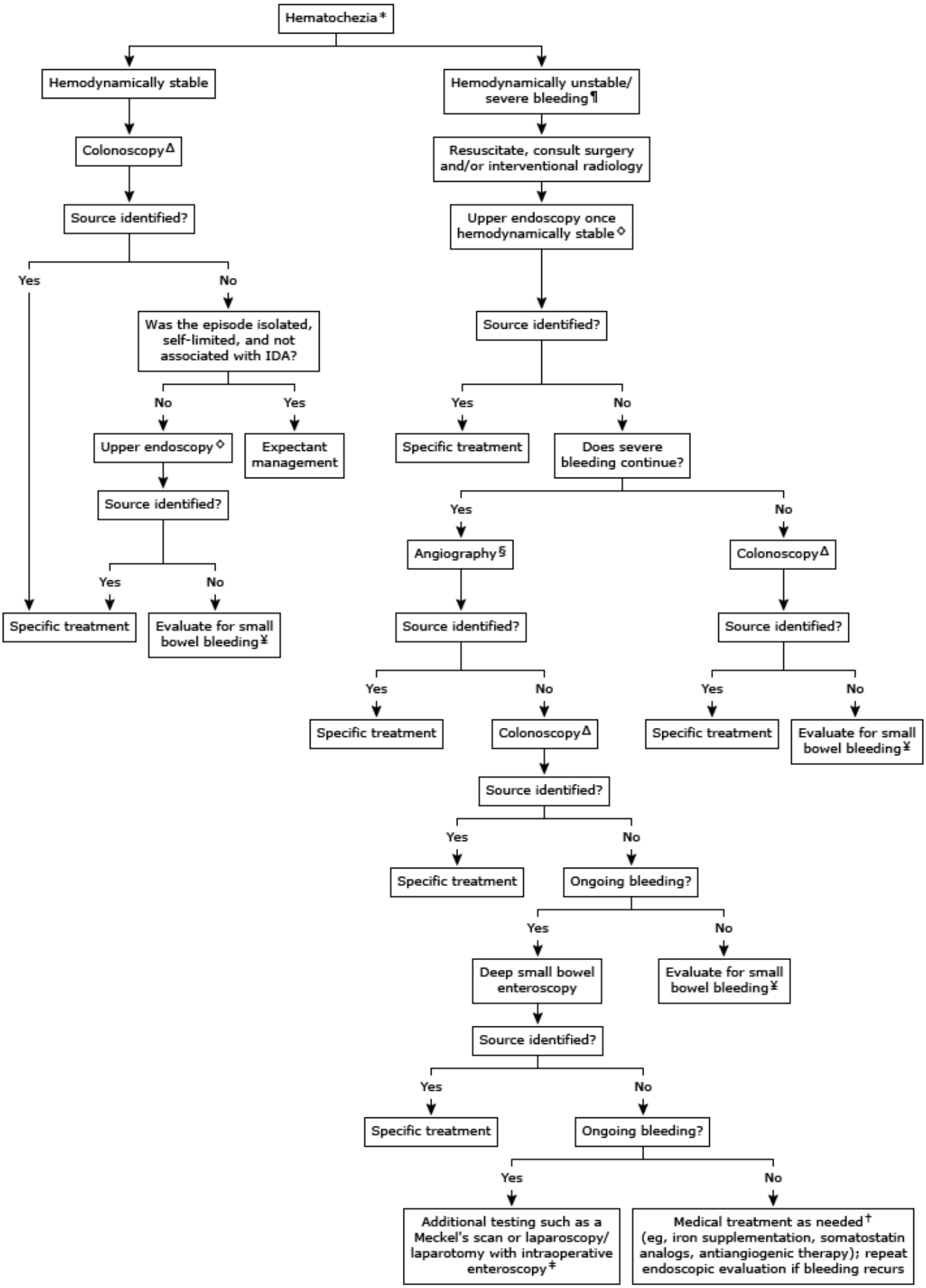
82. Anthony T, Penta P, Todd RD, et al. Rebleeding and survival after acute lower gastrointestinal bleeding. Am J Surg 2004; 188:485.

83. Ríos A, Montoya MJ, Rodríguez JM, et al. Severe acute lower gastrointestinal bleeding: risk factors for morbidity and mortality. Langenbecks Arch Surg 2007; 392:165.

Topic 2547 Version 37.0

## GRAPHICS

### Evaluation of patients presenting with hematochezia (excluding those with minimal rectal bleeding)



IDA: iron deficiency anemia; CTA: computed tomographic angiography; CT: computed tomographic; GI: gastrointestinal; MR: magnetic resonance.
* If hematemesis or melena is present the patient should be evaluated for upper GI bleeding. Refer to UpToDate topics on the evaluation of upper GI bleeding for details.
¶ Bleeding associated with signs such as hypotension, tachycardia, or orthostatic hypotension.
Δ Colonoscopy should be performed once the patient has been resuscitated and an adequate bowel preparation has been given (typically 4 to 6 L of polyethylene glycol). If the initial colonoscopy was inadequate (eg, inadequate visualization, failure to reach the cecum), repeat colonoscopy should be considered.
◇ Consider evaluation with a side-viewing duodenoscope in patients with risk factors for hemobilia or hemosuccus pancreaticus or CT angiography (followed by push enteroscopy if the CT angiography is negative) in patients at risk for an aortoenteric fistula. Conventional transvenous angiography is typically performed if the patient remains hemodynamically unstable despite attempts at resuscitation. If the suspicion for an upper GI source is moderate (rather than high), nasogastric lavage can be performed to look for evidence to support an upper GI source. Refer to UpToDate topics on lower GI bleeding in adults for additional details.
§ CTA is an alternative but lacks therapeutic capacity. A tagged red blood cell scan may aid with localization prior to angiography.
¥ Refer to UpToDate topic review on suspected small bowel bleeding for details.
‡ A Meckel's scan should be performed in younger patients with overt bleeding. Surgical exploration is appropriate if no other studies have revealed a source and significant bleeding continues or if there is high suspicion for a small bowel neoplasm.
† If the deep small bowel enteroscopy was incomplete, a video capsule endoscopy study should be obtained, followed by CT or MR enterography if the capsule endoscopy is negative.

Graphic 95345 Version 6.0

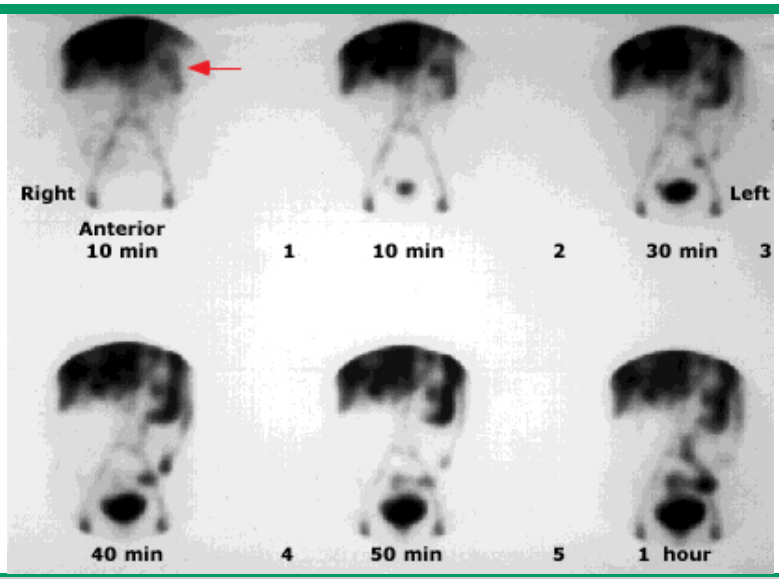
## Procedures used for evaluation of lower gastrointestinal bleeding

| Technique | Advantages | Disadvantages |
|---|---|---|
| Radionuclide imaging | Noninvasive<br>Sensitive to low rates of bleeding<br>Can be repeated for intermittent bleeding | Has to be performed during active bleeding<br>Poor localization of bleeding site<br>Not therapeutic<br>Not widely available |
| CT angiography | Noninvasive<br>Accurately localizes bleeding source<br>Provides anatomic detail<br>Widely available | Has to be performed during active bleeding<br>Not therapeutic<br>Radiation and IV contrast exposure |
| Angiography | Accurately localizes bleeding source<br>Therapy possible with super-selective embolization<br>Does not require bowel preparation | Has to be performed during active bleeding<br>Potential for serious complications |
| Colonoscopy | Precise diagnosis and localization regardless of active bleeding or type of lesion<br>Endoscopic therapy is possible | Need colon preparation for optimal visualization<br>Risk of sedation in acutely bleeding patient<br>Definite bleeding source (stigmata) infrequently identified |

CT: Computed tomographic; IV: intravenous.

Graphic 74147 Version 3.0

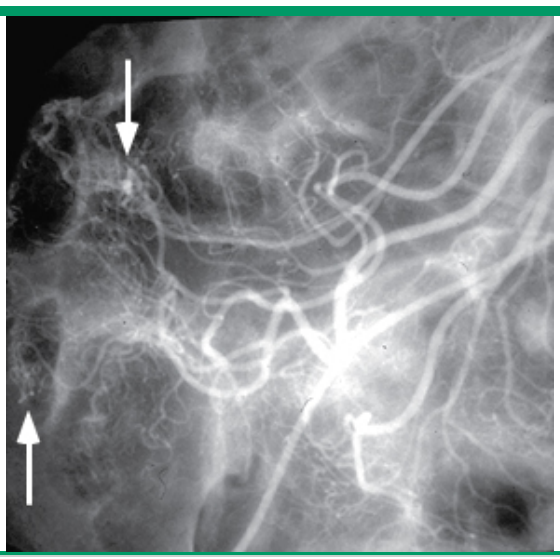
**Technetium labeled red blood cell scan**




A technetium labeled red blood cell scan from a 63-year-old patient with a 24-hour history of bright red blood per rectum reveals increased activity in the distal transverse colon near the splenic flexure (arrow) which progresses toward the descending colon and sigmoid colon by termination of the examination at one hour. These findings are consistent with bleeding from a source in the distal transverse colon near the splenic flexure.

Graphic 79370 Version 2.0

**Angiography of colonic angiodysplasia**



A superior mesenteric arteriogram demonstrates puddling of contrast material in tortuous distended vessels in the cecal wall (arrows).

*Courtesy of Jonathan Kruskal, MD.*

Graphic 52754 Version 4.0

## Contributor Disclosures

**Lisa Strate, MD, MPH** Nothing to disclose **John R Saltzman, MD, FACP, FACG, FASGE, AGAF** Consultant/Advisory Boards: Iterative scopes [Artificial intelligence (AI) applied to polyp detection during colonoscopy]. **Shilpa Grover, MD, MPH, AGAF** Nothing to disclose

Contributor disclosures are reviewed for conflicts of interest by the editorial group. When found, these are addressed by vetting through a multi-level review process, and through requirements for references to be provided to support the content. Appropriately referenced content is required of all authors and must conform to UpToDate standards of evidence.

Conflict of interest policy