

“HOW I DO IT”

Approach to lower gastrointestinal bleeding



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How I do it: Approach to lower gastrointestinal bleeding

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Roque Sáenz MD & Eduardo Valdivieso

Introduction

Lower gastrointestinal bleeding (LGIB) ranges from trivial to massive life-threatening blood loss and is defined as bleeding that emanates from a source distal to the ligament of Treitz.

LGIB represents up to one third of the total cases of gastrointestinal bleeding. It is more frequent in males and older patients. The mortality rate is about 3%–6%, and the prognosis is worse when LGIB occurs during hospitalization [1].

The bleeding is from the small bowel in about 9% of cases and the source remains undiagnosed in 6% of patients with LGIB [2].

In practice, there are three common clinical scenarios related to LGIB: active bleeding, recent bleeding, and chronic bleeding. International nomenclature defines acute LGIB as a bleeding of less than 3 days' duration associated with instability of vital signs, anemia, and/or need for blood transfusion. Chronic LGIB is any passage of blood per rectum that results from intermittent or slow loss of blood.

Although 80% of all LGIB stops spontaneously, and hemodynamic instability and the need for transfusion are rare, the identification of the bleeding source often remains challenging and rebleeding can occur in 25% of cases [3].

Clinical scenario

Clinically, the most common presentation of LGIB is hematochezia, rectorrhagia, but melena, hemodynamic instability, anemia and abdominal pain can be seen.

Hematochezia is defined as gross blood seen either on toilet paper after defecation or mixed with stool. Rectorrhagia means the expulsion of fresh red bright blood without stools, while melena is defined as black stools resulting from the oxidation of hematin in the gut. Hematochezia and rectorrhagia are frequent forms of LGIB, but melena could be present in the setting of constipation.

Because of rapid transit time or massive bleeding, approximately 10% of cases of rectorrhagia, are secondary to upper gastrointestinal bleeding (UGIB) [2].

Chronic bleeding can present as occult fecal blood, occasional episodes of melena, or even small quantities of rectorrhagia.



Unfortunately clinical signs are not reliable predictors of the source or severity of LGIB. As a result, the approach to a case of LGIB depends mainly on the clinical setting, suggesting either acute or chronic bleeding [4].

The hemodynamic stability of the patient and the rate of bleeding dictate the order in which diagnostic and therapeutic procedures should be undertaken.

An initial hematocrit of less than 35%, abnormal vital signs 1 hour after medical management and gross blood on initial rectal examination are all predictors of severe LGIB and adverse outcome [5].

Attention should be paid to anal diseases, which are a common cause of rectal bleeding. A history of anal pain, pruritus, and fresh red blood on the toilet paper is frequently the expression of anal fissures or hemorrhoids.

Anal inspection, anoscopy and rectal examination are mandatory, because patients with clear anal pathology will not require immediate colonoscopy or further investigations.

LGIB associated with an elevated blood urea nitrogen (BUN) or serum bilirubin denotes an increased probability of UGIB. Nasogastric tube aspiration can help identify an upper gastrointestinal bleeding source if it is positive, but a clear nasogastric tube aspirate does not rule out an upper source. The presence of bile in the aspirate suggests that duodenal contents have been sampled and further decreases the likelihood of an upper gastrointestinal source. The presence of blood, clots or “coffee ground” material in the aspirate confirms UGIB and upper gastrointestinal endoscopy should follow immediately.

After aspiration of the gastric contents, the nasogastric tube can also be utilized to start bowel preparation with the instillation of 3–4 liters of polyethylene glycol (PEG) solution at a rate of 1 liter every 30 minutes. PEG, or phosphosoda (45 ml twice), is usually given orally. It usually provides adequate colon cleansing within 3–4 hours. Intravenous prokinetics may be used in order to avoid vomiting and to assure the purge progression.

The patient’s age affects the clinical approach to LGIB. In children and young patients, cow milk allergy, polyps, Meckel’s diverticulum, inflammatory bowel diseases, and anal diseases should be especially considered. Older patients are more likely to have diverticular disease, angiodysplasia, ischemic diseases, colorectal cancer, inflammatory bowel diseases, polyps, nonsteroidal anti-inflammatory drug (NSAID)-induced lesions, and lesions from prior radiotherapy, and may also have anal diseases. Other vascular malformations are infrequent but should occasionally be considered.

Young women could be affected by endometriosis, and when bleeding is episodic or chronic colonoscopy would be better scheduled for menstruation days.

Specific indications and contraindications for diagnostic and therapeutic procedures

The diagnostic accuracy of colonoscopy ranges from 72% to 86% in the setting of LGIB. Cecal



intubation is usually achieved in more than 95% of attempts. The yield from colonoscopy is greater when done earlier in the hospital stay, and patients who undergo colonoscopy for LGIB are reported to have a shorter length of stay compared with those who do not [6]. Colonoscopy leads to the greatest number of specific diagnoses and directed therapy in acute LGIB. For the vast majority of patients with LGIB, colonoscopy is the only intervention needed [7].

A negative technetium-labeled red blood cell nuclear scan rules out active bleeding. The test can detect bleeding at the rate of 0.1 ml/min or greater. However, the results of scintigraphy can be difficult to interpret, have poor accuracy in locating a bleeding site, and are poor predictors of subsequent angiogram results. A limited colonic resection should not be based on only a positive nuclear scan [8].

If the rate of ongoing arterial bleeding is at least 0.5 ml/min, angiography may show extravasations of contrast into the lumen and identify a bleeding site. Angiography is an invasive procedure, which can result in complications including contrast-induced renal failure, arterial injury, and mesenteric ischemia. The accuracy of this procedure can be quite variable; it detects only active bleeding and may miss lesions that bleed intermittently. Angiography can identify neoplastic or vascular disorders and their locations, and can also reveal vascular ectasias based upon the characteristic angiographic appearance. Angiographic therapy can be provided, by means of intra-arterial vasopressin or terlipressin infusions. Intra-arterial vasopressin infusion reduces the bleeding in 70%–80% but the effect is not permanent. Polyvinyl alcohol particles or microcoils, can be placed to occlude vessels; these have a more persistent effect, but increase the risk of ischemia. Unfortunately, angiography is not readily available in all settings, particularly at night or weekends. The use of systemic somatostatin or octreotide infusion is controversial. These drugs reduce the splanchnic blood supply, permitting the spontaneous cessation of bleeding or facilitating local endoscopic treatment.

Computed tomography (CT) angiography is a helpful new diagnostic tool that permits the evaluation of the celiac axis as well as mesenteric arteries.

This technique may offer a very sensitive means to evaluate the source of acute LGIB, while avoiding some of the morbidity and resource-intensiveness of contrast angiography, and may provide unique morphologic information regarding the type of pathology. Investigation with the more rapid and more widely available multidetector CT (MDCT), followed by either directed therapeutic angiography or surgical management, may represent a reasonable algorithm for the early evaluation and management of acute LGIB in which an active bleeding source is strongly suspected [9].

Barium contrast studies have no role in the assessment of LGIB and should be avoided. These procedures have low accuracy and can interfere with subsequent evaluation by colonoscopy or angiography.

Occasionally, the LGIB source is in the small intestine. Push enteroscopy and capsule endoscopy have been used for the assessment of obscure bleeding [10]. New double- and



single-balloon technologies are employed in an improved method, which can be considered for the assessment of acute LGIB; these single- or double-balloon enteroscopes have replaced the push enteroscope where they are available. Enteroscopes have a therapeutic capability, for instance for coagulation, polypectomy or mucosal resection, and for marking for subsequent surgical treatment. Patients with a suspected bleeding area, defined by angiography, scintigraphy or capsule, may be candidates for directed enteroscopic therapy; however, its utility as a primary diagnostic/therapeutic procedure needs further evaluation.

Capsule endoscopy is easier to perform, does not require sedation, and is becoming increasingly cheaper and more widely available. Capsule endoscopy is considered the gold standard for evaluating patients with obscure gastrointestinal bleeding, but its cost-effectiveness is uncertain [11]. Capsule endoscopy identifies findings in 58% of patients compared with 28% with other imaging procedures [12].

In our experience, video capsule endoscopy is best utilized after a negative colonoscopy, but others recommend its earlier use as a first-step procedure for cases of midgut bleeding.

In exceptional conditions, an intraoperative endoscopy (possibly through an enterotomy) should be performed, because of the persistence of bleeding with a probable small-bowel origin that cannot be identified by other investigations.

Surgeons should be a part of the medical team from the very beginning, in case surgical resection is required. Surgery is indicated when more than six units have been transfused, or when hemodynamically significant persistent or recurrent bleeding occurs. Ideally surgery should be directed at a specific bowel segment based upon prior evaluation. Empiric subtotal colectomy should be reserved for life-threatening bleeding that cannot be located by vigorous diagnostic efforts. The overall surgical mortality is about 5%–10%.

Older patients or those with co-morbidities should be considered for earlier surgery, to avoid the complications of multiple transfusion, prolonged hemodynamic instability, cardiovascular impairment or coagulation disorders.

For all cases of confirmed or suspected LGIB, colonoscopy should be the diagnostic and therapeutic procedure of choice. The use of other modalities in the setting of continuous, clinically significant bleeding depends upon the availability of other diagnostic and therapeutic methods (angiography, scintigraphy, etc).

Algorithm for management of LGIB

The very first steps must be to assure hemodynamic stability and to determine the need for hospitalization in an intensive care unit. Volume resuscitation should begin at presentation and continue through the diagnostic evaluation, as needed.

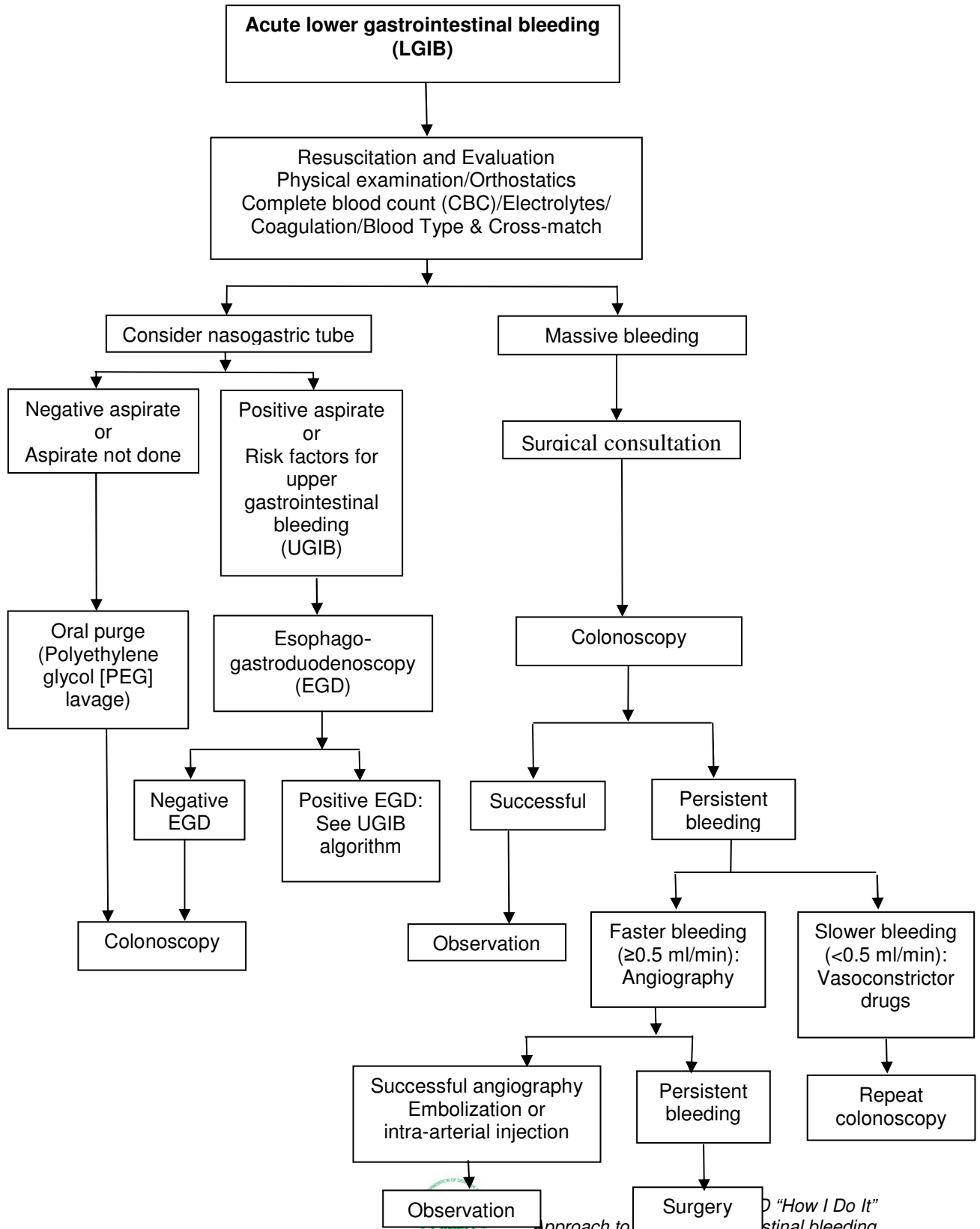
Adequate vascular access is essential. Coagulation tests, hemoglobin level, blood group information, and blood to be used for labeled red cells scintigraphy can be obtained when an



intravenous line is placed.

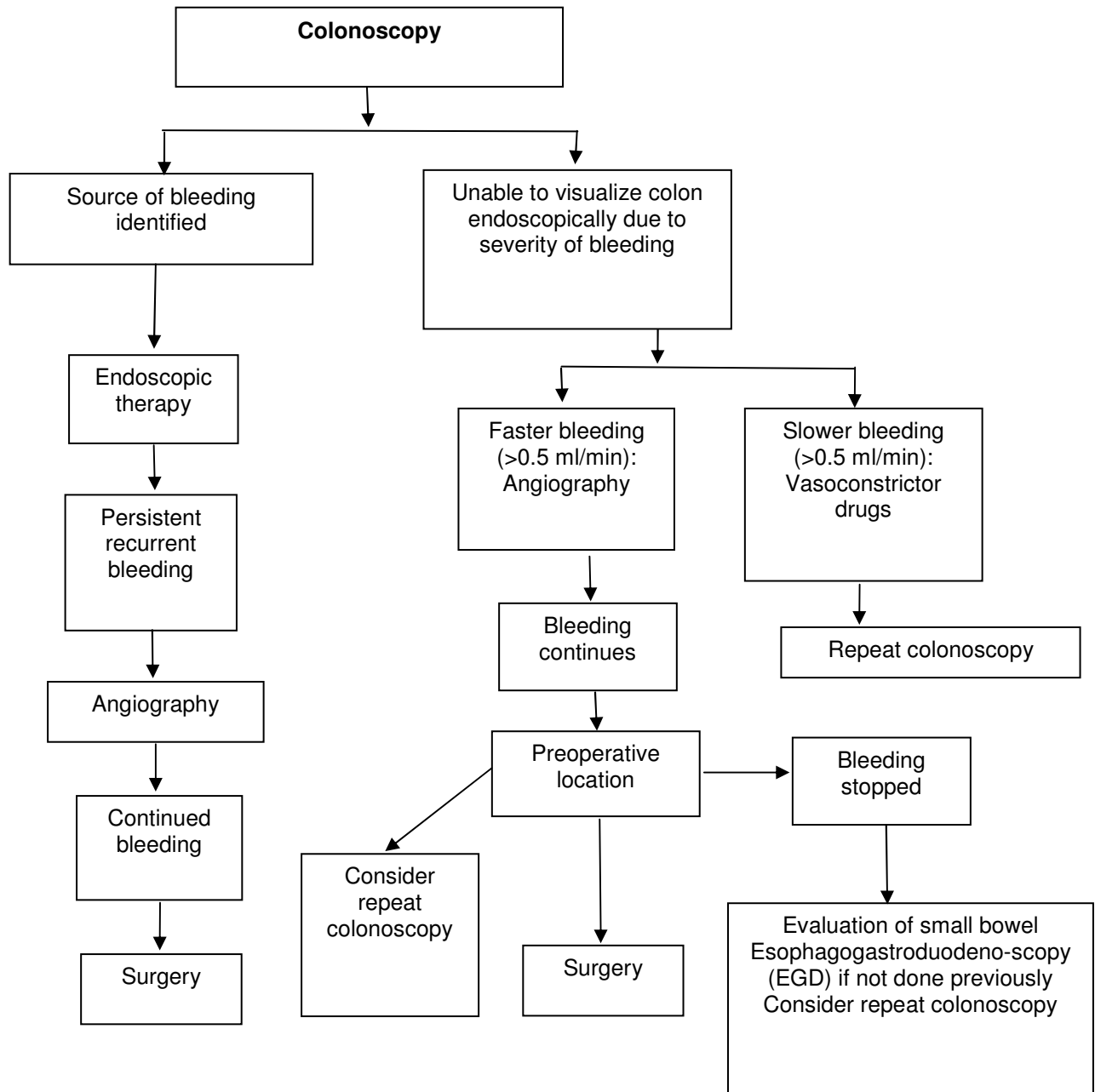
As a guide, we propose the algorithm for management of acute LGIB that is shown in **Figure 1**.

Figure 1. Management algorithm for lower gastrointestinal bleeding (LGIB).



We have also used another management algorithm for acute LGIB, which is based on colonoscopic findings; this is shown in **Figure 2**.

Figure 2. Management algorithm for lower gastrointestinal bleeding (LGIB), based on colonoscopy findings.



Technique of colonoscopy in acute LGIB

Restoration of hemodynamic stability is the most important first step, but bowel cleansing can begin as fluid resuscitation is being carried out. Ideally, colonoscopy should be performed as early as possible, within the first 12–24 hours of admission.

Careful examination, meticulously clearing retained blood and stool, is important. If angiography or scintigraphy has been performed previously, special attention should be paid to areas identified as suspicious by those studies. Care should be taken to avoid excessive air insufflation during the procedure. Repeated aspiration of excess air can reduce the risk of subsequent abdominal distension.

Every effort should be made to visualize the terminal ileum during the colonoscopy. If no blood or clots are found in the small bowel the probable origin is restricted to the colon. A gentle and meticulous withdrawal, searching for active bleeding sources or stigmata, similar to the upper gastrointestinal process is required. Local rinsing in every segment is mandatory, to assure optimal visualization.

Patient preparation

The patient and relatives should be carefully informed about the clinical situation, the probable outcomes, the diagnostic/treatment plan, the associated risks and their solutions. Informed consent should be obtained for all necessary procedures with the patient having the opportunity to have all questions answered.

Sedation

The specific approach to sedation for the procedure will depend upon the co-morbidities and hemodynamic stability of the patient. It may be appropriate to have the services of an anesthesiologist who can monitor and support the hemodynamic status of high-risk patients.

Equipment and accessories

Wide-channel colonoscopes should be available. An experienced endoscopy assistant should be involved in the procedure. All the different devices that are potentially needed should be available at the start of the procedure. This includes, but is not limited to, injection needles and solutions, heater probes, electrocautery devices (including argon plasma coagulation, if available), clips, loops and bands.

Several 100-ml syringes and fluid for vigorous colonic lavage should be available, to flush through the biopsy channel, permitting a better view. Hydrogen peroxide solutions should be avoided because these produce blood bubbles, impairing the view.



Hemostatic procedures

Colonoscopic hemostasis techniques are based on the stigmata of hemorrhage that have been identified in the upper gastrointestinal tract as predictors of upper gastrointestinal bleeding, even though data are limited on the utility of endoscopic stigmata in predicting rebleeding in this setting [13]. Local endoscopic therapy should be reserved for those with active or recurrent bleeding.

In severe diverticulosis the location of the bleeding lesions may be indicated by the presence of fresh blood or clots.

If active bleeding is detected, local epinephrine injection, 1/10 000 or 1/20 000 solution, should be done into the area. In aged patients or patients with vascular impairment, epinephrine use is restricted, or more dilute solutions could be used. Diverticula should be examined carefully, as the bleeding vessel can sometimes be seen in the diverticular dome or on the lip of the diverticulum. The bleeding vessel can be treated with a clip. If a bleeding diverticulum is demonstrated but no vessel is visible, epinephrine injection should be done at the edge of the diverticulum.

The combination of cautery and injection therapy may be useful for visible vessels, according to uncontrolled studies. Clipping or banding could also be attempted according to the vessel characteristics. If an adherent clot is found, it can be guillotined and the underlying lesion treated more accurately. The area should be injected with dilute epinephrine prior to manipulating the clot to decrease the risk of precipitating vigorous bleeding.

Thermal therapies, using a heater probe, electrocautery, or argon plasma coagulation have similar efficacy. Bleeding lesions should be marked by a submucosal India ink tattoo, in order to facilitate location of the lesion in subsequent endoscopic or surgical therapy. In the case of angiodysplasia or angioma lesions, local epinephrine injection prior to thermal therapy is not advisable, because the lesions disappear with the vasoconstriction preventing subsequent therapy.

Submucosal saline injection can be used to produce a cushion that makes thermal treatment in the cecum and right colon less dangerous. It is also advisable to aspirate the excess air to make sure that the thickness of the bowel wall is maximized.

Some characteristics of LGIB

- The most frequent causes of LGIB are diverticular disease and angiodysplasias [14].
- 60% of bleeding patients have diverticula but frequently these are not the source of bleeding [15].
- NSAIDs use increases the risk of LGIB from diverticula and NSAID-induced mucosal erosions.



- It is unusual to find diverticulitis or local inflammation.
- Diverticular bleeding usually presents with hematochezia, maroon material or bright red blood. It is not a common cause of occult bleeding.
- When bleeding stops spontaneously (as occurs in 75%–80% of patients), 65%–75% of those patients do not rebleed.
- Bleeding can occur from diverticula in the right colon.
- Angiodysplasias are frequently seen in the cecum and ascending colon. If they are the source of bleeding or if this is the only finding in a patient with recurrent LGIB, they should be treated.
- Angiodysplasia is present in 3%–40% of patients with occult bleeding. Colonoscopy detects 80%–90% of the cases and it is potentially therapeutic.
- Vascular ectasias and Dieulafoy lesions could be the cause of the local bleeding, and also require local endoscopic treatment. Injection therapy plus coagulation or thermal treatment or mechanical endoscopic procedures (clipping, and banding), could be useful.
- Sometimes if the vessel is difficult to treat, radiological intervention (embolization) or surgery is required.
- Inflammatory bowel disease may be a cause of bleeding in 2%–6% of LGIB cases. It is more significant in Crohn's colitis than in ulcerative colitis. Surgery is required in about 20%–30% of these patients. Bleeding is usually diffuse but occasionally a vessel in an ulcer could be clearly identified and locally treated.
- Infectious colitis could be the cause of diffuse lesions that respond to specific treatment.
- Ischemic colitis is another recognized cause of LGIB. It is more often diagnosed because of diffuse vascular disease, aging of the population, cocaine consumption, vigorous athletic activity, or cardiovascular surgery with hypotension and hormone therapies. It is more frequent in the splenic flexure, descending colon and sigmoid colon because of the characteristics of the blood supply.
- Blue bubbles, ulcerated areas, and the presence of diffuse ectatic vessels and a relative absence of bleeding at the time biopsies are taken may be clues pointing to ischemic impairment. The findings may be asymmetric. A stenosis may be present if the ischemia is chronic or recurrent.
- Dark blue, black, or green coloring of the mucosa suggests severe ischemia that requires urgent surgery in order to avoid perforation and peritonitis.
- If a critical vascular stenosis is demonstrated, vascular surgery or radiological intervention for angioplasty and stenting could be necessary.



- Polyps could be also a bleeding source, and can be treated with polypectomy.
- Bleeding may also be seen at the site of a previous polypectomy or mucosal resection. This can be avoided by careful attention at the time of the initial procedure. Large polyp stalks can be pretreated with clipping or looping. Sometimes adrenaline injection of the stalk produces vasoconstriction, permitting better coagulation or local inflammation of the artery that permits hemostasis. Careful attention to the cautery and coagulation settings, as well as to the snare technique can help reduce the risk of post-polypectomy bleeding.
- Post-polypectomy bleeding that occurs immediately should be treated on the spot, by re-snaring the stalk, adrenaline injection, electrocoagulation, looping or clipping.
- Post-polypectomy bleeding can occur until the 17th day post procedure (mean 5th day). About half of these require transfusions.
- Aspirin, NSAIDs, antiplatelet drugs and anticoagulants can also increase the risk of post-polypectomy bleeding. The appropriate approach should be based upon the underlying need for clot prevention in the individual patient. The risk of bleeding must be balanced against potential thrombotic complications if the drug is stopped.
- We have encountered (unpublished personal data) intestinal ischemia occurring after prolonged colonoscopy for multiple difficult procedures, and resultant overdistension of the bowel. Overinsufflation should be avoided, and excess air aspirated in these cases.
- Colon cancer is also a cause of LGIB, and local treatment is indicated only for hemostasis, very early cancers, or palliation. Definitive surgical treatment is indicated in most cases of colon cancer.
- Radiation colitis is also a common cause of LGIB. Prostate and gynecological cancers are still indications for radiotherapy. Vascular spiders are the cause of such bleeding. Local treatment could be achieved using argon plasma coagulation (APC) or multipolar coagulation. The lower rectum can be treated using scope retroflexion.
- Inflammatory bowel diseases (IBDs) are also a common cause of LGIB. Colonoscopy is usually diagnostic. Ulcerative colitis is easily diagnosed due to its characteristic endoscopic features of confluent inflammation starting in the rectum and extending proximally. Crohn's disease has a characteristic endoscopic appearance of segmentary inflammation and deep ulcers.
- Hemodynamically significant LGIBs due to IBD are uncommon and are usually treated medically or surgically.

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Comment

David J. Bjorkman

While of great clinical significance, lower gastrointestinal bleeding (LGIB) is a less common event than upper gastrointestinal bleeding. As a result, there are fewer prospective trials to guide our diagnostic and therapeutic approach to this condition.

The review of the causes and clinical approach presented by Drs. Sáenz and Valdivieso is excellent and comprehensive. I will not repeat the points they make, but will highlight areas where our approaches may vary slightly, and emphasize points of great importance.

As mentioned by Drs Sáenz and Valdivieso, the clinical approach to the patient will be different, depending upon whether the bleeding is acute, intermittent, or occult. I will focus on acute lower gastrointestinal bleeding (ALGIB), as they have addressed the issues of occult and intermittent bleeding which can be approached less urgently.

The causes of ALGIB vary with the patient population. Retrospective studies of the causes of LGIB have given different information in different settings and varying patient demographics. It is therefore difficult to generalize the frequency of specific causes of ALGIB to all patients. Some common principles, however, appear to be universal. Elderly patients are more likely to bleed from diverticula and vascular lesions than younger patients. Patients taking nonsteroidal anti-inflammatory drugs (NSAIDs), antiplatelet drugs, or anticoagulants are more likely to have ALGIB. The incidence of inflammatory bowel disease and colon cancer in the local population will also affect the likelihood of these disorders causing the bleeding event.

Our approach to ALGIB is very similar to that described by Drs Sáenz and Valdivieso. The primary initial goal is to assess the hemodynamic status of the patient, and provide appropriate intravascular volume resuscitation. Tachycardia and orthostatic changes in blood pressure are indications for rapid volume replacement. Initial volume replacement is done with an isotonic solution (normal saline or lactated Ringer's). The initial hematocrit or hemoglobin level may not be an accurate assessment of the volume of bleeding until intravascular volume has been replaced. Blood is transfused as indicated by the volume loss and underlying medical status of the patient.

After initial hemodynamic stabilization the next step is to prepare the patient for colonoscopy as soon as possible. Colonoscopy has been demonstrated to be the most accurate diagnostic test for ALGIB and can be therapeutic in many situations [1–3]. Early colonoscopy also allows for more rapid directed therapy and decreases the length of hospital stay [4].



Preparation for colonoscopy should begin as soon as the patient is hemodynamically stable. This can be done by giving a polyethylene glycol (PEG) solution either orally or through a nasogastric tube. One liter of solution should be given every 30–45 minutes until the intestinal effluent becomes clear. We prefer this to sodium phosphate because of the ability to titrate the amount of cleansing solution needed and because of the potential electrolytic effects of sodium phosphate, particularly in elderly patients with impaired renal blood flow [5]. Prokinetic agents, such as metoclopramide, may facilitate the administration of the PEG solution.

Vigorous bleeding from the upper gastrointestinal tract can also present as bright red blood, accounting for 10%–15% of cases of presumed ALGIB. If the patient's history suggests a possible upper gastrointestinal source of bleeding (NSAID use, history of peptic ulcers) an upper gastrointestinal endoscopy should be performed prior to starting the colonoscopy preparation. Prompt placement of a nasogastric tube allows for sampling of the gastric contents for blood, clears the stomach for an upper endoscopy, if needed, and facilitates administration of the PEG solution in preparation for colonoscopy.

The colonoscopy should be performed with anticipation of the need for additional flushing to remove blood and retained clots, even after a vigorous purge. Careful evaluation of the entire colonic surface is critical to identify possible bleeding sources. Stigmata of bleeding, similar to those used for upper gastrointestinal bleeding (active bleeding, visible vessels), should be treated at the time of colonoscopy. The method of treatment should be individualized according to the type of lesion seen and the location in the colon. As the colon wall is thinner in the cecum and right colon, I prefer to use dilute epinephrine injection followed by careful thermal therapy after decompressing the colon to maximize wall thickness in the right colon. When argon plasma coagulation (APC) is used the electrical current is transmitted to the colon wall via the argon gas. This makes thermal therapy easier in some situations, but the depth of penetration of the current and the tissue damage is difficult to control. For this reason I avoid using APC in the right colon; I find it to be useful in treating larger areas of radiation damage in the rectum because of the thicker rectal wall. Bleeding diverticula can be treated with thermal coagulation, with or without epinephrine injection, if the vessel can be seen on the lip of the diverticulum. If blood is coming from the opening without a visible vessel, or if the diverticulum is occluded by a clot, the mouth of the opening can be injected with dilute epinephrine or saline to cause local tamponade and promote clot formation. It can be helpful to tattoo the area of the bleeding lesion for later location if bleeding persists or recurs. This can guide subsequent endoscopic or surgical therapy.

In the event that a specific bleeding site cannot be identified and treated at the time of colonoscopy, one can obtain information that may help to locate the general segment that is bleeding by noting the location(s) of fresh blood. If blood is present in the descending colon but not in the transverse or ascending colon, the bleeding site is probably distal to the splenic flexure. It is particularly helpful to determine if blood is present in the terminal ileum, which suggests a small-bowel source. This information may be very useful if bleeding persists and



requires subsequent angiography or surgery.

When colonoscopy does not identify the site of bleeding, other diagnostic approaches should be considered. There is no role for barium studies in the evaluation of ALGIB. They are unlikely to identify a bleeding source and they interfere with more valuable studies, such as endoscopy, angiography, and computed tomography (CT).

If bleeding has ceased and the patient is hemodynamically stable, a more deliberate approach to diagnosis can be used, considering capsule endoscopy, enteroscopy, or CT, as outlined by Drs Sáenz and Valdivieso for intermittent and occult bleeding.

If the active bleeding persists, the approach depends upon the volume of bleeding. Scintigraphy using labeled red blood cells, can detect a slower bleeding rate (0.5 ml/min). Our experience with scintigraphy has been disappointing. Often the bleeding slows to the point where it cannot be detected, or the location of the bleeding site is poorly defined by the study. It may provide information that guides subsequent angiographic diagnosis and therapy, allowing the radiologist to more selectively evaluate the suspected bleeding vessel. For this reason radiologists may request a bleeding scan before performing angiography.

Angiography allows both diagnosis and potential therapy when brisk bleeding persists. Local infusion of vasopressin, or embolic therapy can slow, or stop bleeding, but also carry a significant risk of causing local ischemia. Vasopressin also carries cardiac effects that may limit its use.

CT angiography with high-speed, high-resolution scanners can identify both vascular abnormalities that may be bleeding and soft tissue abnormalities that can be diagnostic. When this technology is available it may obviate the need for angiography.

Surgical intervention should be a last resort for the treatment of continued vigorous ALGIB. Every effort should be made to identify the bleeding segment of bowel prior to surgery, as empiric hemicolectomy has a significant risk of missing the bleeding lesions. When colonoscopy can define an area of bleeding, but cannot identify the specific lesion or provide treatment, the information can be used to determine the section of bowel to be resected. A submucosal tattoo left in the segment may guide subsequent urgent surgery and minimize the amount of bowel that needs to be removed. Tattoos should be left at the site of endoscopic therapy to guide subsequent surgery in case bleeding persists or recurs.

Finally, when a lower gastrointestinal source of bleeding cannot be found, the upper gastrointestinal tract should be evaluated, as it accounts for 10%–15% of ALGIB.

While the approach outlined here applies to most patients presenting with ALGIB, the individual condition, situation and co-morbidities of the patient should ultimately guide the diagnosis and treatment of a specific patient



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Summary

Tamás Molnár

Tibor Wittmann

Drs Sáenz, Valdivieso, and Bjorkmann have excellently summarized the causes, diagnostic methods, and endoscopic therapies of lower gastrointestinal bleedings (LGIBs). We would like to add some further practical notes based on our experience.

- 1 Endoscopic examination of the upper gastrointestinal tract is the first step in our practice in the case of any manifestation of gastrointestinal bleeding; clear nasogastric tube aspirate is not enough to exclude upper gastrointestinal bleeding (UGIB), especially in the case of duodenal origin.
- 2 Examination of the ileum is very important during colonoscopy indicated by gastrointestinal bleeding, particularly if hemorrhage is also present in the cecum. However in such cases, blood can flow back from the colon to the ileum through Bauhin's valve.
- 3 The major diagnostic problem is caused by gastrointestinal bleedings originating in the small bowel. Although capsule endoscopy can determine the source of bleeding, it is very difficult to locate the exact segment and therapeutic intervention cannot be performed. Therefore positive capsule endoscopy often results in surgery, during which intraoperative endoscopy is essential.
- 4 The experience gained from the increasing number of single- and double-balloon enteroscopic examinations allows a more frequent review of the whole length of the small bowel and the use of therapeutic hemostasis, which could solve the problem of the diagnosis and endoscopic therapy of acute small-bowel bleedings.

