Lower GI Bleeding

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Lower GI bleeding (LGIB), or hemorrhage, refers to a significant, sometimes dramatic, event marked by the passage of large amounts of blood [hematochezia (blood with stools) or rectorrhagia (blood without stools)] through the rectum in a sudden and sustained fashion.

The passage of copious blood through the rectum is a less frequent presentation than upper GI hemorrhage (20–27 per 100,000 vs. 50–150 per 100,000). It is associated with lower morbidity and mortality (4% vs. 6–13%). The majority of lower GI bleeds will cease spontaneously. However, patients with continuous bleeding over the initial 24 hours, altered vital signs (tachycardia and/or hypotension), or significant comorbidities are at greater risk for morbidity and mortality.

As in any bleeding case, the initial priority should be a comprehensive assessment of the patient and an aggressive reanimation. The unstable patient should not be moved for radiological or endoscopic examinations until his/her vital signs have been corrected and his/her condition has stabilized.

21.1 Step One

- **Minimize ischemia and restore perfusion supply**
  - (a) Oxygen supplementation: increase inspired O2 by nasal cannula or mask ventilator.
  - (b) Intravenous access: open a vein (two is better) with a large enough catheter (#16 or #18).
  - (c) Fluid resuscitation: infuse an iso-osmolar solution such as 0.9 NaCl (normal saline) or lactated Ringer's solution.

The amount of fluid to be replaced can be estimated based on vital signs:

- Orthostatic hypotension = 20% circulatory loss, i.e., about 1 liter of fluid required.
- Tachycardia or hypotension corresponds to a loss of about 30%, i.e., 1.5 liters.
- Shock = loss of more than 40%, i.e., 2 liters.

This amount of replacement fluid is usually administered over 1–2 hours to restore the hemodynamic state. The speed of administration, however, will be adjusted according to the severity of the instability (may require faster correction if shock) vs. the patient's ability to receive a large and sudden fluid load (with risk of vascular overload if heart or kidney failure, etc.).

- (d) Red blood cell transfusions may be required. The usual goal is to maintain hemoglobin at 80 g/liter; however, patients with diseases that compromise blood supply to vital organs (e.g., coronary artery disease) may benefit from a hemoglobin maintained at 90 g/liter.

21.2 Step Two

- **Clinical and biological assessment of the patient**
  - (a) The evaluation of vital signs is necessary to assess the severity of the bleeding and to adjust the initial vascular repletion therapy.
  - (b) The clinical history and examination will subsequently make it possible to evaluate (1) the general health status and comorbidities that require immediate and short- or medium-term management (e.g., decompensated diabetes, etc.) and (2) the cause of the LGIB and thus to orient specific treatment.
  - (c) Biological examinations: complete blood count (Hb, WBC, plt), INR, renal (urea, creatinine, electrolytes) and liver (bilirubin, ALT, AST, alkaline phosphatase) tests, and blood glucose are obtained at the arrival of the patient and repeated every 6–12 hours.
  - (d) Correction of the comorbidities revealed in the clinical and/or biological examinations: insulin therapy if high glucose, coagulation correction (administration of vit. K, fresh plasma, platelets, etc.) if required, etc.

21.3 Step Three

- **Lower or upper GI bleeding?**

The generally accepted definition of LGIB is bleeding from the GI tract distal to Treitz's angle; it is, however, important to remember that a significant number of patients (10–15%) presenting with the passage of a large amount of blood through the rectum are actually bleeding from an upper GI lesion (UGIB; see ▶ Chap. 11). This condition is seen with severe bleedings and should be suspected in patients with hemodynamic instability and dark/maroon hematochezia (patients with less severe UGIB have melenic stools).

One of the first diagnostic procedures in the patient suspected of UGIB is to insert a nasogastric tube to check for the presence of blood that would indicate a gastric or duodenal lesion (that would need appropriate treatment as discussed in ▶ Chap. 11). If the tube brings back bile without blood, an upper source is virtually eliminated; in the absence of blood and bile, a duodenal lesion remains sometimes possible (10% of these cases).

In patients suspected of an UGIB, an upper GI endoscopy should be performed promptly. It can be

realized rapidly (in comparison with colonoscopy that requires laxative preparation, etc.) to give a definitive answer on the presence or absence of an upper lesion and provide a specific and effective therapy for the UGIB lesion.

21.4 Step Four

Causes of LGIB

Once a proximal source of bleeding has been eliminated, the differential diagnosis of LGIB will primarily include the following clinical entities (see Table 21.1):

Colon diverticulum

- It is the most common cause of LGIB, causing between 20% and 55% of them. It rarely occurs before the age of 40 years, and the incidence increases with age.
- The pathogenesis of a diverticular bleeding is attributed to an erosion (probably by a fecalith) of vasa recta on the edge of a diverticulum.
- Originating from an eroded arterial vessel, the bleeding is frequently acute and with large quantities of red blood. In most cases, the bleeding will stop spontaneously, but it may recur.

Ischemic colitis

- It is the most common form of intestinal ischemia.
- It is usually transient and reversible.
- The areas most susceptible to ischemia are the splenic angle, the rectosigmoid junction, and the right colon.
- The bleeding is usually accompanied by diarrhea.

Table 21.1 Causes of LGIB in various series in the literature

Colon diverticulum	10–40% of cases
Colitis	
Ischemic	5–20%
Infectious	3–30%
Inflammatory	2–4%
Radiation	1–3%
Neoplasm or polyp	3–10%
Vascular lesions/angiodysplasias	3–30%
Anorectal lesions (hemorrhoid, fissure, etc.)	5–15%

- It may occur without identifiable cause, but the usual setting is an elderly patient with a cardiac or vascular disease.
- The diagnosis is usually confirmed on colonoscopy and/or suspected on abdominal CT.
- The majority of patients will show a spontaneous and complete resolution. Some may progress to intestinal necrosis and will require an emergency intervention; the risk of mortality for these patients is significant.

Hemorrhoidal bleeding (and those associated with other anorectal sources)

- The bleeding is usually chronic and intermittent, but it may occasionally be profuse and may be designated as LGIB.
- The diagnosis can be made easily at anoscopy or rectoscopy, hence the importance of one of these procedures early in the investigation of a LGIB.

Gastrointestinal angiodysplasia (or vascular ectasia)

- They are commonly associated with occult bleeding and iron deficiency anemia, but occasionally, they may cause LGIB.
- They are more common in the elderly, being secondary to the degeneration of the venules in the submucosa.
- They are often associated with other conditions such as valvular heart disease or renal failure.
- The lesions are often multiple, but usually in the right colon.
- The recurrence rate is high (up to 80%) after spontaneous cessation of bleeding.
- Endoscopic treatment is effective.

Inflammatory, infectious, and radiation colitis

- They can cause bloody diarrhea.
- They are rarely a cause of LGIB.

Colorectal polyps and cancers

- They may cause occult or visible blood loss.
- In a small percentage of cases, they can cause LGIB.

Post-polypectomy bleeding

- Bleeding in the days following endoscopic removal of a polyp occurs in 1 to 6% of cases.
- Typically, bleeding can occur rapidly following polypectomy (same day) or 7–10 days later when the scab falls off.
- The majority of these cases can be treated conservatively or by endoscopic hemostasis of the polypectomy site.

Small bowel bleeding

- They may be secondary to vascular lesions (e.g., angiodysplasias, Dieulafoy's lesion), Meckel's diverticulum, ulcers, Crohn's disease, etc.
- They represent a small percentage of the causes of LGIB (2% to 15%).
- Meckel's diverticulum bleeding is a common cause of LGIB in children.

21.5 Step Five

Investigation

Once the patient is stabilized and an upper GI or anorectal source has been ruled out, the investigation of the etiology of the LGIB will usually continue with colonoscopy.

Colonoscopy is the test of choice to identify the colonic cause of LGIB. However, it has many disadvantages: it requires a laxative preparation (e.g., Colyte 4 liters in 4 hours) that takes time (and "patience") and may not be totally effective in cases of severe and/or persistent bleeding; it is a procedure whose preparation (induced diarrhea) as well as its realization may be difficult to tolerate (particularly in a fragile, elderly, or unstable patient); it may, in the case of active hemorrhage, be difficult to perform and/or interpret, given the difficulty of visualizing the colonic walls that are not perfectly clean; and it certainly allows therapeutic measures to control the bleeding lesion, but its therapeutic impact is less obvious than for the upper endoscopy in UGIB.

When colonoscopy is not feasible (most often because of active bleeding that compromises the patient's hemodynamic balance or does not allow an effective "colonic lavage"), the following alternatives may be used:

- Labeled red blood cell scintigraphy in nuclear medicine is a noninvasive test and does not require intestinal preparation. However, it is more useful for localizing the site of a bleeding than for a precise diagnosis, and the investigation will generally have to be completed by an endoscopy or another procedure. The technique consists of labeling (by an in vivo or in vitro technique) the patient's red blood cells with a radiotracer followed by dynamic image acquisition over the following hours. The accumulation of the radiotracer signals the site of bleeding. This imaging technique is sensitive since it can detect a bleeding of 0.5 mL/min.
- CT angioscan is increasingly used to detect a bleeding site that would give extravasation of blood into the GI lumen. Its sensitivity is not well known, but CT is usually easier and faster to perform than the scintigraphy described above or the arteriography (see below).
- Angiography necessitates technical expertise that may not be available in all centers. It is an invasive examination but does not require bowel preparation and can detect bleeding of the order of 1 mL/min. Its diagnostic performance is limited by the fact that the bleeding has to be active at the precise and limited time when the exam takes place (the same comment applies for the CT angioscan described above). Arteriography allows therapeutic procedures (arterial embolization to occlude the bleeding vessel). Arteriography and its therapeutic procedures can lead to complications, sometimes serious (intestinal ischemia of the embolized segment).

When the small intestine is the cause of LGIB, it can be investigated with an EnteroScan or video enteroscopy. Push enteroscopy or double-balloon enteroscopy (via the oral or anal route) may also be used.

21.6 Step Six

Treatment

The stabilization of the patient is the priority of treatment in the initial phase. In addition to fluid replacement, an assessment of the patient's comorbidities must be made for the overall management of the patient. If required, the patient should be transferred to the intensive care unit for active monitoring.

The treatment strategy (see ◘ Fig. 21.1) will depend on two factors: (1) the cause of the bleeding and (2) the continuation or stopping of the bleeding. In the majority of cases, the bleeding will cease spontaneously; the investigation will then be primarily endoscopic, and the treatment will depend on the findings during this examination.

In cases of persistent or significant bleeding with hemodynamic repercussions, the immediate goal of treatment will be to stop the bleeding. The therapeutic options should be specific and are multiple: pharmacological, endoscopic, angio-radiological, and surgical.

Diverticular bleeding that has stopped will generally not require treatment if it is a first episode. If the

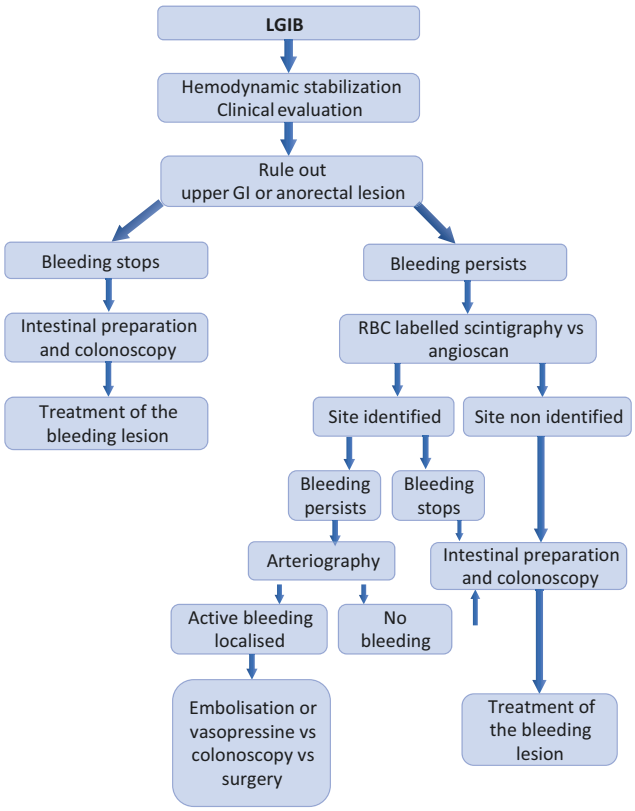

Fig. 21.1 Algorithm for the management of LGIB

bleeding is still active and the responsible diverticulum is clearly identified, per colonoscopy therapeutic maneuvers (sclerotherapy, etc.) can be attempted.

Angiodysplasia identified at colonoscopy can be treated by a variety of endoscopic techniques (electrocoagulation, injection, argon coagulation). If identified on arteriography, intra-arterial vasopressin infusion or selective embolization may be used.

A hemorrhoidal bleeding is usually easily treated once the cause is identified. Elastic ligation (Barron's technique) is most commonly used in North America. Specific cases, such as the cirrhotic patient bleeding from rectal varices and/or hemorrhoids, may be more complicated.

Ischemic colitis usually requires supportive treatment with fluid replacement, antibiotics (possibly), and correction of precipitating factors. A surgical resection may be necessary if the ischemia progresses to transmural necrosis.

Ideally, the surgical treatment should be directed to the specific cause of the LGIB. Investigative techniques now make it possible to avoid the unfortunate circumstance where the patient with an uncontrollable bleeding is taken to the operating room without localization of the bleeding site (and will be submitted to a blind partial or total colectomy).

21.7 Special Topic: GI Bleeding and Altered Coagulation

The patient presenting with a GI bleeding while on anticoagulant or antiplatelet treatment constitutes a therapeutic challenge. These antithrombotic drugs increase the risk of GI bleeding and can limit the efficacy of hemostatic procedures.

The decision to interrupt or reverse the antithrombotic treatment is difficult. Potential benefits of reducing the bleeding process vs. the risk of inducing thrombotic complications must be weighed when modifying the antithrombotic therapy. As a general rule, interruption or reversal of the antithrombotic treatment must be limited to patients with severe, life-threatening, and uncontrollable hemorrhage.

- The vitamin K antagonist warfarin has a half-life of 40 h, and its therapeutic effect lasts 2–5 days. Antagonists include:
  1. Prothrombin complex concentrates (PCC), such as Octaplex®, Beriplex®, and Kcentra®, are produced by chromatography purification of large plasma pools and contain coagulation factors II, VII, IX, and X, as well as proteins C and S. They can induce rapid INR reduction.
  2. Fresh (frozen) plasma are easily available and 10x less expensive than PCC (although probably less potent).
  3. Vitamin K 2.5 mg p.o. or i.v., a very cheap alternative, slowly reverses the anticoagulation effect in 24–28 h.
- Direct oral anticoagulants (DOACs) have a shorter effect. The half-life of dabigatran (Pradaxa®), a thrombin inhibitor, and apixaban (Eliquis®) and rivaroxaban (Xarelto®), inhibitors of factor X (that promotes the transformation of prothrombin to thrombin), are 12–17 h, 12 h, and 8–9 h, respectively.

  Specific antagonists are available for dabigatran [idarucizumab (Praxbind®), a monoclonal antibody binding and inhibiting dabigatran], as well as for apixaban and rivaroxaban [andexanet alfa (Andexxa®), an inactivated factor X that will attract factor X inhibitors], but they are very expensive.

  PCC can possibly help to restore coagulation in some patients on DOACs.
- Antiplatelet agents, such as ASA and P2Y12 platelet receptor inhibitors [clopidogrel (Plavix®), prasugrel (Efient®), ticagrelor (Ticlid®)], block platelet function for a prolonged period (up to 10 days).

  Platelet transfusions to reverse the drug effect have been associated with an increased mortality risk in patients with normal platelet count, and this therapeutic approach needs to be reconsidered.