

Chapter 39

Approach to Lower Gastrointestinal Bleeding (LGIB) in the ICU



39.1 Introduction

Lower gastrointestinal bleeding (LGIB) originates distal to the ligament of Treitz, mainly involving the colon, rectum, and anus. Presenting as either acute, overt bleeding (e.g., hematochezia) or chronic, occult bleeding, LGIB is a significant cause of hospitalization, with rising morbidity and mortality rates, particularly among elderly and comorbid patients. Common causes include diverticular disease, angioectasias, hemorrhoids, and ischemic colitis. Effective management aims to stabilize the patient, identify the bleeding source, and provide targeted medical, endoscopic, or surgical interventions [1] [Algorithm 39.1].

39.2 Initial Assessment

The initial assessment focuses on determining the patient's hemodynamic status and bleeding severity, particularly critical in elderly patients and those with comorbidities due to their higher risk for rapid deterioration. Continuous monitoring of vital signs, especially blood pressure, heart rate, and oxygenation, is recommended.

Key Considerations

- **Vital Signs:** Observe for hypotension, tachycardia, or signs of shock.
- **Comorbid Impact:** Conditions such as cardiovascular disease complicate outcomes, stressing the need for immediate and targeted interventions.
- **Routine Assessment:** Physical examination, including a digital rectal exam (DRE), helps identify signs of active bleeding or hematochezia, as advised by ESGE guidelines.

39.2.1 Shock Index Assessment

The shock index (SI), calculated by dividing the heart rate by systolic blood pressure, is a practical tool to gauge hemodynamic compromise, especially for patients with suspected significant blood loss. Beyond its threshold of 1, the SI is enhanced by integrating clinical features such as ongoing bleeding.

- Shock Index >1: Indicates hemodynamic instability and suggests significant blood loss, typically warranting urgent resuscitation and invasive diagnostic steps like CT angiography.
- Limitations: In cases with baseline tachycardia or hypotension due to chronic conditions or medications, the shock index should be complemented by clinical judgment, aligning with ACG recommendations.

39.3 Resuscitation

Fluid Resuscitation Strategy

The ACG and ESGE guidelines recommend using blood products preferentially over IV fluids to manage hemodynamic stability in LGIB, particularly in elderly or cardiac-compromised patients who are at a higher risk of complications from fluid overload. Excessive IV fluids can dilute blood components, reducing hemoglobin concentration and impeding adequate oxygen delivery to tissues. This hemodilution effect, especially in patients with significant blood loss, may exacerbate hypotension and tissue hypoxia [2].

Blood transfusions are therefore prioritized when hemoglobin levels fall below critical thresholds (typically 7–9 g/dL for most patients or 8–10 g/dL for those with cardiac conditions). This strategy helps maintain a stable hemoglobin concentration, which supports oxygen-carrying capacity and optimizes tissue perfusion without risking fluid overload, a particularly crucial consideration for patients with congestive heart failure or renal impairment. Monitoring of vital signs and hemodynamic parameters during resuscitation is essential, as is adjusting the approach based on real-time responses to intervention.

Anticoagulation Reversal

For patients on anticoagulation therapy, especially those presenting with life-threatening bleeds, immediate anticoagulation reversal is critical to reduce bleeding severity and allow other hemostatic interventions. The ESGE guidelines recommend a stratified approach to anticoagulation reversal based on the thrombotic risk profile and International Normalized Ratio (INR) levels. For patients on vitamin K antagonists, INR levels can guide the urgency and extent of reversal, with agents like prothrombin complex concentrate (PCC) and vitamin K recommended for rapid INR normalization.

For patients on direct oral anticoagulants (DOACs) like dabigatran, specific reversal agents such as idarucizumab are indicated, while andexanet alfa can be used to reverse factor Xa inhibitors, including apixaban and rivaroxaban. In scenarios where these agents are not available, activated charcoal (if ingestion was within the previous hours) or prothrombin complex concentrates may be considered for partial reversal. Prompt reversal is especially warranted when active bleeding compromises hemodynamic stability, underscoring the need for quick identification of anticoagulant use in patient history during initial assessment.

39.4 CT Angiography (CTA)

Utility

CT angiography is a noninvasive diagnostic imaging technique that can identify the active site of bleeding with high precision, particularly in hemodynamically unstable patients or those with rapid blood loss. CTA allows for detailed vascular imaging, providing clinicians with a roadmap for potential therapeutic interventions, such as embolization, should endoscopic approaches prove insufficient. ACG and ESGE guidelines highlight CTA as the preferred imaging modality due to its rapid acquisition and ability to visualize active extravasation, which helps in planning subsequent endoscopic or interventional radiology procedures.

A positive CTA—showing active extravasation—generally necessitates referral to interventional radiology for possible transcatheter embolization. However, a negative CTA might indicate either a cessation of active bleeding or an undetectable slow bleed. This negative result could prompt further workup, including upper GI endoscopy, especially if clinical suspicion of a non-colonic source persists. In certain cases, conservative management might be sufficient if the patient's hemodynamics stabilize without further evidence of bleeding.

Criteria for CTA Referral

CTA is particularly recommended in cases of:

- Persistent hypotension despite adequate initial fluid resuscitation, as this suggests continued blood loss and risk of shock.
- High clinical suspicion of massive hemorrhage, particularly if initial endoscopy is inconclusive or not immediately available.
- Uncertain localization of the bleeding source where endoscopic visualization is limited or delayed.

Aligning with ESGE guidelines, CTA should ideally be performed within 60 min of patient stabilization for prompt and effective management.

39.4.1 Negative CTA Results

Follow-Up

In instances where CTA does not identify an active bleeding site, additional diagnostic steps are necessary to rule out other potential sources, particularly from the upper GI tract. This approach is endorsed by the British Society of Gastroenterology (BSG), which emphasizes the importance of ruling out upper GI causes when a clear source is not visualized in CTA. An upper GI endoscopy may be indicated in cases where aortic aneurysms, peptic ulcers, or aortoenteric fistulas are suspected but not initially visible on CTA.

The algorithm in this case would proceed as follows:

1. Reassess the patient's hemodynamic stability post-CTA.
2. Upper GI endoscopy should be performed if symptoms or clinical history suggest possible upper GI sources, including scenarios where hematemesis or melena are present.
3. If upper GI endoscopy is negative, a conservative observation approach with close monitoring may be considered, especially if the patient stabilizes without recurrent bleeding.

This systematic approach ensures that other potentially serious bleeding sources are not overlooked, preventing premature cessation of the diagnostic workup.

39.5 Oakland Score Assessment

The Oakland Score is a risk stratification tool used in patients with LGIB to estimate the likelihood of adverse outcomes, such as rebleeding or the need for urgent intervention. By incorporating easily measurable clinical parameters, it assists clinicians in determining whether a patient is suitable for outpatient management or requires inpatient care. A score of 8 or below generally indicates a low risk of complications, allowing for conservative management with outpatient follow-up. Conversely, patients scoring above 8 may be at higher risk, warranting closer monitoring and inpatient intervention [3].

Components of the Oakland Score

The Oakland Score is calculated based on the following factors:

1. Age: Age is a significant factor due to the increased risk of adverse outcomes with advancing age.
 - <40 years: 0 points
 - 40–69 years: 1 point
 - ≥70 years: 2 points.

2. Gender: Males tend to have a higher risk for complications from LGIB.
 - Female: 0 points.
 - Male: 1 point.
3. Previous Admission with LGIB: A history of LGIB suggests a greater likelihood of rebleeding and complications.
 - No prior admission for LGIB: 0 points.
 - Prior admission for LGIB: 1 point.
4. Digital Rectal Examination (DRE) Findings: DRE results help determine the likelihood of active or recent bleeding.
 - No blood detected: 0 points.
 - Blood present on DRE: 1 point.
5. Heart Rate: Elevated heart rate may indicate ongoing bleeding or hypovolemia.
 - <70 beats per minute (bpm): 0 points
 - 70–89 bpm: 1 point
 - 90–109 bpm: 2 points
 - ≥110 bpm: 3 points.
6. Systolic Blood Pressure: Lower blood pressure is associated with hypoperfusion and significant blood loss.
 - ≥160 mmHg: 0 points
 - 130–159 mmHg: 2 points
 - 120–129 mmHg: 3 points
 - 90–119 mmHg: 4 points
 - <90 mmHg: 5 points.
7. Hemoglobin Level: Low hemoglobin levels indicate significant blood loss and are predictive of severe bleeding.
 - ≥160 g/L: 0 points
 - 130–159 g/L: 4 points
 - 110–129 g/L: 8 points
 - 90–109 g/L: 13 points
 - 70–89 g/L: 17 points
 - <70 g/L: 22 points.

Interpretation and Clinical Use

- Score ≤ 8: A score of 8 or below is considered low risk, indicating a 95% probability of safe discharge without needing urgent inpatient intervention. These patients can often be managed conservatively with outpatient follow-up.
- Score > 8: A score above 8 suggests a higher risk of serious complications, such as rebleeding or the need for transfusion. For these patients, inpatient care is recommended, along with close monitoring and timely diagnostic procedures, potentially including an urgent colonoscopy.

Stratification and Conservative Management

For patients scoring 8 or below, outpatient management may include the following steps:

1. Clear Discharge Instructions: Educate patients on recognizing rebleeding symptoms and advise them on when to seek emergency care.
2. Elective Colonoscopy or Imaging: Schedule these diagnostic tests within a reasonable timeframe, depending on clinical judgment, to further investigate the source of bleeding.
3. Regular Follow-Up: Arrange follow-up visits to monitor for any delayed complications or recurrence, ensuring the patient remains stable.

This scoring system allows healthcare providers to optimize resource use and patient safety, targeting high-risk patients for more intensive care while minimizing unnecessary admissions for low-risk individuals.

39.6 Colonoscopy

Colonoscopy is essential in both diagnosing and treating lower gastrointestinal bleeding (LGIB), as it provides direct visualization and allows therapeutic intervention at the bleeding site. Current guidelines from ESGE and ACG recommend that the timing of colonoscopy should be based on the patient's stability and bleeding activity rather than routinely performed within 24 hours. For patients with resolved bleeding or those who are hemodynamically stable, elective colonoscopy within 24–72 hours is often appropriate and can improve diagnostic yield by allowing for adequate bowel preparation.

39.6.1 Diagnostic and Therapeutic Interventions

Endoscopic Techniques for Hemostasis

- Through-the-Scope (TTS) Clips: TTS clips are commonly used to mechanically compress the bleeding vessel, especially effective in cases of diverticular bleeding. They are applied directly to the source of bleeding and can rapidly achieve hemostasis.
- Band Ligation: Primarily used in cases of hemorrhoidal or diverticular bleeding, band ligation can occlude blood flow to the bleeding vessel by placing a small rubber band at its base. This technique is particularly beneficial in patients where the bleeding site is clearly identifiable.
- Argon Plasma Coagulation (APC): APC is a noncontact thermal method used to coagulate small bleeding vessels, which is effective for angioectasias and other vascular lesions. By controlling the depth of tissue coagulation, APC can reduce the risk of tissue perforation and is especially useful in diffuse bleeding.

Considerations for Timing

- In actively bleeding patients who are hemodynamically unstable, urgent colonoscopy is advised as it enables real-time diagnosis and immediate therapeutic intervention. For patients with hemodynamic stability but active or recent bleeding, urgent colonoscopy remains beneficial, as it can help identify and treat bleeding sources before rebleeding occurs.
- For stable patients or those with self-limited bleeding, a nonurgent colonoscopy may be scheduled within 24–72 hours. This delayed timing ensures proper bowel preparation, which increases visualization quality and diagnostic accuracy, and reduces the need for emergency procedures. This also aligns with ACG and ESGE recommendations, as evidence suggests that nonurgent colonoscopy does not adversely impact outcomes in stable patients.

39.7 Management of Persistent Active Bleeding

For patients whose bleeding persists despite initial endoscopic interventions, a step-wise approach incorporating interventional radiology and, if necessary, surgical options is recommended.

Angiographic Embolization

- Following a positive CTA that identifies the bleeding site, angiographic embolization can be performed to selectively occlude the bleeding vessel. Embolization is highly effective for localized bleeding sources that are inaccessible or unsuitable for endoscopic treatment.
- ESGE guidelines recommend that embolization should ideally occur within 60 min in centers with 24/7 interventional radiology capabilities. This approach ensures rapid intervention, minimizing the risk of ongoing hemorrhage and hemodynamic compromise. Additionally, centers without immediate access to interventional radiology should establish referral pathways to ensure timely patient transfer.

Surgical Intervention

- Surgery is considered a last-resort option for patients with refractory bleeding who have not responded to endoscopic or radiologic interventions. The ESGE and ACG guidelines both advise against emergency laparotomy unless all other measures have been exhausted. Laparotomy, a highly invasive procedure, carries significant risks, especially in elderly or critically ill patients, and is generally reserved for life-threatening bleeds or cases where other methods are technically unfeasible.
- For patients requiring surgery, preoperative localization of the bleeding site via imaging or endoscopy is critical to guide the surgical approach and improve the likelihood of successful bleeding control.

39.8 Special Considerations

Anticoagulation and Antiplatelet Management

Anticoagulant Reversal:

- For patients actively bleeding while on anticoagulants, stopping and reversing anti-coagulation based on bleeding severity and thrombotic risk is necessary. Warfarin, a vitamin K antagonist, can be reversed using vitamin K and prothrombin complex concentrate (PCC) to quickly correct INR and reduce bleeding. For patients on direct oral anticoagulants (DOACs), specific reversal agents such as idarucizumab for dabigatran or andexanet alfa for factor Xa inhibitors should be administered if available.
- It is essential to consider the patient's thrombotic risk before and during anticoagulation reversal. For patients with high thrombotic risk (e.g., those with prosthetic heart valves), resumption of anticoagulation should be discussed with a multidisciplinary team once bleeding is controlled.

Antiplatelet Therapy:

- For patients on antiplatelet therapy, especially those taking aspirin for secondary cardiovascular prevention, a more nuanced approach is required. Continuation of aspirin may be appropriate in certain patients (e.g., those with coronary artery stents) due to the elevated thrombotic risk associated with stopping therapy. Decisions to continue or hold antiplatelet therapy should be individualized, involving input from a cardiologist for patients on dual antiplatelet therapy to balance bleeding risk with thrombotic risk.

Blood Transfusion Strategy

Restrictive Transfusion Thresholds:

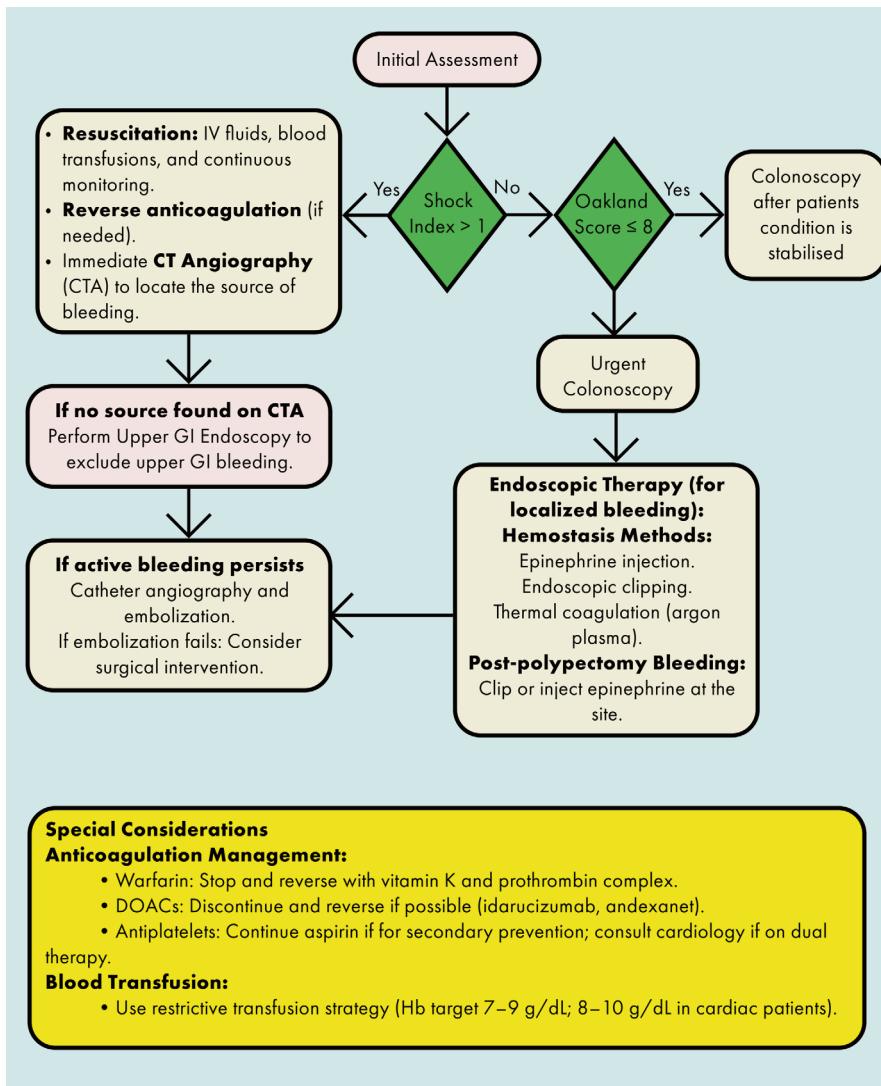
- A restrictive approach to blood transfusion is recommended, aiming to maintain hemoglobin levels within 7–9 g/dL, except in patients with cardiovascular disease, where the threshold is slightly higher at 8–10 g/dL. This approach minimizes the risks associated with over-transfusion, including fluid overload, potential cardiac stress, and immunomodulation.
- Evidence suggests that a restrictive transfusion strategy is safe and effective in most patients with LGIB, as it prevents excessive transfusions and associated complications while supporting adequate tissue oxygenation. Hemoglobin levels should be monitored regularly, and transfusion decisions adjusted based on the patient's clinical status and response to treatment.

39.9 Conclusion

The management of LGIB requires a structured, evidence-based approach, starting with patient stabilization and risk stratification using tools like the shock index and Oakland score. These tools help guide the urgency of interventions such as CTA,

colonoscopy, and embolization. Evidence-based thresholds for transfusion, selective use of CTA, and outpatient management of low-risk patients can optimize outcomes while reducing unnecessary healthcare utilization. Early, guided intervention and individualized management based on risk profiles improve the efficacy of LGIB management and patient prognosis.

Algorithm 39.1: Approach to lower gastrointestinal bleeding (LGIB) in the ICU



Bibliography

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