International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 4 July-Aug 2025, pp: 819-823 www.ijprajournal.com ISSN: 2456-4494

Comprehensive Review of Lower Gastrointestinal Bleeding: Etiology, Diagnosis, and Management

1.Ijan Dhamala, 2.Soniya Bhatta, 3.Kuldip Khatri Sapkota, 4.Bibek Poudel Kshetri, 5.Pratik Sharma Gairhe, 6.Dik Prasad Katel, 7.Ashish Mishra

1.MS, General Surgery, AIIMS Rishikesh
2.JR, Department of Anaesthesia, AIIMS Rishikesh
3.MS, Orthopaedics and Trauma surgery, NAMS
4.MS, General Surgery, NAMS
5.JR, Department of Pathology, KUSMS
6.MD, Radiology, Institute of Medicine (IOM)
7.MS, General Surgery, AIIMS Rishikesh

Date of Submission: 10-08-2025 Date of Acceptance: 20-08-2025

ABSTRACT
Lower gastrointestinal bleeding (LGIB) is a complex and potentially life-threatening condition that presents significant diagnostic and therapeutic challenges across all age groups. This comprehensive review provides an in-depth analysis of LGIB, encompassing its epidemiology, pathophysiology, clinical presentation, and state-of-the-art management strategies. We systematically examine the diverse etiologies of LGIB, ranging from common benign conditions such as hemorrhoids and diverticulosis to more severe pathologies including colorectal cancer and angiodysplasia. Special attention is given to age-specific considerations, highlighting the distinct causes and management approaches in pediatric, adult, and elderly populations.The review critically evaluates current diagnostic modalities, emphasizing the pivotal role of colonoscopy as both a diagnostic and therapeutic tool, while also discussing the utility of advanced imaging techniques such as computed tomography angiography (CTA) and tagged red blood cell scintigraphy. We provide a detailed comparison of endoscopic, radiologic, and surgical interventions, supported by the latest evidence-based guidelines. Additionally, emerging technologies, including artificial intelligence in endoscopy and novel hemostatic techniques, are explored as potential future directions in LGIB management.
Risk stratification models and pharmacotherapeutic options are thoroughly reviewed to guide clinicians in optimizing patient outcomes. The article concludes with practical algorithms for the management of acute and recurrent LGIB, ensuring a structured approach to patient care. This review serves as an authoritative resource for gastroenterologists, surgeons, and emergency physicians, offering a balanced synthesis of current knowledge and clinical best practices in the management of LGIB.

KEYWORDS: lower gastrointestinal bleeding, hematochezia, melena, colonoscopy, angiography

I. INTRODUCTION

Lower gastrointestinal bleeding (LGIB) is defined as hemorrhage originating distal to the ligament of Treitz, most commonly manifesting as hematochezia (bright red blood per rectum) or, less frequently, melena (black, tarry stools indicative of proximal but slow bleeding). LGIB accounts for 20–30% of all gastrointestinal bleeding episodes, with an estimated annual incidence of 20–30 cases per 100,000 individuals in Western populations [1]. While the majority of cases are self-limiting, approximately 10–15% of patients experience severe bleeding requiring hospitalization, with reported mortality rates of 2–4% [2].

The clinical significance of LGIB lies in its diagnostic complexity and the broad spectrum of potential etiologies, ranging from trivial hemorrhoidal bleeding to life-threatening colorectal malignancies. This comprehensive review aims to:

1. Systematically analyze the epidemiology and pathophysiology of LGIB across different age groups.
2. Provide a detailed framework for clinical assessment and risk stratification.
3. Evaluate the diagnostic accuracy and therapeutic utility of modern investigative modalities.
4. Summarize evidence-based management strategies, including emerging endoscopic and surgical techniques.

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 4 July-Aug 2025, pp: 819-823 www.ijprajournal.com ISSN: 2456-4494

5. Discuss special considerations in pediatric and elderly populations.

EPIDEMIOLOGY AND RISK FACTORS

Demographic trends

The incidence of LGIB demonstrates a striking age-dependent pattern, increasing by over 200-fold between the third and ninth decades of life [3]. Population-based studies reveal a mean age of presentation between 63-77 years, with males slightly predominating (male-to-female ratio 1.2:1) [4]. This demographic distribution reflects the increasing prevalence of age-related pathologies such as diverticulosis and angiodysplasia.

Etiological spectrum

The causes of LGIB vary significantly by age group:

Table 1: Age-Stratified Etiologies of LGIB

Age Group (years)	Common Causes	Less Frequent Causes
Pediatric (<18)	Meckel's diverticulum, juvenile polyps, intussusception	Henoch-Schönlein purpura, infectious colitis
Adults (18–50)	Hemorrhoids, anal fissures, inflammatory bowel disease (IBD)	Rectal ulcers, solitary rectal ulcer syndrome
Elderly (>50)	Diverticulosis (40–60%), angiodysplasia (20–30%), colorectal cancer (10–15%)	Ischemic colitis, radiation proctopathy

Risk Factor Analysis

Modifiable and non-modifiable risk factors include:

- **Non-modifiable**:

Advanced age, male sex, chronic kidney disease (predisposing to angiodysplasia) [5].

- **Modifiable**:
  - Anticoagulant use (warfarin, direct oral anticoagulants) increases bleeding severity [6].
  - Nonsteroidal anti-inflammatory drug (NSAID) use exacerbates diverticular bleeding [7].
  - Chronic constipation predisposes to hemorrhoidal bleeding.

CLINICAL PRESENTATION AND DIFFERENTIAL DIAGNOSIS

Bleeding Characteristics

The nature of bleeding provides crucial diagnostic clues:

- **Hematochezia**: Bright red blood typically indicates a distal source (rectum/anal canal). However, massive upper GI bleeding (>1000 mL) can also present as hematochezia due to rapid transit [8].
- **Melena**: Suggests proximal small bowel or upper GI source with >50 mL blood loss.
- **Occult bleeding**: May manifest as iron-deficiency anemia without visible blood.

Associated Symptoms

Symptom Complex	Likely Diagnoses
Painless hematochezia	Diverticulosis, angiodysplasia, hemorrhoids
Painful bleeding + tenesmus	Inflammatory bowel disease (IBD), infectious colitis, rectal carcinoma
Bloody diarrhea	Ulcerative colitis, Campylobacter/Shigella infection, ischemic colitis
Weight loss + bleeding	Colorectal malignancy, Crohn's disease

Digital Rectal Examination (DRE) Findings

A systematic DRE evaluates:

1. **Inspection**:
   - Sentinel pile → chronic anal fissure.
   - Prolapsed hemorrhoids → grade III/IV hemorrhoids.
2. **Palpation**:
   - Irregular, fixed mass → rectal carcinoma.
   - Tender anal canal → acute fissure.
3. **Anoscopy**: Essential for detecting internal hemorrhoids and distal rectal lesions.

DIAGNOSTIC EVALUATION

Laboratory Assessment

- **Complete Blood Count (CBC)**:
  - Hemoglobin <10 g/dL indicates significant bleeding.
  - Thrombocytopenia exacerbates bleeding risk.

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 4 July-Aug 2025, pp: 819-823 www.ijprajournal.com ISSN: 2456-4494

- **Coagulation profile**:
  - Prothrombin Time (PT)/International Normalized Ratio (INR) for warfarinized patients.
  - Activated Partial Thromboplastin Time (APTT) for heparin monitoring.
- **Renal function**:
  - Elevated Blood Urea Nitrogen (BUN)-to-creatinine ratio (>30:1) suggests upper GI source [9].

Endoscopic Modalities

Colonoscopy

- **First-line diagnostic tool** (sensitivity 80–90% for active bleeding) [10].
- **Therapeutic options**:
  - Epinephrine injection (1:10,000) + hemoclip placement → diverticular bleeding.
  - Argon Plasma Coagulation (APC) → angiodysplasia.

Capsule Endoscopy

- Useful for obscure LGIB (diagnostic yield 60–70%) [11].
- Limitations: Cannot provide therapeutic intervention.

Radiologic Imaging

CT Angiography (CTA)

- Detects bleeding rates >0.5 mL/min (sensitivity 85%).
- Advantages: Non-invasive, rapid localization.

Tagged Red Blood Cell (RBC) Scintigraphy

- Detects intermittent bleeding (sensitivity 93%, specificity 95%) [12].
- Useful for guiding subsequent angiography.

Catheter Angiography

- Required for active bleeding >0.5–1 mL/min.
- Therapeutic embolization success rate: 70–90% [13].

MANAGEMENT STRATEGIES

Resuscitation and Risk Stratification

- **Hemodynamic stabilization**:
  - Intravenous (IV) crystalloids for hypotension.
  - Packed RBC transfusion if hemoglobin <7 g/dL (or <8 g/dL in cardiovascular disease) [14].
- **Risk scores**:
  - Oakland Score predicts safe discharge in minor LGIB [15].
  - SHA2PE score assesses rebleeding risk [16].

Pharmacotherapy

- **Octreotide**: Reduces bleeding in angiodysplasia (50–100 mcg subcutaneous TID) [17].
- **Tranexamic acid**: Controversial role in LGIB (limited evidence) [18].

Surgical Intervention

Indications:

- Hemodynamic instability despite resuscitation.
- Transfusion requirement >4 units/24 hours.
- **Surgical options**:
  - Segmental colectomy (if bleeding localized).
  - Total abdominal colectomy (for unlocalized massive bleeding) → morbidity 30–40% [19].

SPECIAL POPULATIONS

Pediatric LGIB

- **Meckel's diverticulum**: Most common cause in children <2 years (technetium-99m scan diagnostic).
- **Juvenile polyps**: Painless hematochezia, require polypectomy.

Elderly Patients

- Higher prevalence of anticoagulant-related bleeding.
- **Ischemic colitis**: Consider in atrial fibrillation/hypotension.

FUTURE DIRECTIONS

- Artificial intelligence in colonoscopy (e.g., Computer-Aided Detection (CADe)systems for angiodysplasia detection) [20].
- Over-the-scope clips (OTSC) for refractory diverticular bleeding.

II. CONCLUSION

Lower gastrointestinal bleeding (LGIB) represents a multifaceted clinical entity that demands a systematic and evidence-based approach to ensure optimal patient outcomes. This review has comprehensively addressed the epidemiology, etiology, and diagnostic challenges associated with LGIB, emphasizing the importance of early risk stratification and targeted intervention. Colonoscopy remains the cornerstone of both diagnosis and therapy, offering the dual benefits of precise localization and immediate hemostatic treatment in cases of active bleeding. However, in scenarios where colonoscopy is inconclusive or impractical, advanced imaging techniques such as CTA and angiography play a crucial role in

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 4 July-Aug 2025, pp: 819-823 www.ijprajournal.com ISSN: 2456-4494

identifying and managing obscure or massive bleeding.

The management of LGIB is further complicated by the diverse patient populations it affects, from children with Meckel's diverticulum to elderly individuals with diverticulosis or colorectal cancer. Tailoring diagnostic and therapeutic strategies to these specific subgroups is essential for improving clinical outcomes. Pharmacologic adjuncts, such as octreotide for angiodysplasia, and the judicious use of blood products, further enhance the armamentarium against LGIB. Surgical intervention, though reserved for severe or refractory cases, remains a critical option, with segmental or total colectomy providing definitive treatment in life-threatening scenarios.

Looking ahead, advancements in artificial intelligence, capsule endoscopy, and minimally invasive techniques hold promise for revolutionizing the diagnosis and management of LGIB. The integration of these technologies into clinical practice, coupled with ongoing research into risk prediction models and novel hemostatic agents, will likely shape the future of LGIB care.

In summary, this review underscores the importance of a multidisciplinary approach to LGIB, combining endoscopic, radiologic, and surgical expertise to achieve the best possible outcomes. By adhering to evidence-based guidelines and remaining vigilant to emerging innovations, clinicians can effectively navigate the complexities of LGIB, reducing morbidity and mortality for patients worldwide. Future research should focus on refining risk stratification tools and expanding therapeutic options to further improve the precision and efficacy of LGIB management.

REFERENCES

[1]. Strate LL, Gralnek IM. ACG Clinical Guideline: Management of Patients With Acute Lower Gastrointestinal Bleeding. Am J Gastroenterol. 2016;111(4):459-74.

[2]. Oakland K, Chadwick G, East JE, et al. Diagnosis and management of acute lower gastrointestinal bleeding: guidelines from the British Society of Gastroenterology. Gut. 2019;68(5):776-89.

[3]. Longstreth GF. Epidemiology and outcome of patients hospitalized with acute lower gastrointestinal hemorrhage: a population-based study. Am J Gastroenterol. 1997;92(3):419-24.

[4]. Farrell JJ, Friedman LS. The management of lower gastrointestinal bleeding. Aliment PharmacolTher. 2005;21(11):1281-98.

[5]. Foutch PG, Rex DK, Lieberman DA. Prevalence and natural history of colonic angiodysplasia among healthy asymptomatic people. Am J Gastroenterol. 1995;90(4):564-7.

[6]. Sengupta N, Feuerstein JD. Early Colonoscopy for Diverticular Bleeding Does Not Reduce Risk of Postdischarge Recurrent Bleeding: A Propensity Score Matching Analysis. ClinGastroenterolHepatol. 2019; 17(6):1105-11.

[7]. Pasha SF, Shergill A, Acosta RD, et al. The role of endoscopy in the patient with lower GI bleeding. GastrointestEndosc. 2014;79(6): 875-85.

[8]. Zuckerman GR, Prakash C. Acute lower intestinal bleeding: part II: etiology, therapy, and outcomes. GastrointestEndosc. 1999;49(2) :228-38.

[9]. Chalasani N, Clark WS, Wilcox CM. Blood urea nitrogen to creatinine concentration in gastrointestinal bleeding: a reappraisal. Am J Gastroenterol. 1997;92(10):1796-9.

[10]. Jensen DM, Machicado GA. Diagnosis and treatment of severe hematochezia. The role of urgent colonoscopy after purge. Gastroenterology. 1988;95(6):1569 -74.

[11]. Pennazio M, Santucci R, Rondonotti E, et al. Outcome of patients with obscure gastrointestinal bleeding after capsule endoscopy: report of 100 consecutive cases. Gastroenterology. 2004;126(3):643-53.

[12]. Howarth DM. The role of nuclear medicine in the detection of acute gastrointestinal bleeding. SeminNucl Med. 2006;36(2):133-46.

[13]. Funaki B. Superselectivemicrocoil embolization of colonic hemorrhage. AJR Am J Roentgenol. 2001;177(4):829-36.

[14]. Villanueva C, Colomo A, Bosch A, et al. Transfusion strategies for acute upper

gastrointestinal bleeding. N Engl J Med. 2013;368(1):11-21.

[15]. 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 GastroenterolHepatol. 2017;2(9):635-43.

[16]. Aoki T, Nagata N, Shimbo T, et al. Development and validation of a risk scoring system for severe acute lower gastrointestinal bleeding. ClinGastroenterolHepatol. 2016; 14(11):1562-70.

[17]. Junquera F, Saperas E, Videla S, et al. Long-term efficacy of octreotide in the prevention of recurrent bleeding from gastrointestinal angiodysplasia. Am J Gastroenterol. 2007;102(2):254-60.

[18]. Roberts I, Shakur-Still H, Afolabi A, et al. Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patients with significant haemorrhage (CRASH-2): a randomised, placebo-controlled trial. Lancet. 2010;376(9734):23-32.

[19]. McGuire HH Jr. Bleeding colonic diverticula. A reappraisal of natural history and management. Ann Surg. 1994;220(5):653-6.

[20]. Misawa M, Kudo SE, Mori Y, et al. Artificial intelligence-assisted polyp detection for colonoscopy: initial experience. Gastroenterology. 2018;154(8):2027-9.