



## **Causes and Management of Lower Gastro-Intestinal Bleeding**

**Mohammed Salah Hussein<sup>1,2\*</sup>, Ziyad Abdullah Alshagawi<sup>3</sup>,  
Noor Abdulhakim M. Al Fateel<sup>4</sup>, Hossam Mohammed Alashhab<sup>5</sup>,  
Alenzi Meshari Mosleh<sup>6</sup>, Osamah Abdulmonem Almutawa<sup>7</sup>,  
Abdulrahman Oun Alshahrani<sup>7</sup>, Mohammed Faisal G. Alahmadi<sup>8</sup>,  
Saleh Kamal Alzahrani<sup>3</sup>, Wed Mohammed Khorami<sup>9</sup>,  
Naif Mohammed Al-Wagdani<sup>10</sup>, Abdalrhman Nbil Bokhari<sup>10</sup>,  
Wafa Faisal W. Aljadrawi<sup>11</sup> and Abdulrahman Ghorom Malhan<sup>12</sup>**

<sup>1</sup>Department of Gastroenterology and Endoscopy, Dr Samir Abbas Hospital, Jeddah, Saudi Arabia.

<sup>2</sup>Department of Internal Medicine, Faculty of Medicine, Al- Azhar University, Cairo, Egypt.

<sup>3</sup>Imam Abdulrahman Bin Faisal University, Saudi Arabia.

<sup>4</sup>Abqaiq General Hospital, Saudi Arabia.

<sup>5</sup>King Saud University, Saudi Arabia.

<sup>6</sup>Jouf University, Saudi Arabia.

<sup>7</sup>King Khalid University, Saudi Arabia.

<sup>8</sup>Qassim University, Saudi Arabia.

<sup>9</sup>Batterjee Medical College, Saudi Arabia.

<sup>10</sup>King Abdulaziz university- Rabigh Branch, Saudi Arabia.

<sup>11</sup>Tabuk University, Saudi Arabia.

<sup>12</sup>King Abdullah Hospital, Bisha, Saudi Arabia.

### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

### **Article Information**

DOI: 10.9734/JPRI/2021/v33i46A32907

#### Editor(s):

(1) Dr. R. Deveswaran, M.S.Ramaiah University of Applied Sciences, India.

#### Reviewers:

(1) Panat Anuracpreeda, Mahidol University, Thailand.

(2) Nermine Ahmed Ehsan, Menoufia University, Egypt.

Complete Peer review History: <https://www.sdiarticle4.com/review-history/74842>

**Review Article**

**Received 01 August 2021**

**Accepted 06 October 2021**

**Published 18 October 2021**

## ABSTRACT

Gastrointestinal (GI) bleeding from the colon is a communal reason for hospitalization and is being more frequent in older patients. Gastrointestinal bleeding is known as any bleeding that takes place in the GIT from mouth to anus. Lower GI bleeding is defined as bleeding distal to the ligament of Treitz. Lower GI bleed is typically presented as hematochezia which is the passing of bright red blood clots or burgundy stools through the rectum. The causes of lower GI bleeding are changing over the past several decades from diverticulosis (which is the protrusion of the colon wall at the site of penetrating vessels), infectious colitis, ischemic colitis, angiodysplasia, inflammatory bowel disease, colon cancer, hemorrhoids, anal fissures, rectal varices, dieulafoy lesion, radiation-induced damage following cancer treatment to post-surgical. Management of lower GI bleeding is done through assessing the severity of symptoms and the condition of the overall case.

*Keywords: GI bleeding; hematochezia; diverticulosis; lower GI.*

## 1. INTRODUCTION

Bleeding beyond the ligament of Treitz, which is a thin band that links the ending of duodenum and the beginning of jejunum in the gastrointestinal tract (GIT) or called the suspensory muscle of duodenum, is considered as bleeding in the lower GIT, therefore the term lower gastrointestinal bleeding is a misnomer and should be called lower intestinal bleeding instead [1, 2]. Gastrointestinal bleeding is also defined as any bleeding that takes place in the GIT from mouth to anus [3]. Bleeding above the ligament of Treitz, which is called upper gastrointestinal bleeding, is presented as either hematemesis or melena, hematemesis is the regurgitation of blood or blood mixed with stomach contents whereas melena is dark, black, and tarry faeces that has a strong distinctive odor caused by the activity of digestive enzyme and intestinal bacteria on hemoglobin. Bleeding below the ligament of Treitz, which is called lower gastrointestinal bleeding, is presented as hematochezia, which is the passing of bright red blood clots or burgundy stools through the rectum [4, 5]. Lower GI bleeding is a common cause of emergency hospital admission, even though there is scarcity of data on presentations, interventions and outcomes. Many terms are used to describe lower gastrointestinal bleeding as rectal bleeding, and hematochezia however these terms do not indicate the perception or severity of bleeding, do not always localize the bleeding source, and are not special to bleeding from beyond the Treitz ligament [6].

The prevalence is approximately 36 per 100,000 population, half of patients suffer from upper GI bleeding, the frequency of hospitalization is higher in the elderly, with mortality rate of about 3.9% within 1 year, and it is thought that this rate

may rise up to 13% by 5 years [4, 7-9]. In the UK the mean age of patients of lower GI bleeding at time of presentation is within the range of 63–77 years and they constitute about 3% of all surgical referrals to hospital [10, 11]. GI bleeding is self-limiting and self-resolving in approximately 85% of patients spontaneously, however recurrence can occur with rates up to 19 % within one year and with continuing risks of rebleeding [9, 12].

Critical hospitalization, diagnosis, as well as intervention are needed in the cases that do not resolve spontaneously, or presented with severe hematochezia which is seen as ongoing bleeding in the first 24 hours of hospitalization with a minimum fall in the hemoglobin of 2 g/dL and/or a need for transfusion of 2 units of packed red blood cells or more [13].

## 2. EPIDEMIOLOGY

Upper GI bleeding mainly occurs in the esophagus, stomach, or duodenum, whereas lower GI bleeding occurs in small bowel, colon, or anorectum. Many studies claimed that upper GI bleeding is more common than lower GI bleeding [14-17]. Where the incidence of upper GI bleeding is almost 67 per 100,000 population and the incidence of lower GI bleeding is approximately 36 per 100,000 population.

Lower GI bleeding is seen more frequently in men than women because of vascular diseases and diverticulosis which are more common in men than women [18]. The prevalence is higher in elderly patients and patients who are taking multiple medications. Another study claimed that prevalence of upper GI bleeding is decreasing due to the combined therapies eradicating *Helicobacter Pylori* and utilizing of proton pump

inhibitors. The condition of lower GI bleeding is more likely to have a longer period of hospitalization and have higher risk of morbidity or recurrence [19]. Around 80% to 85% of lower GI bleedings initiate beyond the ileocaecal valve, only 0.7% to 9% initiating from the small intestine, and the rest initiates from the upper GIT [20]. Fortunately, the incidence of GI bleeding generally is decreasing.

### 3. CAUSES OF LOWER GI BLEEDING

Causes of lower GI bleeding can be summarized to diverticulosis (which is the protrusion of the colon wall at the site of penetrating vessels, and by time the mucosa lining the vessel can be injured and ruptured leading to bleeding), infectious colitis, ischemic colitis, angiodysplasia, inflammatory bowel disease, colon cancer, hemorrhoids, anal fissures, rectal varices, dieulafoy lesion, radiation-induced damage following cancer treatment, and post-surgical [5]. According to the UCLA-Center for Ulcer Research and Education (CURE) database, discussing frequencies of different etiologies, excluding upper GI sources, diverticulosis is still the most common cause of 30 % of lower GI bleeding cases that require hospitalization, the second most common cause is hemorrhoids, another causes frequencies is increasing greatly as ischemic colitis and post-polypectomy bleeding; this increase is due to the increasing use of anti-platelet/anticoagulant [21- 24].

UCLA-CURE Hemostasis Research Group database had set frequencies for some causes of lower GI bleeding; 30% diverticulosis, 14% hemorrhoids, 12% ischemic, 9% irritable bowel disease, 8% post-polypectomy, 6% colon cancer, 6% rectal ulcer, 3% vascular ectasia, 3% radiation colitis, 6% other [23, 24]. Another study conducted among 165 patients assessed for lower GI bleeding revealed that diverticulosis was the main cause in 56% of patients, followed by colonic ulcers in 10%, cancer in 7%, and vascular ectasias in 5% [25]. Diverticulosis counts for around 40% of lower GI bleedings and is presented in emergency as painless hematochezia and it always recur. The occurrence of diverticulosis is higher in older patients, mostly over 80 years, patients suffering of chronic constipation, and changed colonic motility. The left colon is frequently more affected as it is the source of diverticular bleedings.

Ischemic colitis happens in 20% of lower GI bleedings and is occurs more frequent in the

older ages. It occurs as a result of decreased mesenteric flow to the colon due to reduced cardiac output, vasospasm, or atherosclerosis. Non-occlusive and non-thrombotic diseases developments typically resolve with hydration and non-surgical intervention. Occlusive or thromboembolic processes can affect greater areas of the bowel and should be quickly evaluated and require intervention.

Almost one third of patients affected with presumed lower GI bleeding also get affected with upper GI bleedings especially if the patient presents with symptoms of peptic ulcer or recent NSAID use.

Anorectal disorders, mainly hemorrhoids, are the most common cause of lower GI bleedings in patients under 50 years. Post-polypectomy bleeding is more frequent in patients aged over than 65 years with a polyp bigger than 1 cm, in this case bleeding is commonly self-limiting but can be delayed to one week after the process [20].

Occult, moderate, and massive bleeding are three categories of lower GI bleeding [21, 22]. Occult bleeding in lower GI present in patients at any age. Lab tests show if patients had microcytic hypochromic anemia due to chronic blood loss. The differential diagnosis of those anemic patients should include inflammatory, neoplastic and congenital diagnosis. The patient classically appears in a good condition, and hemodynamically stable. Moderate bleeding in lower GI occur at any age and presents as hematochezia or melena, where the patient is typically hemodynamically stable. Many disease processes should be considered on the differential diagnostic list as neoplastic disease, inflammatory, infectious, benign anorectal, and congenital. Massive bleeding in lower GI happens in elderly patients over 65 years with multiple medications; this bleeding presents as hematochezia or bright red blood per rectum, where the patient is typically hemodynamically unstable, having a systolic blood pressure equal to or less than 90 mmHg, heart rate less than or equal 100/min, and reduced urine output. Lab tests reveal that hemoglobin equal to or less than 6 g/dl. Massive lower GI bleedings are commonly because of diverticulosis and angiodysplasias. Unfortunately, the mortality rate is high and may be up to 21% [20].

#### 4. RISK FACTORS& HISTORY

The clinician should first ask the patient about his/her history to obtain any clues or risk factors that may aggravate the GI bleeding, as if the patient endured past episodes of bleeding, or if the patient had past history related to potential bleeding sources (like varices, portal hypertension, alcohol abuse, ulcers, H.pylori, diverticulosis, hemorrhoids, and inflammatory bowel disease), presence of comorbid conditions that affect management, contributory medications (as NSAIDs, anticoagulants, antiplatelet agents, bismuth, or iron), or symptoms related with bleeding (as painless vs. painful, trouble in swallowing, unintended weight loss, preceding emesis or vomiting, alter in bowel habits).

The clinician should also evaluate some physical signs as searching for signs of hemodynamic instability(as resting tachycardia associated with the loss of  $\leq 15\%$  total blood volume, orthostatic hypotension associated with the loss of around 15% total blood volume, supine hypotension associated with the loss of around 40% total blood volume), abdominal pain may increase notion about perforation or ischemia, and rectal examination is significant for evaluating anal fissures, hemorrhoids, anorectal mass, and stool exam [5].

#### 5. DIAGNOSIS

Patients presented at the emergency department with lower GI bleeding should be evaluated immediately as the patient's case could deteriorate quickly [26]. Lab tests should be done to evaluate the case and to aid in finding the cause. Those tests as complete blood count (CBC), hemoglobin/hematocrit, lactate level, electrolyte evaluation, liver function tests, international normalized ratio (INR), prothrombin time, and activated partial thromboplastin time [5, 20].

BLEED criteria are applied for diagnostic purposes: continuing Bleeding (Red bloody emesis), Low Systolic Blood Pressure less than 100 mmHg, Elevated Prothrombin time that is higher than 1.2 times normal, Erratic Mental Status (changed level of consciousness), and unstable Comorbid Disease (any other disease process that could increase risk of admission to intensive care unit (ICU) without the presence of a GI bleed). The presence of any of these

symptoms is considered high risk to patients with higher risk of in-hospital complications.

There are also some diagnostic studies that help in diagnosing like upper GI endoscopy, lower GI endoscopy (colonoscopy), push enteroscopy, deep small bowel enteroscopy, nuclear scintigraphy, CT angiography, standard angiography, meckel scan [5,20].

#### 6. MANAGEMENT OF GI BLEEDING

More than 80% of lower GI bleeding cases resolve on its own without any interventions, with a morbidity and mortality rate of 2% to 4% [7-9]. The first step for managing lower GI bleeding is to ask patient about history in order to get some clues as suggestions to acknowledge the source and know the etiology of the bleeding. Management of acute lower GI bleeding is summarized to setting an appropriate treatment followed by supportive and restorative therapy while examining the main cause and trying to resolve it.

Assessing the risks is essential in determining the management procedure suitable for each individual case, and there are specific calculators for measuring risks score. The AIMS65 score and the Rockall score calculate the mortality rate and risk score of upper GI bleeds, where the Oakland score is a risk calculator that helps calculating the probability of a safe discharge in lower GI bleedings [27].

In some cases, patients with hemodynamic instability, ongoing bleeding, or with a high risk of morbidity should be hospitalized in an intensive care unit (ICU) to enable more frequent observation and monitoring of vital signs and more emergency interventions. The majority of patients can go through examination and monitoring on a general medical floor. As we mentioned, the majority of patients with lower GI bleeding will require hospitalization, but some young, healthy patients with self-limiting and asymptomatic bleeding may be discharged safely and evaluated on an outpatient basis.

Colonoscopy is the main procedure to detect the source of lower GI bleeds in more than 75% of cases while also allowing a therapeutic effect. The period of colonoscopy remain divisive. Some studies recommend that this procedure should be done within the first 24 hours of admission. Treating bleeding of diverticulosis comprise the injection of epinephrine (adrenaline) 1:10000 in 1 mL to 2mL. If the patient does not fit for a

colonoscopy, then a radiologic evaluation should be considered. CT angiography (CTA) is fairly noninvasive, quick and broadly available, however it has a low sensitivity (85%). Surgery may be needed when radiologic and endoscopic processes fail. [28,29]

Treating patient is through assessing the overall health condition; as if the patient is hypoxic then supplemental oxygen should be provided. Important measure is avoiding non-invasive positive pressure ventilation because of expected aspiration. The patient may also need IV access then IV fluid restoration with normal saline or ringer lactate solution, also some cases need blood transfusions especially when hemoglobin drops under 7 g/dL or for coronary heart disease patients [30,31].

## 7. CONCLUSION

Patients with lower GI bleeding typically present to the emergency department, with different causes so it is best managed by professional team that includes a surgeon, gastroenterologist, radiologist, intensivist and the emergency department physician. Depending on the severity of symptoms, the medical procedures are determined, and also the clinicians determine whether the patient needs to be hospitalized in the ICU. Some patients require invasive processes as blood transfusions or even surgery. But after all lower GI bleeding is manageable disease and its mortality rates are dropping.

## CONSENT

Not applicable.

## ETHICAL APPROVAL

Not applicable.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. Shafqet MA, Tonthat A, Esparragoza P, Toro B, Ehrlich AC, Friedenber FK. Recent use of NSAID and NOAC medications are associated with a positive CT arteriogram. *AbdomRadiol (NY)*. 2019 Jul;44(7):2632-2638.
2. Rawla P, Devasahayam J. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Mar 29, 2021. Mallory Weiss Syndrome.
3. Kim ER, Chang DK. Management of Complications of Colorectal Submucosal Dissection. *Clin Endosc*. 2019;52(2):114-119.
4. Laine L, Yang H, Chang SC, Datto C. Trends for incidence of hospitalization and death due to GI complications in the United States from 2001 to 2009. *Am J Gastroenterol*. 2012;107:1190-5
5. DiGregorio AM, Alvey H. Gastrointestinal Bleeding. [Updated 2021 Jul 25]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available: <https://www.ncbi.nlm.nih.gov/books/NBK537291/>
6. Lisa L. Strate, Lower GI Bleeding: Epidemiology and Diagnosis, *Gastroenterology Clinics of North America*, Volume 34, Issue 4, 2005, Pages 643-664, ISSN 0889-8553, DOI:<https://doi.org/10.1016/j.gtc.2005.08.007>. Available:<https://www.sciencedirect.com/science/article/pii/S0889855305000786>
7. Strate LL, Ayanian JZ, Kotler G, Syngal S. Risk factors for mortality in lower intestinal bleeding. *Clin Gastroenterol Hepatol*. 2008;6(9):1004-1010. DOI:10.1016/j.cgh.2008.03.021, quiz 1955
8. Nagata N, Niikura R, Aoki T, Shimbo T, Itoh T, Goda Y, Suda R, Yano H, Akiyama J, Yanase M, Mizokami M, Uemura N (2014) Increase in colonic diverticulosis and diverticular hemorrhage in an aging society: lessons from a 9-year colonoscopic study of 28,192 patients in Japan. *Int J Color Dis* 29(3):379-385. DOI:10.1007/s00384-013-1808-4
9. Aoki T, Nagata N, Niikura R, Shimbo T, Tanaka S, Sekine K, Kishida Y, Watanabe K, Sakurai T, Yokoi C, Akiyama J, Yanase M, Mizokami M, Uemura N. Recurrence and mortality among patients hospitalized for acute lower gastrointestinal bleeding. *Clin Gastroenterol Hepatol*. 2015;13(3):488-494. DOI:10.1016/j.cgh.2014.06.023, e481
10. Newman J, Fitzgerald JE, Gupta S, von Roon AC, Sigurdsson HH, Allen-Mersh TG. Outcome predictors in acute surgical admissions for lower gastrointestinal bleeding. *Color Dis*. 2012;14(8):1020-1026.

- DOI:10.1111/j.1463-1318.2011.02824.x
11. Longstreth GF. Epidemiology and outcome of patients hospitalized with acute lower gastrointestinal hemorrhage: a population-based study. *Am J Gastroenterol.* 1997; 92(3):419–424
  12. Farrell JJ, Friedman LS. Gastrointestinal bleeding in the elderly. *Gastroenterol Clin N Am.* 2001;30(2):377–407
  13. Strate LL, Orav EJ, Syngal S. Early predictors of severity in acute lower intestinal tract bleeding. *Arch Intern Med.* 2003;163:838–43.
  14. Wuerth BA, Rockey DC. Changing epidemiology of upper gastrointestinal hemorrhage in the last decade: a nationwide analysis. *Dig Dis Sci.* 2018 May;63(5):1286-1293.
  15. Ghassemi KA, Jensen DM. Lower GI bleeding: epidemiology and management. *Curr Gastroenterol Rep.* 2013 Jul;15(7):333.
  16. Longstreth GF. Epidemiology of hospitalization for acute upper gastrointestinal hemorrhage: a population-based study. *Am J Gastroenterol.* 1995 Feb;90(2):206-10.
  17. Lanas A, Perez-Aisa MA, Feu F, Ponce J, Saperas E, Santolaria S, Rodrigo L, Balanzo J, Bajador E, Almela P, Navarro JM, Carballo F, Castro M, Quintero E., Investigators of the Asociación Española de Gastroenterología (AEG). A nationwide study of mortality associated with hospital admission due to severe gastrointestinal events and those associated with nonsteroidal antiinflammatory drug use. *Am J Gastroenterol.* 2005 Aug; 100(8):1685-93.
  18. Strate LL, Gralnek IM. ACG Clinical guideline: management of patients with acute lower gastrointestinal bleeding. *Am J Gastroenterol.* 2016 May; 111(5):755.
  19. Kathryn Oakland. Changing epidemiology and etiology of upper and lower gastrointestinal bleeding, *Best Practice & Research Clinical Gastroenterology.* 2019;42–43: 101610. ISSN 1521-6918 DOI:<https://doi.org/10.1016/j.bpg.2019.04.003> Available:<https://www.sciencedirect.com/science/article/pii/S1521691819300137>
  20. Amin SK, Antunes C. Lower Gastrointestinal Bleeding. [Updated 2021 Jul 19]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan. Available:<https://www.ncbi.nlm.nih.gov/books/NBK448126/>
  21. Jung K, Moon W. Role of endoscopy in acute gastrointestinal bleeding in real clinical practice: An evidence-based review. *World J Gastrointest Endosc.* 2019 Feb 16;11(2):68-83.
  22. Mizuki A, Tatemichi M, Nagata H. Management of Diverticular Hemorrhage: Catching That Culprit Diverticulum Red-Handed! *Inflam Intest Dis.* 2018 Dec; 3(2):100-106.
  23. Gayer C, Chino A, Lucas C, et al. Acute lower gastrointestinal bleeding in 1,112 patients admitted to an urban emergency medical center. *Surgery.* 2009;146:600–7.
  24. Chavalitdhamrong D, Jensen DM, Kovacs TOG, et al. Ischemic colitis is a common cause of severe hematochezia and patient outcomes are worse than with other colonic diagnoses. *Gastrointest Endosc.* 2011;74:852–7.
  25. Wilcox CM, Clark WS. Causes and outcome of upper and lower gastrointestinal bleeding: the Grady Hospital experience. *Southern Medical Journal.* 1999 Jan;92(1):44-50. DOI: 10.1097/00007611-199901000-00008. PMID: 9932826.
  26. Oakland K, Chadwick G, East JE, Guy R, Humphries A, Jairath V, McPherson S, Metzner M, Morris AJ, Murphy MF, Tham T, Uberoi R, Veitch AM, Wheeler J, Regan C, Hoare J. Diagnosis and management of acute lower gastrointestinal bleeding: guidelines from the British Society of Gastroenterology. *Gut.* 2019 May; 68(5): 776-789.
  27. Oakland K, Jairath V, Uberoi R, Guy R, Ayaru L, Mortensen N, Murphy MF, Collins GS. Derivation and validation of a novel risk score for safe discharge after acute lower gastrointestinal bleeding: a modelling study. *Lancet Gastroenterol Hepatol.* 2017 Sep;2(9):635-643.
  28. Nagashima K, Tominaga K, Fukushi K, Kanamori A, Sasai T, Hiraishi H. Recent trends in the occurrence of bleeding gastric and duodenal ulcers under the Japanese evidence-based clinical practice guideline for peptic ulcer disease. *JGH Open.* 2018 Dec;2(6):255-261.
  29. Sengupta N, Cifu AS. Management of patients with acute lower gastrointestinal

- tract bleeding. JAMA. 2018 Jul 03; 320(1):86-87.
30. Qaseem A, Humphrey LL, Fitterman N, Starkey M, Shekelle P., Clinical Guidelines Committee of the American College of Physicians. Treatment of anemia in patients with heart disease: a clinical practice guideline from the American College of Physicians. Ann Intern Med. 2013 Dec 03;159(11):770-779.
31. Duggan JM. Gastrointestinal hemorrhage: should we transfuse less? Dig Dis Sci. 2009 Aug;54(8):1662-6.

---

© 2021 Hussein et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Peer-review history:*

*The peer review history for this paper can be accessed here:*  
<https://www.sdiarticle4.com/review-history/74842>