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Management of Lower Gastrointestinal Bleeding (LGIB) - A Narrative Review of the Literature

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What is lower GI bleeding?

There are various definitions exist to define LGIB. Historically, LGIB was defined as bleeding from a source distal to the ligament of Treitz [1,2]. American Journal of Gastroenterology defines LGIB as the recent and sudden onset of overt haemorrhage originating from a source within the distal terminal ileum, colon and rectum, which are within the potential reach of a colonoscope [3]. For guideline and management purposes, European Society of Gastrointestinal Endoscopy (ESGE) and the American College of Gastroenterology (ACG) define it as the onset of hematochezia originating from either the colon or the rectum [2-4].

Causes of LGIB?

LGIB can be either due to benign or malignant causes. The commonest cause of LGIB in the western population is diverticular disease, accounting for around 40% of the cases [1,4-7]. Anorectal diseases are the second most frequent cause of LGIB, predominantly Haemorrhoids, followed by anal fissure, solitary rectal ulcer, rectal prolapse, radiation proctopathy and trauma. Others are due to vascular conditions such as angioectasia, hereditary hemorrhagic telangiectasia, Dieulafoy's lesion and colonic or rectal varices, colitis including inflammatory bowel disease, ischemic colitis and infectious colitis, colonic polyps, iatrogenic causes such as post polypectomy, post endoscopic mucosal resection and endoscopic submucosal dissection, malignant causes including colorectal carcinoma and anal carcinoma and radiation proctitis [4]. These data are all about the western population, and the actual incidence in South Asia couldn't be found due to limited literature. Anyhow, it seems the incidence has geographic as well as age related variations. Among Indian children, the most common causes identified were colitis and polyps, but conditions like Meckel's diverticulum often present with life threatening bleeding [8]. A study on the Sudanese population correlates with the incidence of those of the Western population, the most common being diverticular disease followed by haemorrhoidal bleeding [6].

How will you initially evaluate and stratify the patients?

All the existing guidelines recommend an initial assessment of the patients with history, examination and laboratory tests to identify the aetiology, asses the severity quickly, mark the site of bleeding and decide on which setting the patient is going to be managed.

Identify the aetiology

A good history and examination would be adequate to identify the aetiology. Diverticular bleeding is often painless, with acute onset in patients with a history of diverticular disease [1]. Hemorrhoidal bleeding typically presents with painless, bright red blood over the surface of the stools or in the toilet bowl associated with a lump at the anus [9]. Bleeding from

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infectious colitis usually presents with an acute onset of bloody diarrhoea associated with recent travel history or outside food consumption. Bleeding from angioectasia is commoner in the elderly and will be painless and recurrent. Inflammatory bowel disease often presents with on-and-off bloody diarrhoea, recurrent abdominal pain and weight loss. Bleeding from ischemic colitis presents with bloody diarrhoea and acute abdominal pain in patients with cardiovascular diseases. Bleeding associated with colon cancer is typically painless, with intermittent episodes of hematochezia, bright red rectal bleeding, or melena, in addition to alternate bowel habits and weight loss. Post-polypectomy bleeding presents with painless bleeding within 30 days of a polypectomy or biopsy [1,2].

Assessment of the severity of LGIB

Assessing the severity is vital in deciding the management setting. Depending on the severity patients can be managed as outpatients, hospitalized or in the intensive care unit. Most of the LGIB settle spontaneously and can be managed in outpatient settings but the morbidity and mortality are increased in older patients and those with comorbid medical conditions [2,10,11]. The severity assessment is based on history, examination and laboratory findings. Various scoring systems have been described in the literature.

The ABC scoring system is supposed to predict mortality rates in GI bleeding better. The factors considered in the score are age, blood investigations such as urea, albumin and creatinine values, comorbidities such as altered mental status, liver cirrhosis disseminated malignancy, and ASA score. Patients with a score of ≤3 had a very low risk of death within 30 days. Patients with a score of 4–7 had a mortality rate of 9.3%, and patients with a score of ≥8 had a very high mortality rate. The ABC score was less accurate at predicting the need for hospital admission and hospital-based interventions [12].

The Oakland scoring system can classify stable LGIB majors and minors. It is the first score that has been specifically designed for LGIB. It comprises seven variables such as age, gender, previous hospital admission with LGIB, DRE findings, heart rate, systolic blood pressure and haemoglobin. A score of ≤8 at presentation has a 95% chance of safe discharge from the emergency department and is considered as a minor bleed and can be managed as an outpatient if no other indication for hospital admission. A score of >8 at presentation is considered a major bleed and warrants hospital admission. Oakland score has not been tested outside the United Kingdom [4,13].

ESGE recommends using a shock index calculated by dividing the heart rate by the systolic blood pressure in the initial assessment of LGIB and is a marker of active bleeding. The use of shock index is well established in trauma settings, and few data describe its use in LGIB, and it is found that increasing shock index was associated with mortality. A patient with a shock index >1 is considered an unstable LGIB, whereas <1 is a considerable LGIB and is less likely to have active bleeding. A shock index of ≥1 can also predict extravasation of contrast on angiography, and a CT angiogram can be used to evaluate the bleeding site. Shock is of limited use in patients with B blockers [4,14].

Rather than recommending scoring systems, ACG identifies high-risk patients and scores them for ICU management. High-risk patients in LGIB are those presented with hemodynamic instability (tachycardia, hypotension and syncope), ongoing bleeding, comorbid illnesses, age >60 years, a history of diverticulosis or angioectasia, elevated creatinine and anaemia. The likelihood of an adverse outcome increases with the number of risk factors present [2,15].

Other validated scoring systems such as GBS and AIMS65 are also being used in the assessment of LGIB though they are being widely used in the assessment of UGIB [12].

As many as 8-15% of patients suspected initially to have LGIB are ultimately found to have a UGI source, and in patients with severe haematochezia and haemodynamic instability, up to 15% have a UGIB source [2,4,16,17].

Suspicion of a UGI source should crop up in the initial assessment with history, examination and laboratory findings. Hematochezia associated with hemodynamic instability should lead to the consideration of a brisk UGIB source. Patients with a history of peptic ulcer disease or liver disease with portal hypertension and those using antiplatelet or anticoagulant medications are more likely to develop

Etiology	Clinical presentation
Diverticular bleeding	painless bleeding with acute onset; history of diverticular disease
Haemorrhoids	painless bright red blood over the surface of the stools or in the toilet bowl, lump at the anus
Infectious colitis	acute onset of bloody diarrhoea associated with recent travel history or outside food consumption
Angioectasiasis	painless recurrent bleeding is commoner in elderly people
Inflammatory bowel disease	on-and-off bloody diarrhoea, recurrent abdominal pain and weight loss
Ischemic colitis	bloody diarrhoea and acute abdominal pain in patients with cardiovascular diseases
Colorectal cancer	painless, episodes of hematochezia, bright red rectal bleeding, and weight loss
Post polypectomy bleeding	painless bleeding within 30 days of a polypectomy or biopsy

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brisk UGIB [2,16,18]. An elevated blood urea nitrogen (BUN) to creatinine ratio of more than 30 suggests a UGIB than an LGIB source [19]. BSGE recommends that OGD be performed immediately if initial CTA identifies a UGI bleeding, whereas OGD would be the first investigation if the patient stabilises after initial hemodynamic resuscitation [13]. ACG recommends that OGD should be performed in patients with hematochezia and hemodynamic instability, and if the suspicion for a UGIB source is modest, nasogastric aspirate/lavage can be used. A positive nasogastric aspirate indicates a high likelihood of a UGIB and warrants an OGD before colonoscopy, whereas a negative aspirate makes a UGIB less likely [2]. BSGE does not routinely recommend the placement of a nasogastric tube in suspected UGIB as it does not reliably help in the diagnosis, does not affect outcomes, and possesses complications [13]. Anyhow, the treating clinician should make the decision, and the management of each patient should be tailor-made.

Author Details	Scoring system	Considering factors	Interpretation
Laursen SB et al. (2019)	ABC Scoring system	· Age	· Score of ≤ 3 very low risk of death within 30 days.
		· blood investigations	· Score of 4–7 had a mortality rate of 9.3%
		- Urea	· Score of ≥ 8 had a very high mortality rate.
		- Albumin	
		- Creatinine values	
		· Comorbidities	
		- Mental status	
		- Liver Cirrhosis	
		- Malignancy	
		- ASA score	
Kathryn Oakland et al (2018)	Oakland Scoring system	· Age,	· Score of ≤ 8 at presentation has a 95% chance of safe discharge from the emergency department and is considered as a minor bleed.
		· Gender	· Score of > 8 at presentation is considered a major bleed and warrants hospital admission.
		· Previous hospital admission with LGIB	
		· DRE findings	
		· Heart rate	
		· Systolic blood pressure	
		· Haemoglobin	
Triantafyllou et al. (2021)	Shock index	· Heart rate	· > 1 is considered as an unstable LGIB
		· Systolic blood pressure	· < 1 is considerable LGIB and less likely to have active bleeding.
			· ≥ 1 can also be used to predict extravasation of contrast on angiography
Laursen SB et al. (2019)	GBS	· Blood urea level	· Score = 0 low risk
		· Haemoglobin level	· Score > 0 high risk, needing medical intervention, transfusion, endoscopy or surgery
		· Systolic blood pressure	· Score ³ 8 ICU admission is indicated
		· Other markers	
		- Haemoglobin	
		- Systolic blood pressure	
		- Pulse rate	
		- Presentation with melaena	
		- Presentation with Syncope	
		- Hepatic disease	
		- Cardiac failure	
Laursen SB et al. (2019)	AIMS65	· Albumin level	· Score > 2 considered as high risk
		· INR	
		· Mental status	
		· Systolic blood pressure	
		· Age	

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Steps in Initial Resuscitation

Patients with hemodynamic instability with or without ongoing bleeding should receive intravenous fluid resuscitation with the aim of normalisation of blood pressure and heart rate before intervention [2]. ACG, ESGE and BSGE recommend a restrictive transfusion strategy to maintain haemoglobin above 7 g/dl [2,4,13]. ACG recommends a transfusion threshold of 9 g/dl should be considered in patients with massive bleeding, significant comorbid illness such as cardiovascular diseases or with a possible delay in receiving therapeutic interventions, though ESGE and BSGE recommend a threshold of 8 g/dl in such group of patients. Anyhow, strict transfusion protocol adherence is difficult in an emergency setting. In a study done by Oakland, only 19.5% of eligible patients were transfused at an appropriate threshold. Although most patients met the criteria for restrictive transfusion, most were not managed per this practice [17]. Again, we recommend a strong clinical judgement in the blood transfusion rather strongly adhering to transfusion thresholds.

Role of colonoscopy in the management

ACG recommends colonoscopy should be the initial diagnostic procedure for nearly all patients with acute LGIB. During the procedure, colonic mucosa must be carefully inspected during scope insertion and withdrawal. Intubating the terminal ileum is also recommended to rule out proximal bleeding from the small bowel.

Timing of colonoscopy

The optimum time to perform a colonoscopy for acute LGIB remains uncertain. Early colonoscopy is defined as those performed within 24 hours of presentation, whereas delayed colonoscopy is defined as those performed between 24 hours and 96 hours of initial presentation [16].

Nagata did a retrospective study on 223 patients with LGIB who underwent an early colonoscopy and 126 patients who had CTA within 3 hours of arrival before colonoscopy. It was shown that there was no difference in overall diagnostic yield between the groups [20].

In a randomised trial of urgent vs elective colonoscopy in patients hospitalised with lower GI bleeding done on 72 patients, it was shown that there is no evidence of improved clinical outcomes with urgent colonoscopy as compared to delayed/routine colonoscopy [21].

In another randomised controlled trial on 50 hospitalised patients with LGIB, a definite source of bleeding was found more often in urgent colonoscopy patients. Still, there were no significant differences in outcomes among the two groups such as mortality, duration of hospital stay, transfusion requirements, early or late rebleeding and surgery requirements [16].

In a retrospective study by Navaneethan U et al. on 58,296 patients with LGIB, 22,720 had a colonoscopy during their hospital stay, of which 9156 were early colonoscopies. It was shown that there was no difference in mortality in patients with LGIB who had early versus delayed colonoscopy. Still, patients who underwent early colonoscopy had a shorter hospital stay, decreased need for blood transfusion, and lower hospitalisation costs [22].

ESGE recommends colonoscopy as the first diagnostic modality for hemodynamically stable patients with acute LGIB. Still, in patients with major acute LGIB, colonoscopy should be performed sometime during their hospital stay as there is no high-quality evidence that early colonoscopy alters patient outcomes [4]. BSGE recommends patients with minor stable bleeds be discharged and that a colonoscopy be performed on an outpatient basis. For major LGIBs, a colonoscopy should be performed on the next available list [13].

Thus, the timing of colonoscopy should be determined on a patient basis, with the presence of local expertise and individual experience.

Preparation of colonoscopy

ACG and ESGE recommend strictly recommend adequate bowel preparation before sigmoidoscopy or colonoscopy. Four to six litres of a polyethylene glycol-based solution should be administered over 3-4 hours until the rectal effluent is clear of blood and stool. A nasogastric tube can facilitate colon preparation in patients who cannot take PEG orally [2,4].

However, a cohort study on 12 patients suggests the use of immediate hydro flush colonoscopy in unprepared bowel in patients with severe LGIB [23]. Another cohort study on 33 elderly patients suggests an immediate unprepared PEG flush colonoscopy, which detects bleeding sources and provides endoscopic therapy [24].

Colonoscopic intervention

High-risk findings during colonoscopy include active bleeding vessels, spurters or oozers, non-bleeding visible vessels, and adherent clots. Endoscopic therapy should be provided to those with high-risk findings. Available endoscopic therapy includes clipping, contact thermal therapy, band ligation, non-contact thermal therapy using argon plasma coagulation, epinephrine injection and haemostatic topical agents.

It is recommended to use endoscopic clips for diverticular bleeding as clips are safer than contact thermal therapy and are easier to perform than band ligation. Other modalities, such as contact thermal therapy, endoscopic detachable snare ligation and Hemostatic topical agents, are also used in current practice.

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For angioectasia bleeding, noncontact thermal therapy using argon plasma coagulation is considered the gold standard technique. Post-polypectomy bleedings can either be clipped or diathermised using contact thermal therapy with or without the combination of dilute epinephrine injection. Epinephrine injection therapy can be used to gain initial control of an active bleeding lesion and improve visualisation. It is recommended to use epinephrine injection in combination with other modalities and not alone.

Hemostatic topical agents can be used as a secondary treatment option or rescue therapy in cases of inadequate/ failed hemostasis with ongoing bleeding [2,4,13].

Role of CT angiogram

The recommended timing of CT angiogram in LGIB differs among guidelines. ACG has the highest threshold in the timing of CT angiogram, and it is recommended in patients with high-risk clinical features and ongoing bleeding who have a negative OGD and failed to respond adequately to hemodynamic resuscitation and are unable to tolerate bowel preparation and urgent colonoscopy.

BSGE recommends a CT angiogram as a first line investigation in haemodynamically unstable patients or who have a shock index of >1 even after initial resuscitation and in those who have active bleeding is suspected [13].

Anyhow, the choice between colonoscopy or CT angiogram, which should be done first, solely depends on the clinical assessment and has to be decided by the clinician as per the available resources. To conclude, CT angiography provides the fastest and least invasive means to localise the site of blood loss before planning endoscopic or radiological therapy, and colonoscopy has the advantage of diagnosis and treatment simultaneously [4,13].

Role of surgery

ACG and ESGE recommend that surgery be considered the last resort of treatment modality in LGIB. It can be considered if every effort to localise and control the bleeding utilising endoscopic and radiologic means has failed or if endoscopic or radiological modalities cannot correct the underlying pathology. It is important to very carefully localise the source of bleeding whenever possible before surgical resection to avoid continued or recurrent bleeding from an unresected culprit lesion [2,4].

Handling patients who are on warfarin

ESGE recommends continuing warfarin for those with minor LGIB (Oakland<8). For those with major bleeds, warfarin has to be withheld, and correction of coagulopathy has to be done in those with severe ongoing bleeding. In those with haemodynamic instability, it is recommended to administer intravenous vitamin K and Prothrombin complex concentrate. BSGE recommends stopping warfarin at presentation for all with LGIB.

Resumption of warfarin is recommended after LGIB is settled. For those with low thrombotic risk, it can be commenced in 7 days, and for those with high thrombotic risk such as prosthetic metal mitral valve, atrial fibrillation with prosthetic heart valve or mitral stenosis, <3 months after venous thromboembolism, it can be commenced within 72 hours and if needed, with heparin bridging [4,13].

Handling patients who are on antiplatelets

Aspirin should be withheld in patients taking low-dose aspirin for primary cardiovascular prevention and should be continued in those taking a low-dose secondary cardiovascular prevention. If withheld, low-dose aspirin should be resumed, preferably within five days or even earlier if hemostasis is achieved or there is no further evidence of bleeding. Platelet transfusion for patients with lower gastrointestinal bleeding taking antiplatelet medications is not routinely recommended. For those on dual antiplatelets, cardiology or specialist opinion should be obtained before omission and restarting [2,4].

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