Acute lower gastrointestinal bleeding

Nicola S Fearnhead

Abstract

Acute lower gastrointestinal bleeding often presents a challenging clinical situation. Although bleeding can be severe and associated with significant haemodynamic compromise, cessation is usually spontaneous. The causes are numerous, and the bleeding source can be difficult to identify, even with sophisticated diagnostic methods. Colonoscopy, CT angiography, mesenteric angiography and capsule enteroscopy offer a choice of diagnostic tools. Intervention is occasionally required; the options include therapeutic colonoscopy, super-selective embolization and surgical resection.

Keywords Angiodysplasia; bleeding scan; colectomy; colonoscopy; CT angiography; diverticular disease; embolization; gastrointestinal bleeding; haemostatic agents; mesenteric angiography; MRCP; polypectomy; rebleeding risk

Key points

- Lower gastrointestinal haemorrhage can be sudden and substantial, requiring early rapid resuscitation, although most episodes resolve spontaneously
- The most common causes are diverticular disease, colitis and anorectal conditions
- Definitive investigations to identify the bleeding source include colonoscopy, CT angiography, mesenteric angiography and red blood cell scintigraphy
- Around 10% of patients require intervention to control the bleeding, most commonly with therapeutic colonoscopy or selective mesenteric embolization, and occasionally surgery
- New haemostatic agents and endoscopic applicators have improved the options for colonoscopic intervention in colonic haemorrhage

Definition

Acute lower gastrointestinal (LGI) haemorrhage refers to acute bleeding emanating from the gastrointestinal tract distal to the ligament of Treitz at the junction between the fourth part of the duodenum and the proximal jejunum. The source of the haemorrhage is usually colonic, but it occasionally arises from the small intestine.

Epidemiology

LGI haemorrhage accounts for about 20% of all acute gastrointestinal haemorrhage. The annual incidence is about 20 per 100,000 population in developed countries. Most patients are elderly, but it affects any age group. There is a slight preponderance in men.

Causes and differential diagnosis (Table 1)

The most common causes of LGI bleeding in admitted patients are diverticular disease (Figure 1), colitis and benign anorectal conditions.[1] Anticoagulant and antiplatelet therapies do not cause LGI bleeding but can worsen haemorrhage or unmask a bleeding source (e.g. colonic malignancy). Bleeding can present as melaena from the small intestine, altered blood from the right colon, dark red blood from the left colon or bright red blood from the anorectum. Profuse fresh blood per rectum can represent a brisk bleed from any site in the gastrointestinal tract.

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The use of non-steroidal anti-inflammatory drugs (NSAIDs) is a risk factor for diverticular haemorrhage. In a significant proportion of diverticular haemorrhages, bleeding is massive, although <10% of patients require emergency intervention.

Other potential sources of LGI bleeding include inflammatory, infectious or ischaemic colitis, colonic polyps and tumours, sites of colonoscopic intervention (e.g. polypectomy), angiodysplasia (an acquired malformation of intestinal blood vessels most

Differential diagnosis of lower gastrointestinal haemorrhage

Colonic	Anorectal	Ileo-jejunal
Diverticular disease	Haemorrhoids	NSAID ulceration
Angiodysplasia	Anal fissure	Meckel's diverticulum
Ulcerative colitis	Rectal prolapse	Angiodysplasia
Crohn's colitis	Solitary rectal ulcer	Arteriovenous malformation
Ischaemic colitis	Radiation proctitis	Visceral aneurysm
Infectious colitis	Post-haemorrhoidal intervention	Crohn's disease
Pseudomembranous colitis	Rectal varices	Aortoenteric fistula
Colorectal carcinoma	Anorectal trauma	Strictureplasty site
Colorectal polyps	Chronic anastomotic sinus	Small bowel varices
Colonoscopic intervention		Intussusception
Colonic varices		
Anastomotic haemorrhage		
Visceral aneurysm		
Autoimmune vasculitis		

Table 1

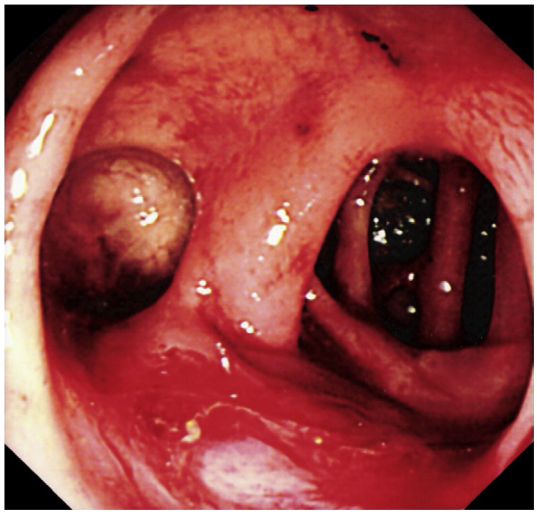

Figure 1 Colonoscopic appearances of bleeding diverticular disease.

common in the right colon) and radiation proctitis.[1] A past history of abdominal aortic aneurysm repair raises the possibility of an aortoenteric fistula, particularly if there is a history of an infected graft. Haemorrhoids and fissures are common causes of anorectal bleeding; less common sources include solitary rectal ulcer syndrome and anorectal varices.

Diagnosis

History

The classical presentation is passage of blood per rectum or melaena with symptoms of anaemia (fatigue, lethargy) or hypovolaemia (postural hypotension, collapse, dizziness, syncope). Hypotension, and especially cardiovascular shock, is an important predictor of adverse outcome. Important features in the history include previous episodes, anaemia, recent colonoscopy and bleeding diatheses. A past history of aortic surgery or radiotherapy may suggest the cause. The drug history is particularly important with respect to NSAIDs, antiplatelet therapy and anticoagulants (including novel oral anticoagulants and direct oral anticoagulants). Co-morbidities are also relevant: elderly patients with ischaemic heart disease or cardiac failure are less likely to tolerate either massive haemorrhage or massive transfusion, and co-morbidity is a predictor of poor outcome.[1]

Physical examination

The ABCDE algorithm of assessment and resuscitation should be applied to any patient with LGI haemorrhage. If there is clinical evidence of haemodynamic instability, resuscitation should be instituted before completing the history or examination. Tachypnoea, cool peripheries, tachycardia, hypotension, agitation and altered mental state suggest a significant bleed. Formal assessment is made after resuscitation and includes physical, abdominal and digital rectal examinations. Rigid sigmoidoscopy is advisable if anorectal pathology is suspected.

Resuscitation and initial investigations

Large-bore intravenous cannulas allow intravenous crystalloid or colloid resuscitation. Tranexamic acid, administered as an intravenous loading dose of 1 g followed by 3 g infused over 24 hours, can reduce transfusion requirements and mortality. The Haemorrhage Alleviation with Tranexamic Acid — Intestinal System (HALT-IT) trial is on target to recruit 12,000 patients by 2019 and will provide definitive evidence on the efficacy of tranexamic acid in gastrointestinal haemorrhage.

Blood transfusion is carried out according to the patient's haemodynamic status and haemoglobin concentration, with 25–35% of admitted patients undergoing transfusion in recent national audits.[1,2] Coagulopathy resulting from the use of oral anticoagulants or bleeding should be corrected. Restrictive rather than liberal transfusion protocols appear to be associated with lower mortality in LGI bleeding.[3] Oesophago-gastroduodenoscopy should be carried out as soon as feasible in any patient with LGI haemorrhage and haemodynamic instability to rule out an upper gastrointestinal source.

Definitive investigations

Colonoscopy and computed tomographic (CT) angiography are the most commonly used investigations to identify the bleeding source,[1] with CT angiography now the emergency investigation of choice in patients with massive bleeding or an unstable condition. With either, definitive investigation should be carried out as soon as possible after initial resuscitation and stabilization. Colonoscopy after full bowel preparation is the investigation of choice in stable or stabilized patients. Early colonoscopy within 24 hours is associated with shorter length of stay but lower efficacy with higher rebleeding and readmission rates, compared with colonoscopy within 1–3 days of admission.[4]

Colonoscopy during an acute LGI bleed requires copious lavage to allow localization of the bleeding point (Figure 1). Therapeutic options to control haemorrhage include injection with adrenaline (epinephrine), argon plasma coagulation, clipping devices and application of haemostatic agents via endoscopic delivery catheters.[5] Colonoscopic haemostasis is particularly effective for diverticular and post-polypectomy haemorrhage. Colonoscopic clip placement or tattoo with injectable India ink marks the bleeding site to guide localization by mesenteric angiography and surgical resection, respectively, in the event of further haemorrhage. Logistical factors, available expertise and the likelihood of a localized source of bleeding predicate the use of early colonoscopy to evaluate acute LGI haemorrhage.

Multi-section abdominal CT scan with intravenous contrast (CT angiography) often demonstrates a bleeding source with a blush of contrast in the bowel lumen if the patient is actively bleeding (Figure 2). It can also provide information on extent of colitis, presence of malignancy, staging of metastatic disease and mesenteric vessel occlusion. Patients with clinical evidence of severe bleeding (tachycardia, hypotension) usually undergo CT angiography to identify the bleeding point, followed by selective mesenteric angiography to allow therapeutic embolization. Successful angiography depends on a bleeding rate of at least 1 ml/minute so is more likely to be positive in patients with greater instability or higher transfusion requirements (see Further reading). Advances in endovascular techniques have made super-selective catheterization and embolization of small visceral arterial branches possible. Early complications include rebleeding, colonic ischaemia, renal failure and femoral pseudoaneurysm, whereas late complications include recurrent haemorrhage and colonic stricture. Mesenteric angiography can

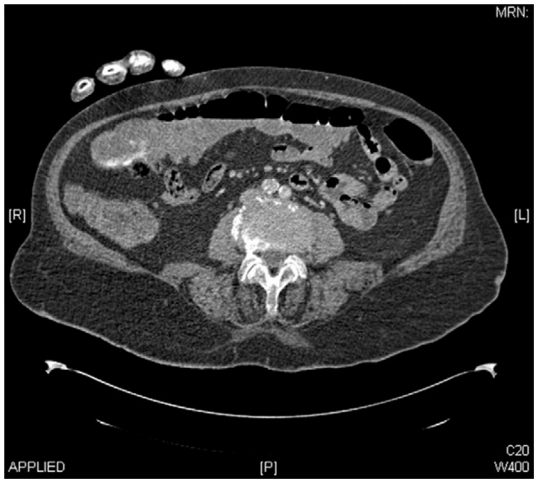

Figure 2 CT angiography showing a blush of intravenous contrast at a lower gastrointestinal bleeding point at hepatic flexure in a patient with acute colonic haemorrhage.

identify angiodysplastic lesions once bleeding has ceased. Provocative mesenteric angiography with tissue plasminogen activator, heparin or tolazoline can have a role if recurrent LGI bleeding cannot be localized by other means.

^{99m}Technetium-labelled red blood cell scintigraphy requires a bleeding rate of just 0.1 ml/minute to detect bleeding, but does not have the sensitivity or specificity of colonoscopy, CT or selective mesenteric angiography. It can be used when other investigations have failed to identify a bleeding source, but results can be misleading and many centres have therefore abandoned it.

Small bowel enteroscopy and video-capsule endoscopy have a limited role in acute LGI haemorrhage. If bleeding is thought to arise from a source between the duodenum and terminal ileum, the British Society of Gastroenterology recommends early capsule endoscopy to increase the diagnostic yield.

Management

Any patient with haemodynamic compromise should be managed in a high-dependency or intensive care setting to facilitate intensive monitoring and optimize continuing resuscitation. Massive transfusion can result in hypothermia, disseminated intravascular coagulopathy, cardiac failure, hyperkalaemia, respiratory compromise and citrate toxicity.

LGI haemorrhage can be profuse, with significant haemodynamic instability, but nevertheless is usually self-limiting with adequate resuscitation. About 10% of patients require intervention to control the bleeding.[2] If the patient's condition is unstable, the dual priorities are to identify the source and stop the bleeding. Selective mesenteric angiography with embolization or therapeutic colonoscopy is the initial treatment of choice. Surgery is only occasionally required if other interventions are unsuccessful or bleeding is massive.[1]

Terlipressin causes splanchnic vasoconstriction and can be used intravenously as an adjunct to slow active LGI bleeding, particularly in the presence of portal hypertension. Terlipressin or somatostatin can also be infused arterially via a mesenteric catheter placed during angiography for non-variceal bleeds. Longer term terlipressin use can result in abdominal pain, cardiac dysrhythmias and cutaneous necrosis.

Surgery

Surgical intervention is required in a small minority of patients with LGI haemorrhage. The surgical options depend on whether the bleeding source has been identified preoperatively by colonoscopy, angiography, CT scan or red cell scan. If it has, it is possible to perform segmental resection (e.g. right hemicolectomy for caecal angiodysplasia, sigmoid colectomy for bleeding diverticular disease).

If the source is unknown, upper gastrointestinal endoscopy should be performed in the anaesthetized patient just before surgery. It is often difficult to identify the bleeding source at laparotomy, as blood refluxes into the bowel proximally as well as distally. On-table colonic lavage and colonoscopy can help to identify the source. Another strategy is to clamp segments of the bowel with soft clamps to identify the segment that fills with blood. If the bleeding source remains unclear, a subtotal colectomy with end-ileostomy is the procedure of choice. Rarely, it is necessary to perform an emergency proctectomy in a patient with inflammatory bowel disease with rectal haemorrhage. Anastomosis after resection for haemorrhage depends on the stability of the patient and co-morbid factors, and may be best deferred.

Prognosis

Hypotension at presentation is the most important predictor of severity. The presence of any of the 'BLEED' criteria (continuing Bleeding, Low systolic blood pressure, Elevated prothrombin time, Erratic mental status, co-morbid Disease) at initial presentation can be used to predict poor outcome from LGI bleeding. Predictors of safe early discharge include lower age, absence of signs of shock or low haemoglobin, history of prior bleeding and findings on sigmoidoscopy (see Further reading). In-hospital mortality is around 4%, with co-morbidity being its strongest predictor (see Further reading).[1]

Follow-up

Readmission rates at 30 days are around 10% although only half results from rebleeding. Rebleeding rates are about 15% at 2 years after untreated colonic haemorrhage. Advanced age and use of antithrombotic agents increases the risk of rebleeding and mortality after LGI haemorrhage. Even after angiographic treatment or targeted surgical resection of haemorrhaging diverticular disease, there is a significant risk (14%) of recurrent diverticular haemorrhage. Hormonal therapy with oestrogen–progestogen treatment does not prevent rebleeding from angiodysplasia. ◆

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FURTHER READING

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TEST YOURSELF

To test your knowledge based on the article you have just read, please complete the questions below. The answers can be found at the end of the issue or online here.

Question 1

A 78-year-old man presented with acute rectal bleeding, passing large amounts of bright red blood He had a history of coronary artery stenting and was taking antihypertensive medication, clopidogrel and a statin.
On clinical examination, his heart rate was 115 beats/minute, and systolic blood pressure was 100 mmHg.
He was resuscitated with intravenous fluids.

What is the best initial investigation?

A. Capsule endoscopy
B. Mesenteric angiography
C. Colonoscopy
D. CT angiography
E. Red cell scintigraphy

Question 2

An 82-year-old man presented with a 3 day history of rectal bleeding. The blood was dark red and mixed with the stool. There was a past history of stable angina. On examination heart rate was 78 beats/minute and blood pressure was 136/88 mmHg.

Investigation

Haemoglobin 125 g/litre (130–180)

What instruction should be left about the circumstances in which packed red blood cells should be administered.

A. Continuing bleeding but haemoglobin concentration remains above 120 g/litre
B. Stopped bleeding and haemoglobin concentration drops to between 80 and 100 g/litre
C. Continuing bleeding and haemoglobin concentration drops below 90 g/litre
D. Stopped bleeding and haemoglobin concentration is between 110 and 120 g/litre
E. Continuing bleeding and haemoglobin concentration drops to between 100 and 110 g/litre

Question 3

A 66-year-old woman presented as an emergency with rectal bleeding. The bleeding continued for a further 24 hours after admission, but there was no haemodynamic instability. Limited flexible sigmoidoscopy was carried out on the day after admission and showed old blood in the sigmoid colon and rectum, with diverticular disease seen, but no definite bleeding source was identified.

What is the most appropriate further clinical management?

A. Discharge with reassurance that bleeding was caused by diverticular disease
B. Discharge with plans for outpatient colonoscopy within next month
C. Inpatient CT arteriogram to look for alternative bleeding sources
D. Capsule endoscopy to exclude angiodysplasia in the right colon
E. Review in clinic in 6 weeks to check whether there have been any further bleeding episodes