



## The Role of Interventional Radiology in the Management of Acute Gastrointestinal Bleeding



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### A B S T R A C T

**Keywords:**  
Radiology nursing  
Gastrointestinal hemorrhage  
Imaging  
Interventional radiology

This review article is intended to serve as an introductory reference to the clinical management of gastrointestinal bleeding (GIB) by interventional radiologists. This article focuses on the role of the nursing staff participating alongside the interventional radiologist in the patients' care. A discussion regarding presentation of GIB, workup, and postendoscopic role of interventional radiology (IR) is presented. Special emphasis is placed on the postprocedural care issues that are relevant specifically to nursing staff as they relate IR. Several sample cases are provided to illustrate common etiologies, presentations, and clinical management of GIB, with special emphasis on the role of IR.

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### Introduction

Gastrointestinal hemorrhage is one of the most common reasons for emergency department visits and hospital admissions in the United States with an estimated annual incidence of approximately 122 cases per 100,000 individuals (Longstreth, 1997; Longstreth, 1995). Gastrointestinal bleeding (GIB) represents the loss of blood from the abdominal vasculature, either arterial or venous. In general, GIBs are characterized by location. Upper GIB is more common and anatomically defined by bleeding from gastrointestinal organs proximal to the ligament of Treitz, which includes the esophagus, stomach, and duodenum. Lower GIB is approximately one-fourth as common as upper gastrointestinal hemorrhages and is defined as bleeding from gastrointestinal organs distal to the ligament of Treitz, including the jejunum, ileum, colon, and rectum (Peura et al., 1997). Apart from the anatomical difference,

upper and lower gastrointestinal hemorrhages often present with different symptomologies, etiologies, and treatments.

This article aims to educate the interventional nursing staff about the classification, etiologies, workup, and management of acute gastrointestinal hemorrhages, both upper and lower, as well as the role of interventional radiology (IR) in the management of patients with acute gastrointestinal hemorrhages. After a brief discussion of medical management, it will specifically focus on the postendoscopic role of radiology in the diagnosis and management of acute gastrointestinal hemorrhage. It is designed to educate nursing staff on elements of recognizing acute gastrointestinal bleeds, initiating the clinical pathway for treatment and management of postprocedural complications.

### Clinical Presentation

Both upper and lower gastrointestinal hemorrhage can be acute or subacute in severity. Thus, they can present with a wide array of symptoms. Acute hemorrhage can present with signs of hypovolemic shock including tachycardia, hypotension, pallor, and in some instances dyspnea and loss of consciousness. In hemodynamically

Conflicts of interest: No conflicts of interest declared.

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<https://doi.org/10.1016/j.jradnu.2018.04.004>

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stable patients, direct visualization of blood in the stool is often the first symptom. “Coffee-ground” emesis or frank hematemesis can be presenting symptoms of an upper gastrointestinal hemorrhage. In a lower GIB, the patient may present with melena, dark tarry stool, or bright red blood per rectum, also known as hematochezia. Of note, rapid transit of blood from an upper gastrointestinal hemorrhage may also produce hematochezia and cause ambiguity in diagnosis. Lower GIB may be occult and slower than upper GIB, requiring further testing. A fecal occult blood test is an inexpensive and fast way to assess for a lower gastrointestinal hemorrhage. Other less apparent presentations of upper and lower gastrointestinal hemorrhage can include fatigue, abdominal pain, and diarrhea due to the osmotic effect of hemorrhagic material in the colonic lumen.

### Classification and Etiologies

A discussion of the etiologies of the various types of GIB can help the interventional nursing staff understand why the interventionist may perform one particular type of procedure over another and where IR fits into the management of these patients. Upper gastrointestinal hemorrhage has a wide range of etiologies. It is vital to differentiate variceal (venous)-associated hemorrhages from nonvariceal (arterial) hemorrhages. Variceal hemorrhages are often localized to the stomach and distal esophagus. They have a high association with portal venous hypertension secondary to several hepatic or portal venous pathologies and require early intervention because mortality rates can be as high as 42%. Repeated episodes of bleeding can further increase the risk of mortality (Smith & Graham, 1982; Graham & Smith, 1981). Although these patients have venous bleeding, they are often markedly sick due to underlying liver disease, which makes treatment options limited. In comparison, nonvariceal hemorrhage is mostly from arterial sources and has different associated comorbidities and patient profiles. Causes include peptic ulcer disease (in up to 40% of cases), Mallory-Weiss tears (15%), hemorrhagic pancreatitis, neoplasms, aortoenteric fistulas, and trauma (Patel, Kang, & Navuluri, 2012). Discussion of portal hypertension-related variceal bleed is beyond the scope of this article.

Lower gastrointestinal hemorrhage is more prevalent in the aging population with a mean age of more than 65 years in most studies (Strate, 2005). It is typically due to diverticular disease, which increases with age and explains the increased likelihood of these patients being elderly at presentation. Other causes include ischemic or inflammatory colitis, angiodysplasia or vascular ectasia, colon cancer, and radiation proctocolitis (Ghassemi & Jensen, 2013). Lower gastrointestinal hemorrhage is less common than upper gastrointestinal hemorrhage and is often less severe (Strate, 2005).

### Preendoscopic Medical Management

The most important aspect of initial management of any acute hemorrhage is maintaining the patient's airway, breathing, and circulation, which first involves assessing the patient's airway and breathing for signs of distress and airway obstruction. Intubation may be indicated in this step for airway control. Circulation involves placement of two large-bore intravenous lines, at least 22 gauge IV, and initiation of fluid resuscitation using crystalloids and blood products. Correction of coagulopathies may require administration of platelets or other procoagulants and is recommended before any further investigations or intervention (Patel et al., 2012; Ghassemi & Jensen, 2013). Because patients presenting with bleeding are often taking anticoagulant medications, efforts to reverse these agents should be attempted first to stop the bleeding (Ghassemi & Jensen, 2013). Once a patient stabilizes, a full and more thorough medical workup can be initiated.

A complete history and physical examination is the first step for diagnosis and localization of any acute gastrointestinal hemorrhage. Diagnostic clues for an upper gastrointestinal hemorrhage include prior history of peptic ulcer disease, heavy use of nonsteroidal anti-inflammatory drugs (NSAIDs), or a history of portal venous hypertension. For a lower GIB, a history of diverticulosis, inflammatory bowel disease, or hemorrhoids can help establish the diagnosis. Physical examination can be used to evaluate for signs of portal venous hypertension (such as through large collateral vessels in the subcutaneous tissues of the abdomen), frank blood or melena in the rectal vault, or signs of hypovolemia including hypotension, pallor, and delayed capillary refill. Blood work follows the history and physical examination. Evaluation of the need for blood transfusion includes assessing hemoglobin and obtaining a type and screen. Although somewhat controversial, the goal of transfusion at most institutions is to maintain a hemoglobin level of above 7 g/dL (Patel et al., 2012; Ghassemi & Jensen, 2013).

Preendoscopic treatment of acute gastrointestinal hemorrhage starts by placing a nasogastric tube, which can confirm the presence of an upper gastrointestinal bleed. For variceal hemorrhages, an esophageal or gastric balloon can be positioned to tamponade the bleeding. These are placed by gastroenterologists and require frequent monitoring to prevent tissue ischemia due to the compression by the balloon (Patel et al., 2012). These patients are therefore monitored in an intensive care unit. It is imperative that gastroenterology is involved in the initial workup and management of the patient with GIB as their expertise can help guide appropriate management and use of medical/noninvasive techniques to decrease bleeding before intervention.

Medications such as somatostatin, octreotide, and vasopressin can also be administered as first-line agents to help reduce portal pressures, reducing the acuity of a variceal bleed (Patel et al., 2012). For nonvariceal bleeds and, in particular, those caused by peptic ulcer disease or NSAIDs, high-dose intravenous proton pump inhibitors have been shown to reduce associated complications especially rebleeding (Lau et al., 2000). Lower GIB is much more difficult to manage through the use of pharmaceuticals, and early colonoscopy (within 12–24 hr) has shown to be extremely beneficial in reducing morbidity and mortality and decreasing hospital stay (Strate, 2005; Ghassemi & Jensen, 2013).

### Endoscopy

Endoscopy has become a mainstay in the management of acute upper and lower GIB. It is both diagnostic and therapeutic. Esophagogastroduodenoscopy in an upper gastrointestinal hemorrhage can differentiate between arterial and variceal bleeds, localize the site of the bleed, and obtain biopsies of suspicious lesions. During the procedure, the gastroenterologist also has multiple approaches to achieve hemostasis through thermocoagulation, sclerosant agents, or the use of clips and bands (Holster, 2012). Similarly, colonoscopy can reveal bleeding diverticula, ectatic vessels, hemorrhoids, or a bleeding mass within the rectum or colon.

There are multiple pitfalls, however, that limit this technique's use in all patients. Twenty-four percentage of upper gastrointestinal bleeds are not localized by this technique (Vreeburg et al., 1997). Variceal bleeding often involves bleeding from multiple sources, and endoscopic banding tends to be a temporizing measure. In upper gastrointestinal hemorrhage, there is a 15% to 20% risk of rebleeding after an initial endoscopic evaluation (Lim & Ahmed, 2004). Endoscopy also requires sedation, which can pose additional risks of anesthesia in select patients. Additional risks from endoscopy include perforation of the gastrointestinal tract, infection, and esophageal/gastrointestinal strictures (Eisen et al., 2002).

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