

Approach to Upper Gastrointestinal Hemorrhage

Mehret Dessalegn and Richard Davis

Background:

Upper gastrointestinal (GI) hemorrhage is one of the commonest causes of acute presentation to the emergency department. It is a bleed from any part of the GI tract proximal to the ligament of Treitz. Commonest sites are the distal esophagus, stomach and the 1st and 2nd part of the duodenum.

Potential causes of upper GI bleeding include esophageal or gastric varices, gastric or duodenal ulcers, Mallory-Weiss tear, vascular malformations (including Dieulafoy's lesion,) and neoplasms.

It is usually easy to distinguish between upper and lower GI bleeding; a history of hematemesis or epigastric pain usually indicate an origin proximal to the ligament of Treitz. However, hematochezia can originate from upper GI bleeding up to 15% of the time; if the bleeding is brisk enough it will still be bright red in color when it emerges from the anus. In such cases a nasogastric tube may be placed and the aspirate examined: if it is bilious without blood, an upper GI source is unlikely. If there is no output or the output is clear only, an upper GI hemorrhage has not been ruled out. This test is the only role of nasogastric tube placement in GI hemorrhage. Maneuvers such as cold water lavage, once thought to induce vasoconstriction, will only worsen hypothermia and coagulopathy.

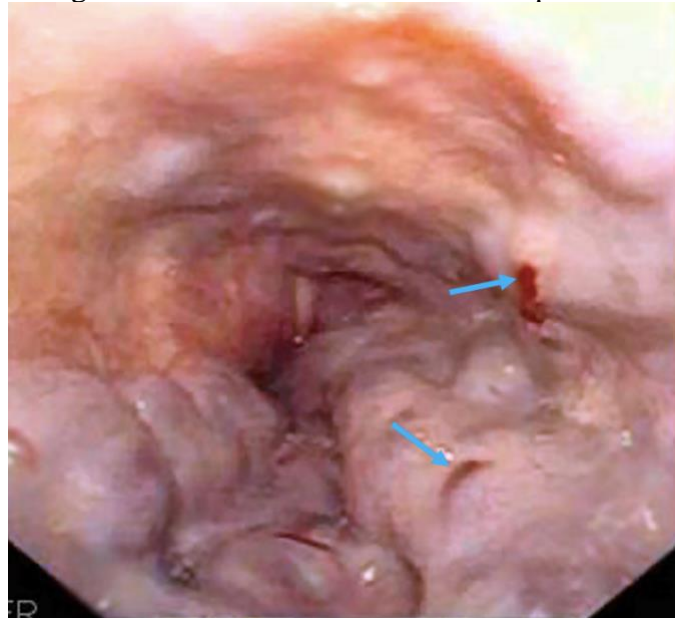
Upper GI hemorrhage is a life-threatening condition that requires immediate attention. Careful attention should be paid to airway, breathing and circulation, with immediate placement of two large-bore IV cannulas. Interventions such as intubation, blood transfusion, urgent endoscopy with intervention and large-bore central line placement are made as appropriate. Patients who are not treated immediately should be watched carefully in a monitored setting in case of rapid deterioration.

Anatomy:

Gastroesophageal Varices

Varices are veins that are enlarged due to increased flow. In the case of hypertension at any part of the portal venous system, collaterals between the portal and systemic venous systems become enlarged and dilated due to increased flow. When these collateral veins are near to a mucosal surface, they bulge into the lumen of the organ. As pressure

and flow increase they can bleed intermittently. Dilated vessels can be seen on upper endoscopy as esophageal or gastric varices, or on proctoscopy as enlargement of the hemorrhoidal venous plexi.



Esophageal varices are raised columns of dilated veins that protrude into the lumen of the esophagus. Sites of recent bleeding appear as red dots at the center of the varices. These are also known as Red Wine spots. Source:

https://en.wikipedia.org/wiki/Esophageal_varices

Esophageal varices are caused by elevated pressure throughout the entire portal venous system: the collaterals in the esophageal submucosa enlarge as blood flows from the gastric (portal) venous system to the thoracic (systemic) venous system. Acute treatment is directed at locating and arresting the bleeding by applying a band directly to the site. Longer term treatment focuses on eliminating the varices altogether through repeated banding.

Conversely, gastric varices are caused by obstruction and hypertension in one specific part of the portal system, usually the splenic vein. Collaterals in the fundus of the stomach enlarge as blood flows from the short gastric veins (portal system,) through the esophageal submucosal veins, into the thoracic (systemic) venous system. Esophageal varices are usually present as well due to increased flow. When the bleeding is from the gastric varices, one must not band the esophageal varices, as this can increase the pressure “downstream” in the gastric varices and lead to an increase in bleeding.

Bleeding Gastric Ulcers

OPEN ACCESS MANUAL OF SURGERY IN RESOURCE-LIMITED SETTINGS

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Gastric ulcers can be benign or malignant and thus should be biopsied at endoscopy if it is safe to do so. However, if the patient is presenting with acute upper gastrointestinal hemorrhage, biopsy should be deferred and endoscopic interventions to slow or stop the bleeding should be done if possible. Previous biopsy results, if available, are crucial to decision-making.

Bleeding Duodenal Ulcers

Duodenal ulcers in the anterior bulb, or the second or third portions of the duodenum, may bleed in the same manner as gastric ulcers. However, duodenal ulcers in the posterior bulb are prone to erode into the gastroduodenal artery and have the most dramatic and life-threatening presentations.

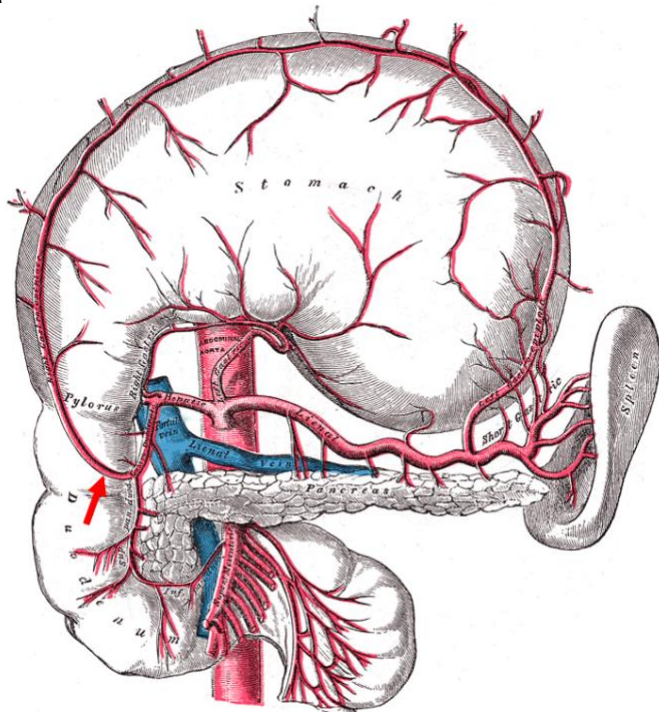
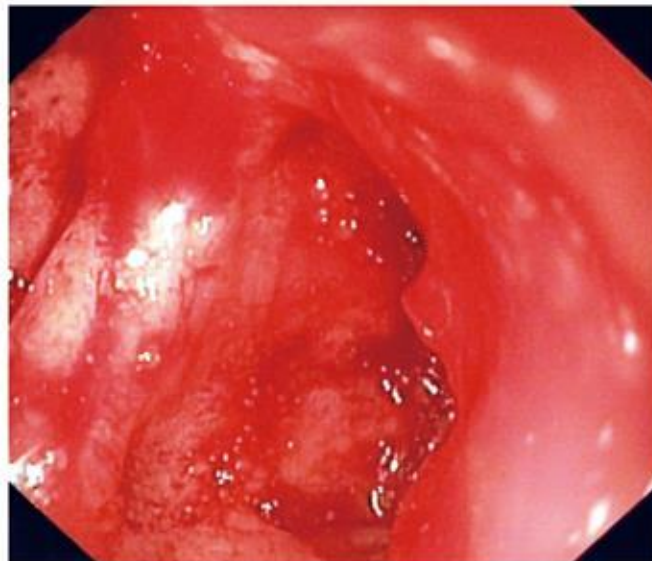


Illustration showing the stomach and first portion of the duodenum reflected upwards. The Gastroduodenal artery (Red Arrow) passes posterior to the first portion of the duodenum, variably giving side branches to the pancreas. An ulcer of the posterior first portion of the duodenum which erodes into this artery and its branches will result in brisk, life-threatening hemorrhage.



Posterior duodenal ulcer with ongoing bleeding. These may be difficult to visualize endoscopically, as they are often just inside the pylorus and obscured by it. Source: World J Gastroenterol 2015; 21(5): 1666-1669

URL: <https://www.wjgnet.com/1007-9327/full/v21/i5/1666.htm>

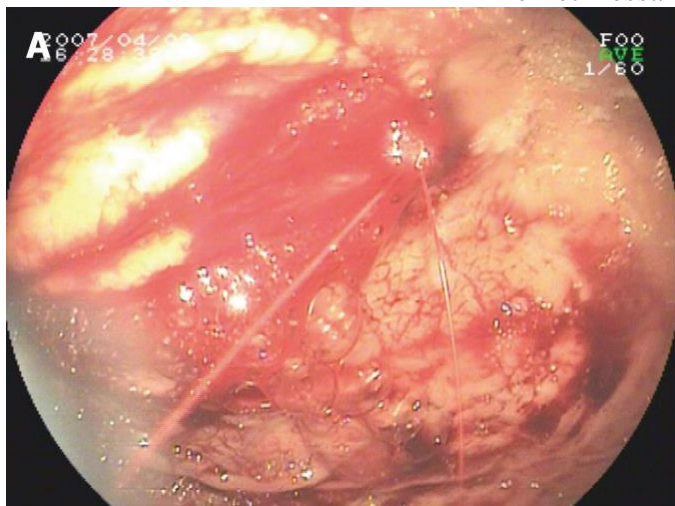
Patients may give a history of epigastric pain, previous treatment for ulcers, or a previous positive *helicobacter pylori* test. Abdominal examination is usually unrevealing although there may be epigastric tenderness.

Dieulafoy and other vascular malformations

Arterial and arterio-venous malformations are usually easy to visualize on endoscopy. One exception to this rule is a Dieulafoy lesion, an abnormally dilated mucosal arteriole which can be very difficult to visualize unless it is actively bleeding at the time of endoscopy. Occasionally there will be a small circular ulcer at the site. This lesion can be treated with endoscopic band ligation. Dieulafoy lesion should be suspected if endoscopy is completely unrevealing, but the hemorrhage is clearly from the upper GI tract.

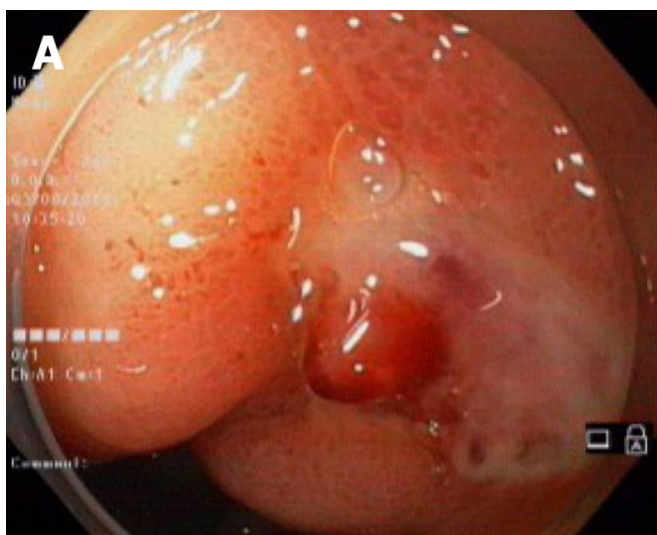
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Typical appearance of an actively bleeding Dieulafoy lesion. A small ulcer may be visible, or the blood may appear to be coming directly from normal mucosa. Source: World J Gastroenterol 2010; 16(5): 631-635

<https://www.wjgnet.com/1007-9327/full/v16/i5/631.htm>



A non-bleeding Dieulafoy lesion may be seen as a small ulcer on the otherwise normal mucosa. Source: World J Gastroenterol 2020; 26(30): 4557-4563

URL: <https://www.wjgnet.com/1007-9327/full/v26/i30/4557.htm>

Mallory-Weiss Tears

These are superficial linear tears at the gastroesophageal junction caused by excessive vomiting. A careful history will sometimes elicit that vomiting was initially non-bloody and then turned bloody. Heavy alcohol users will often fail to mention drinking and subsequent vomiting episodes. The classic teaching is that bleeding from a Mallory-Weiss tear is self-limited, however in settings where endoscopic interventions are not available, the surgeon is occasionally forced to

perform laparotomy and gastrotomy to oversee these lesions to control bleeding.

Tumors

Esophageal, gastric or duodenal tumors will rarely cause life-threatening hemorrhage that requires immediate intervention. However, it can be difficult to distinguish them from other life-threatening conditions on presentation. Patients give a history of bloody sputum or hematemesis, and they can be severely volume depleted or even in shock due to poor fluid intake and blood loss. It is prudent to treat such patients urgently until other causes of upper GI hemorrhage are ruled out. Often these patients will respond to resuscitation and become stable after fluid and blood losses are replaced.

Epistaxis

Bleeding from the nose, nasopharynx, or other source above the upper esophageal sphincter may lead to swallowed blood which is then vomited. A clinician may then assume that the patient has an upper GI bleed. A careful history and physical examination can usually avoid this problem. Patients who have hematemesis after blunt trauma usually fall into this category, as blunt trauma never causes an immediate upper GI bleed.

Principles:

In patient presenting acutely with upper GI bleeding the overall clinical condition should be assessed and plan to control the bleeding as we continue to resuscitate the patient should ensue.

- Assess the patient's airway, respiratory and hemodynamic parameters continuously as you start resuscitation of the patient
- Large bore IV opened bilaterally
- Prepare either O negative blood or typed and cross-matched blood depending on the urgency
- Alert the operating room team
- When obtaining consult for endoscopy, obtain consent also for laparotomy.

Decision Making:

Immediate vs. Delayed Intervention

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Appropriate resuscitation is mandatory. Patients present dramatically, with hemorrhagic shock and hematemesis that may be repetitive. Do give blood and fluids as the patient needs, but do not be tempted to over-resuscitate. The patient must be monitored for signs that bleeding has stopped and that resuscitation end-points have been met. This is especially true with elderly patients, or those with pre-existing heart disease.

The most important decision to be made is whether the patient requires immediate intervention, or whether they can be integrated with the day's elective endoscopy list. The best way to make this decision is to serially evaluate the patient during resuscitation. Patients who respond to initial fluid resuscitation and remain stable over the next 1-2 hours may safely be admitted to a monitored setting and endoscopy done on an urgent but not emergent basis, unless they deteriorate again. Patients who do not respond to resuscitation, or who respond but then become hypotensive or tachycardic again, clearly have ongoing bleeding and need prompt intervention. Waste no time taking these patients to the endoscopy suite.

Unstable patients and "transient responders" should be explained and provide informed consent for both endoscopy with intervention (see Chapter) and laparotomy and oversewing of bleeding gastric or duodenal ulcer (see Chapter.) Endoscopy should be done under general anesthesia, with as large a scope as possible, warm irrigation and well-functioning suction all available.

Endoscopic interventions are much less likely to succeed in resource-limited settings because of lack of equipment and expertise. The standard in a resource-rich setting is to operate after two failed endoscopic interventions. In our setting, we obtain informed consent for laparotomy in every patient going for an endoscopic intervention, and we perform laparotomy if the patient rebleeds after a single attempt at endoscopic intervention.

Gastric Ulcers

Gastric ulcers present a difficult challenge if their etiology is unknown. The surgeon in resource-limited settings who is forced to operate on a bleeding (or perforated) gastric ulcer will decide whether to oversee the ulcer, excise it in a wedge, or perform a formal oncologic resection. This decision will likely be made without intraoperative

pathology assistance. The surgeon must be guided by the gross appearance of the ulcer and surrounding tissue, a careful abdominal exploration for signs of metastasis, and the condition of the patient. It is acceptable to perform a non-oncologic resection on a patient in extremis, but suture lines through tissue that is infiltrated by tumor will be likely to leak. As explained below, the surgeon is much more likely to be faced with this difficult decision with a perforated, rather than a bleeding ulcer. However, if the surgeon is forced to operate on a bleeding gastric ulcer, it is crucial to understand exactly where it is when making the gastric incision. Once the stomach is opened, finding a small ulcer within the folds of mucosa can be difficult if one is unclear about exactly where it is located.

Patients with a GI tract tumor that is clearly malignant, who present with hemorrhage, will usually respond to initial resuscitation. It is rare for such patients to remain unstable and to require emergency intervention. A careful history and physical examination will occasionally reveal the diagnosis. Symptoms that may distinguish these patients include dysphagia, postprandial vomiting prior to the onset of hemorrhage, and weight loss. Signs include palpable abdominal mass, supraclavicular or axillary lymph nodes, and temporal wasting. Such patients can usually be resuscitated, biopsied and staged, and then undergo the appropriate treatment without emergency intervention.

Schistosomiasis

On some occasions, patients with hepatic schistosomiasis will benefit from splenectomy and distal splenorenal shunt. Schistosomiasis is characterized by presinusoidal fibrosis, leading to preserved liver function in the presence of portal hypertension. Such patients can be expected to tolerate general anesthesia and some blood loss during surgery. This indication is the only one where we would recommend surgical treatment of portal hypertension.

Nevertheless, this operation should not be performed acutely in patients presenting with variceal upper GI bleed; they should be managed as described here and this difficult operation deferred until it can be done electively. A shunt operation is extremely dangerous in a patient in hemorrhagic



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shock. Also, at the time of presentation, the etiology of the varices, and the degree of underlying hepatic dysfunction, will be unclear. Splenectomy and distal splenorenal shunt are described elsewhere in this Manual.

When There is no Endoscopy

Flexible upper endoscopy is the mainstay of decision making in patients with upper GI bleeding. If one is forced to manage patients without endoscopy, the decision making is similar to that described above: patients who do not respond to resuscitation, or who respond only transiently, need immediate intervention. A careful history and physical examination are key to directing surgery, looking for signs and symptoms of ulcer disease, hepatic disease, or malignancy. Especially if you are forced to operate without an endoscopic diagnosis, it is worth taking time and discussing the history with the patient and family; the timing, character and chronicity of symptoms may provide important clues towards the diagnosis.

Few guidelines exist for operative management of upper GI bleeding without an endoscopic diagnosis. At laparotomy, perform a thorough inspection and palpation, including opening and looking in the lesser sac, looking for dilated branches of the portal venous system and palpable induration in the stomach or duodenum. If there are no such signs, an anterior gastrotomy in the area of the body allows inspection of the stomach. Once the stomach is opened, it becomes a confusing mass of mucosal folds. Make the incision large enough to allow manipulation, 15cm is acceptable. Two Deaver or Maleable retractors held opposite each other, with headlight illumination, allows the surgeon to examine the fundus, gastroesophageal junction, body, antrum and pylorus. Be systematic; life threatening hemorrhage can come from a very small lesion such as a Mallory-Weiss tear or Dieulafoy's lesion. If bleeding seems to be coming from the pylorus, a separate incision can be made over the distal antrum, extending through the pylorus into the duodenum, as described in the chapter, Gastrotomy and Duodenotomy for Bleeding Ulcer.



A Deaver and a narrow malleable retractor, held opposite each other through a gastrotomy, allow a thorough and systematic exploration of the stomach.

Unfortunately, there are no legitimate surgical options for bleeding esophageal varices. Do not attempt surgical heroics such as a Sugiura procedure or a portocaval shunt on a patient in extremis.

(See following page for a description of a Resource-Rich setting resource.)

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Resource-Rich Settings

Trans-Jugular Intra-Hepatic Stent placement (TIPS) has revolutionized management of portal hypertension in resource-rich settings. This is the placement, usually by an interventional radiologist, of a covered stent from inside the vena cava, through the liver parenchyma, to one of the branches of the portal vein. Placement of a TIPS allows direct decompression of the portal venous system without the need for general anesthesia, a laparotomy, and a vascular operation such as porto-caval shunt, on a patient with the severe comorbidities that come with portal hypertension. The introduction of TIPS has led to a virtual abandonment of surgical operations for portal hypertension, which were almost always high in morbidity and mortality.

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