GI Bleeding

September 18, 2018 by Josh Farkas

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diagnosis & risk stratification

diagnosis of GI bleed:

- Usually easy to diagnose, but consider:
  - Posterior epistaxis can cause patients to swallow blood, mimicking an upper GI bleed. This can cause hemorrhagic shock.
  - Bloody diarrhea (e.g. due to mesenteric ischemia or infectious colitis) can be misleading. Although this is technically a GI bleed, bleeding isn't the main problem.

physical exam with bedside ultrasonography

- Hemodynamic evaluation
  - Collapsed inferior vena cava and hyperkinetic left ventricle suggest volume depletion from bleeding.
  - If a normal or distended IVC is seen in a patient with shock, this argues against hemorrhagic shock as the cause of the patient's instability. In this scenario, initiating a massive transfusion protocol is probably the wrong move.

- Ascites
  - Ascites can easily be evaluated with a FAST exam (or an abbreviated exam including the right & left upper-quadrant FAST views).
  - Presence of ascites suggests cirrhosis, with a potential benefit from octreotide and antibiotics. However, note that hemoperitoneum should be considered if there aren't clear signs of gastrointestinal hemorrhage. Occasionally patients will present with splenic laceration due to trivial trauma or splenic pathology.¹ ²

- Gastric distension
  - Gastric ultrasonography is a simple, validated approach to evaluate gastric size and contents.³
  - A collapsed stomach argues against active bleeding in the esophagus or stomach (e.g. variceal hemorrhage). Alternatively, a distended stomach may suggest upper GI hemorrhage if the patient hasn't recently eaten.⁴
  - For patients undergoing intubation, gastric distension increases the risk of aspiration (more on this below (#approach_to_upper_GI_bleed)).

risk stratification

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² The internet isn't of critical care by @emcrit

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**Hemoglobin**
- **Best case scenario**: Profound anemia (e.g. hemoglobin <5 g/dL or <50 g/L) in a patient who is hemodynamically stable and minimally symptomatic implies a chronic bleed, with little risk of rapid deterioration. These patients have been bleeding for days, meanwhile gradually retaining volume to compensate (isovolemic anemia). The only immediate danger to these patients is iatrogenic: if given blood too rapidly they will develop volume overload. Ideal management isn't to slam in several units of blood, but rather to provide gradual transfusion (often in combination with diuresis).
- **Worst case scenario**: Normal hemoglobin with hemodynamic instability is worrisome for severe bleed. Hemoglobin takes time to fall in response to bleeding, so normal/hemoglobin plus shock implies a very active bleed.
- **Intermediate scenarios**: Many patients will present with moderate anemia (e.g. hemoglobin 6-7 g/dL or 60-70 g/L) and hemodynamic stability. In this case, it can be helpful to determine the patient's response to blood transfusion. A unit of packed cells should increase hemoglobin by ~1 g/dL (~10 g/L). Failure to respond appropriately to transfusion implies ongoing bleeding.

**Hemodynamics**
- Hypotension or elevated shock index (HR/SBP above ~0.8) are extremely concerning.
- Syncope or presyncope are worrisome. However, orthostatic vital signs are unhelpful (myth debunked in video below).
- Pressor-dependent shock is the most scary feature. In patients with reasonable hemodynamic reserve, this is an extremely late manifestation that implies profound blood loss. Consider initiation of massive transfusion protocol.

**Coagulation**
- Presence of easily reversible coagulopathy is a good sign (e.g. markedly supratherapeutic INR from warfarin). If the patient has survived living with an INR of 10, then they will do much better once their INR is normalized. So although the INR elevation can invoke panic, it's actually a favorable prognostic sign.
- Poorly reversible coagulopathy is worrisome (e.g. NOACs).

**Signs of bleeding**
- Active bleeding is obviously worrisome. Hematemesis is more worrisome than hematochezia, because upper GI bleeding carries a higher mortality than lower GI bleeding.
- The most concerning is active bleeding from both ends (hematemesis plus hematochezia), as this implies brisk upper GI bleeding with rapid transit through the GI tract.
- Cessation of bleeding (e.g. no recent bowel movements or hematemesis) is reassuring. For example, a patient who hasn't had a bowel movement in >12-24 hours probably doesn't have a critical GI bleed (noting that blood is a cathartic).

**High-risk conditions**
- Cirrhosis is worrisome regarding risk of variceal hemorrhage.
- Prior abdominal aortic aneurysm repair may raise concern for aorto-enteric fistula.

**Overall fitness**: Elderly patients with numerous comorbidities are at higher risk of poor outcome.
resuscitation basics

labs

- Chemistries
- CBC (cycle perhaps ~q8hrs)
- PT, PTT, Fibrinogen
- Type & cross-match
- Cirrhotic patients: thromboelastography (TEG) is useful for patients with elevated INR

access

- Two large-bore peripheral IV lines.
- Patients undergoing massive transfusion benefit from central access. Any of the following will work, with my preferences as follows:\(^5\)
  - (1) MAC catheter (multi-lumen access catheter) if you can find one.
  - (2) Hemodialysis catheter (large-caliber access, two lumens, doesn't kink).
  - (3) Standard central line (universally criticized due to low flow rates, but if attached to a Level-1 or Belmont rapid infuser it will work just fine here).
- For patients undergoing massive transfusion, consider emergent placement of a femoral arterial line plus femoral venous access (the dirty double [https://emcrit.org/pulmcrit/hemodynamic-access-for-the-crashing-patient-the-dirty-double/]). An arterial catheter is invaluable when running a massive transfusion to titrate vasopressors and avoid overshoot hypertension (which may encourage re-bleeding).

blood products

- The hemoglobin target should be > 7 g/dL (>70 g/L) in nearly all cases (infographic below).\(^6\) Exceptions include:
  - Massive bleed with hemodynamic instability.
  - Acute coronary syndrome (target hemoglobin > 8 g/dL or >80 g/L).
- If you’re really worried that the patient will open up, request 4 units PRBC on hold in the blood bank. Don’t transfuse to a high hemoglobin to “tank up” the patient.

https://emcrit.org/ibcc/gi-bleeding/
Massive transfusion protocol (MTP): For severe instability (e.g. vasopressor dependence) consider activation of a massive transfusion protocol (link). In this situation, blood products will be provided with a 1:1:1 ratio of PRBC:FFP:platelets. Also consider tranexamic acid, cryoprecipitate, IV calcium, and a warming blanket.

Medications

- **Proton Pump Inhibitor**: If upper GI hemorrhage possible, give IV proton pump inhibitor. There's no evidence that a continuous infusion is superior to intermittent IV bolus therapy (e.g. 40 mg pantoprazole IV q12hr).7
- **Octreotide**: If variceal hemorrhage is possible, give octreotide (50 microgram bolus followed by 50 mcg/hr infusion). This is safe, when in doubt just give it.
  - There is even some weak evidence (http://rebelem.com/rebel-cast-ep-48-octreotide-somatostatin-undifferentiated-upper-gastrointestinal-bleed/) that it might be helpful in non-variceal bleeding.
- **Antibiotic**: Cirrhosis plus GI bleeding equals antibiotics (usually ceftriaxone 1 gram daily). More on this below.

Coagulopathy management

- The indication for anticoagulation must be weighed against the severity of the bleed to determine how aggressively to reverse anticoagulation.
- Anticoagulation: reverse as discussed (link).
- Antiplatelet agents, uremia, or thrombocytopenia: Consider DDAVP, platelet transfusion.

Tranexamic acid?

- One meta-analysis of old RCTs found mortality benefit.8 Whether tranexamic acid remains beneficial in the modern context remains unclear. This is currently under investigation within the HALT-IT trial.9
- Administration of tranexamic acid may be reasonable, especially in the following situations (31329328
  - (1) Severe bleed
  - (2) Patients with complex coagulopathies which are otherwise hard to treat.
  - (3) Lab evidence of hyperfibrinolysis (e.g. TEG with increased LY30, or patients with cirrhosis and low fibrinogen level).
  - (4) Failure of conventional therapy.
- Dose:
  - Loading dose of 1 gram IV
Continuous infusion of 3 grams over the next 24 hours. The easiest way to do this is to order 1 gram doses within 150 ml minibags; infuse each minibag slowly over 8 hours.

**NG tube with gastric lavage?**

- Diagnostic performance:
  - Sensitivity for upper GI bleed is ~50%, so negative lavage doesn't exclude upper GI bleed.
  - Bloody lavage has high *specificity* for an upper GI bleed. Bloody lavage also increases the risk of deterioration and argues for prompt upper endoscopy.
- Historically, gastric lavage has been applied broadly to patients with minimal benefit. For example, if a patient has hematemesis then they obviously have an active upper GI bleed – performing a NG lavage provides no diagnostic information.
- Gastric lavage can be useful in the patient with a probable lower GI bleed, because this helps direct whether the patient should receive an upper endoscopy versus CT angiogram of the abdomen.
  - This should be performed within a specific algorithm for approaching hematochezia (more on this below).
- NG tube placement can be useful to therapeutically drain the stomach prior to intubation, to reduce the risk of aspiration.

### approach to upper GI bleed

#### initial sequence of interventions

1. Emergent upper endoscopy is usually first line, although there are a few exceptions:
   - (a) For a patient with a history of aortic surgery within the past ~5 years, it might be better to start with a CT angiogram to evaluate for aortoenteric fistula.
   - (b) For a patient with exsanguinating bleeding from a duodenal ulcer (e.g. diagnosed based on active extravasation on CT angiography), it could be reasonable to go directly to interventional radiology. Posterior duodenal ulcers can be difficult to manage endoscopically in the face of torrential bleeding.
2. If endoscopy identifies source of bleeding but fails to achieve hemostasis, interventional radiology is generally next step.
   - Ideally endoscopy will localize the bleed, which helps direct interventional radiology towards the appropriate arteries to embolize.
   - If endoscopy doesn't show *any* source of bleeding, consider CT angiography to evaluate for a lower GI bleed.
3. If all else fails, surgery is a last-ditch option (with modern endoscopy & IR techniques, this is rarely needed).
Dieulafoy’s lesion is a rare cause of brisk GI bleeding due to an aberrant artery close to the surface of the bowel. These lesions are frustrating because they can bleed intermittently but evade endoscopic detection when they are not actively bleeding.

**Intubation**

- Intubating the GI bleeder isn’t a benign intervention. Intubation is associated with worse outcomes, but it’s unclear whether this is truly a causal relationship.\(^\text{10}\)
- Indications for intubation include:
  - Altered mental status with inability to protect airway
  - Massive bleeding or anticipated massive bleeding (e.g. suspected variceal hemorrhage), which could cause aspiration during upper endoscopy.
- In practice, the decision about intubation is often determined by the gastroenterologist.
- These are high-risk intubations, with a risk of hemodynamic decompensation or massive aspiration:
  - Consider resuscitation and initiation of vasopressor infusion before intubation, to avoid hemodynamic collapse.
  - **Gastric ultrasonography** may be helpful to detect gastric distension. Consider NG suction to reduce the risk of aspiration (varices aren’t a contraindication to NG tube placement). However, **NG drainage** may not be 100% effective due to occlusion by clots. **IV erythromycin** is another option to promote gastric emptying prior to procedures (3 mg/kg infused over 5 minutes, >15 minutes prior to procedure).\(^\text{11}\)

**Non-intubated patient: procedural sedation for upper endoscopy in the difficult-to-sedate patient**

- Most patients are easy to sedate with a variety of regimens (e.g. fentanyl/midazolam). Unfortunately, some patients have a history of responding poorly to sedation (often patients with alcoholism). In this situation, the intensivist may be called upon to provide help with sedation.
- Propofol is an option here, but it requires that the intensivist must be present and paying close attention throughout the entire endoscopy. In a busy department this may be logistically impossible. Also, most intensivists don’t have an attention span this long.\(^\text{12}\)
- Full dissociation with **ketamine** is my preferred approach here:
  - Ketamine monotherapy is extremely safe (preserved ventilation, airway protection, fairly stable hemodynamics). Dissociation creates a ceiling effect, which makes it nearly impossible to overdose the patient on ketamine.
  - Once the patient is dissociated and tolerating the procedure well, the patient no longer requires 100% of the intensivist's attention.
Patients with alcoholism may be ketamine resistant, but this can be overcome by using higher doses.

**post-endoscopy risk stratification & disposition**

The type of bleeding lesion seen on endoscopy determines the risk of re-bleeding. This can assist with patient disposition, for example:

- Visible vessel: higher risk of re-bleeding.
- Adherent clot: intermediate risk.
- Clean-based ulcer or ‘flat spot’: low risk of re-bleeding (patient can be sent home or to ward).

**management of re-bleeding**

This will depend on the lesion seen initially. However, the usual sequence of events is as follows:

- 1st line: Repeat endoscopy
- 2nd line: Interventional radiology
- 3rd line: Surgery

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**Interventions**

- **Octreotide** should be provided immediately on an empiric basis if varices are considered a possibility.

- **Esophageal varices**:
  - Often can be treated via upper endoscopy with banding (rubber bands are used to occlude the varices).
  - If endoscopy fails, the second step is often Transjugular Intrahepatic Portosystemic Shunting (TIPS).

- **Gastric varices** generally require an interventional radiology approach:
  - **Endoscopic therapy** often doesn't work well for gastric varices (due to the anatomy of the stomach).
  - **BRTO procedure** (balloon-occluded retrograde transvenous obliteration of gastric varices): If the patient has a gastrorenal shunt, this may be used as a passageway for interventional radiology to reach the varices (figure below). This procedure is technically challenging and not widely available. BRTO won't exacerbate hepatic encephalopathy, but it may increase portal vein pressures and thereby worsen ascites or esophageal varices.
  - **TIPS** is more commonly used for gastric varices than BRTO. TIPS has the opposite complication pattern of BRTO (TIPS may worsen hepatic encephalopathy, but it will alleviate ascites and esophageal varices).
Variceal bleeding is from a venous source, so any fluid will increase the central venous pressure and directly promote bleeding (figure below). These patients often live at a low blood pressure (e.g. 80-90 mm systolic), so borderline hypotension is preferable to large-volume resuscitation.

When in doubt, try to avoid massive transfusion in patients with variceal hemorrhage. This can rapidly devolve into a vicious cycle which promotes ongoing bleeding and worsening coagulopathy (more on this here [https://emcrit.org/pulmcrit/coagulopathy-bleeding-cirrhotic-inr/]).

Antibiotic administration has been shown to improve mortality among patients with GI bleed and cirrhosis. This is often thought of as "SBP prophylaxis" but that's not entirely true. There is a close relationship between infection, coagulopathy, and bleeding among cirrhotic patients. In some patients, GI bleed may be a manifestation of occult underlying infection which triggers coagulopathy.

Antibiotics should be given to any patient with cirrhosis plus GI bleeding (this is what the evidence has proven).

- Doesn't matter whether or not it is a variceal bleed.
Doesn't matter whether or not the patient has ascites.
Usual therapy is ceftriaxone 1 gram IV for seven days.\textsuperscript{14} (Several problems\footnote{https://emcrit.org/pulmcrit/fluoroquinolone-critical-illness/} with fluoroquinolones limit their use in the ICU.)

**evaluate for infection**

- Given the close relationship between bleeding, coagulopathy, and infection there should be a high index of suspicion for underlying infection.
- If significant ascites is present, this should be sampled to exclude spontaneous bacterial peritonitis. Therapeutic paracentesis may decrease the portal pressure and thereby decrease bleeding.\textsuperscript{15}
- Additional investigation (e.g. chest X-ray, blood cultures) may be indicated if there are signs of infection.

**cirrhotic coagulopathy**

- INR elevation in cirrhosis is meaningless and doesn't necessarily correlate with actual coagulation tendency. Thromboelastography (TEG) is more accurate here (more explanation here\footnote{https://emcrit.org/pulmcrit/coagulopathy-bleeding-cirrhotic-inr/}).
- **Trying to "correct" the INR with fresh frozen plasma or PCC is a classic mistake.** This is rarely beneficial. Studies in cirrhosis have shown that administration of FFP generally doesn't improve coagulation.\textsuperscript{16,17}
- Giving platelets can be helpful if the platelet count is <50,000. Unfortunately platelets are often consumed rapidly, making this a short-lived intervention.
- Many patients with cirrhosis develop hyperfibrinolysis, which causes ongoing degradation of their fibrinogen. Hyperfibrinolysis is suggested by the presence of a low fibrinogen level (unfortunately, the LY30 on TEG isn't very sensitive here). For bleeding cirrhotic patients with a low fibrinogen consider:
  - Cryoprecipitate transfusion to increase the fibrinogen level over ~150 mg/dL (~1.5 g/L).
  - Tranexamic acid to prevent ongoing fibrinolysis (more on this \textit{above (#txa)}).

**be prepared for hepatic encephalopathy**

- Upper GI bleeding is a common precipitant for hepatic encephalopathy.
- There should be a low threshold for initiation of lactulose +/- rifaxamin for patients who develop delirium.

**blakemore tube placement**

- May be used as a last-ditch effort (e.g. to bridge an exsanguinating patient to TIPS). An overview of the procedure is as follows (for more detailed information see the procedure videos below & see Scott Weingart's post\footnote{https://emcrit.org/emcrit/blakemore-tube-placement/}).
  1) Insert the tube through the mouth to a depth of 50 cm (these patients will be intubated already).
  2) Confirm that tube is in the stomach (e.g. either visualization with ultrasonography or withdrawal of gastric contents via gastric port).
  3) Inflate the gastric balloon with 50 ml of air.
  4) Confirm placement within the stomach using either an X-ray or gastric ultrasonography.
  5) Inflate the gastric balloon with 200 ml of additional air for a total volume of 250 ml.
  6) Put traction on the tube (using either a pulley system plus a liter bag of saline or by attaching it to the ETT securement device; see third video below).
  7) Start by inflating only the gastric balloon to avoid esophageal ischemia. With traction, this may occlude veins which are feeding the esophageal varices.
  8) If bleeding persists, inflate the esophageal balloon to 30 mm. If bleeding is controlled, try gradually reducing pressure in the esophageal balloon promptly to avoid esophageal necrosis.
  9) After the patient has stabilized for ~12 hours, start weaning. Deflate the balloons and observe for re-bleeding. If the patient remains stable, the tube may be removed.
Placement of a Blakemore Tube for Bleeding Varices
Using an ETAD for traction during a variceal tamponade.
Hematochezia is due to a lower GI bleed ~85% of the time, but it can also be due to a massive upper GI bleed with rapid transit through the gut.

- Hematochezia due to an upper GI bleed is usually associated with hemodynamic instability. Other features that help sort this out are shown in the figure above.\(^1\)
- The traditional approach to hematochezia was always to start with an upper endoscopy to exclude upper GI bleed. However, 85% of the time this is an unnecessary procedure that will only delay appropriate management. This has been replaced by newer algorithms which involve risk stratification, NG lavage, and CT angiography (explained in detail here).\(^1\)

expanding role of CT angiography

- Improvements in multi-detector CT technology are making this a front-line test for lower GI bleeds (replacing the tagged RBC scan). Advantages of CT angiography include the following:
  - Can be performed rapidly (e.g. no oral contrast, no delays waiting for radio-tracer dye).
  - Localization of bleeding lesions anywhere in the GI tract (e.g., upper GI bleed, lower GI bleed, hemobilia).
  - Diagnosis of broad range of abdominal pathologies which can present with bleeding (e.g. ischemic colitis, aortoenteric fistula).
  - Imaging the vascular anatomy creates a map to guide subsequent procedures by interventional radiology.
  - Risk stratification based on amount of blood extravasation.
- Timing is essential
  - Lower GI bleeds have a maddening tendency to stop and start. In order to be helpful, the scan must be obtained while the patient is bleeding.
  - If the patient is actively bleeding, obtain a STAT CT angiography.
• If the patient has clearly stopped bleeding, it may be wise to follow the patient carefully. If bleeding resumes, order a CT angiogram immediately.

• Make sure the scan is protocoled correctly
  • CT angiography is *not* the same thing as simply a “contrasted CT abdomen/pelvis.” CT angiography actually involves three different CT scans which are timed around a bolus of contrast, in order to watch contrast pass through the abdominal vasculature.
  • If there is any confusion about which test to order, call your radiologist and make sure the test is protocoled correctly.

interventional radiology is usually the key intervention

• Colonoscopy is rarely useful for severe lower GI bleeds (with the possible exception of a post-polypectomy bleed).
  • Brisk bleeding impairs the ability to clear the bowel, making colonoscopy difficult. The endoscopist will be buried in blood, feces, or both.
• Intervventional radiology with embolization is generally the most useful therapy.
• Surgery may be considered for refractory bleeding if it can be definitively localized to a specific region of bowel.

common mistakes to avoid:

1. Consulting GI and doing nothing until they provide recommendations.
  • Gastroenterology will rarely be able to urgently intervene on a patient with hematochezia (unless the patient has upper GI bleeding, in which case emergent upper endoscopy is needed).
  • Consulting GI and waiting for them to see the patient will typically delay care by several hours. If you believe that the patient has lower GI bleeding and their NG lavage is negative, it’s probably best to order a CT angiogram without delay.

2. Ordering a tagged RBC scan
  • Tagged RBC scans are slightly more sensitive than CT angiography, but they are nonspecific. The scan tends to provide a fuzzy image which doesn't definitively identify the source of bleeding.
  • Unlike CT angiography, a tagged RBC scan doesn't provide precise guidance for IR to perform angiography. Likewise, a tagged RBC scan isn't accurate enough to confidently direct a surgeon towards which part of the bowel should be resected.
GI bleed checklist

- **History**
  - NSAID/aspirin use? Abdominal pain?
  - Alcoholism? Liver disease?
  - Surgical history: Gastric bypass surgery? AAA repair?
  - Prior GI bleed? Prior upper endoscopy or colonoscopy?
  - Anticoagulant medications? (including over-the-counter aspirin)

- **Exam:**
  - Echo: Hemodynamics, IVC
  - Abdominal ultrasound: Ascites? Distended stomach?

- **Labs**
  - CBC, Lyes, LFTs
  - INR, PTT, fibrinogen, TEG if cirrhotic
  - Type & Cross

- **Access** (ideally two 18G IVs, or central access)

- **Coagulation status:**
  - Review coagulation labs & anticoagulant meds
  - Consider treating coagulopathies (e.g., PCC, IV vitamin K, cryoprecipitate)

- **Medications**
  - Proton pump inhibitor 40 mg IV q12hr if upper GI bleed is possible
  - Octreotide if variceal bleed is possible (50 mcg bolus & 50 mcg/hr infusion)
  - Ceftriaxone 1 gram if patient has cirrhosis
  - ? Tranexamic acid 1 gram (consider if exsanguinating bleed or cirrhotic)
  - ? DDAVP 0.3 mcg/kg (consider if uremic or anti-platelet drugs)
  - Review med list, consider discontinuation of anticoagulants & anti-hypertensives

- **Intervention**
  - Blood transfusion as needed
  - Suspected upper GI bleed: Consult GI for EGD
  - Suspected lower GI bleed: NG lavage plus CT angiogram (algorithm below)

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**severe hematochezia algorithm:**


### Approach to severe hematochezia

**Where do you think the source is?**

- **Features favoring lower GI source**
  - History of lower GI bleed (LR=6)
  - Age >50 YO (LR=1.3)
  - Clots per rectum (LR=20)

- **Features favoring upper GI source**
  - History of upper GI bleed (LR=6)
  - Age <50 YO (LR=4)
  - Epigastric discomfort (LR=2)
  - BUN/Cre > 30 (LR=7)
  - Cirrhosis (LR=3)

**Suspect lower GI source, OR endoscopy not immediately available**

- **NG Lavage**
  - Positive
  - **Upper Endoscopy**
    - Source identified
    - **Treatment per upper GI hemorrhage algorithm**
  - Negative

**Is the patient actively exsanguinating (i.e. extremely severe bleed)?**

- **Yes**
  - **Invasive Angiography**
    - Upper GI source identified
    - **Treat per upper GI hemorrhage algorithm**
  - **CT Angiogram**
    - Lower GI source identified
    - **Consider therapeutic angiography**
  - **No source identified**
    - No active critical bleeding. Consider non-emergent evaluation on the ward (e.g., colonoscopy)

- **Negative**

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§ If NG tube cannot be placed successfully, consider skipping this step and proceeding to CT angiogram.

LR = Positive Likelihood Ratio of each finding (obtained from Strygle F et al JAMA 2012; 307:1072-1079).

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### The Podcast Episode

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### questions & discussion

To keep this page small and fast, questions & discussion about this post can be found on another page [here](https://emcrit.org/pulmcrit/gi-hemorrhage/).
Don't panic in response to a patient who walks into the emergency department with a hemoglobin of 4 mg/dL. Profound anemia in a hemodynamically stable patient implies chronicity, not acuity.

Don't waste your time with orthostatic vital signs.

Overtransfusion increases mortality and complications. For a hemodynamically stable patient, transfuse to a hemoglobin >7 g/dL (>70 g/L).

The severe hematochezia algorithm has changed recently. Tagged RBC scans have largely been replaced by CT angiography. Most patients can avoid getting an upper endoscopy. The new algorithm streamlines evaluation, treatment, and disposition.

A variceal bleed is a venous bleed, so over-resuscitation can dramatically increase the driving pressure of the bleed (roughly equal to the central venous pressure). Consider a cautious resuscitation strategy with tolerance of soft blood pressures (noting that patients with cirrhosis often live at a low blood pressure).

Don't try to "correct" the INR among patients with cirrhosis using fresh frozen plasma or PCC. This is futile and potentially harmful (more on this [here](https://emcrit.org/pulmcrit/coagulopathy-bleeding-cirrhotic-inr/)).

**Going further**

- **GI bleed overview**
  - Upper GI bleed ([https://coreem.net/core/upper-gi-bleeding/](https://coreem.net/core/upper-gi-bleeding/)) (CORE EM)
  - EBM review ([https://www.aliem.com/2014/03/upper-gastrointestinal-bleeding-treatment/](https://www.aliem.com/2014/03/upper-gastrointestinal-bleeding-treatment/)) of some treatments for upper GI bleed (Salim Rezaie, ALIEM blog)

- **Gastric ultrasonography**
  - [GastricUltrasound.org](http://gastricultrasound.org/index.html)

- **NG lavage: Indicated or outdated?**
  - Salim Rezaie casts some shade on NGL [here](https://www.aliem.com/2013/04/ng-lavage-indicated-or-outdated/)(ALIEM blog)

- **Octreotide**

- **PPIs**

- **Intubation**
  - Intubating the critical GI Bleeder ([https://emcrit.org/emcrit/intubating-gi-bleeds/](https://emcrit.org/emcrit/intubating-gi-bleeds/)) (EMCrit)

- **Coagulopathy**

- **New algorithms for hematocchezia**

- **Blakemore tube placement**


5. My preference is to avoid placing a sheath (a.k.a. introducer, cordis), because these tend to kink (especially in the jugular position) and don’t get you a lot of lumens.


12. The exception of course being folks cross-trained in anesthesiology & critical care.


19. For the record, when I proposed this algorithm on the PulmCrit blog in 2015, it was a relatively new design that was a bit hard to sell many folks on. Subsequently, the AGA 2016 guidelines proposed an algorithm which is essentially identical to it.


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**The Internet Book of Critical Care** is an online textbook written by Josh Farkas (@PulmCrit), an associate professor of Pulmonary and Critical Care Medicine at the University of Vermont.

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