Gastrointestinal Bleeding When is it a True Emergency?

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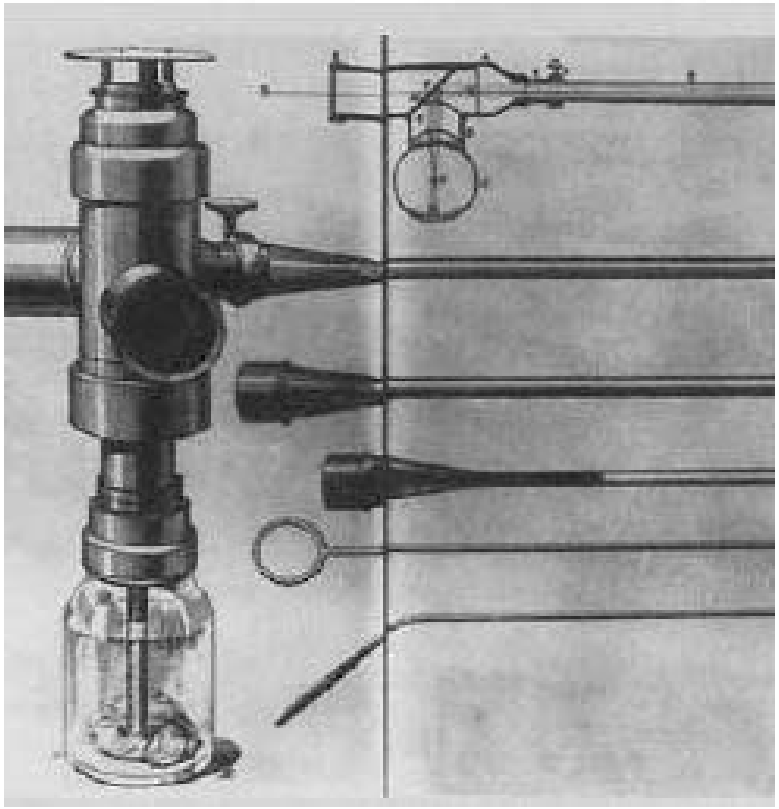
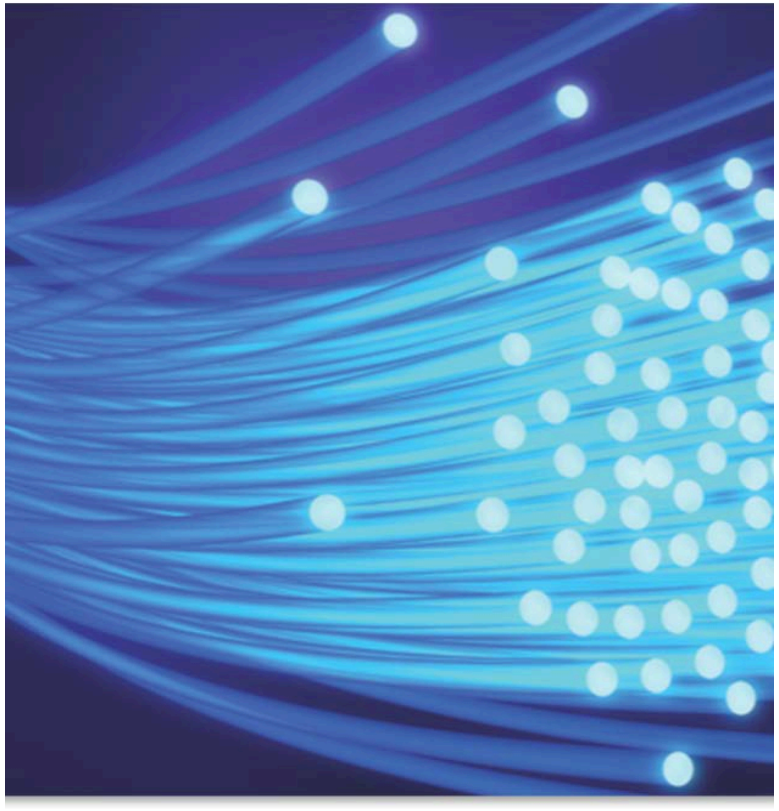
PRE-TEST
true or false:

- **Octreotide is useful for both upper and GI bleeding sources**
- **Antibiotics for bleeding varices has resulted in improved outcomes more than anything else in the past decade**
- **Endoscopy is contraindicated during acute myocardial infarction**
- **Coagulopathy must be corrected prior to EGD or colonoscopy**
- **What is the BEST WAY anyone can help reduce mortality from GI bleeding?**

GI Bleeding can be scary, unless you are prepared!

History of Endoscopy



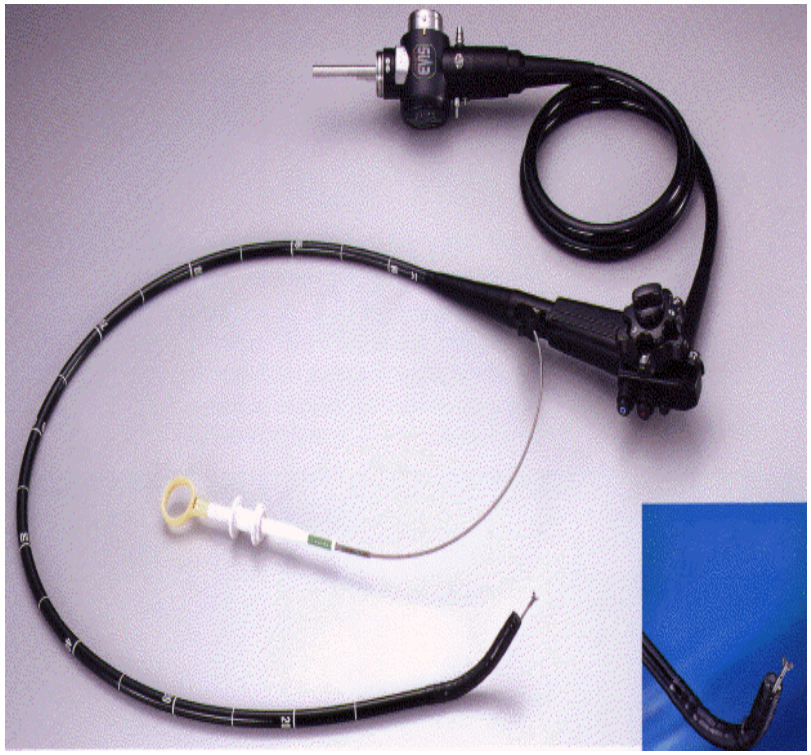


GI Bleeding, *WHAT* is bleeding?

- Best resuscitation strategy?
- Unit bed or floor bed?
- Timing of Endoscopy?
- Which Pharmocotherapy?

Emergency Endoscopy Preparation

Specialized equipment



Trained Personnel

- Endoscopist
- Nurse for conscious sedation
- Technician to hand accessories

Patient Preparation

- Adequate IV access
- Volume resuscitate
- Type and Cross match
- Abdominal and Chest plain films
- Consider EKG/troponins

Utility Of NG Tube Aspiration

- 50% duodenal lesion bleedings have a false negative aspirate
- 14% with clear or bile aspirate have high risk lesions misleading information
- 42% with a blood in the NG tube have stopped bleeding or have a clean based ulcer false positive

NG Tube aspiration has limited diagnostic and prognostic value, and does not change management

Mortality is Predictable Based on Clinical Exam

Coffee Ground Emesis Heme positive stool Very low mortality	Hematemesis Melena 10% mortality
Negative NG aspirate Red Blood Per Rectum < 10% mortality	Red from above and Red from below 10-30% mortality

Indicators of High Risk Lesions Significant or Ongoing Bleeding

- Presentation with shock
- Age >60
- Hemoglobin <8.0
- Hematemesis, High volume Hematochezia
- Witnessed or history of continuous bleeding
- History of Liver Cirrhosis, Coagulopathy, Anticoagulant or Antiplatelet Use

The Blatchford Score

BUN mmol/L	2-6
Hemoglobin g/L	1-6
SBP	1-3
Pulse > 100	1
Melena	1
Syncope	2
Liver disease	2
Cardiac Failure	2

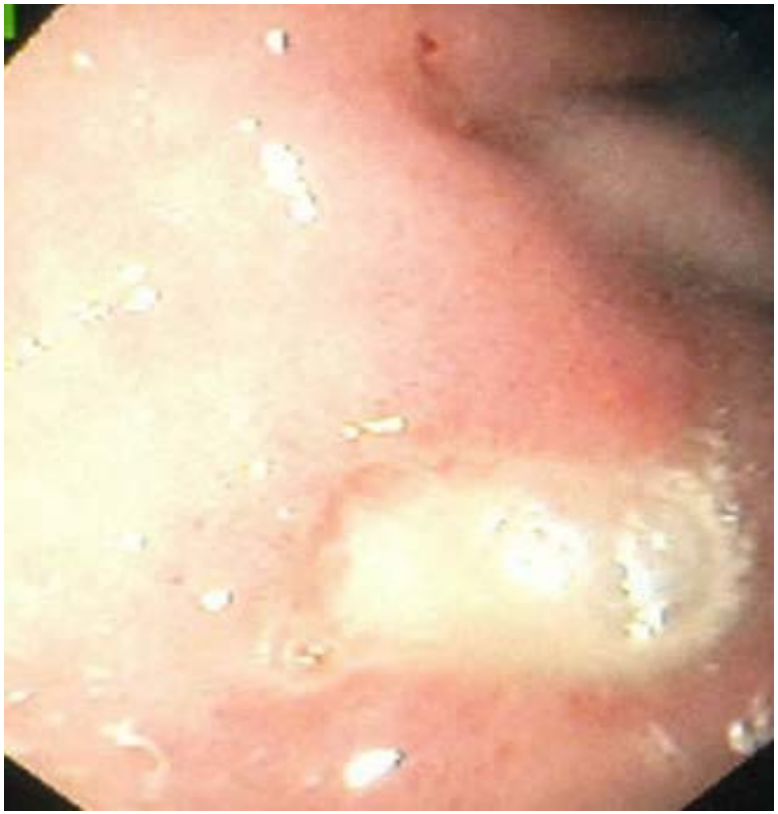
A score of zero accurately predicts low risk patients who can be managed as outpatients

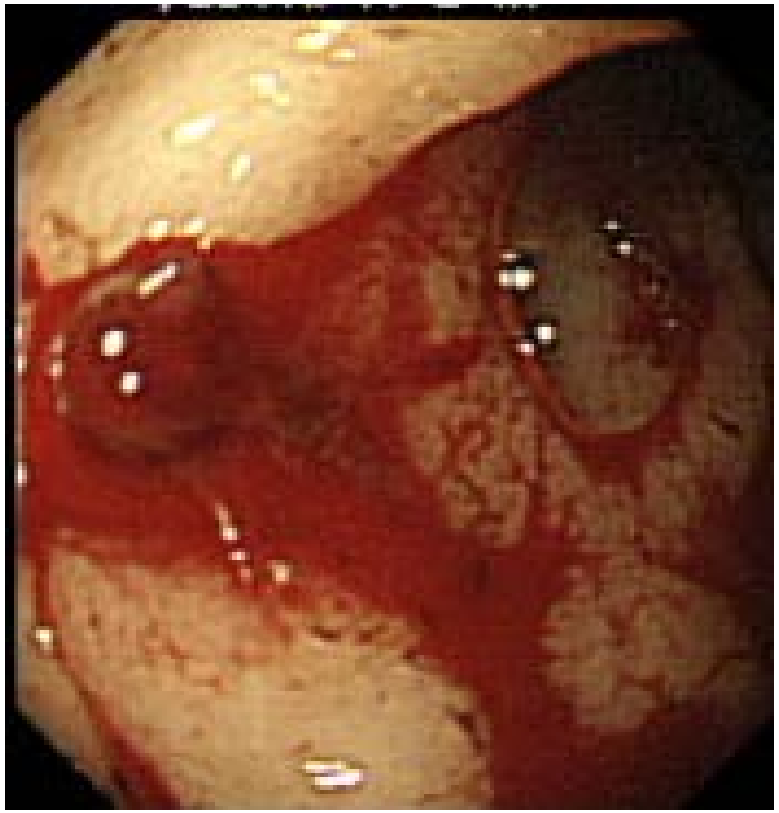
AIM65 GI Bleeding score
Predictable and Practical

Risk Factor		Mortality	
Albumin <3.0	1	0	0%
INR > 1.5	1	1	0.9%
Altered mental status	1	2	7.4%
SPB > 90mm Hg	1	3	42%
Age > 65	1	4	high
		5	high

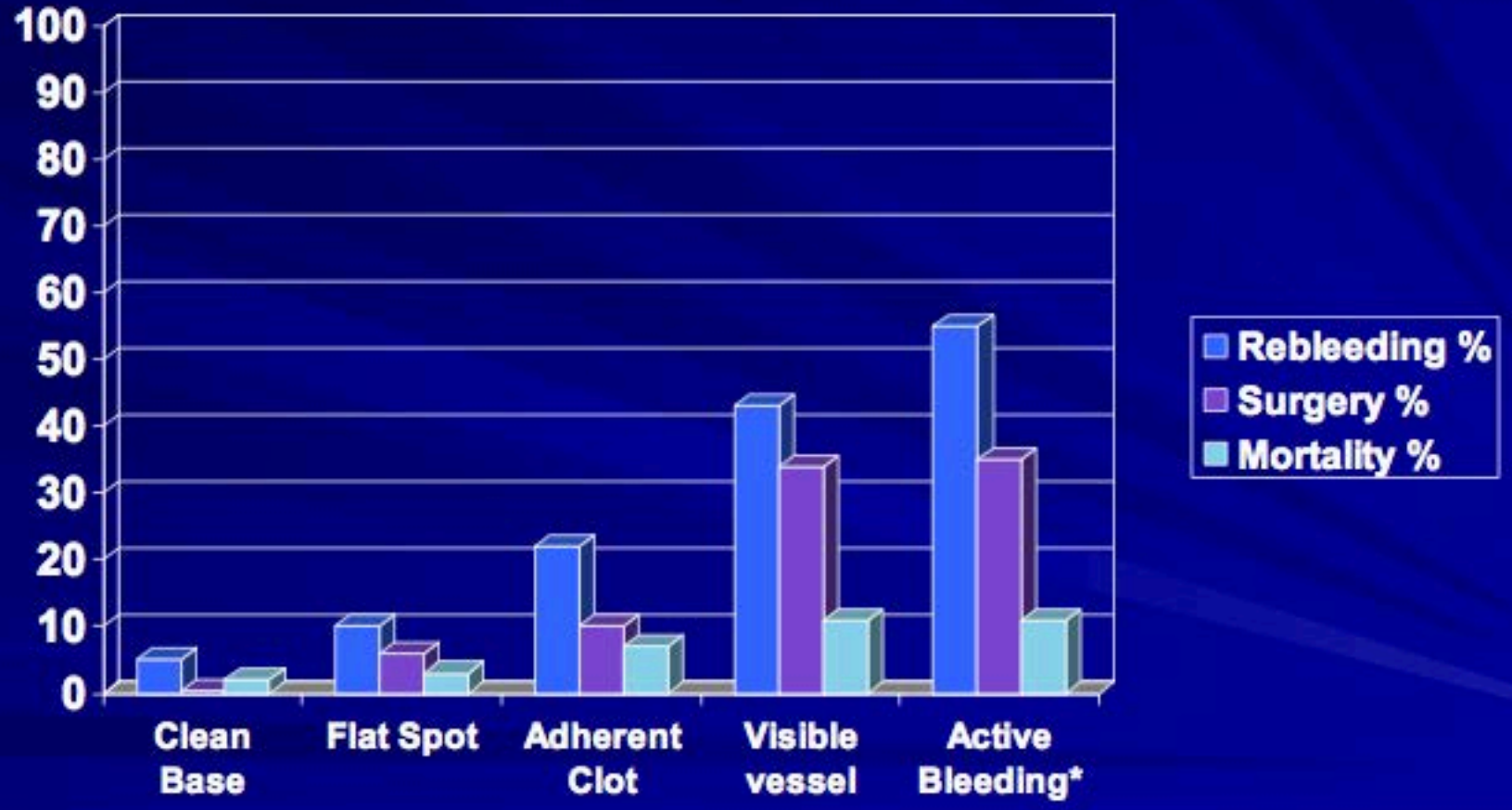
Scoring Assists with level of care and timing for endoscopy
Hyett, et al, Gastrointestinal Endosc 2013;77:551-7

Prognosis Is Related To Endoscopic Findings





Prognosis by Endoscopic Stigmata of Recent Hemorrhage



*Oozing, without adherent clot nor visible vessel, has low risk of re-bleeding after endoscopic therapy, and its re-bleeding rate is not affected by high-dose IV PPI. OK to give PO PPI.

Blood loss is variable depending on source

Upper GI Bleeding

- 35% present with shock
- 65% require transfusion
- 20-30% require intervention to stop bleeding

Lower GI Bleeding

- 19% present with shock
- 36% require transfusion
- >90% spontaneously stop bleeding

The goal of therapy is to prevent end-organ ischemic damage achieved by stopping ongoing blood loss as soon as possible

Pathopysicology of Bleeding Lesions: Big Vessels Bleed More

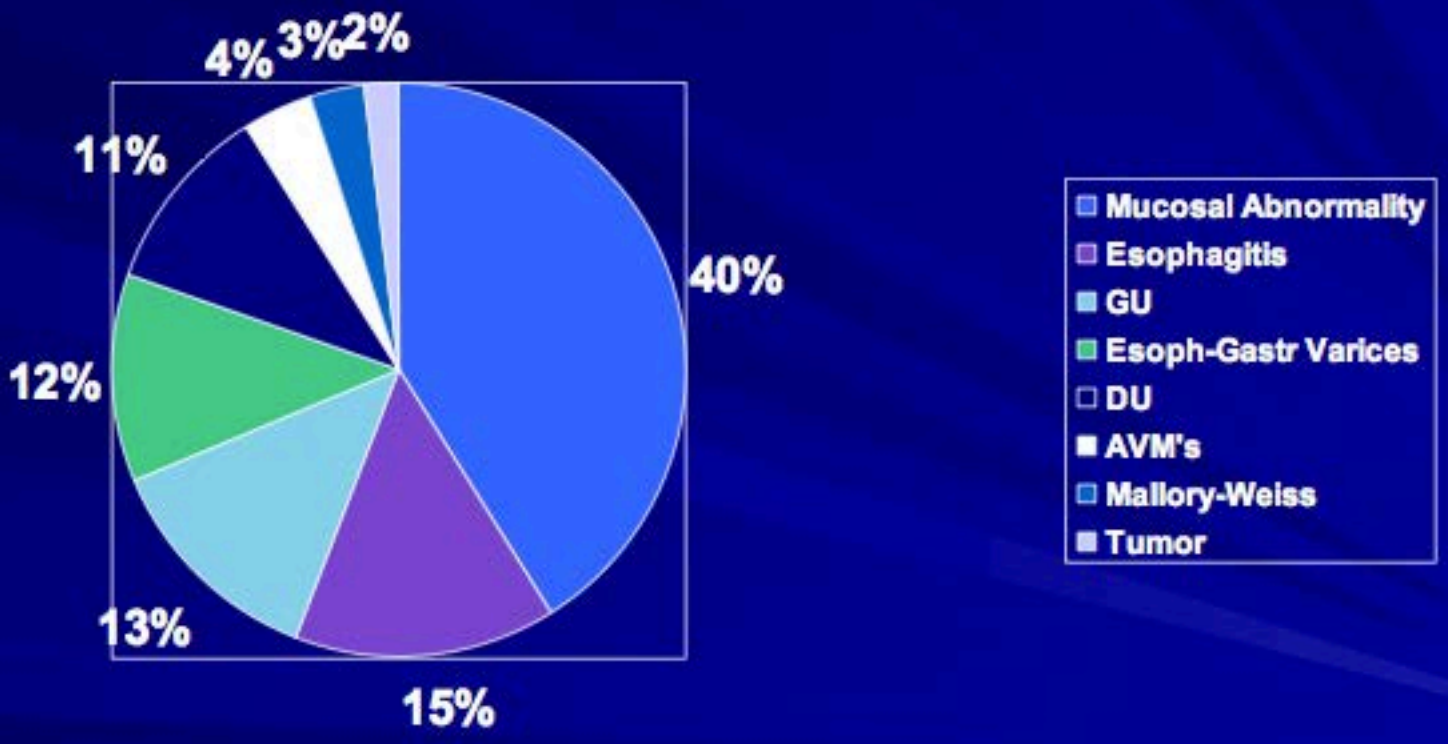
Endoscopy for Treatment

Endoscopy for Diagnosis

Varices and arterioles greater than 1mm bleed >300mls/hr

Causes of UGI Bleeding

Boonpongmanee S et al. Gastrointest Endosc 2004;59:788



**Variceal bleeding has higher incidence today and varies by region

Causes of Lower GI Bleeding

- 40% Diverticuli
- 30% vascular ectasias
- 10-20% colitis
- 15% neoplasia
- 10% anorectal lesions
- 11% upper GI bleed mistaken as lower
- 9% small bowel source (AVM, apthous ulcer)

Demographics: All GI Bleeding

- Upper source: 65-80%
- 350,000 U.S. hospital admissions year
- Cost burden average $8,000 per admission
- Gastric ulcer incidence has increased due to NSAID use and Helicobacter pylori infection
- Increased use of warfarin, aspirin, clopidogrel, and now Factor X2a inhibitors due to atherosclerotic disease (heart and strokes)
- 40% > 60 yrs old, more diverticuli and AVM's
- **Viral hepatitis and fatty liver/cirrhosis increasing**

Bleeding Gastroesophageal Varices

- Present in 50% cirrhotics (30% with compensated and 60% uncompensated cirrhosis
- Bleeding if Portal Pressure >12mmHg
- Mortality from variceal bleed = 20-30% /episode
- Size does matter
  - If small bleeding risk = 10% / yr
  - If large bleeding risk = 30% / yr
  - Re-bleeding rate of large varices 70% / 3mo

Morphologic Classification of Esophageal Varices

- Grade F0: no EV detected;
- Grade F1: small (</= 5 mm) straight EV;
- Grade F2: slightly enlarged tortuous EV occupying less than one-third of the esophageal lumen; and
- Grade F3: large coil-shaped EV that occupy more than one-third of the esophageal lumen

Recognizing the Cirrhotic Patient with GI Bleed

- Doppler ultrasound: low portal vein flow or hepatopedal flow, or high resistive index in hepatic artery
- History of alcoholism, tattoos, diabetes/metabolic syndrome
- Physical exam may be NORMAL
- **Look at labs: low albumin, plt <150K, prolonged pro-time

Upper GI Bleeding in the Cirrhotic Patient

- 70-80% will have bleeding varices as the source
- 20-30% will have ongoing bleeding/spurting vessel at endoscopy
- Re-bleeding rates are high if left untreated (30-70%), with most rebleeding within 2-3 days after the index bleed
- Mortality due to uncontrolled bleeding 4-8%, majority of deaths due to liver failure, renal failure or infections

Screening for Varices

- Endoscopy indicated for all known cirrhotics to determine treatment strategy (primary prevention)
- For small varices, b-blockade alone is sufficient, with surveillance intervals at 3 years unless clinical change
- For varices grade 2 or larger, EVL is preferred for prevention of first bleed. Consider addition of beta-blocker as well.
- Once EVL begun, continue at monthly intervals until eradicated, then survey at 3 months, then every 6 months for re-occurrence

Primary Prophylaxis for Esophageal Variceal Hemorrhage

- Annual rate of first hemorrhage: 12%
  - Mortality per episode 15-30%
- Recommended Therapies:
  - Prophylaxis with non-selective beta blocker (nadolol or propranolol or carvedilol) without nitrates, or
  - Endoscopic Variceal Ligation (EVL) reduces risk of first variceal hemorrhage.
  - Weight loss in obese patients
- Use of Beta-Blockers
  - Decreases 1st bleed rate (12 vs 23% with placebo) and death rate from bleeding; gives trend to improved survival.
  - NNT to prevent one bleed = 11
  - Reduces progression from small to large varices.
  - Titrate to resting pulse of 55-60 bpm, or
  - Titrate to HVPG < 12 mmHg or 20% drop (>/= 10% drop with IV propranolol)
  - Caution in refractory ascites and low MAP < 84 mmHg; Also in SBP?

Algorithm for Primary Prophylaxis (Baveno VI)

FINDING	RESPONSE
Diagnosis of Cirrhosis	EGD to R/O Varices
No Varices	-Compensated cirrhosis + no active injury: re-scope in 3 years -Compensated cirrhosis + active injury: re-scope in 2 years -Decompensated cirrhosis: re-scope in 1 year
F1 without red wale and Child-Pugh A	-Compensated cirrhosis + no active injury: re-scope in 2 years -Compensated cirrhosis + active injury: re-scope in 1 year -Decompensated cirrhosis: re-scope in 1 year
F1 **and** Red wale or Child-Pugh B or C	-Beta Blocker
F2 without Red wale and Child-Pugh A	-Beta Blocker
F2 **and** Red wale or Child-Pugh B or C	-Beta Blocker, or -EVL
F3	-Beta Blocker, or -EVL

No Need for EGD if liver stiffness < 20 kPa and with a platelet count > 150,000
(Baveno VI: Repeat both tests yearly)

Discontinuation of Beta Blockers as Secondary Prophylaxis

- Until randomized trials are available NSBB should be reduced/discontinued if a patient with refractory ascites develops any of the following events:
  - Systolic blood pressure <90 mmHg
  - Hypo-Natremia < 130
  - Acute Kidney Injury
- If there was a clear precipitant for these events (e.g. spontaneous bacterial peritonitis, hemorrhage), re-initiation of NSBB should be considered after these abnormal parameters return to baseline values after resolution of the precipitant
  - If reinitiating NSBBs, dose should be re-titrated, starting at the lowest dose
  - If the patient continues to be intolerant to NSBB and is an appropriate TIPS candidate, covered TIPS placement may be considered

Esophageal Variceal Rebleed: Very Early TIPS vs EVL+BB

Garcia-Pagan JC; N Engl J Med 2010; 362:2370-2379

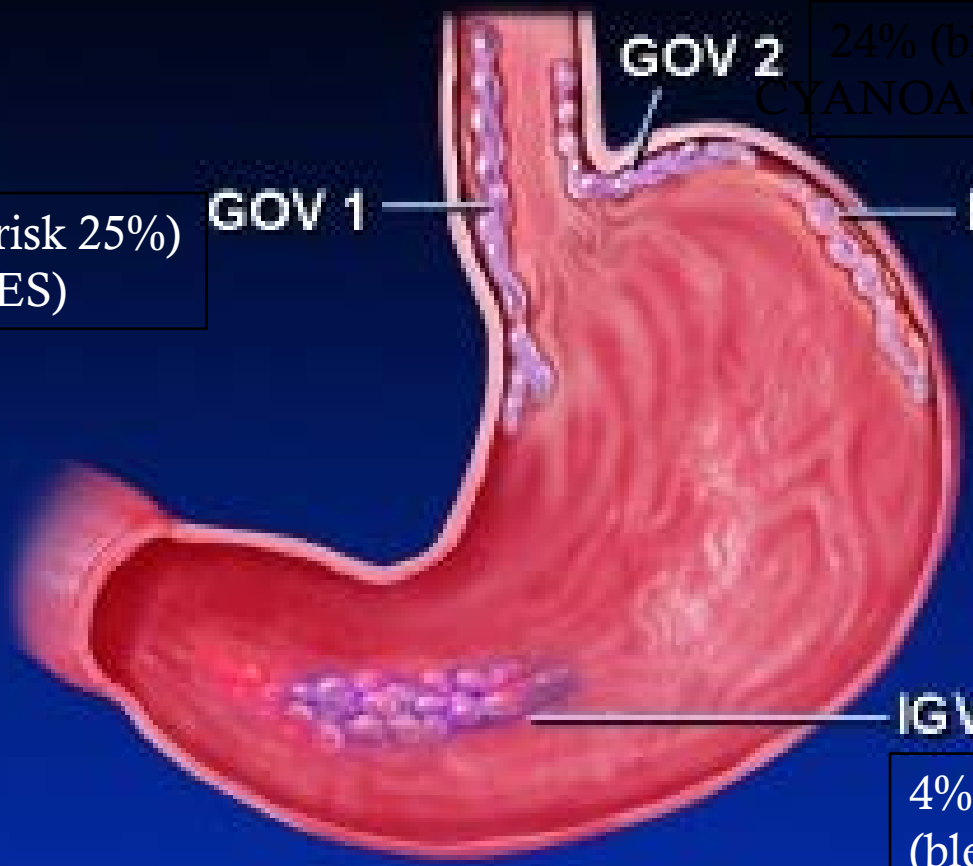
- Prospective, randomized study.
- Patients:
  - Cirrhotic Child B (score 7-9) with active bleeding, or C **(only scores 10-13, with score 14 and 15 excluded due to expected high TIPS mortality)** with/without active bleeding, who had esophageal variceal bleed, and no previous endoscopic therapy nor beta-blockers.
  - All patients received antibiotics, early banding (< 12h) and octreotide, somatostatin, or terlipressin
- Treatment arms:
  - a) TIPS within 24-72h with **Polytetrafluoroethylene (PTFE)-covered stent (N=32);**
  - b) EBL q 10-14d + B-blocker + PPI +/- ISMO (N=31)

Esophageal Variceal Rebleed Very Early TIPS vs EVL+BB

Garcia-Pagan JC; N Engl J Med 2010; 362:2370-2379

- Outcomes:
  - a) Failure to control bleed, or rebleed;
  - b) Mortality at 6 wks & 1 y
- Results:
  - a) Rebleeding-free at 1 y: **TIPS = 97%, EBL+BB = 50%;** NNT:2.1
  - b) Survival @ 6 weeks: **TIPS = 97%, EBL+BB = 67%**; NNT 3.3.
  - c) Survival @ 1 y: **TIPS = 86%, EBL+BB = 61%;** NNT:4
  - d) Actuarial risk of Hepatic Encephalopathy and ascites was not increased by TIPS (both risks were decreased by TIPS)
- **Conclusion: TIPS with PTFE covered stent is superior to EBL+BB in the treatment of first esophageal variceal bleed in:**
  - **Child B actively bleeding at time of EGD, and in**
  - **Child C with score 10-13 (scores 14 & 15 excluded) .**

Classification of Gastric Varices



24% (bleeding risk 60%)
CYANOACRYLATE +/- TIPS

70% (bleeding risk 25%)
EVL (or ES)

2%
(bleeding risk 90%)
SPLENECTOMY

4%
(bleeding risk 15%)
EVL or ES

Sarin et al, Am J Gastro 1989; 84:1244

Treatment of Acute Gastric Variceal Bleed

- Intravariceal Cyanoacrylate injection (**Hystoacryl**, Dermabond) q 3-4 weeks until obliteration:
  - hemostasis in 90%;
  - embolization 0.7%;
  - re-bleeding at 3 d, 3 month and 1 year: 6.9%, 10.6%, and 10.0%.
- TIPSS:
  - controls 90% of bleeds (goal HVPG pressure =/< 8 mmHg);
  - re-bleeding at 3 d, 3 month and 1 year: 9.5%, 20.7%, and 25% (Procaccini NJ et al. Gastrointestinal Endoscopy 2009;70:881-7)
- Vasoactive drugs + antibiotics (used but not studied).
- BRTO (Balloon-Occluded Retrograde Transvenous Obliteration)
- BRTO + TIPS: less ascites, hydrothorax, esophageal varices and re-bleeding.
- Balloon (Linton-Nacklas or modified Minnesota) as bridge to TIPS

Butyl-cyanoacrylate (Histoacryl) vs EVL in Gastric Variceal Bleed

Lo et al. Hepatology 2001;33:1060-4

- Study: prospective, controlled and randomized.
- Cyanoacrylate vs. Banding
- Cyanoacrylate:
  - Higher initial hemostasis.
  - Lower rebleeding rate.
  - Lower transfusion requirements.
  - Less treatment related bleeds.
  - Lower mortality.
- **CONCLUSION**: Cyanoacrylate is the treatment of choice for gastric variceal bleed (TIPSS in USA)

Balloon-Occluded Retrograde Transvenous Obliteration (BRTO)

- BRTO needs a Gastro-Renal Shunt (present in 85% of GV patients).
- Technique: instillation of sclerosant or foam into the GV via a balloon-occluding catheter placed through the GRS.
- Indication: GVB who have failed endoscopic therapy and are poor candidates for TIPS.
  - In Japan: prevention of initial bleed and secondary prophylaxis of GVB.
- Initial control of bleeding > 90%,
- Re-bleeding rates 0%-9%,
- Variceal eradication rates 75%-100%,
- Adverse effects: fever, ascites, pleural effusions, and development of Esophageal Varices in up to two-thirds of patients.
- Partial splenic embolization preceding BRTO reduces incidence of Esophageal Varices compared with BRTO alone (9% versus 45%) by reducing blood inflow into the portal vein.

Management of GI Bleeding

- **Resuscitate**
- **Resuscitate**
- **Resuscitate!!!!**

- Airway, Breathing
  - Intubation, oxygen
- Circulation
  - IV access two peripheral large bore or central line
  - Ringers lactate (preferred)
  - Type and Cross match for packed cell transfusion
  - Fresh frozen plasma (INR>1.5)
  - Platelets (<50K)

How Much Blood is Enough?

- Maximum tissue oxygen extraction estimates hemoglobin 7.0 is sufficient (Fick principle)
- Transfusion risk increases with each unit of blood
- Volume expansion increases the pressure in bleeding vessels (promotes ongoing blood loss or re-bleeding)
- Exceptions include patients with CHF (low cardiac reserve), coronary ischemia (higher demand) – transfuse to Hgb 10 or until symptoms abate.

Restrictive (Hb 7-8) vs Liberal (Hb 9-10) Transfusion in Acute Variceal Bleed

Colomo A, et al. AASLD Abstr 210, 2009

- Study:
  - Prospective, randomized, in cirrhosis with acute variceal bleed.
- Intervention:
  - **a) Restrictive:** transfuse to keep Hb 7-8 g/L.
  - **b) Liberal:** transfuse to keep Hb 9-10 g/L.
- Measurements:
  - hemodynamics within 48 h and 2-4 d later

- **RESULTS:**
- Therapeutic failure:
  - higher in liberal group.
- 42 d survival without bleeding:
  - worse in liberal group.
- Patients in liberal group had elevation in MAP, HVPG, SVR, and decrease in cardiac output.
- Patients in restrictive group did not have hemodynamic changes.

Pharmacotherapy for ANY Significant GI Bleeding

Octreotide 50mcg bolus then 50mcg/hour (decreases glucagon/opposes vasodilation)

- Superior to placebo in randomized controlled trials for all causes portal hypertension

  Reduced transfusion, re-bleeding, improved mortality
- Case series with improved outcomes for peptic and duodenal ulcer
- Case series with decreased transfusion need in diverticuli and AVM's

Pharmacotherapy for Upper GI Bleeding

- Proton pump inhibitor (PPI) for 3 days decreases re-bleeding in patients with ulcers requiring endoscopic intervention (6.7% vs. 22% placebo) also reduces need for surgery

  Optimal pH 7 for plt function/clot adherence

- In *H. pylori* (+) peptic ulcer, antibiotic eradication decreases ulcer recurrence:
  - DU from 67% to 6%
  - GU from 59% to 4%

Antibiotics for GI Bleeding

Ceftrixone 1gm/d or Norfloxacin 400mg BID for cirrhotic patients with GI bleeding:

- Decreased mortality by 25%
- Reduced infection risk by 60%
- Decreases re-bleeding rate by 56%
- Decreases transfusion needs (2.7 vs. 0.7 units)

Erythromycin 250mg IV 30 minutes before EGD

- Improves visualization and treatment of lesions

Endoscopy in Acute MI

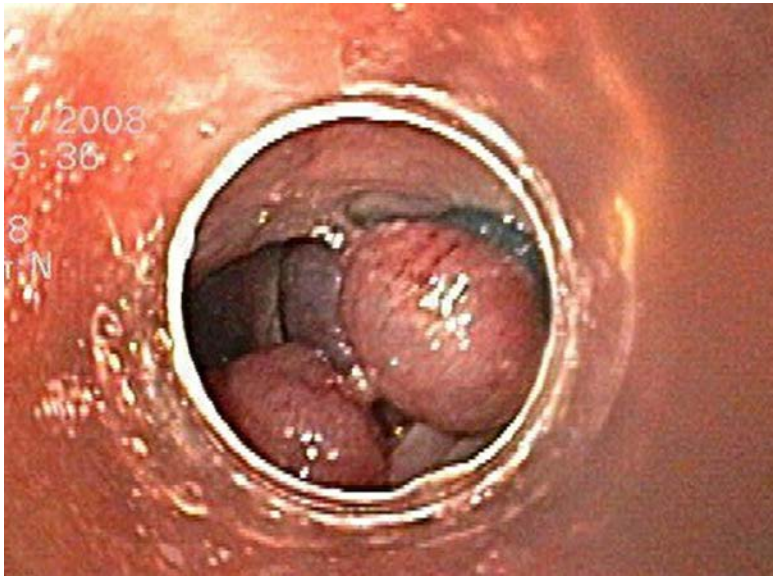
- Patients with GI bleeding leading to acute MI are more likely to require endoscopic or interventional therapy
- The benefit of urgent endoscopy before heart catheterization in patients with significant GI bleeding and acute MI reduced overall deaths from 600 to 97 per 10,000 patients
- Endoscopy is not beneficial in patients with acute MI and occult blood loss

Management of Clopidogrel and Warfarin in GI bleed

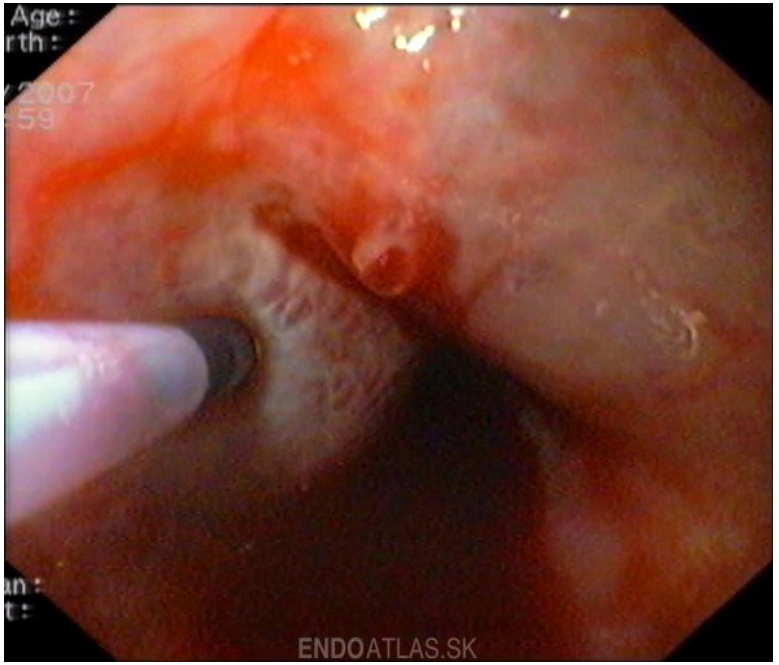
- Main goal is stop bleeding as soon as possible
- Evaluate
  - Risk of continuous/recurrent bleeding
  - Severity of hemorrhage
  - Risk of thrombosis/acute coronary event
- Consult Cardiology or Neurology
  - Lovanox or heparin may be indicated
  - Reversal of anticoagulation may be contraindicated

Endoscopy for Upper GI Bleeding

Band Ligation



Sclerotherapy



Technique

EVL

- Requires second intubation, view may be limited, washing required may lead to aspiration, bands may be knocked off
- Fewer side effects (smaller site ulcer, no embolization, less bacteremia, limited strictures
- Transient dysphagia

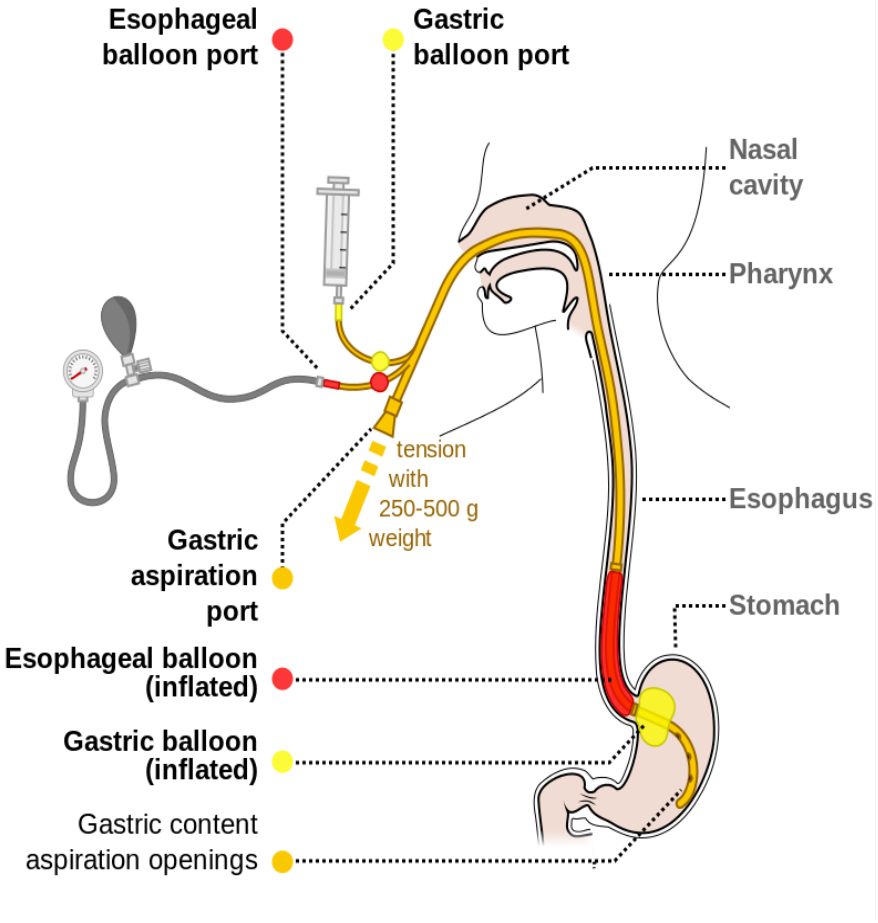
Sclerotherapy

- Ethananolamine oleate 5%, poicocanol 1-2%, soduium morrhuate 5%
- Does not require second intubation, rapid thrombus formation
- Problems: Esophageal ulcers, embolization, bacteremia in 35%, chest pain, dysphagia, strictures

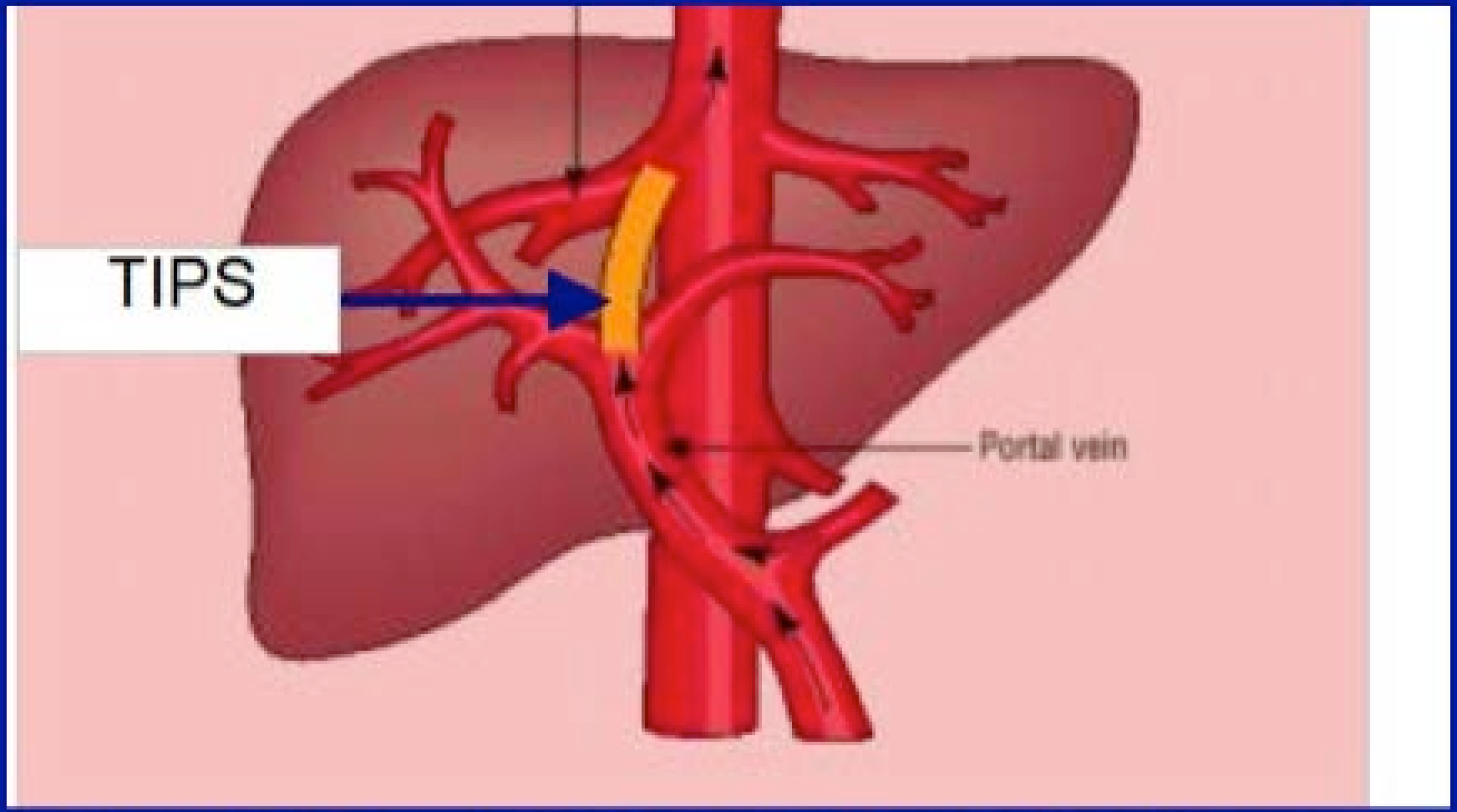
Resuscitation Pearls

- Lactated ringers preferred (more physiologic)
- Follow trauma care/massive transfusion guidelines
- Have a low threshold to intubate for hematemesis
- Use best window of opportunity to scope ASAP; waiting for bleeding to stop may never occur without active intervention
- Favor placing bands in esophageal variceal bleeding even if they appear flat at initial endoscopy OR re-scope within 72 hours for definitive therapy

What About Sengstacken Blakemore Tube Use?



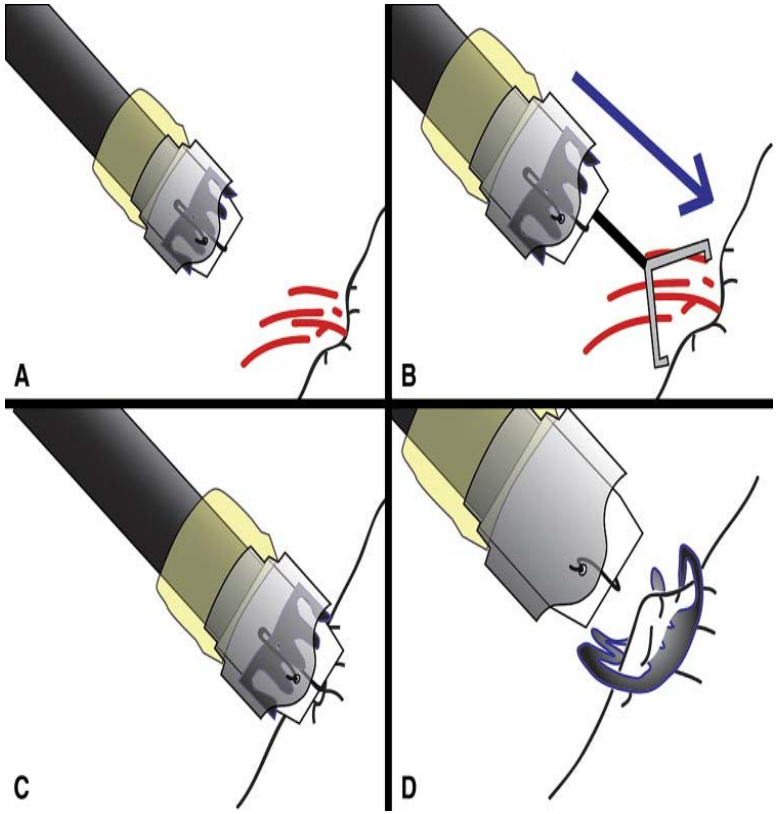
TIPPS as Salvage if Endoscopy Fails to Control Variceal Hemorrhage



Mortality with Emergency TIPPS Less Than Operative Shunt Surgery

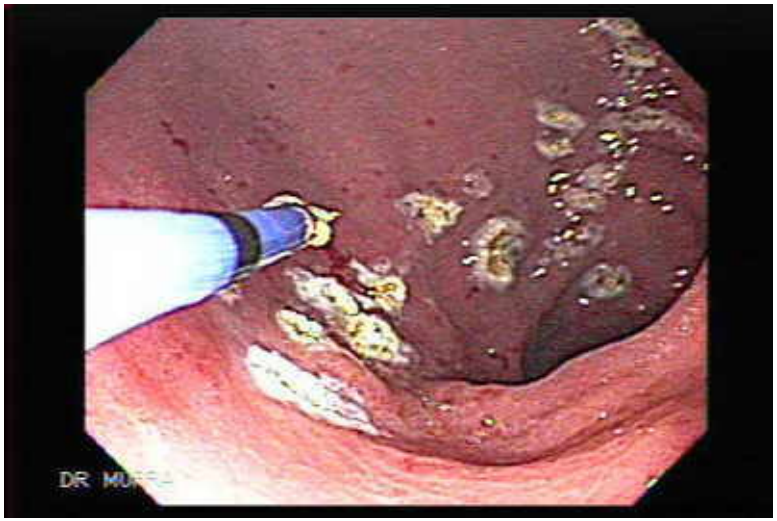
Emerging Technologies for Endoscopic Hemostasis

- Cyanoacrylate (glue) if available
- Hemostatic Sprays (hemospray) and Ankaferd Blood Stopper
- Mechanical Devices-Over the Scope Clip (OTSC)
- Self Expanding Metal Stents for Esophageal Variceal Bleeding, SX-Ella Danis stent
  - Removable, fully covered
  - Can be placed without endoscopy or fluoroscopy

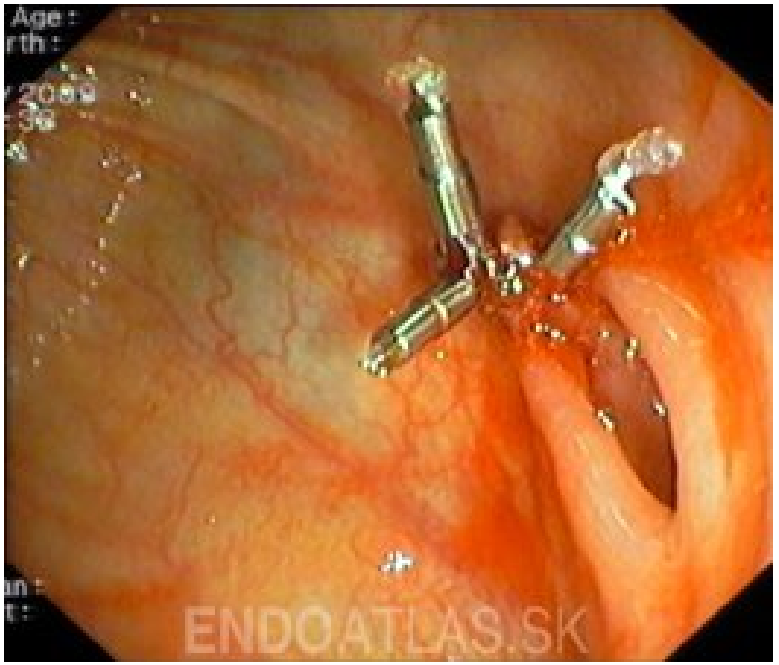


Endoscopy for Lower GI Bleeding

Argon plasma



Endoscopic clipping



Indications for Surgery or Therapeutic Mesenteric Angiography

- **Upper GI bleed with failed hemorrhage control by EGD or re-bleed with failed control by repeat EGD, (and octreotide)**
- **Lower GI bleed with ongoing hypotension despite transfusion and octreotide**
- **Any source with hemodynamic instability despite vigorous resuscitation and 3 units PRBC's or continuous bleed 3 units/day**

Over 95% cases do not require surgery or angiography

Therapeutic Endoscopy Improves Outcomes

Multiple Randomized controlled clinical trials

"endotherapy" = inject, band, clip, cauterize, show significantly improved outcomes than medical treatment alone

- **Reduced hospital length of stay**
- **Reduced need for transfusions or surgery**
- **Reduced rate of re-bleeding**
- **Reduced mortality (compared to non-intervention)**

GI Bleeding Outcomes Have Not Changed in Many Decades…..

Despite improved medical and surgical care, overall mortality remains unacceptably high:

- **6-10% non-variceal causes**
- **20-33% variceal hemorrhage**

Are the patients different? YES (older, anti-plt therapy, factor X2a inhibitors, etc.)


Timing is critical
R

Timing to Endoscopy and Outcomes in Upper Gastrointestinal Bleeding

Sarin, N. Can J Gastroenterol Vol 23 No 7, July 2009

- Retrospective chart review
- 502 pts, 375 non-variceal, 10% variceal
- Timing <6 hours (early) vs. 6-24 hrs vs. >24 hrs
  - No difference in length of stay
  - No difference in need for surgery
  - No difference in transfusion requirements
  - No difference in mortality

Patients were 3.6 x more likely to require surgery or die if endoscopy done within 6 hours compared to >24 hours

Conclusion: Time to endoscopy was not associated with better outcomes and most patients could be effectively managed within 24 hours

Admission Time is Associated with Outcome of Upper GI Bleeding

N.L. de Groot, et al, Aliment Pharmacol Ther 2012;36:477-484

- 9% mortality on weekends vs. 3% weekdays
- Patients admitted during the evening had a significantly longer time to endoscopy
- Multicenter Prospective cohort study, 571 patients, 8 hospitals
- Only independent predictor for poorest outcome was massive hematemesis and circulatory collapse

No difference in Quality of Care, Attributed findings to differences in patients!

Poor outcomes Associated with Massive Ongoing Blood Loss

Case One - Hematemesis

- 43 year old painter with sudden nausea and bright red blood **hematemesis** is brought by car to your emergency department. He admits to drinking a *six pack of beer daily*. He takes no medications.
- He looks pale, **SBP is 100, pulse is 105,** abdomen is soft with hyperactive bowel sounds. He has a few *spider angiomata* on his chest
- He asks for a bed pan and passes a large amount of **maroon stool**, then he passes out.

How do you manage this case?

Hematemesis and Maroon Stool
Big Vessel, Upper Source

Management

- Intubate to protect airway, carefully sedate
- Two large bore IV's or central line
- Packed cell transfusion (2-4U), goal Hgb 7
- IV Octreotide 50mcg/hr
- IV continuous PPI
- IV Erythromycin 250mg over 30 minutes
- IV Ceftriaxone or Fluoroquinolone

Emergency Endoscopy Now!

Case Two – Rectal Bleeding

- 68 yr old frail female brought by ambulance from the nursing home after falling while ambulating to the bathroom. Medicines include aspirin, clopidogrel (post stroke) and ibuprofen for arthritis. She has chronic atrial fibrillation.
- She is pale, mildly confused, and tachypneic , with SPB 105 heart rate 98 and irregular. Her abdominal exam reveals tenderness in the left low quadrant without rebound, a rectal exam reveals brown stool and reddish mucousy secretions
- Hemoglobin is 6.4 with MCV 70. Creatinine is 2.4

Iron Deficiency Anemia (low MCV)
Small Vessels/Mucosal Lesions

- **Clinical Concern:**
  - She has **symptomatic anemia** (syncope, exertional fatigue)
  - She has ischemic colitis
  - Be concerned about demand cardiac ischemia
- **Management:**
  - Admit to monitored bed, consult cardiology
  - STOP ibuprofen, continue aspirin and clopidogrel
  - **DELAY ENDOSCOPY UNTIL SHE IS TRANSFUSED AND STABLE HEMODYNAMICALLY**

Endoscopy for GI Bleeding Summary

- Early EGD is the best predictor for hospitalization, ICU admission, diagnosis, prognosis, and treatment
- Colonoscopy main use to diagnose lower GI bleeding cause, although newer techniques can be therapeutic
- Angiography, TIPSS or emergent surgery are needed <5% of time
- For cirrhotics, urgent endoscopy post initial resuscitation is best advised as up to 30% will require intervention to stop the bleeding. Waiting in these cases will result in further end organ damage.
- The optimal timing for emergent EGD has not been adequately determined; for massive bleeding earlier intervention should confer better outcome, in all others endoscopy within 24 hours is sufficient.

POST-TEST

- **Octreotide is useful for both upper and GI bleeding sources-TRUE**
- **Antibiotics for bleeding varices has resulted in improved outcomes more than anything else-TRUE**
- **Endoscopy is contraindicated during acute myocardial infarction-FALSE**
- **Coagulopathy must be corrected prior to EGD or colonoscopy-FALSE**
- **REFER patients with portal hypertension/cirrhosis for SCREENING ENDOSCOPY as PRIMARY PREVENTION**