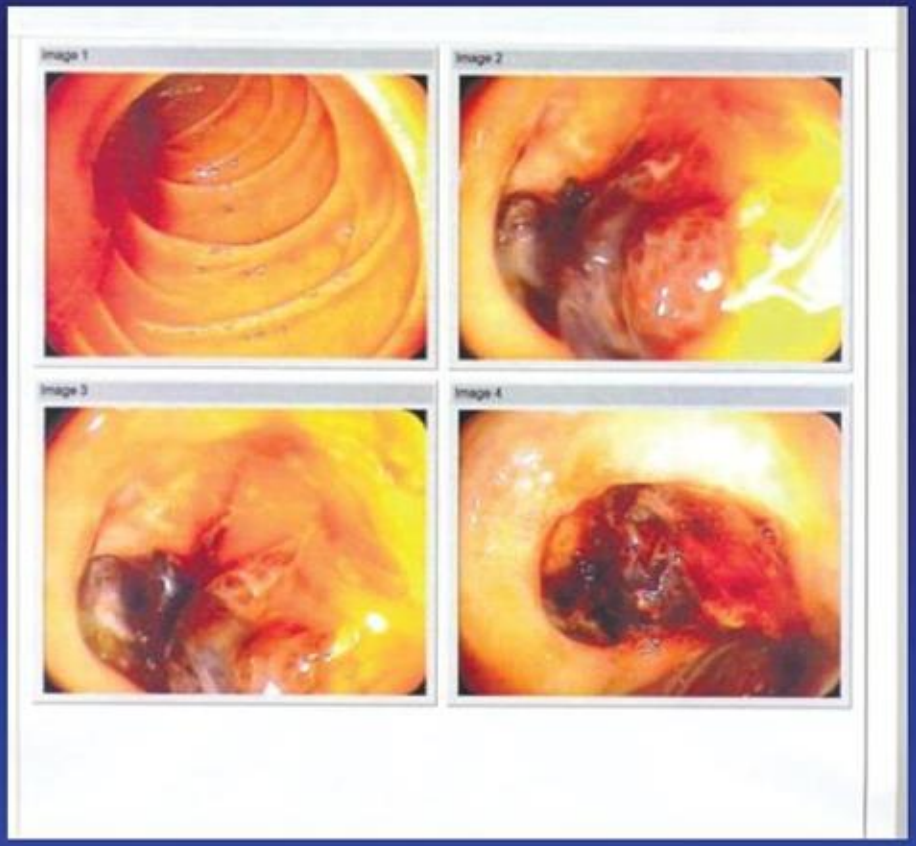
Non-Variceal
Upper Gastro-Intestinal Bleeding

Acute Upper GI Bleeding: A Lethal Disease

Outcomes include

- DEATH
- CARDIAC ARREST
- MI
- CVA
- INJURY (e.g. Fx, head)
- SEIZURES
- SURGERY or ANGIOGRAPHY
- RISK FOR FUTURE BLEEDING

ASA-associated DU eroding into GD artery

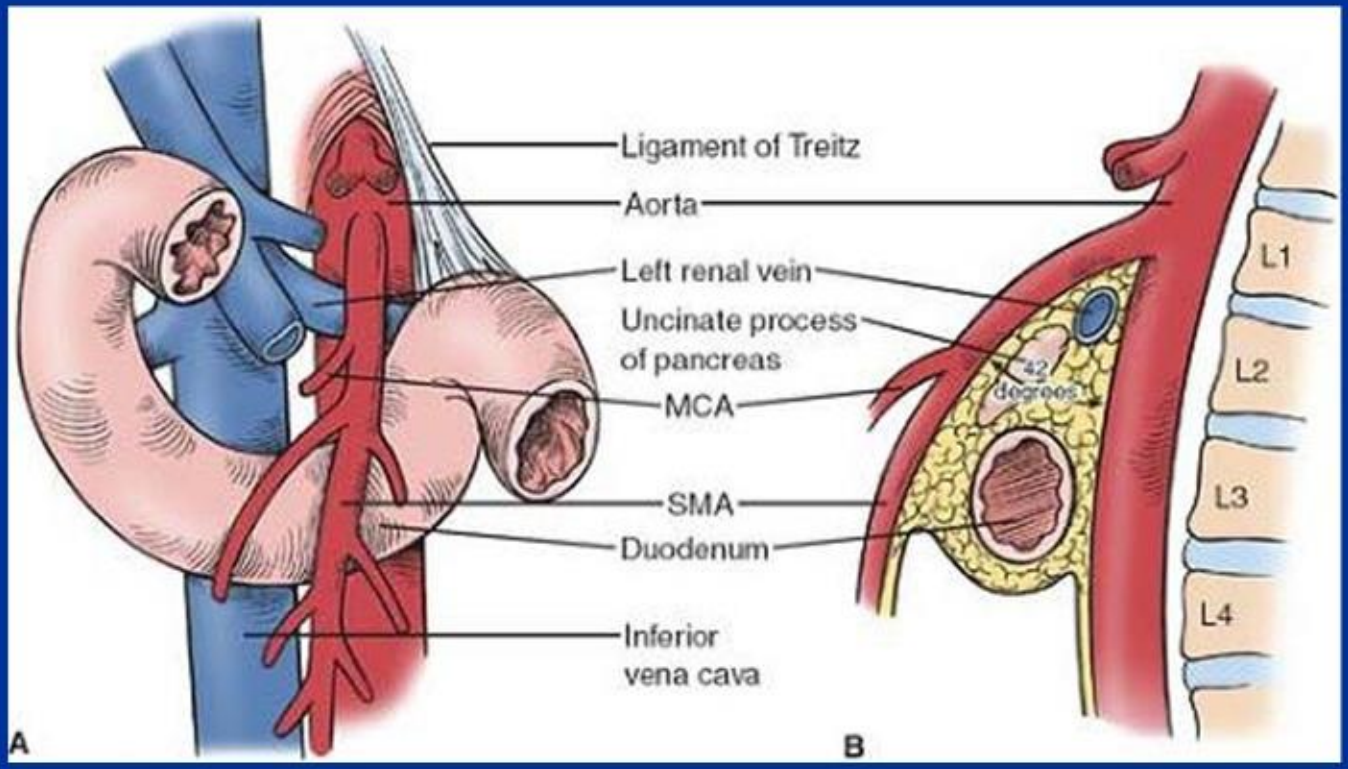


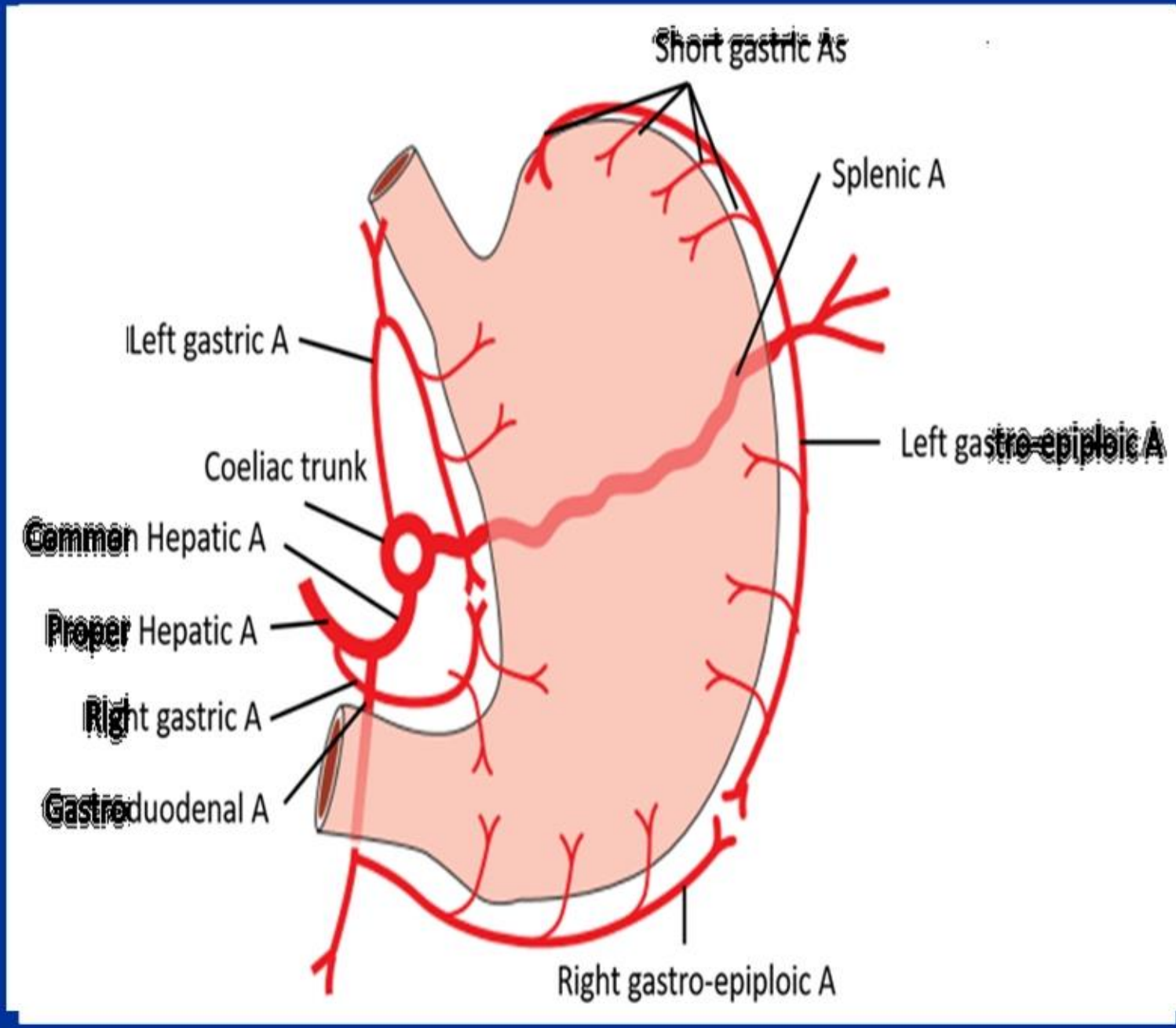
(Upper GI Bleeding) UGIB

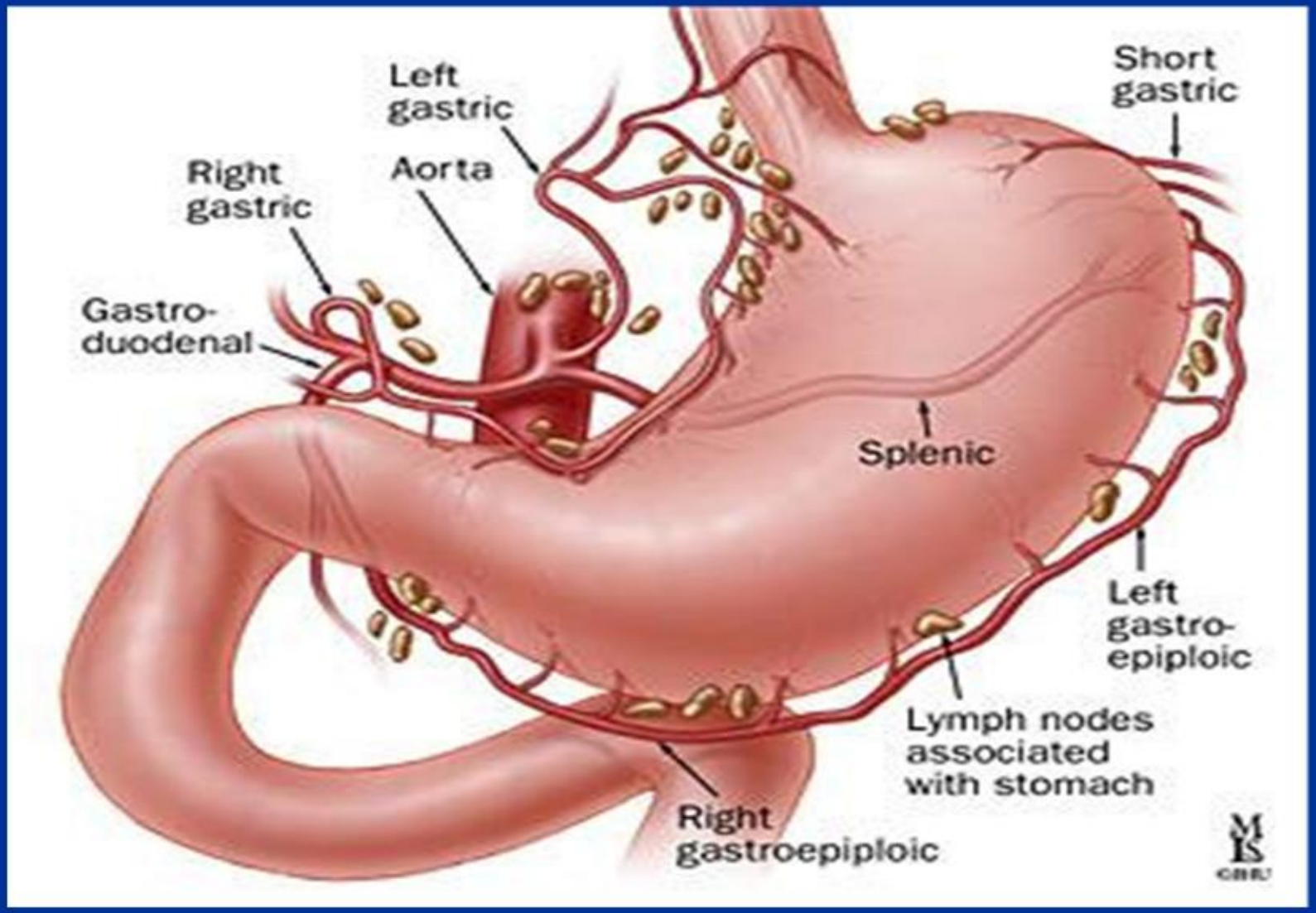
Is bleeding proximal to:

“Ampulla of Vater or (precisely) Ligament of Treitz”

(50% of all GI Bleeding)


Ligament of Treitz
Aorta
Left renal vein
Uncinate process of pancreas
MCA
SMA
Duodenum
Inferior vena cava
42 degrees
L1
L2
L3
L4
A
B


Short gastric As
Splenic A
Left gastric A
Left gastro-epiploic A
Coeliac trunk
Common Hepatic A
Proper Hepatic A
Right gastric A
Gastroduodenal A
Right gastro-epiploic A


Left gastric
Short gastric
Right gastric
Aorta
Gastro-duodenal
Splenic
Left gastro-epiploic
Lymph nodes associated with stomach
Right gastroepiploic

UPPER GI BLEEDING

Signs and Symptoms

- Hematemesis
- Melena
- Dizziness
- Abd. Pain and symptoms of Peptic ulcer disease
- Hx of NSAID's use
- Pallor
- Hypotension
- Orthostasis
- Jaundice and other stigmatas of chronic liver diseases

HCO_3 & Mucus

(1) The mucosal barrier is a thick, alkaline, unstirred, aqueous layer of dissolved **bicarbonate** & **mucus**, which neutralizes the effects of gastric juice H+.

(2) (Gastric surface mucus cells) & (duodenal enterocytes & goblet cells) with a **lipid bilayer membranes** forming a barrier to H+ & **tight junctions** between cells

Blood Flow

Sub-mucosal blood flow drains H+ away from the mucosa & buffers H+ w/plasma HCO_3 & proteins.

pH gradient changes from the gastric lumen pH of 2.0, the mucosal cell surface of pH 7.0, the mucosal cell interior pH of 7.0, and the circulating blood pH of 7.4.

Blood Flow

If HCO3 secretion ↓: when proteolysis of mucus is ↑ (as in **inflammation**), or when mucosal blood flow is ↓ (as with using **NSAIDs**), intracellular acidosis occurs, leading to cell necrosis.

PGs

Prostaglandins protect gastro-duodenal mucosa by **secretion of mucus**, (**PG-E2**) **bicarbonate secretion** & **maintenance of blood flow** during periods of potential injury. Mucosal peptides and growth factors, including trefoil-family peptides and transforming growth factor alpha, also participate to ensure normal epithelial function by regulating responses to injury.

PGs

NSAIDs, which block the synthesis of prostaglandins, predispose to mucosal injury and peptic ulceration.

H. Pylori

Pan-Gastritis (Body + Corpus)
"Early life infection"

- Multifocal/Pan-gastric gastritis →

  Antral & Corpus Atrophy (**parietal cell loss**) + intestinal metaplasia →

  ↓HCL outputs → ↑risk for **GU** & **Adeno-Ca**

- Depletion of antral somatostatin effect→ ↑gastrin levels.

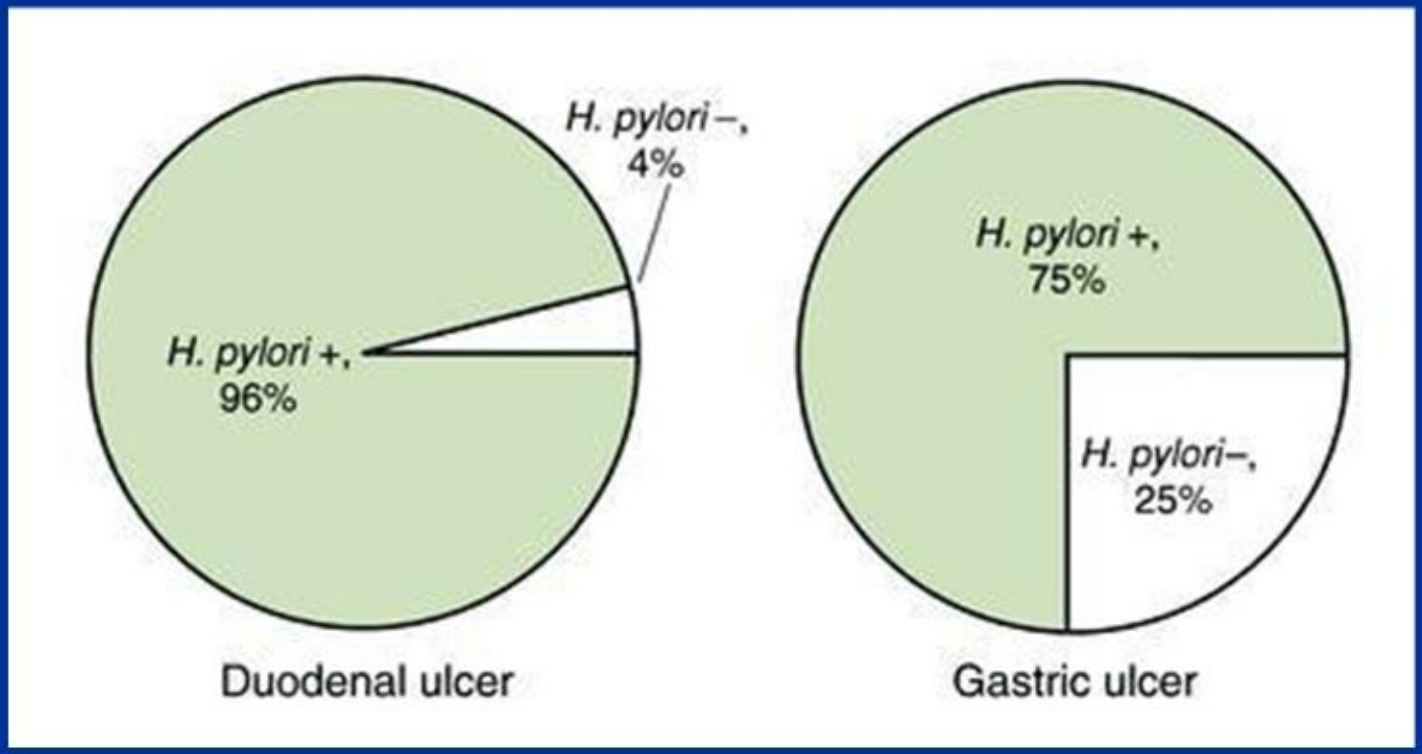
Antral Gastritis Only (↑ %)
"Late life infection"

- Antral-predominant active chronic gastritis → Antral Atrophy & ↓ **antral D cells** → (Corpus-sparing) → **↑HCL output** → ↑risk for **DU** + duodenal gastric metaplasia → HP colonize duodenum

- Depletion of antral somatostatin effect→ ↑gastrin levels.

UPPER GI BLEEDING

Peptic Ulcer Disease



UGIB Bleeding forms

Melena: occurs w/≥100mL blood is instilled into UGI tract

Hematochezia: occurs w/≥1,000mL blood is instilled into UGI tract

(Hematochezia is a sign of severe bleeding (if associated w/red NGT aspirate (mortality ↑to ≈30%))

Bleeding & Laboratory Values

One PRBC unit will raise the hematocrit of a standard adult patient by 3%

One PRBC unit has a standard vol. of 300 **mL**

One PRBC unit is expected to ↑Hb by 1g/dL

Bleeding & Laboratory Values

Significant Hb drop 2ry to a bleeding:

Hb ↓≥ 2g from baseline

Hct ↓≥ 6% from baseline

Don't use **Hb/Hematocrit to evaluate or monitor acute bleeding (Pt bleeds whole blood; hematocrit may not ↓immediately w/acute bleeding.**

Extravascular fluid will enter the vascular space → restore vol. for up to 72 hrs → subsequent ↓in hematocrit for few days after bleeding has stopped)

Hemodynamics

Orthostais is the most accurate non-invasive indicator of severity of Blood loss ≈20%

Orhtostasis = ↓Sys BP >20

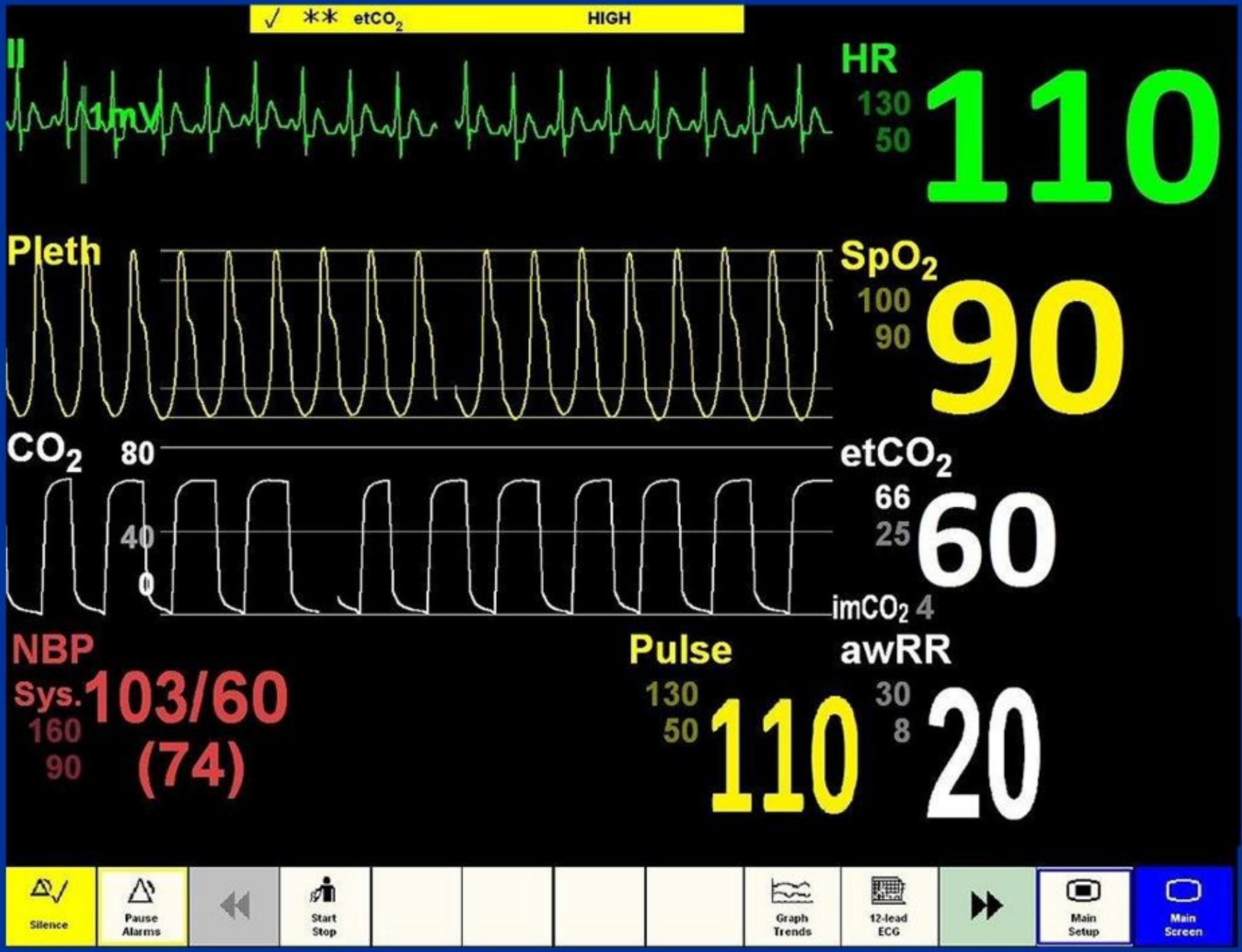
or

↓ Dias BP >10

or

↑HR >20

w/in 3 minutes of standing


✓ ** etCO2 HIGH
II
1mV
HR
130
50
110
Pleth
SpO2
100
90
90
CO2
80
40
0
etCO2
66
25
60
imCO2 4
NBP
Sys.
160
90
103/60
(74)
Pulse
130
50
110
awRR
30
8
20
Silence
Pause Alarms
Start Stop
Graph Trends
12-lead ECG
Main Setup
Main Screen

Tachycardia

Bleeding Peptic Ulcer

- 250,000-300,000 admissions / year
- $2.5 Billion in costs
- Re-bleeding rate after hemostasis about 20%
- Mortality remains 5 – 14%

General Approach to the patient with Acute Upper GI Bleeding

- Guiding Principles
  - Restoration or maintenance of hemodynamic stability
  - Blood products if needed
  - Nasogastric lavage
  - Endoscopy with hemostasis if indicated
  - Antisecretory medications
  - Surgery if necessary

1) Hemodynamic Stabilization:

- Adequate IV access
- Volume resuscitation

2) NPO

3) NGT Lavage

(NO proven Benefit)

(15% False)

4) Transfuse PRBCs if: Hb ≤ 7g/dL

(Hct: <21%)

(Hb ≤ 9-10g/dL

(Hct: <30%) in CAD)

or

Shock

5) co-morbidities assessment:

- **Stabilization of other active co-morbidities before EGD**

(Rarely, massive bleeding cannot be stabilized adequately before EGD).

- **Intubation for airway protection should be considered w/ [(ongoing hematemesis) or (active bleeding w/↓ CNS or loss of the gag reflex)].**

6) Risk assessment

(see below)

7) ± Prokinetics prior to EGD

(Erythromycine: 250mg IV (3mg/kg)

30-60min before EGD

8) Urgent (Only when Stable)

EGD w/in 24hrs (↓ transfusion need, emergent Sx, rebleeding & Hospital stay)

(no change in mortality or ↓in the need for Sx if EGD done w/in 6hrs) specially if: Ca, cirrhosis, hematemesis, shock, Hb<8g/dL.

9) ± Initiate IV PPI infusion

(Bolus 80mg → 8mg/h) (to maintain)

↓ need for EGD ttt

(no change in: Re-Bleeding, need to transfuse, need for Sx, or Mortality)

↓high risk stigmata & need for EGD ttt

- PPI → pH>6 →

Prevent clot lysis (pH>5) & ↑Plts aggregation (pH>6)

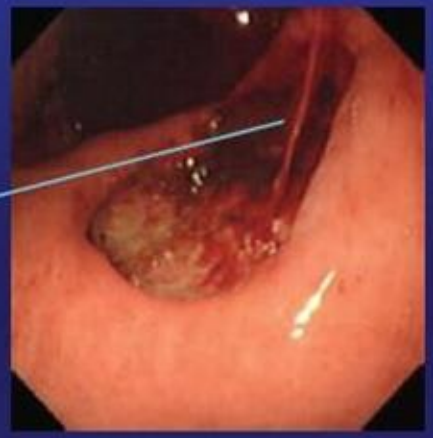
- pH >4: prevent Stress Ulcers).

Causes of Acute Upper GI Bleeding

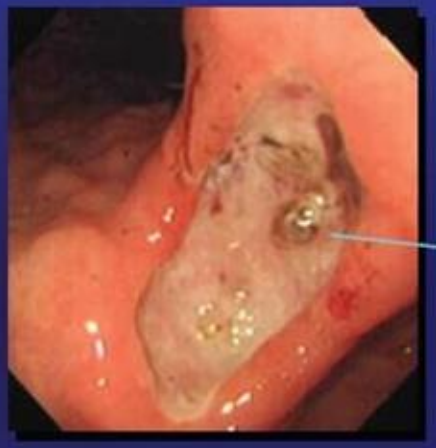
Cause	Frequency (%)
Peptic Ulcer	40
Esophagitis	10
Erosive disease	6
Other	6
Mallory-Weiss	5
Varices	5
Neoplasm	4
No cause identified	24

Adapted from Dallal HJ, Palmer KR. *BMJ*. 2001;323:1115.

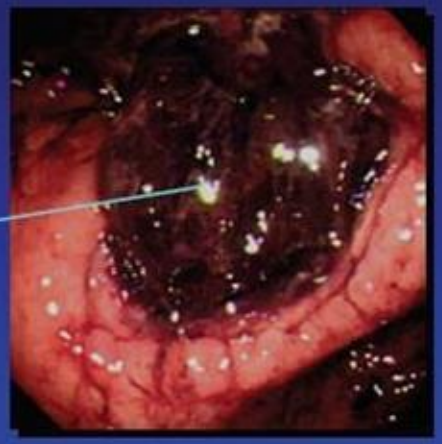
Gastric ulcers presenting with acute upper GI bleeding



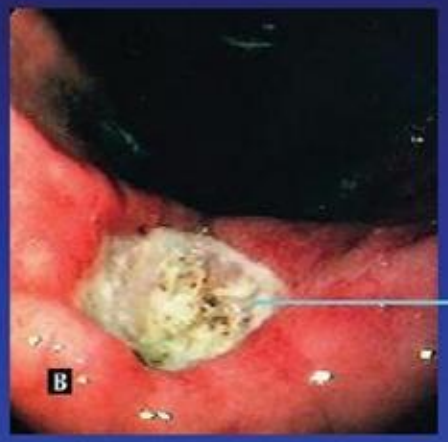
spurt



Visible vessel



adherent clot

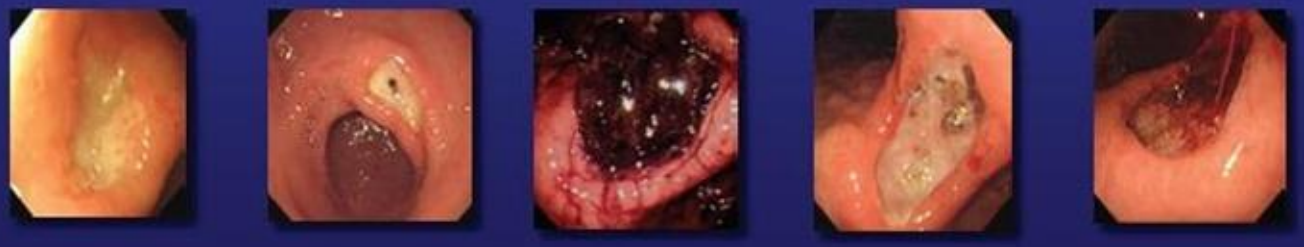


Spots
Dots

Forrest Classification

Stigmata of hemorrhage	Forrest classification
Active spurting bleeding	IA
Active oozing bleeding	IB
Non-bleeding visible vessel	IIA
Adherent clot	IIB
Flat pigmented spot	IIC
Clean base	III

GI Bleed: Risk of Rebleeding

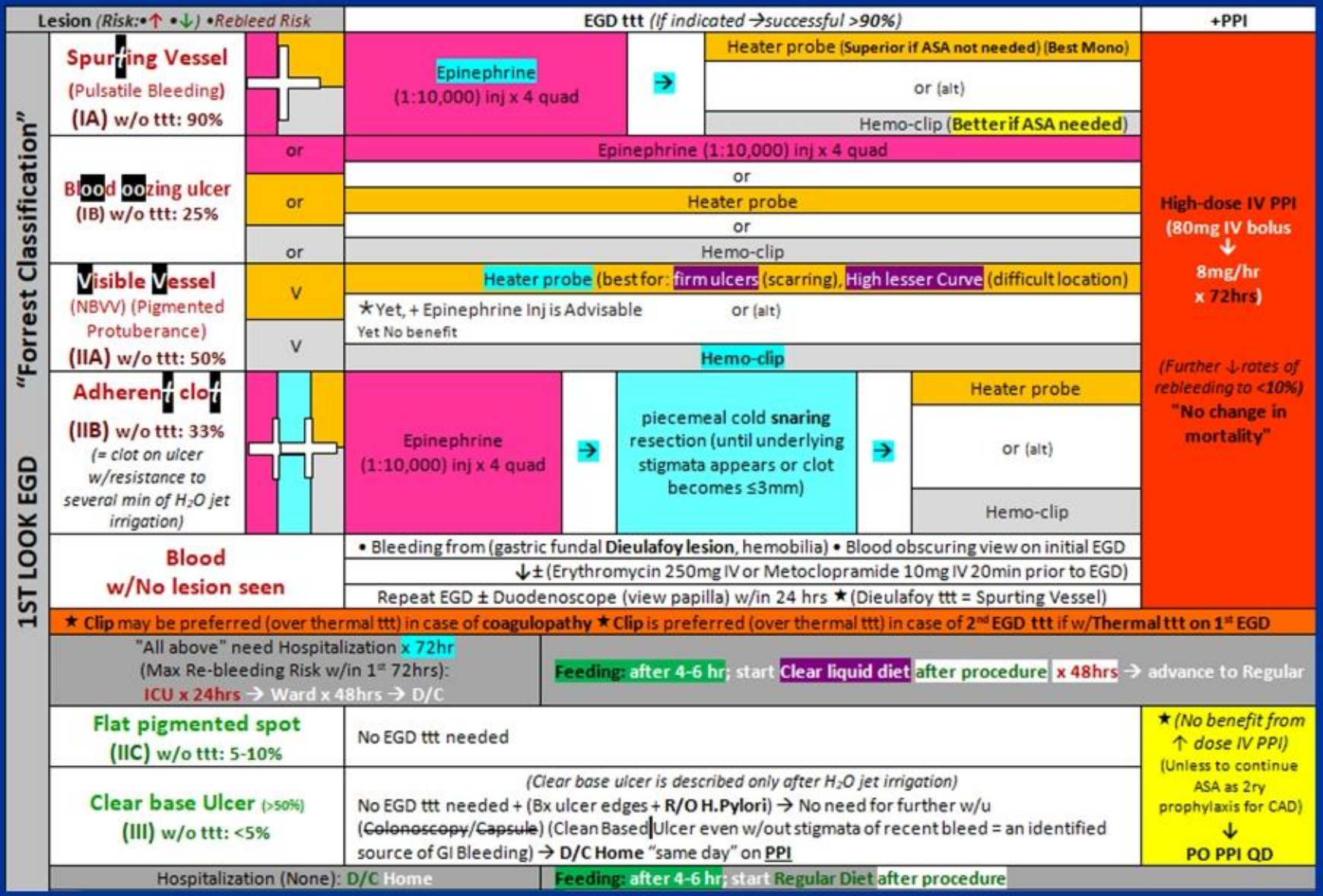


	Clean Base	Flat Spot	Adherent Clot	NBVV*	Active Bleed
Prevalence (%)	42	20	17	17	18
Rebleeding risk (%)	5	10	22 †	43 †	55†
Mortality (%)	2	3	7	7	11

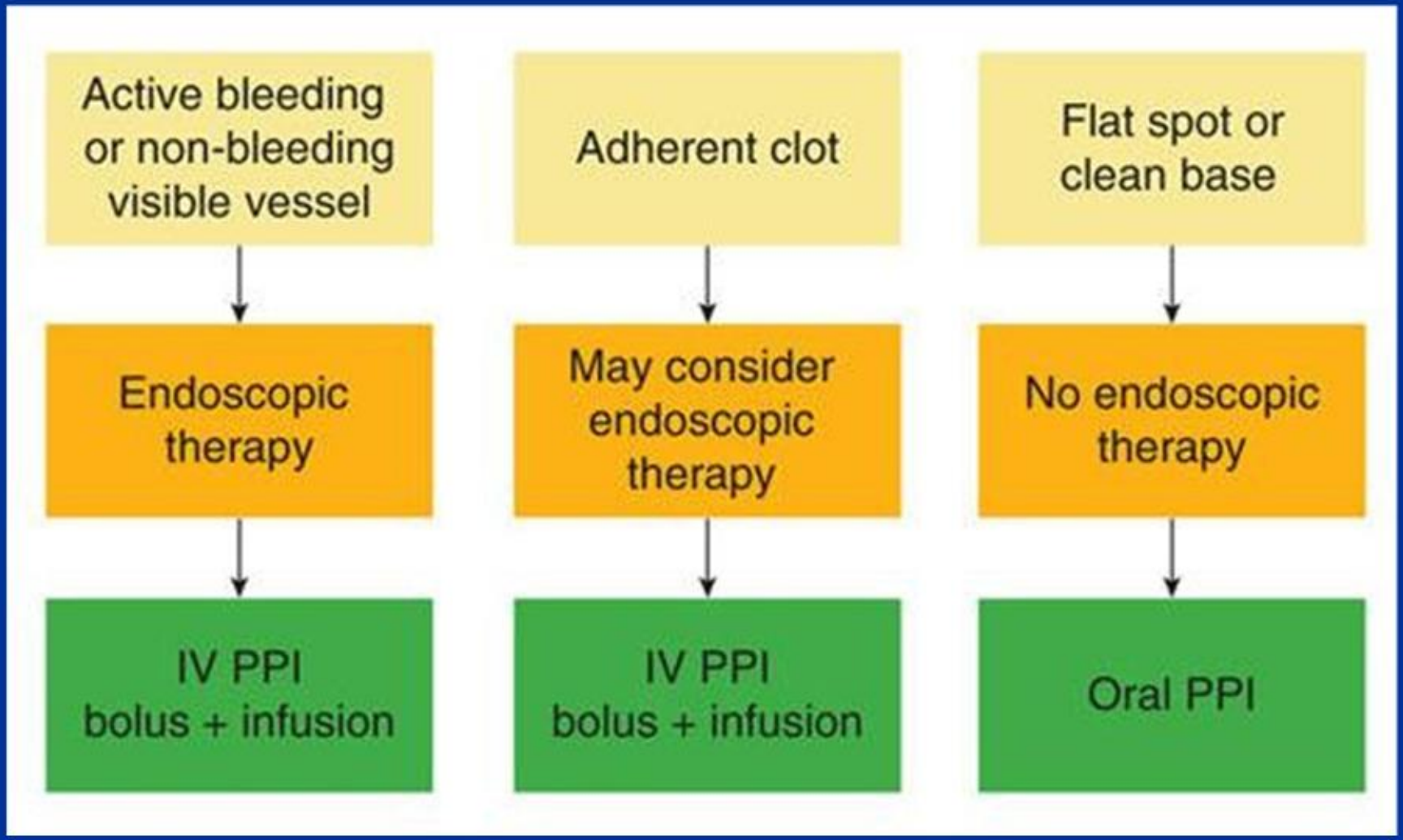
*Nonbleeding visible vessel. † Endoscopic therapy recommended.

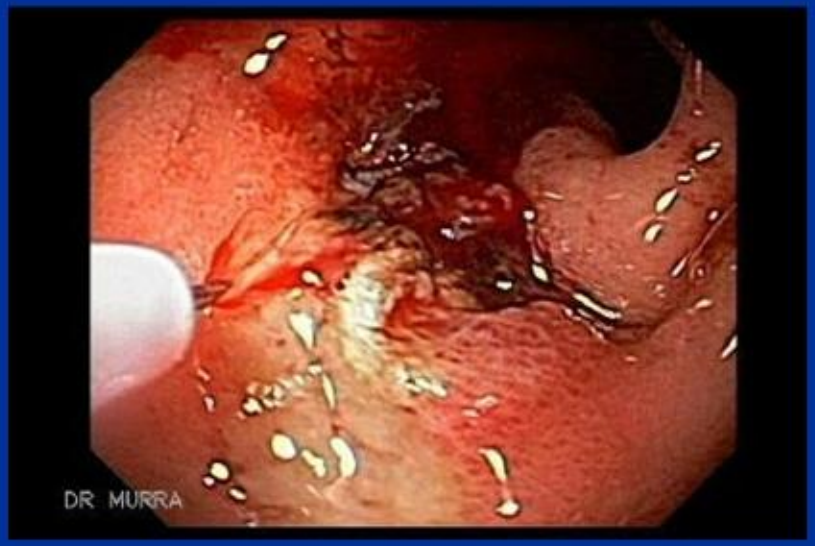
Adapted from Laine L, Peterson WL. *N Engl J Med*. 1994;331:717–727.

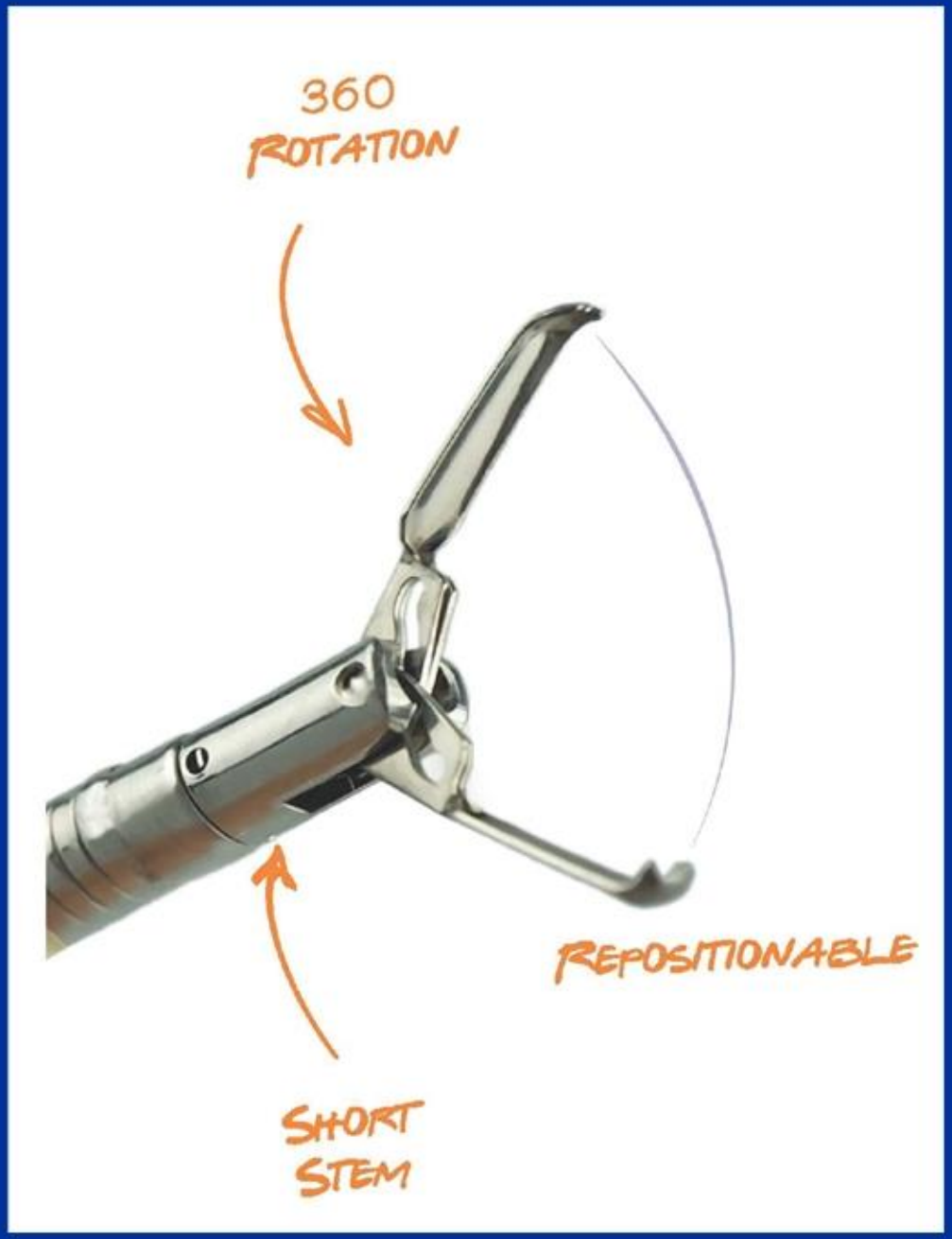
Endoscopic Therapy

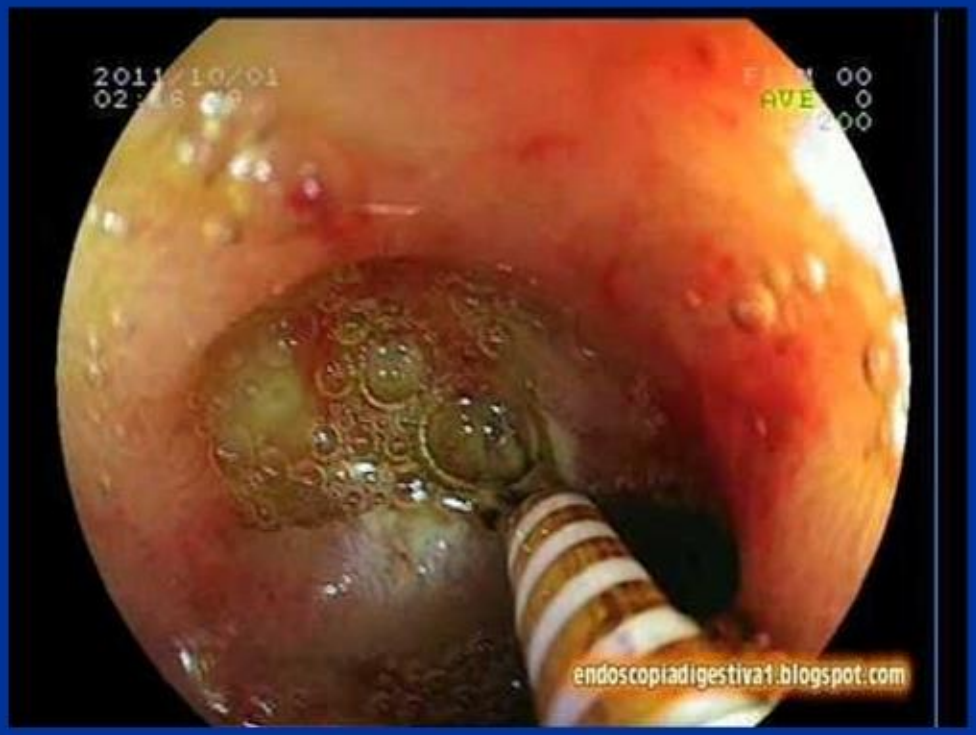


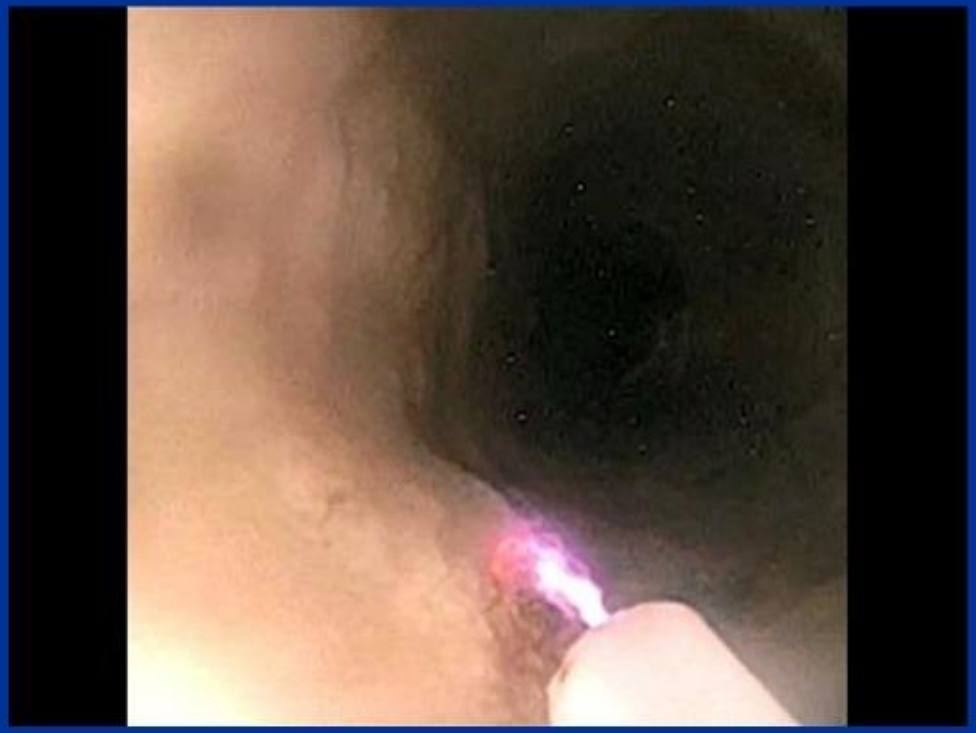
Management


Active bleeding or non-bleeding visible vessel
Endoscopic therapy
IV PPI bolus + infusion
Adherent clot
May consider endoscopic therapy
IV PPI bolus + infusion
Flat spot or clean base
No endoscopic therapy
Oral PPI

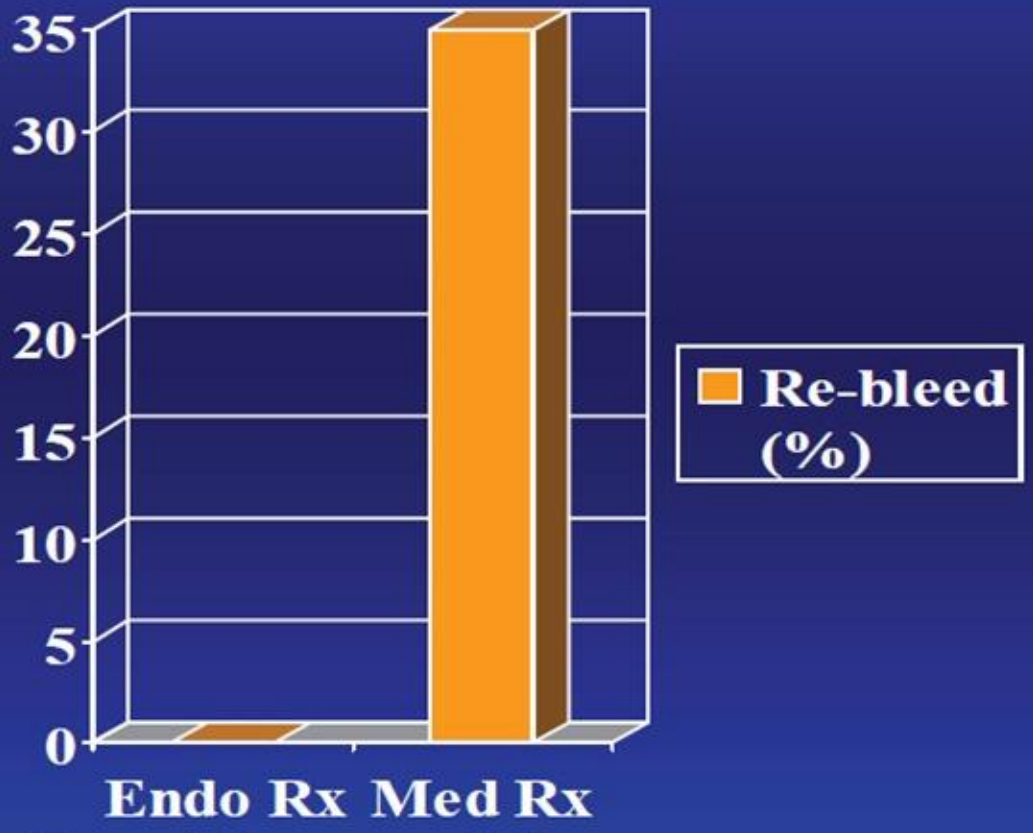

DR MURRA


360
ROTATION
REPOSITIONABLE
SHORT
STEM


endoscopiadigestiva1.blogspot.com



Management of the Adherent Clot Leans Towards Intervention



p= 0.011

Both groups received ORAL PPI therapy

Endo Rx = Cold snare plus dual modality intervention

Adapted from Jensen. Gastroenterol 2002:123:407

Endoscopic hemostasis: Efficacy in nonvariceal UGI bleeding

- 30 RCTs reviewed
- Almost all patients had bleeding ulcers
- Thermal, laser and injection therapy all decreased
  - re-bleeding (OR 0.38)
  - surgery (OR 0.36)
  - mortality (OR 0.55)

  in patients with active bleeding or visible vessels but not those with flat spots or adherent clot.

Cook et al.Gastroenterology 1992;102:139

Endoscopic Hemostasis: Technique in bleeding ulcers

- Epinephrine less effective than thermal methods or hemoclip in RCTs
  - latter may be safer
- Epinephrine + thermal methods or hemoclip
  - superior to epinephrine alone
  - not superior to thermal or hemoclip alone
- Repeat endoscopy for recurrent bleeding following hemostasis reduces the need for surgery without increasing complications

Marmo et al, Am J Gastroenterol 2007; 102: 279

H_2-receptor antagonists in upper GI bleeding

- Widely used with little / no supporting evidence
- No evidence for any useful effect in NVUGIB
- No reduction in mortality or re-bleeding in patients with bleeding DU
- Possible small improvements in outcomes in patients with bleeding GU

Collins and Langman, New Engl J Med 1985; 313: 660
Levine et al, Aliment Pharmacol Ther 2002; 16: 1137

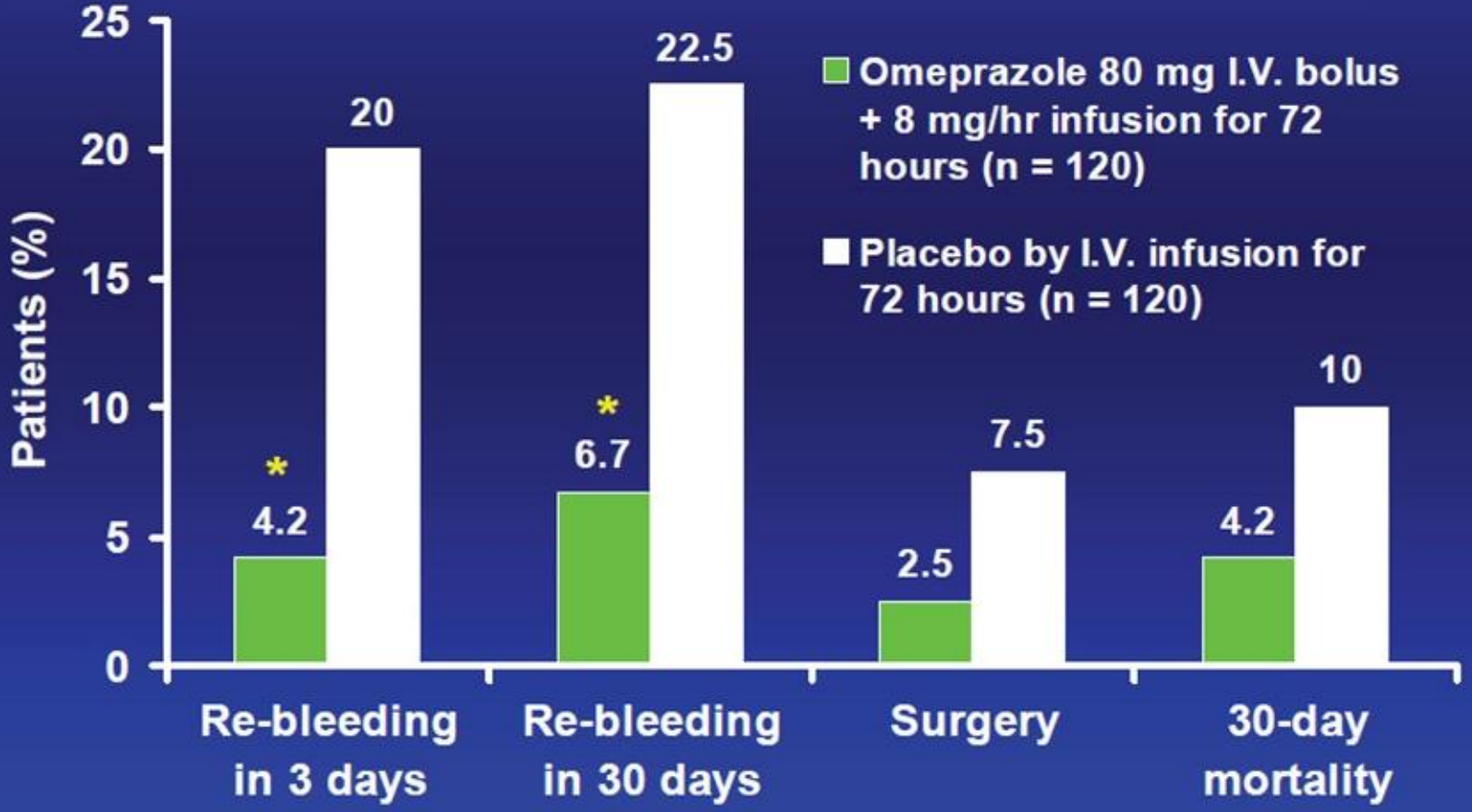
Somatostatin / Octreotide for Non-Variceal UGI Bleeding

- **Significant decrease in bleeding by 47%**
  - **More effective in ulcer bleeding (52%) than in non-ulcer non-variceal bleeding (38%)**
- **No significant reduction in need for emergency surgery**
- **Rarely used because of availability of PPIs and high cost**
- **May be an option when cause of bleeding is not clear (variceal *vs.* non-variceal) prior to diagnostic / therapeutic endoscopy**

Javid G, et al. *Am J Med*. 2001;111:280

Randomized Placebo-Controlled Comparison of IV PPI in Bleeding Peptic Ulcer

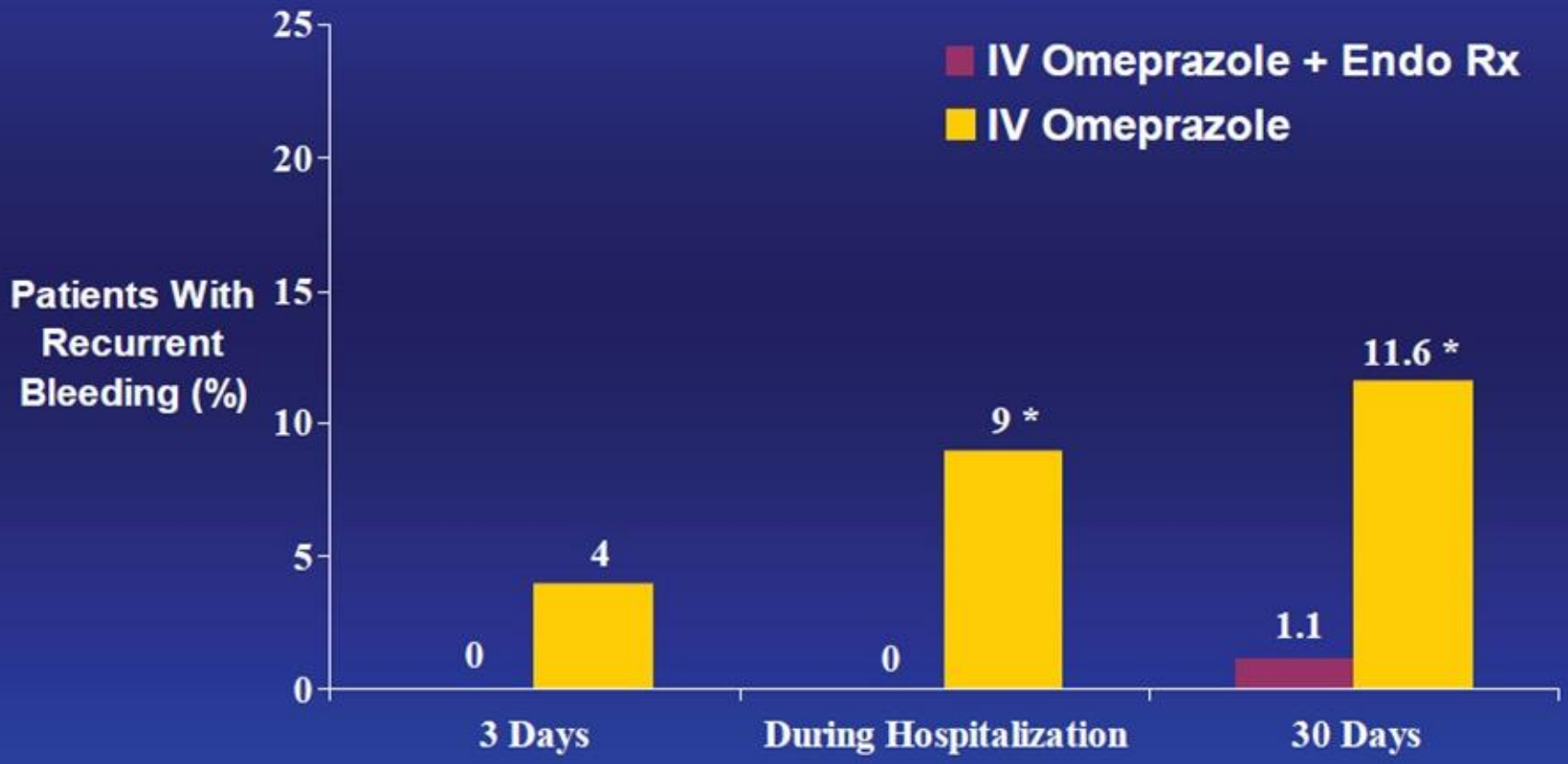
- All patients had actively bleeding vessel or a non-bleeding visible vessel (NBVV) and received endoscopic therapy



* $p < 0.001$ vs. placebo

Adapted from: Lau et al, *N Engl J Med.* 2000; 343: 310

IV PPI Therapy Alone is Insufficient



*$P < 0.05$.

Adapted from: Sung et al, *Ann Intern Med*. 2003: 139: 237

Initial assessment and risk stratification

Hemodynamic status

&

Resuscitative measures

Initial assessment and risk stratification

Blood transfusions should target **Hb ≥ 7** g/dl

(higher Hb targeted in patients with clinical evidence of intravascular volume depletion or comorbidities)

Initial assessment and risk stratification

Risk assessment →

Stratify patients: higher Vs lower risk

(assist in initial decisions such as timing of endoscopy, time of discharge, and level of care)

Initial assessment and risk stratification

Discharge from the emergency department w/out inpatient endoscopy may be considered in patients w/:

urea **< 18** mg/dl;

Hb **≥ 13** g/dl for men (12 g/dl for women),

systolic BP **≥ 110** mm Hg;

pulse **< 100** beats / min;

and **absence** of melena, syncope, cardiac failure, and liver disease

(< 1% chance of requiring intervention).

Pre-endoscopic medical therapy

IV Erythromycin

(250 mg, 30 min before endoscopy)

Pre-endoscopic medical therapy

IV PPI

(80 mg bolus → 8 mg/h infusion)

↓proportion of patients who have higher risk stigmata of hemorrhage at endoscopy and who receive endoscopic therapy.

(PPIs do not improve clinical outcomes such as further bleeding, surgery, or death).

Gastric pH and Clinical Effect

Gastric pH	Clinical Effect	
>4	Pepsin inactivated	Stress Ulcer Prophylaxis
>6	Functional coagulation and platelet aggregation	Reduction of rebleeding after endoscopic intervention
>7	Pepsin denatured	

Pre-endoscopic medical therapy

If endoscopy will be delayed or cannot be performed, intravenous PPI is recommended to reduce further bleeding

Pre-endoscopic medical therapy

Gastric lavage

Nasogastric or orogastric lavage is not required in patients with UGIB for diagnosis, prognosis, visualization, or therapeutic effect

Timing of endoscopy

Patients with UGIB should generally undergo endoscopy within 24 h admission, following resuscitative efforts to optimize hemodynamic parameters and other medical problems

Timing of endoscopy

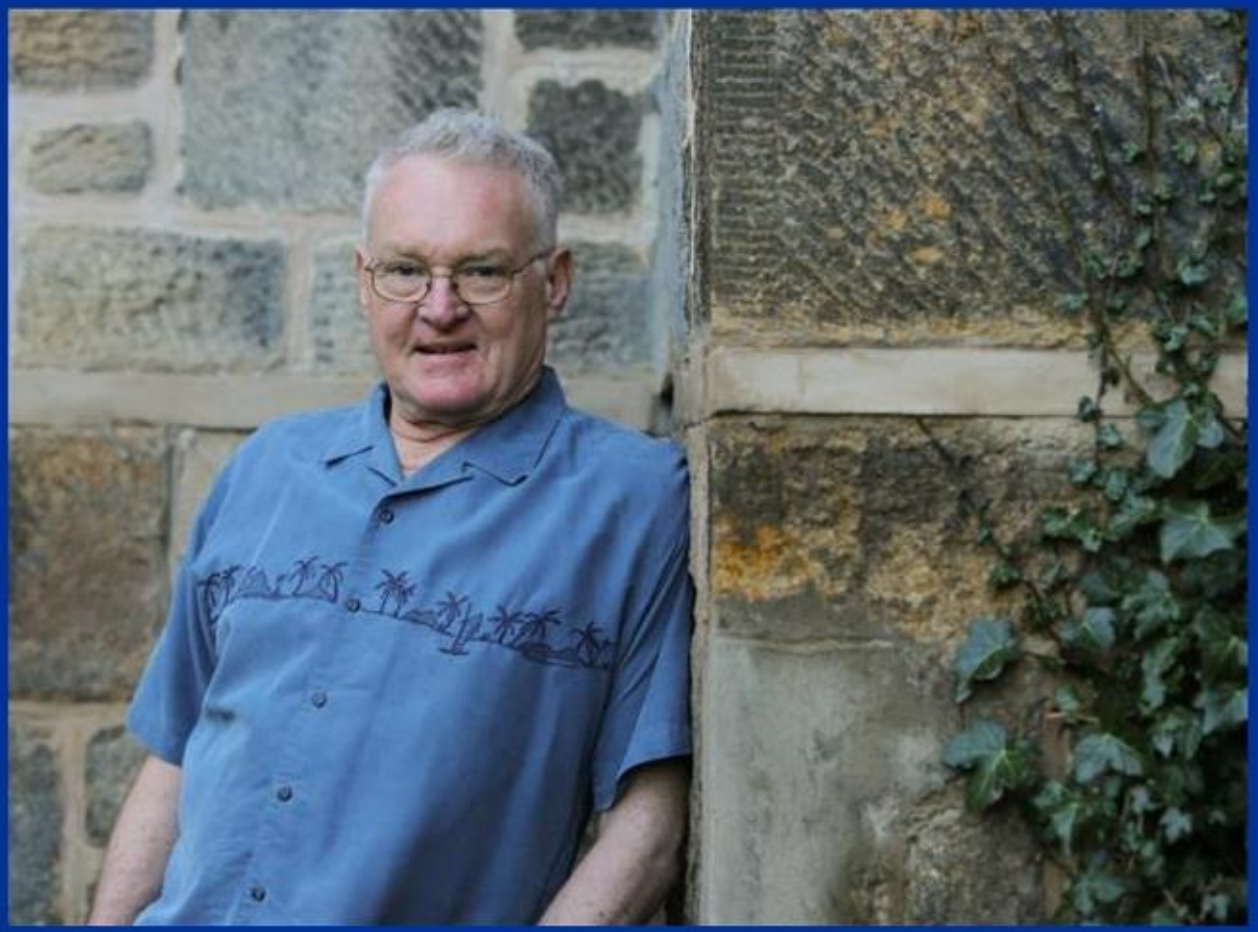
Patients with higher risk clinical features

(e.g., tachycardia, hypotension, bloody emesis or nasogastric aspirate in hospital)

→

Endoscopy with[illegible] be considered to potentially improve clinical outcomes

Oliver Blatchford



Blatchford Score

Blatchford Score

Risk Assesment

Blatchford Score

Blatchford bleeding score Predicts: Need of EGD/PRBC	BUN	18 - 22	2	Hb	M	F	Sys BP		Others				
		22 - 28	3	12-13	1	-	100 - 110	1	HR	Two Blacks		Two Failures	
		28 - 70	4	10-12	3	1	90 - 100	2	≥100	Stool (Melana)	Out (Syncope)	Liver	Cardiac
		≥70	6	< 10	6		<90	3	1	1	2	2	2
	Score	•score≤2: ↓risk ± D/C (OP management) •score ≥6: >50% require intervention (EGD/PRBCs)											

Timothy Rockall

Rockall Score

	0	1	2	3
Age	< 60	60-79	> 80	
BP & HR	BP > 100 HR < 100	BP > 100 HR > 100	BP < 100	
Co-morbidites	None	-	CCF / IHD major co-morbidity	AKI, liver failure, metastatic Ca
Diagnosis	Mallory-Weiss / no pathology	All other	Malignancy	
Bleeding on endoscopy?	None or dark spots only	-	Blood, clot, spurting vessel	

Rockall Score (points)	Mortality
3	3%
4	6%
5	12%
6	17%
7	27%
8	40%

Repeat endoscopy

Routine second-look endoscopy, in which repeat endoscopy is performed 24 h after initial endoscopic hemostatic therapy, is not recommended.

Unless:

- There is a clinical evidence of recurrent bleeding.

- If further bleeding occurs after a second endoscopic therapeutic session, surgery or interventional radiology with transcathether arterial embolization is generally employed (Conditional recommendation).

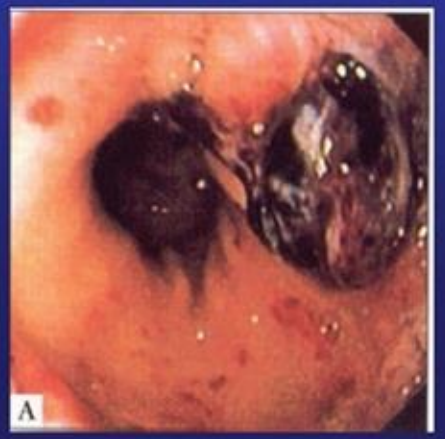
Rebleeding after 2nd EGD

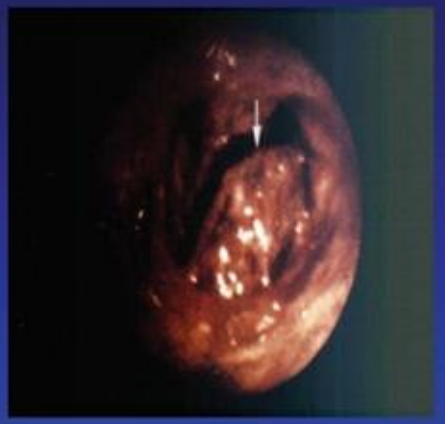
If further bleeding occurs after a second endoscopic therapeutic session:

Surgery or interventional radiology with transcathether arterial embolization is generally employed.

Non PUD Bleeding lesions
Mallory Weiss tears

- Painless upper GI bleeding due to mucosal tear(s) near EG junction, usually on the gastric side.
- Contrasted with intramural hematoma and esophageal rupture (Boorhaave's)





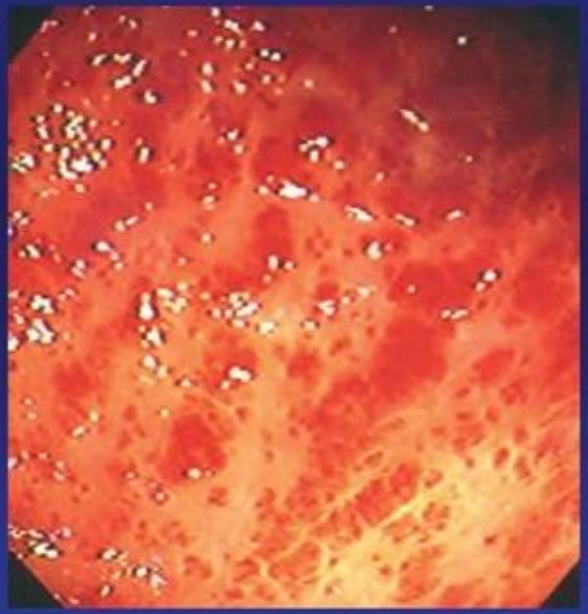
Photographs Courtesy Brian Fennerty, MD

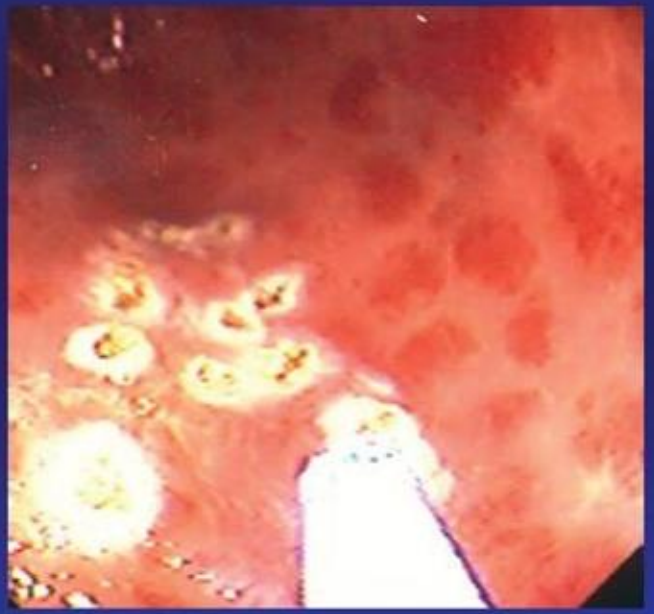
Vascular lesions

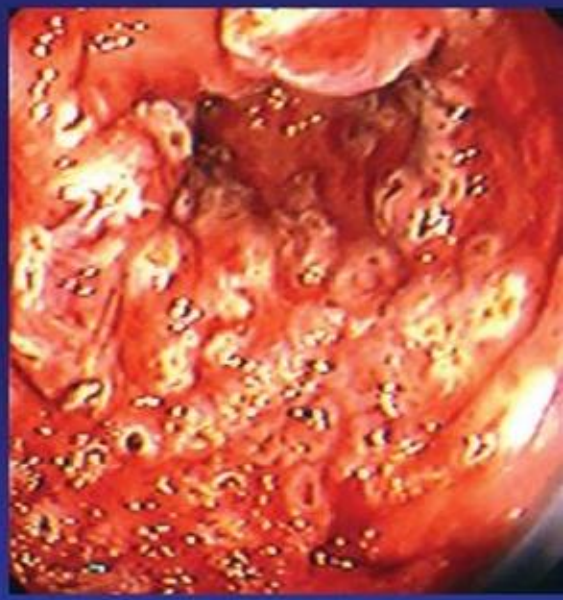
- Vascular ectasias
  - angiodysplasia, telangiectasia
- Gastric Antral Vascular Ectasia ("Watermelon stomach")
- Dieulofoy's lesion
- Portal hypertensive gastropathy
- Cameron's lesions

Gastric Antral Vascular Ectasia (GAVE)

Before, during, and after Endoscopic Therapy

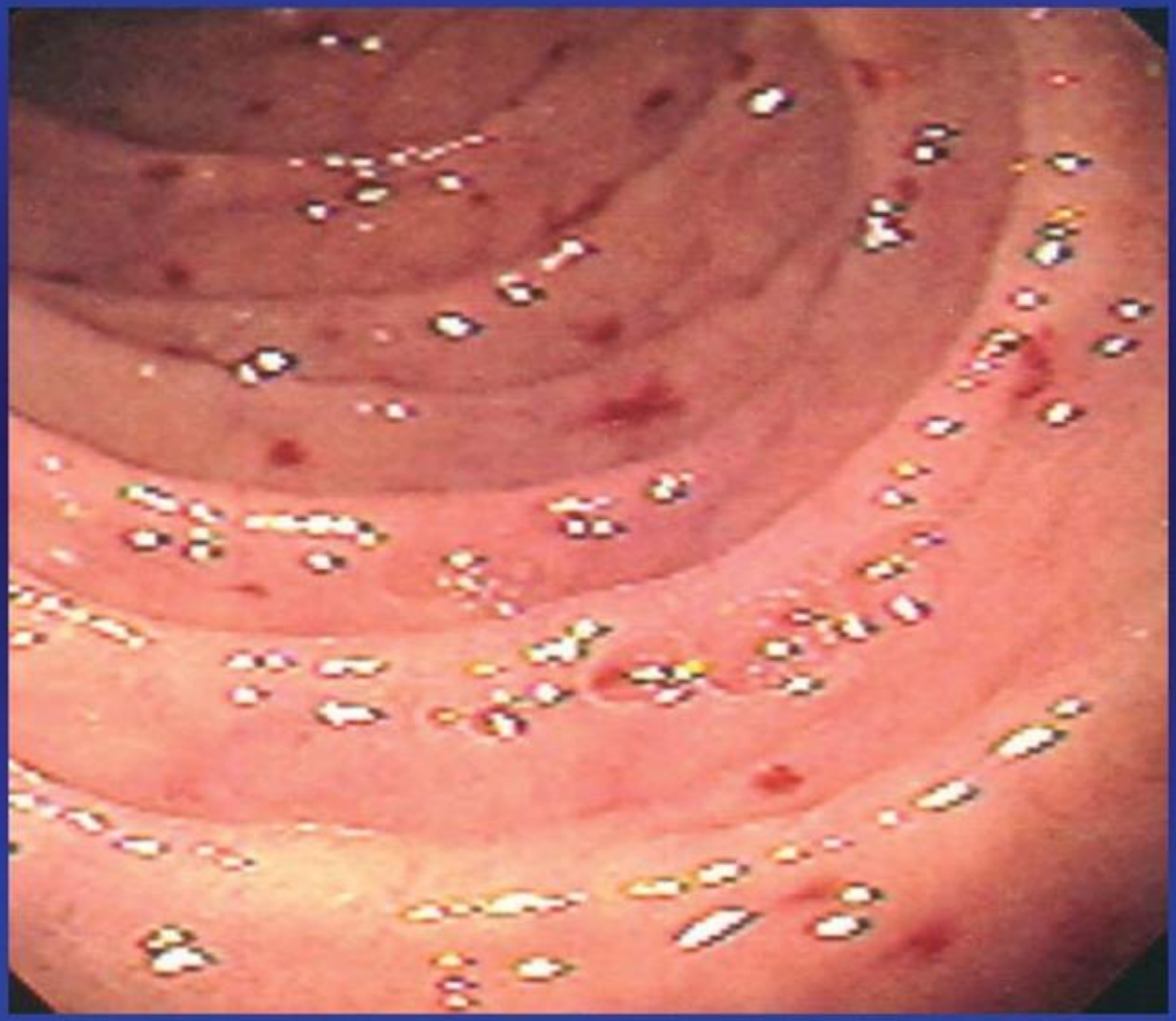






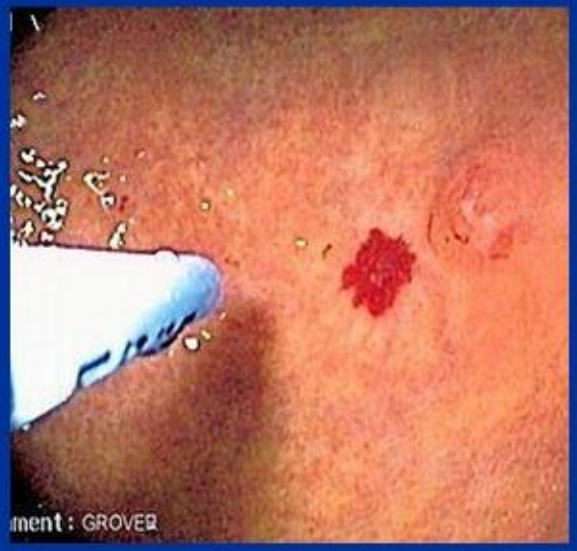
Photographs Courtesy Brian Fennerty, MD

Duodenal Angioectasia



- Acquired
  - aging
  - PSS
  - CREST
  - radiation
- Hereditary
  - lips
  - nose

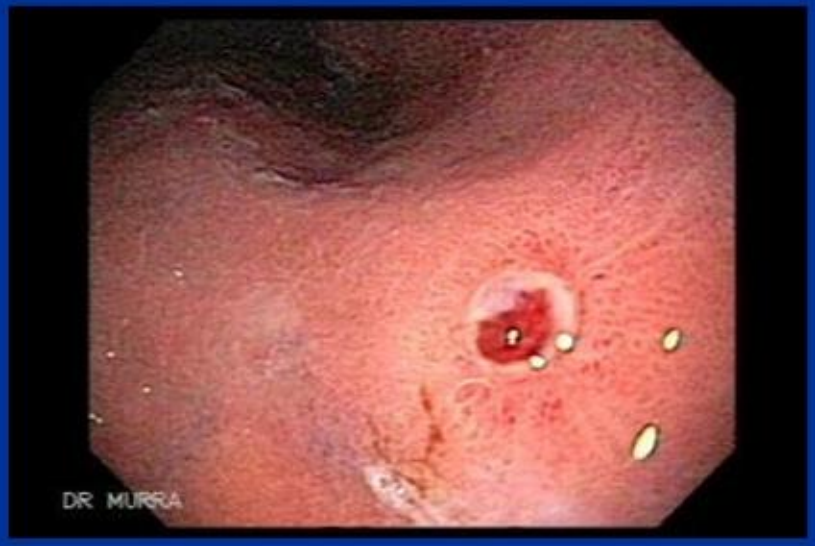
Photograph Courtesy Brian Fennerty, MD

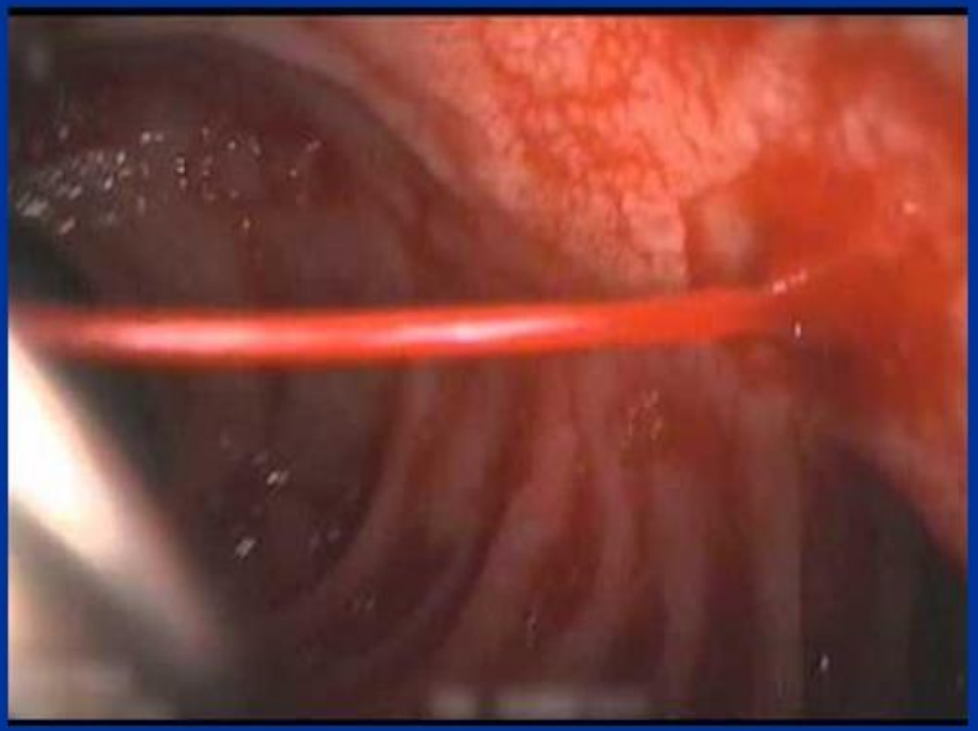

ment : GROVER

Dieulafoy's Lesion

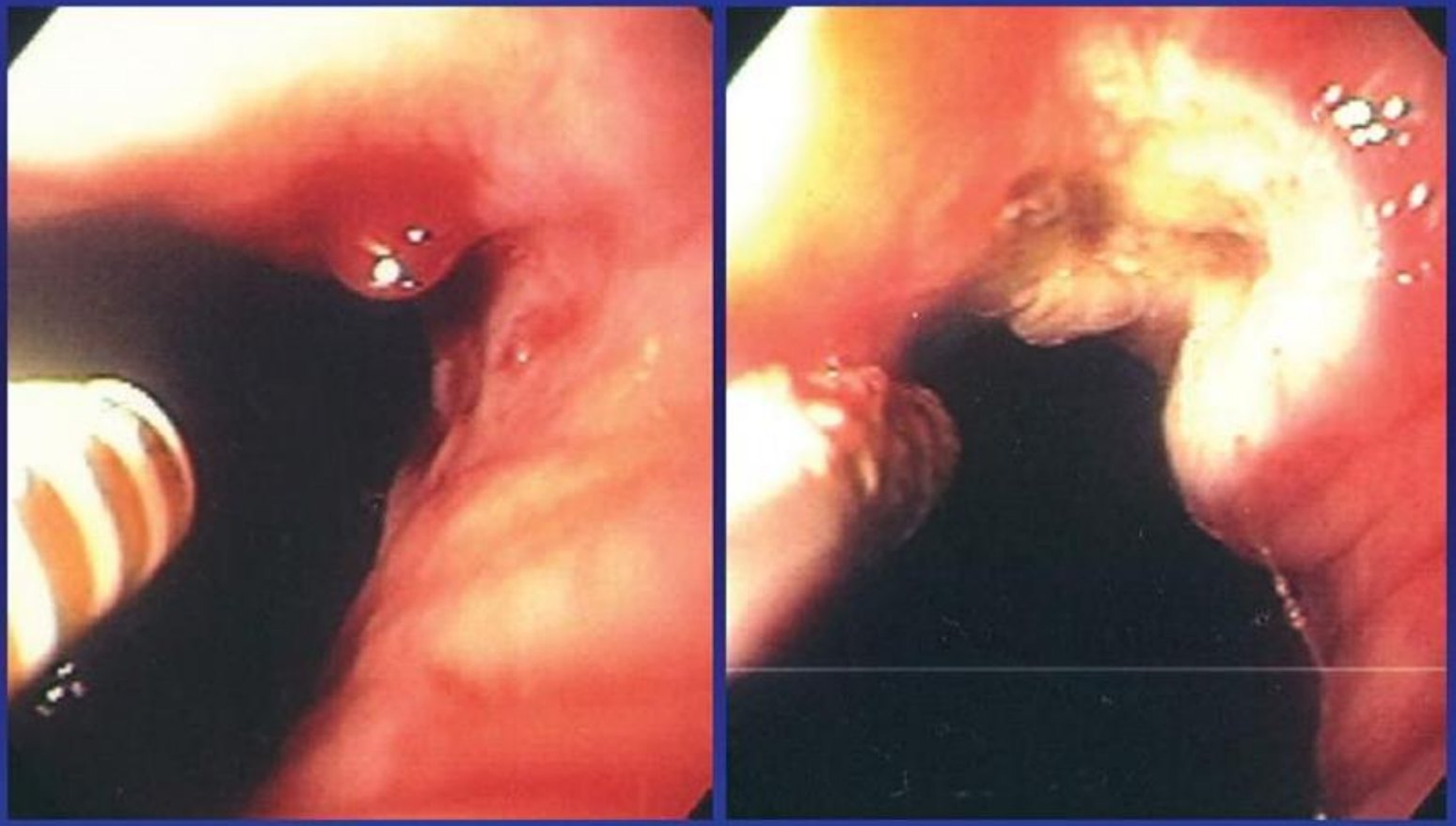
- Abnormally large submucosal artery
- Proximal stomach (duodenum, elsewhere)
- Intermittent, painless massive bleeding
- Often difficult to identify endoscopically
- Endoscopic therapy (epinephrine, polidocanol) ultimately effective for hemostasis in 96%
- Long-term hemostasis in 85-90%
- Late (post-discharge) bleeding after successful endoscopic hemostasis uncommon
  - 5% or less after 2 years follow-up

Baettig et al Gut 1993; 34:1418


DR MURRA

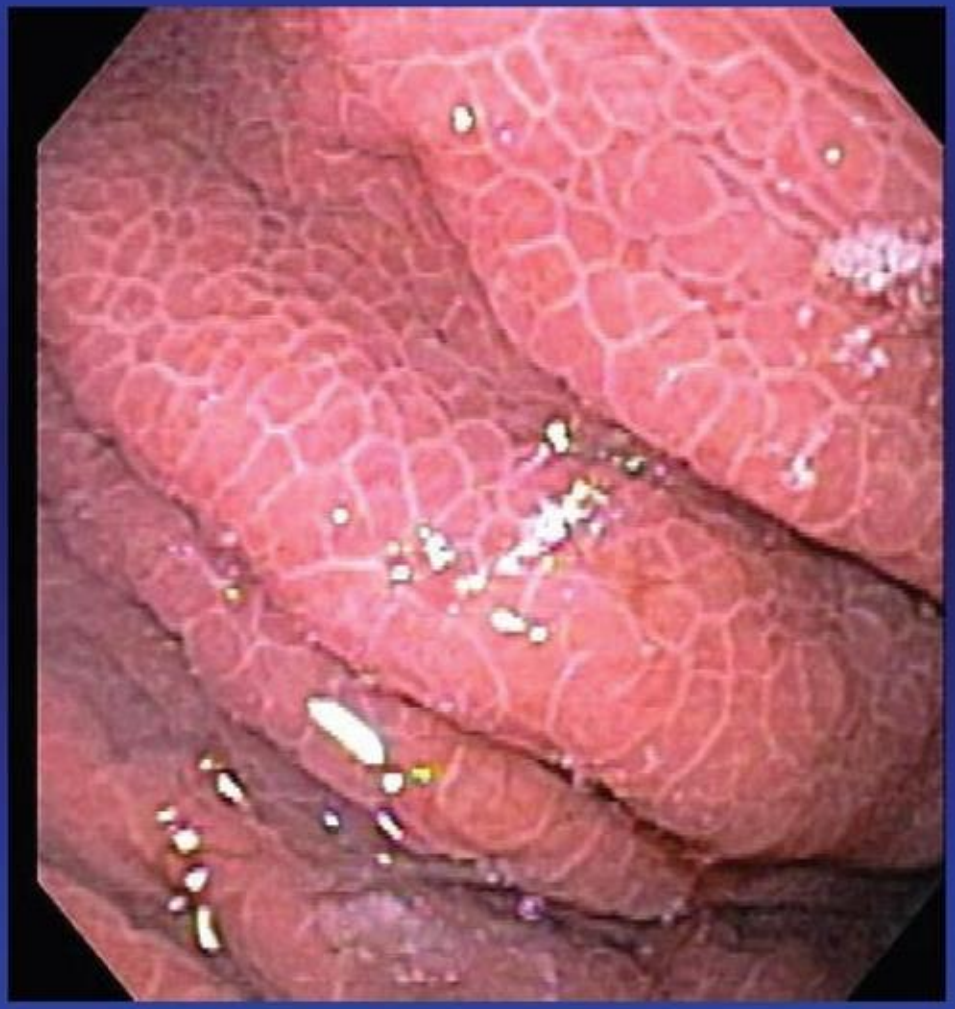


Dieulafoy's lesion



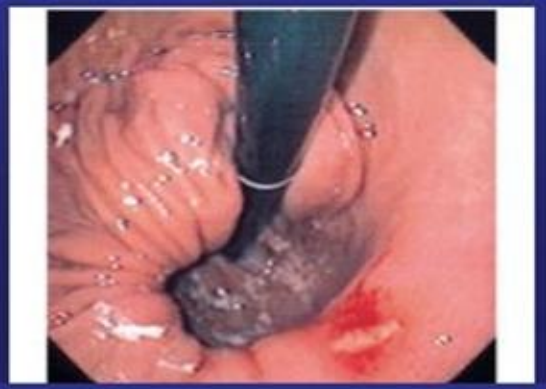
Photographs Courtesy Brian Fennerty, MD

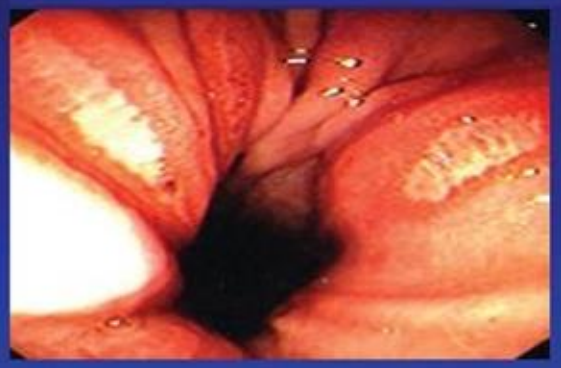
Portal Hypertensive Gastropathy



Cameron's Lesions

- Linear erosions in a hiatus hernia
- Usually sliding hernia
- Chronic or acute bleeding
- No abdominal pain, but may have reflux symptoms
- RX: Iron ± PPI



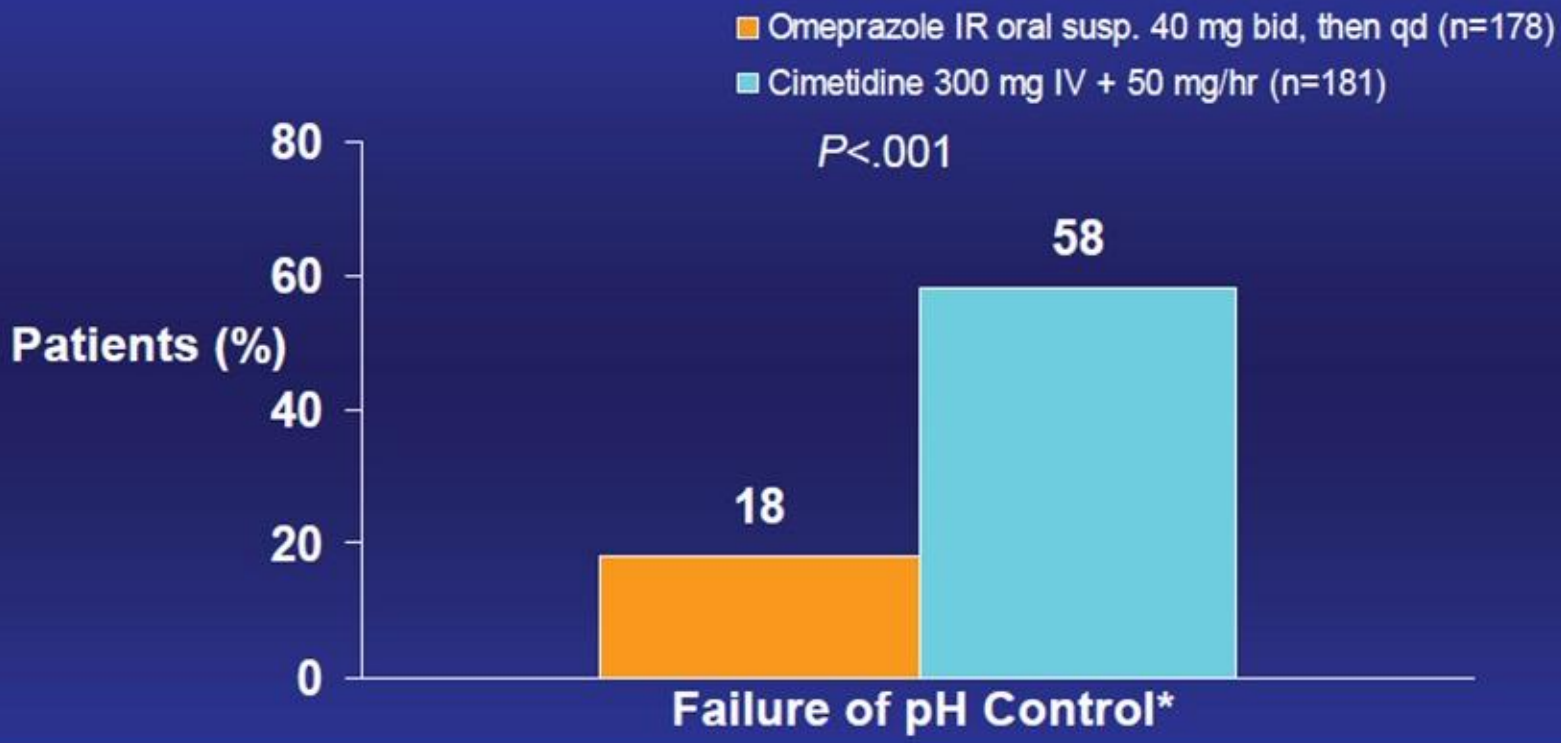


Photographs Courtesy Brian Fennerty, MD

Stress Ulcer Bleeding

- Patients admitted to an ICU demonstrate endoscopic evidence of GI damage within 24 hours
- Historically, GI bleeding occurred in approximately 15% of seriously ill ICU patients without prophylactic therapy
- Much lower now with improved ICU care
- Current incidence of clinically significantly bleeding is 1.5% or less

Stress Ulcer Prophylaxis: H_2RA vs PPI



359 mechanically-ventilated ICU patients with 1 additional risk factor.
UGI bleeding rate: 6.8% (cimetidine) *vs*. 4.5% (omeprazole) ⇒ noninferiority of PPI

*2 consecutive aspirates with pH ≤ 4

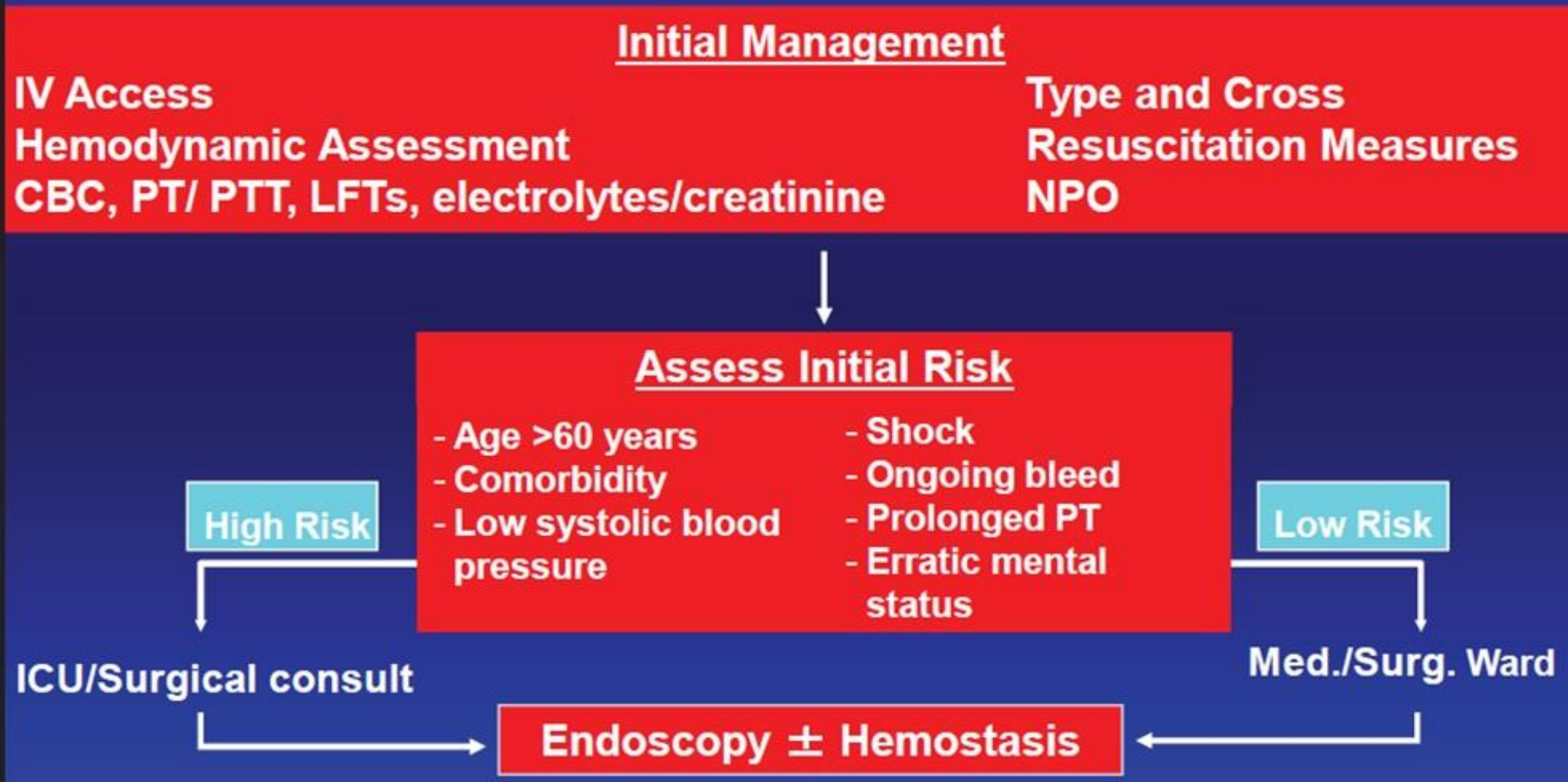
Adapted from: Conrad et al, *Crit Care Med* 2005; 33: 760

Risk Factors for Clinically Important UGI Bleeding in ICU Patients

Risk Factors	Odds Ratio	P Value
Respiratory failure	**15.6**	**<0.001**
Coagulopathy	**4.3**	**<0.001**
Hypotension	3.7	0.08
Sepsis	2.0	0.17
Hepatic failure	1.6	0.27
Renal failure	1.6	0.26
Glucocorticoid administration	1.5	0.26
Organ transplantation	1.5	0.42
Anti-coagulant therapy	1.1	0.88
Enteral feeding	1.0	0.99

Adapted from: Cook et al, *N Engl J Med* 1994; 330: 377

Management of Acute GI Bleeding



Management of Acute GI Bleeding (cont'd)