

# Non-Variceal Upper Gastro-Intestinal Bleeding

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# Acute Upper GI Bleeding: A Lethal Disease

Outcomes include

DEATH

CARDIAC ARREST

MI

CVA

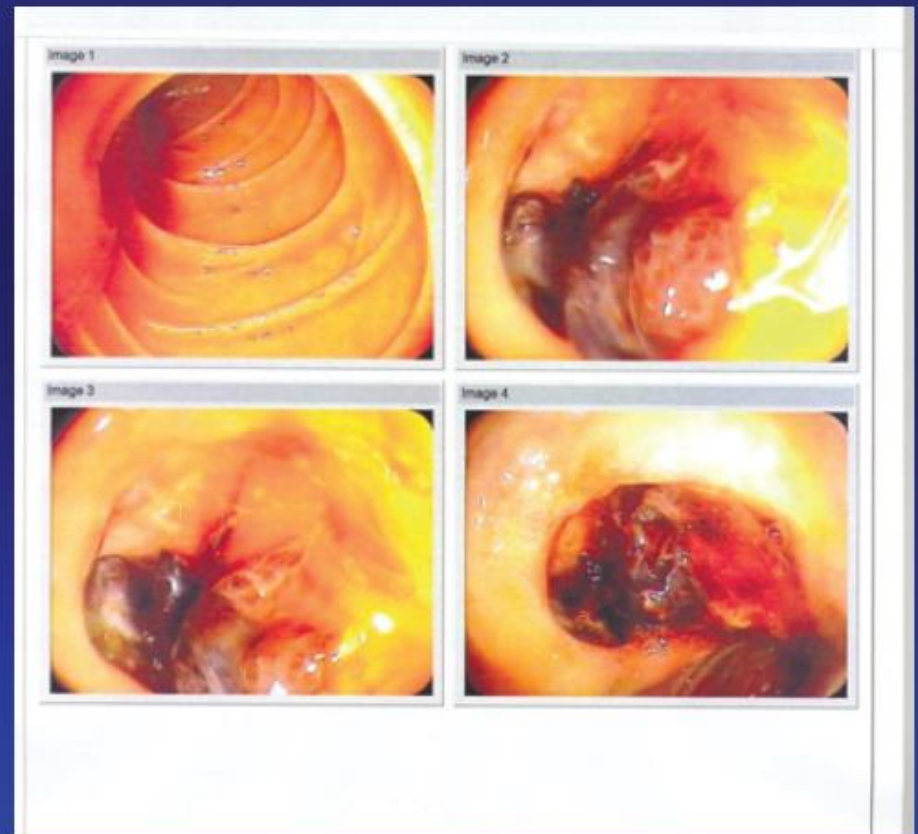
INJURY (e.g. Fx, head)

SEIZURES

SURGERY or ANGIOGRAPHY

RISK FOR FUTURE BLEEDING

ASA-associated DU eroding into GD artery

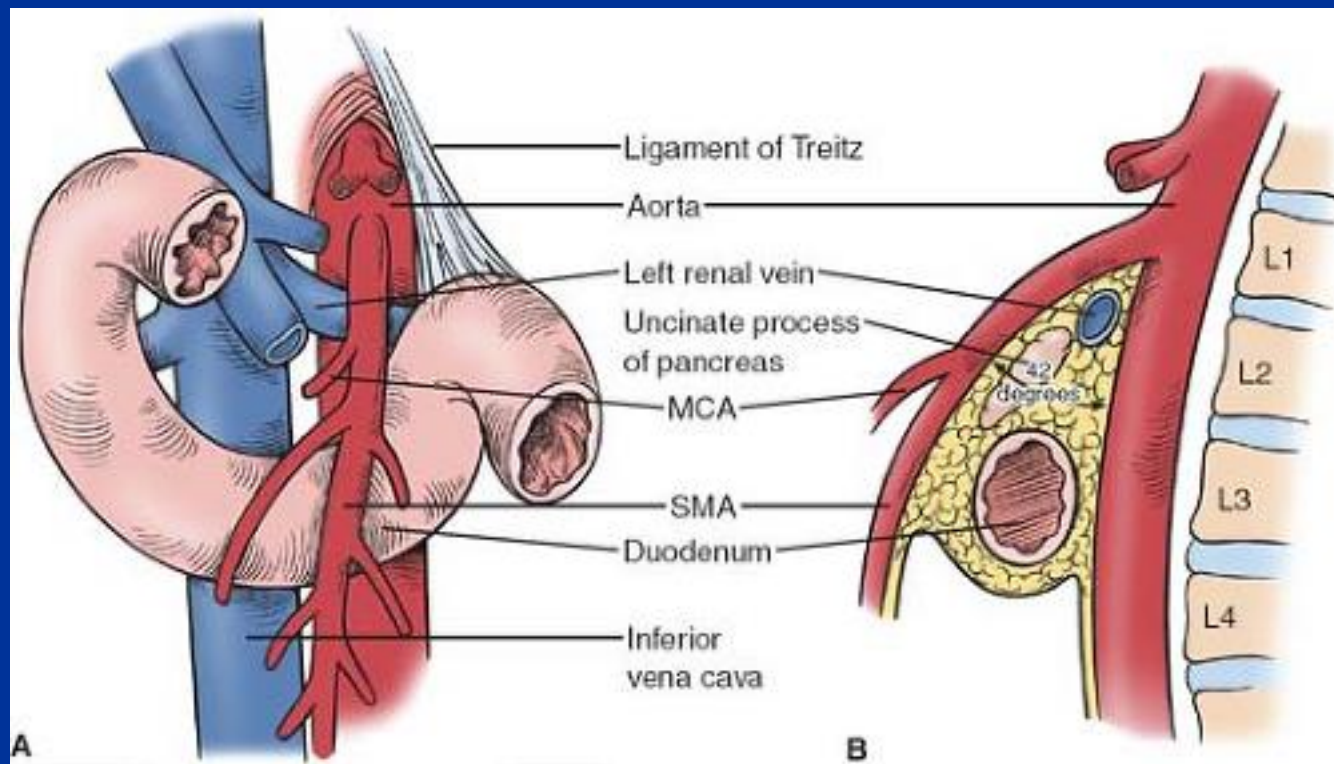


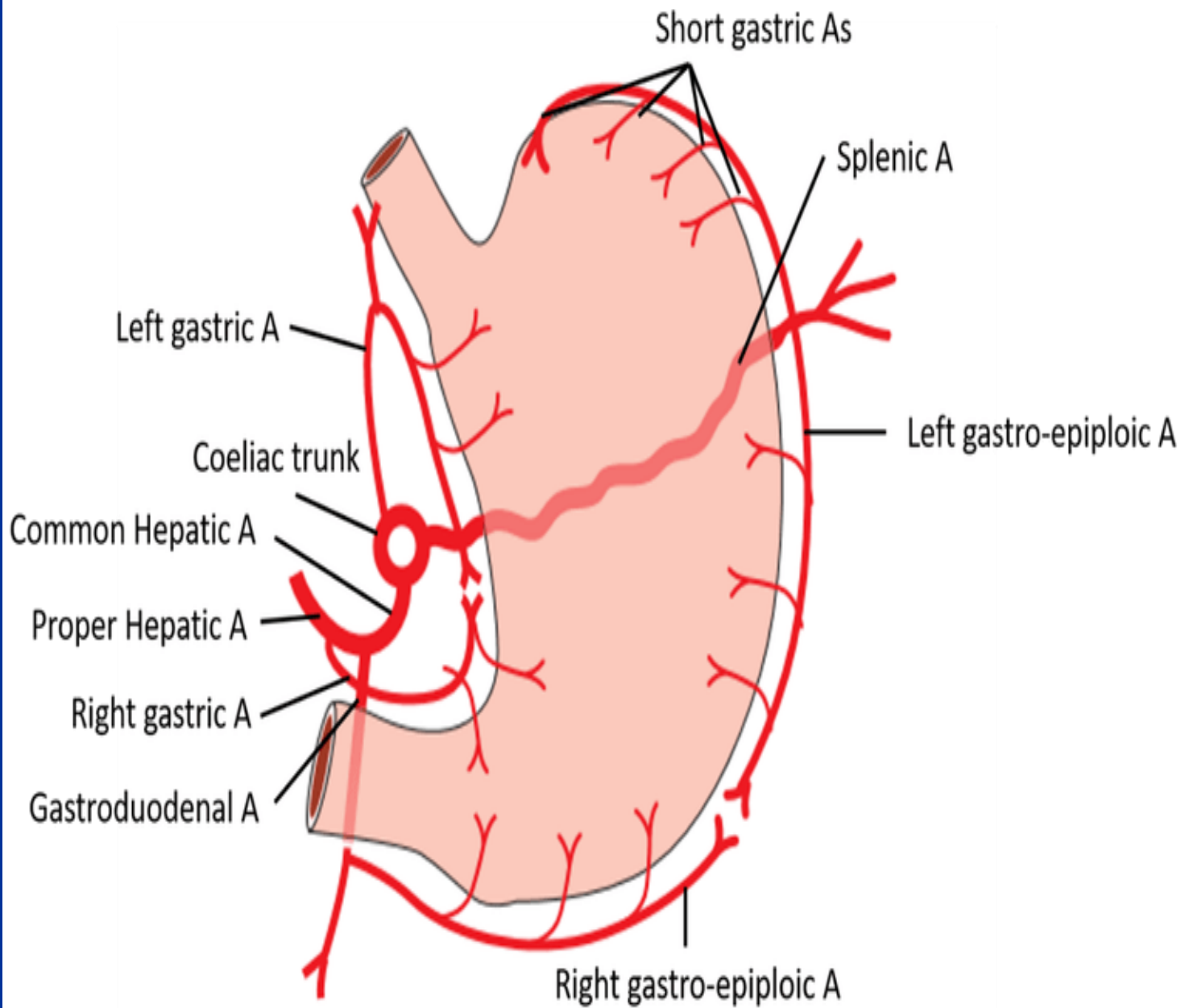
## **(Upper GI Bleeding) UGIB**

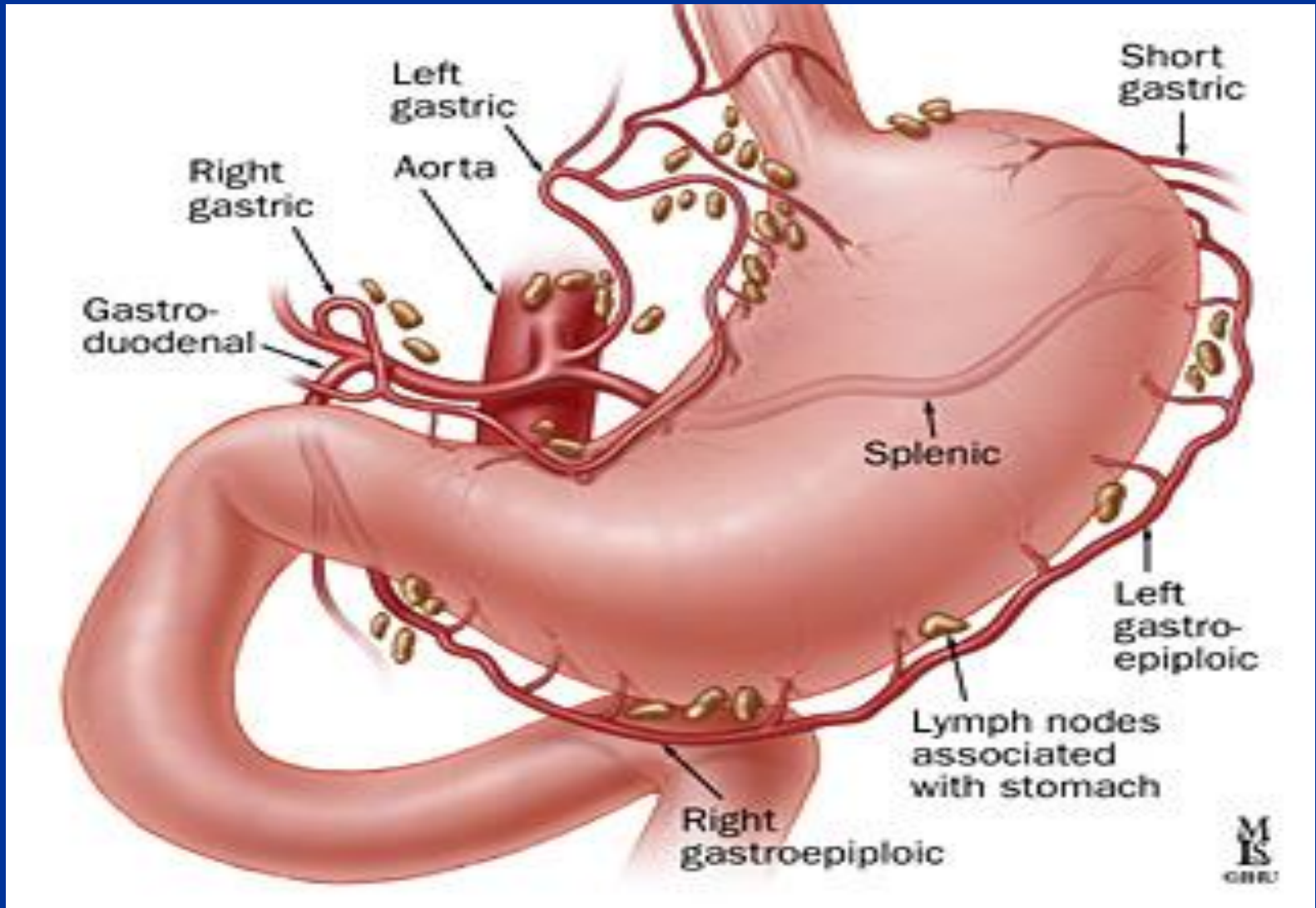
**Is bleeding proximal to:**

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

**(50% of all GI Bleeding)**







# 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 stigmata of chronic liver diseases

# HCO<sub>3</sub> & Mucus

- (1) The mucosal barrier is a thick, alkaline, unstirred, aqueous layer of dissolved **bicarbonate & mucus**, which neutralizes the effects of gastric juice H<sup>+</sup>.
- (2) (Gastric surface mucus cells) & (duodenal enterocytes & goblet cells) with a **lipid bilayer membranes** forming a barrier to H<sup>+</sup> & **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  $\text{HCO}_3^-$  secretion  $\downarrow$ : when proteolysis of mucus is  $\uparrow$  (as in **inflammation**), or when mucosal blood flow is  $\downarrow$  (as with using **NSAIDs**), intracellular acidosis occurs, leading to cell necrosis.

# PGs

Prostaglandins protect gastro-duodenal mucosa by **secretion of mucus, (PG-E<sub>2</sub>) ⊕ 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  $\ominus$  effect →  
↑gastrin levels.

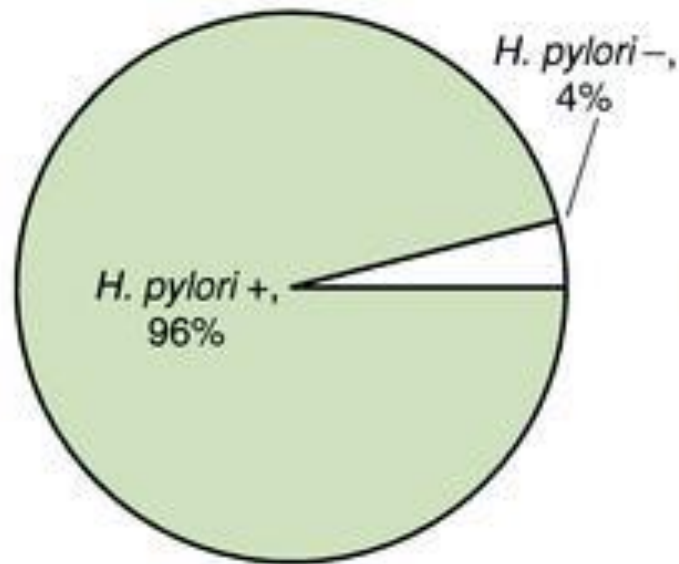
# Antral Gastritis Only (↑ %)

“Late life infection”

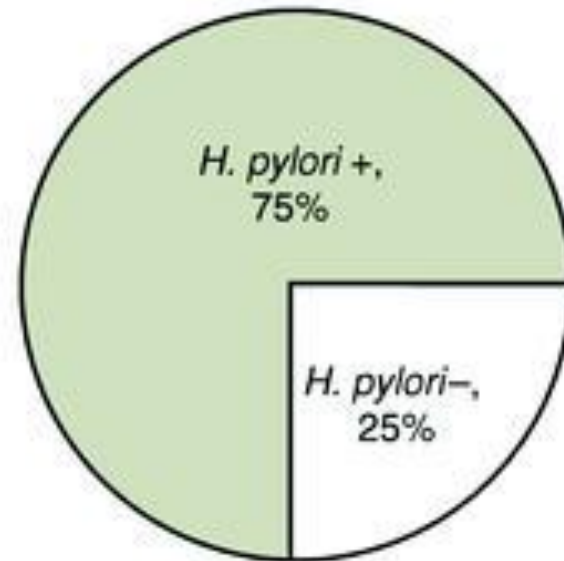
- Antral-predominant active chronic gastritis → Antral Atrophy & ↓ antral D cells → (Corpus-sparing) →  
↑ HCL output → ↑ risk for DU + duodenal gastric metaplasia → HP colonize duodenum
- Depletion of antral somatostatin ⊖ effect →  
↑ gastrin levels.

# UPPER GI BLEEDING

## Peptic Ulcer Disease



Duodenal ulcer



Gastric ulcer



# UGIB Bleeding forms

**Melena: occurs w/ $\geq$ 100mL blood is instilled into UGI tract**

**Hematochezia: occurs w/ $\geq$ 1,000mL blood is instilled into UGI tract**

(Hematochezia is a sign of severe bleeding (if associated w/red NGT aspirate (mortality  $\uparrow$  to  $\approx$ 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  $\downarrow \geq 2\text{g}$  from baseline

Hct  $\downarrow \geq 6\%$  from baseline

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

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

# Hemodynamics

**Orthostasis is the most accurate non-invasive indicator of severity of Blood loss  $\approx 20\%$**

**Orthostasis =  $\downarrow$  Sys BP  $>20$**

**or**

**$\downarrow$  Dias BP  $>10$**

**or**

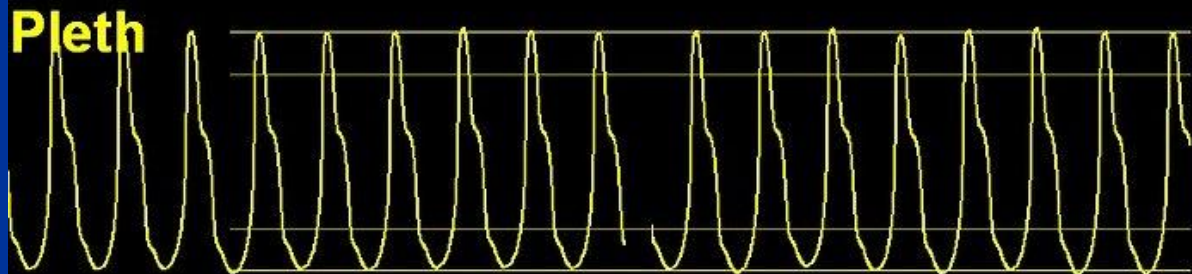
**$\uparrow$  HR  $>20$**

**w/in 3 minutes of standing**

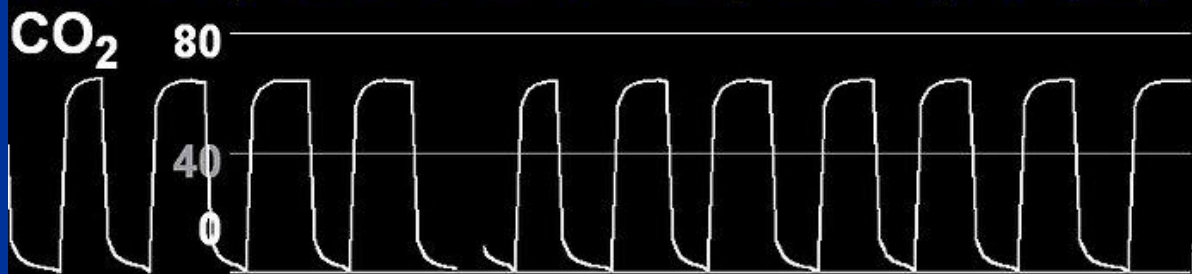
✓ \*\* etCO<sub>2</sub> HIGH



HR  
130  
50  
**110**



SpO<sub>2</sub>  
100  
90  
**90**



etCO<sub>2</sub>  
66  
25  
**60**

NBP  
Sys. **103/60**  
160  
90  
**(74)**

Pulse  
130  
50  
**110**

awRR  
30  
8  
**20**

Navigation bar with icons for Silence, Pause Alarms, Start Stop, Graph Trends, 12-lead ECG, Main Setup, and 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 $\Theta$ )

**4) Transfuse PRBCs if: Hb  $\leq$  7g/dL**

**(Hct: <21%)**

**(Hb  $\leq$  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

<u>Cause</u>	<u>Frequency (%)</u>
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

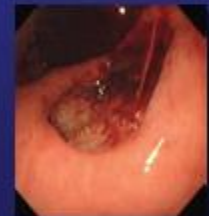


# Forrest Classification

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**

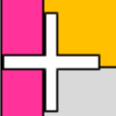



<b>Prevalence (%)</b>	42	20	17	17	18
<b>Rebleeding risk (%)</b>	5	10	22 †	43 †	55†
<b>Mortality (%)</b>	2	3	7	7	11

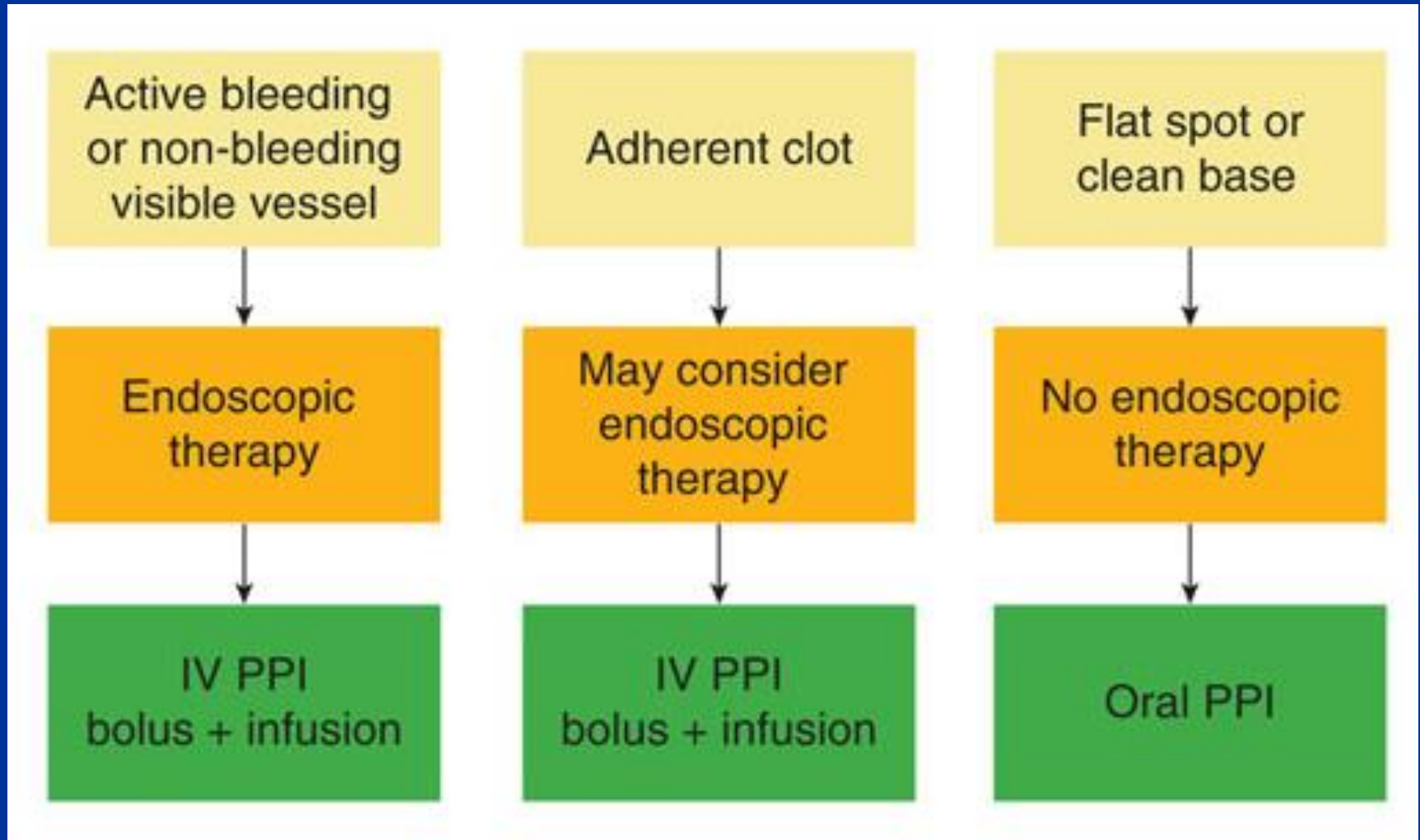
\*Nonbleeding visible vessel. † Endoscopic therapy recommended.

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

# Endoscopic Therapy

Lesion (Risk: •↑•↓) •Rebleed Risk		EGD ttt (If indicated →successful >90%)			+PPI	
1ST LOOK EGD "Forrest Classification"	<b>Spurting Vessel</b> (Pulsatile Bleeding) (IA) w/o ttt: 90%		<b>Epinephrine</b> (1:10,000) inj x 4 quad →	Heater probe (Superior if ASA not needed) (Best Mono) or (alt) Hemo-clip (Better if ASA needed)	High-dose IV PPI (80mg IV bolus ↓ 8mg/hr x 72hrs)  (Further ↓rates of rebleeding to <10%) "No change in mortality"	
	<b>Blood oozing ulcer</b> (IB) w/o ttt: 25%	or	Epinephrine (1:10,000) inj x 4 quad	or		
	<b>Visible Vessel</b> (NBVV) (Pigmented Protuberance) (IIA) w/o ttt: 50%	V	Heater probe (best for: firm ulcers (scarring), High lesser Curve (difficult location) ★ Yet, + Epinephrine Inj is Advisable Yet No benefit	or (alt) Hemo-clip		
	<b>Adherent clot</b> (IIB) w/o ttt: 33% (= clot on ulcer w/resistance to several min of H <sub>2</sub> O jet irrigation)		Epinephrine (1:10,000) inj x 4 quad →	piecemeal cold snaring resection (until underlying stigmata appears or clot becomes ≤3mm) → Heater probe or (alt) Hemo-clip		
	<b>Blood w/No lesion seen</b>		• Bleeding from (gastric fundal Dieulafoy lesion, hemobilia) • Blood obscuring view on initial EGD ↓± (Erythromycin 250mg IV or Metoclopramide 10mg IV 20min prior to EGD) Repeat EGD ± Duodenoscope (view papilla) w/in 24 hrs ★ (Dieulafoy ttt = Spurting Vessel)			
	★ Clip may be preferred (over thermal ttt) in case of coagulopathy ★ Clip is preferred (over thermal ttt) in case of 2 <sup>nd</sup> EGD ttt if w/Thermal ttt on 1 <sup>st</sup> EGD					
	"All above" need Hospitalization x 72hr (Max Re-bleeding Risk w/in 1 <sup>st</sup> 72hrs): ICU x 24hrs → Ward x 48hrs → D/C		Feeding: after 4-6 hr; start Clear liquid diet after procedure x 48hrs → advance to Regular			
	<b>Flat pigmented spot</b> (IIC) w/o ttt: 5-10%	No EGD ttt needed				★ (No benefit from ↑ dose IV PPI) (Unless to continue ASA as 2ry prophylaxis for CAD) ↓ PO PPI QD
	<b>Clear base Ulcer</b> (>50%) (III) w/o ttt: <5%	(Clear base ulcer is described only after H <sub>2</sub> O jet irrigation) No EGD ttt needed + (Bx ulcer edges + R/O H. Pylori) → No need for further w/u (Colonoscopy/Capsule) (Clean Based Ulcer even w/out stigmata of recent bleed = an identified source of GI Bleeding) → D/C Home "same day" on PPI				
	Hospitalization (None): D/C Home		Feeding: after 4-6 hr; start Regular Diet after procedure			

# Management

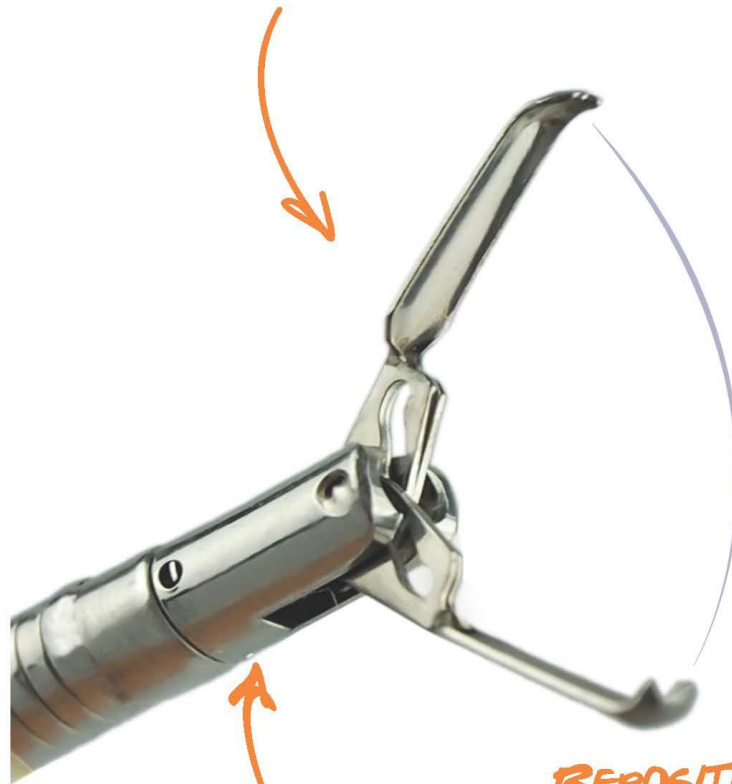




DR MURRA

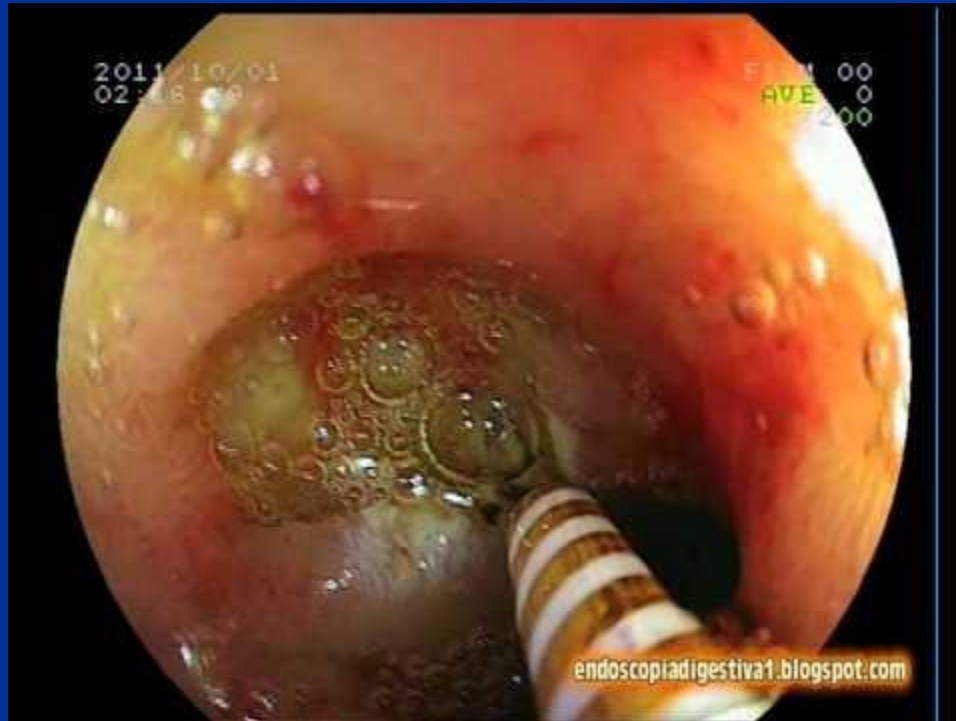


360  
ROTATION



REPOSITIONABLE

SHORT  
STEM



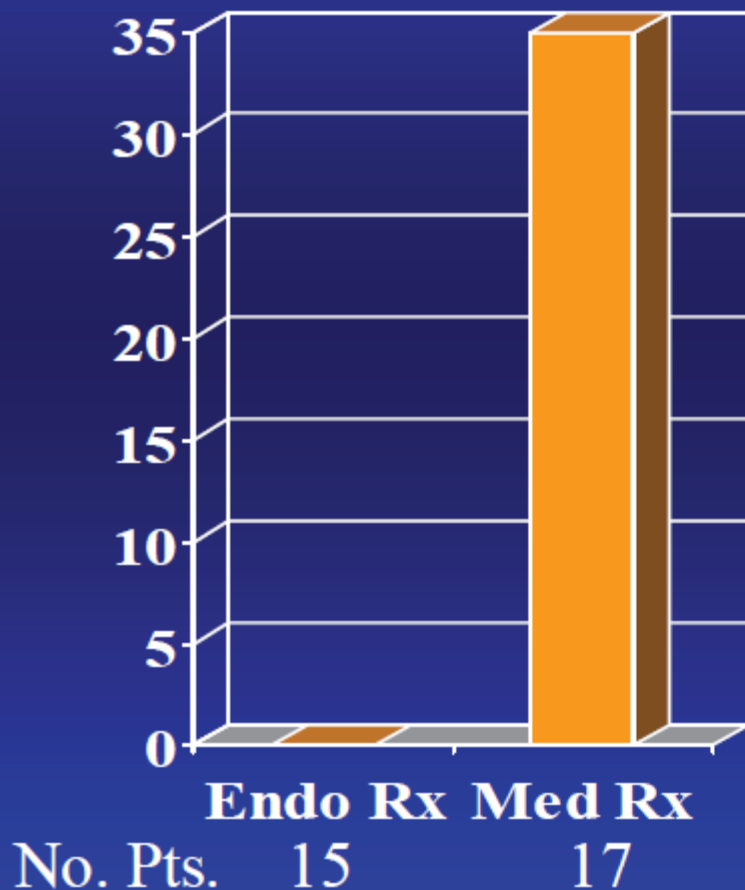
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[endoscopiadigestiva1.blogspot.com](http://endoscopiadigestiva1.blogspot.com)



# 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

# 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.

# 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

# H<sub>2</sub>-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*

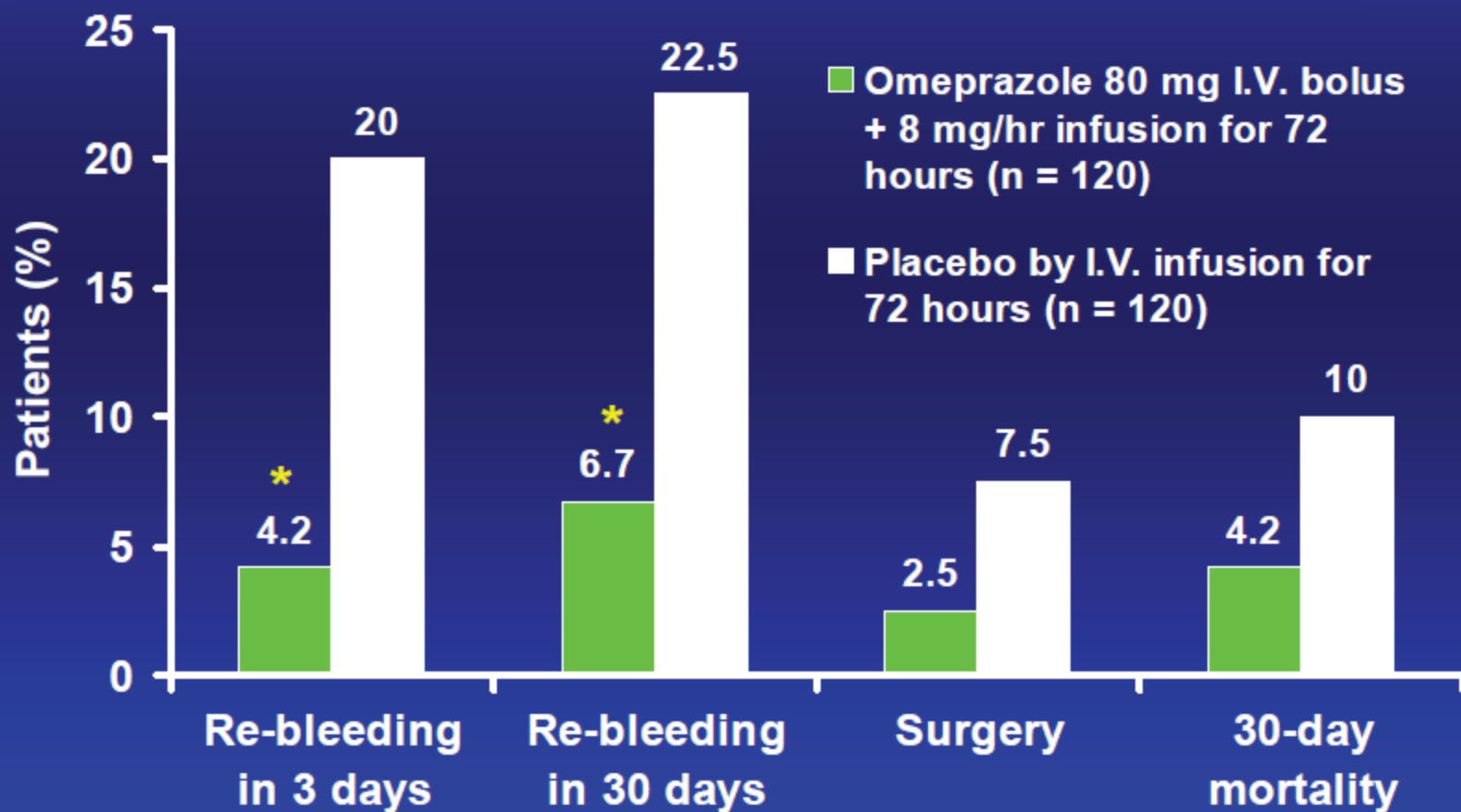
## Somatostatin / Octreotide for Non-Variceal UGI Bleeding

- **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**



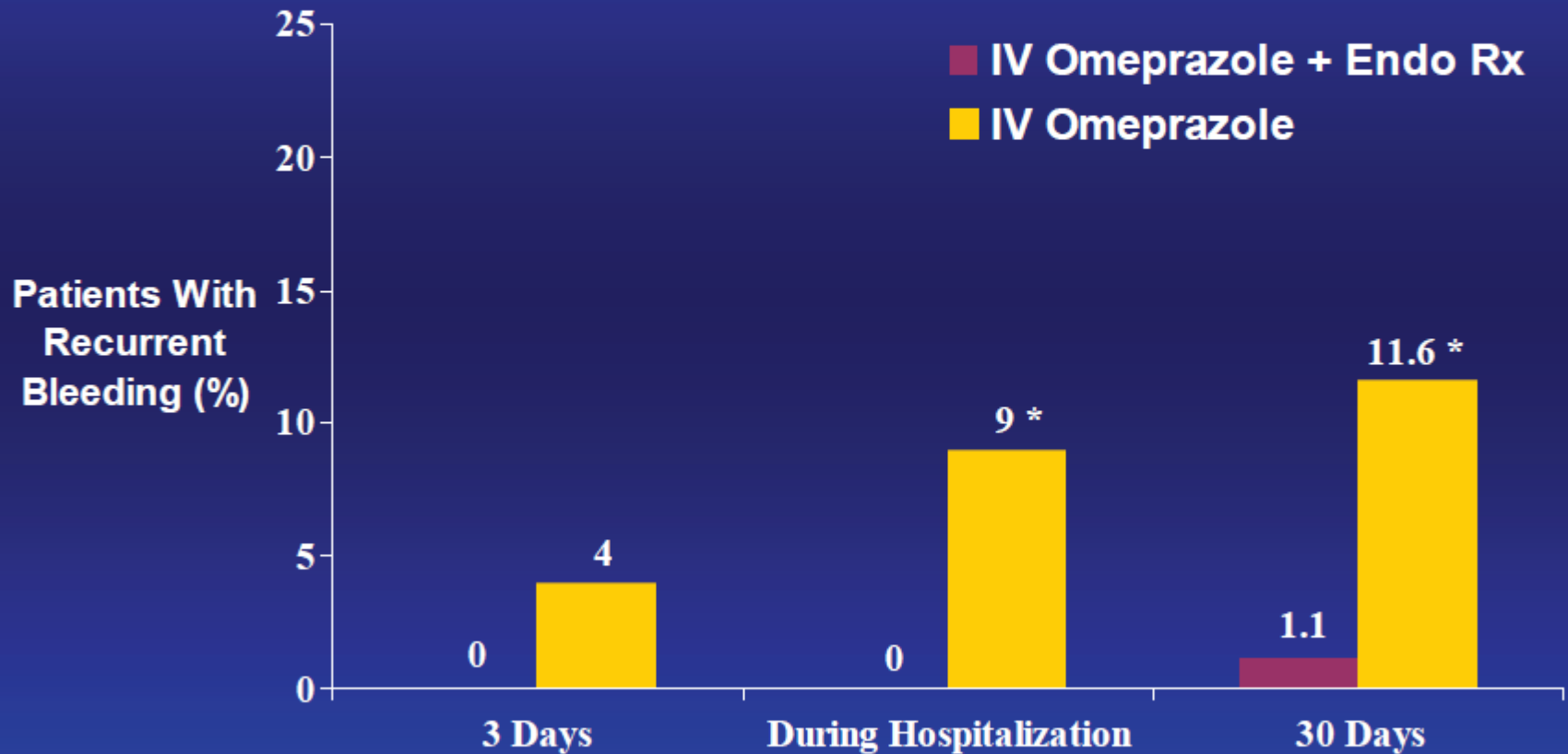
# Randomized Placebo-Controlled Comparison of IV PPI in Bleeding Peptic Ulcer

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



\*  $p < 0.001$  vs. placebo

# 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  $\geq$  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** of 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 within **12 h** may be considered  
to potentially improve clinical outcomes

# Oliver Blatchford



# Blatchford Score

BUN

Two Blacks

Sys BP

Hb

HR

Two Failures



# Blatchford Score

BUN

Two Blacks

Sys BP

Hb

HR

Two Failures

# Risk Assessment

## 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-morbidities	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 transcatheter arterial embolization is generally employed (Conditional recommendation).

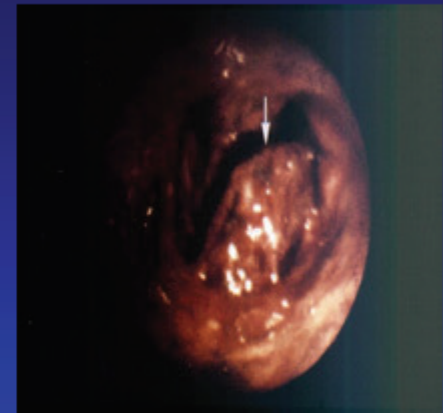
## *Rebleeding after 2<sup>nd</sup> EGD*

If further bleeding occurs after a second endoscopic therapeutic session:

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

# 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)



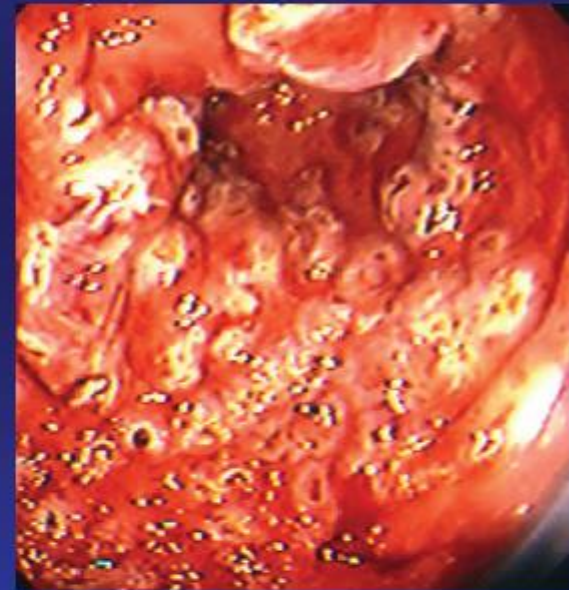
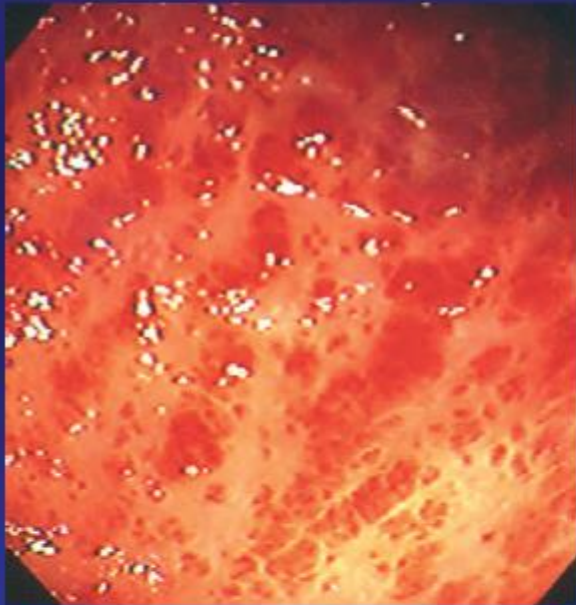


# Vascular lesions

- Vascular ectasias
  - angiodysplasia, telangiectasia
- Gastric Antral Vascular Ectasia  
 (“Watermelon stomach”)
- Dieulafoy’s lesion
- Portal hypertensive gastropathy
- Cameron’s lesions

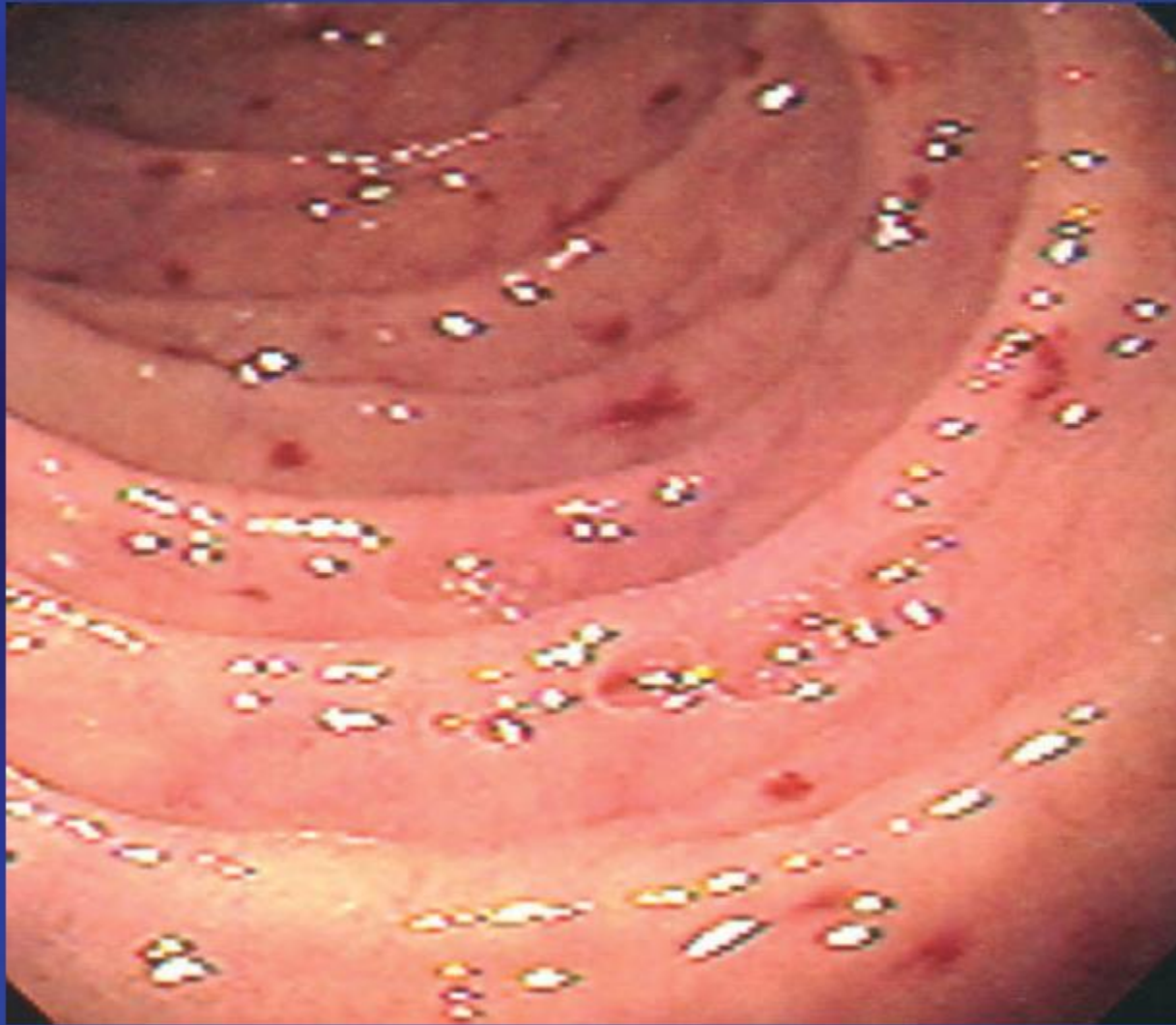
# Gastric Antral Vascular Ectasia (GAVE)

Before, during, and after Endoscopic Therapy



Photographs Courtesy Brian Fennerty, MD

# Duodenal Angioectasia



## Acquired

aging

PSS

CREST

radiation

## Hereditary

lips

nose

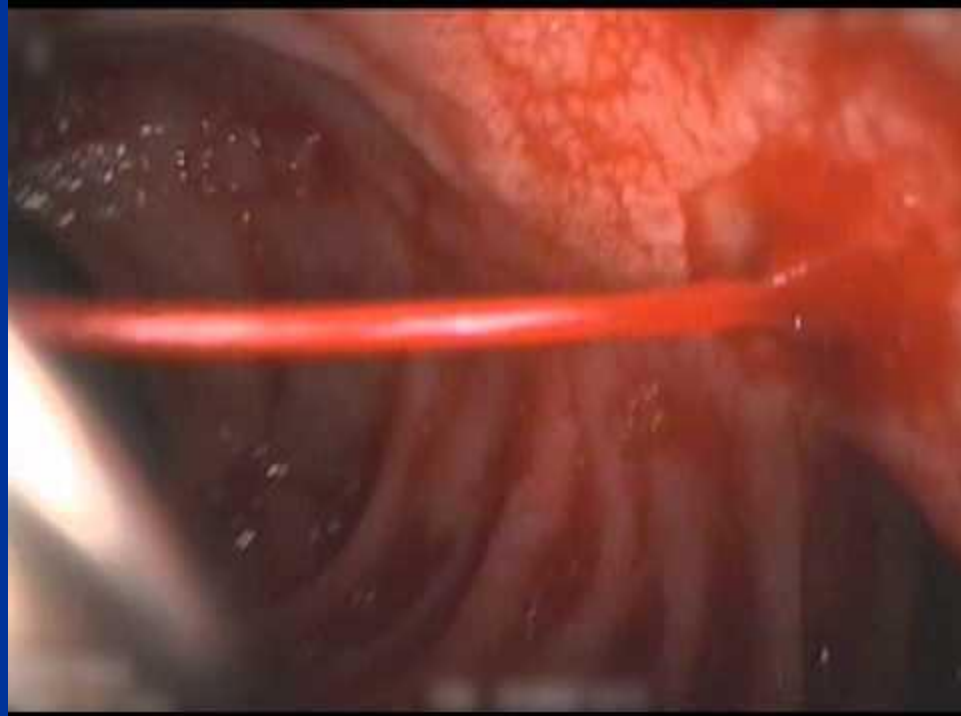


# Dieulafoy's Lesion

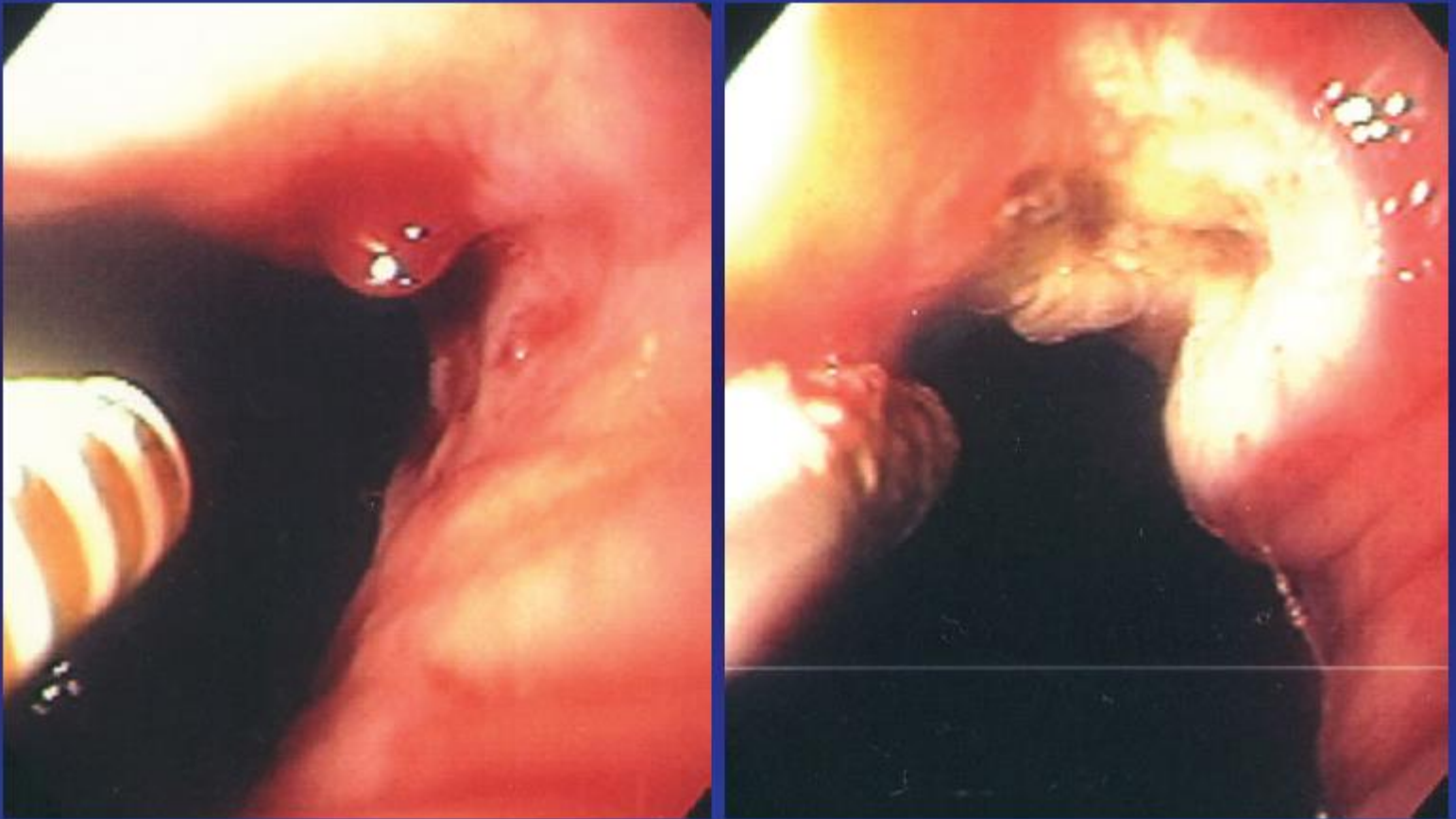
- Abnormally large submucosal artery
- Proximal stomach (duodenum, elsewhere)
- Intermittent, painless massive bleeding
- Often difficult to identify endoscopically
- Endoscopic therapy (epinephrine, polidocanol) ultimately effective for hemostasis in 96%
- Long-term hemostasis in 85-90%
- Late (post-discharge)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



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  $\pm$  PPI

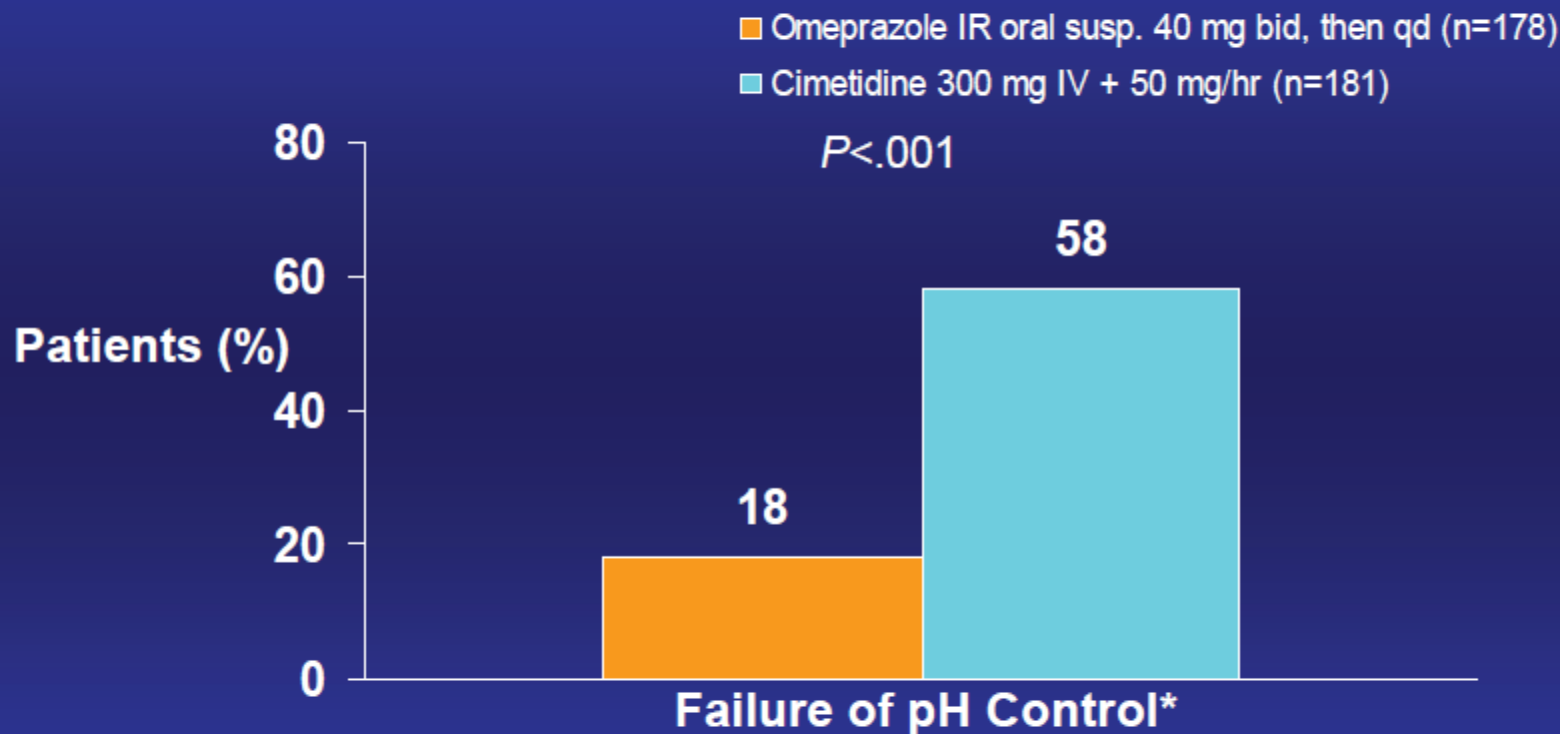


Photographs Courtesy Brian Fennerty, MD

# 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 significant bleeding is 1.5% or less**

# Stress Ulcer Prophylaxis: H<sub>2</sub>RA 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
<b>Respiratory failure</b>	<b>15.6</b>	<b>&lt;0.001</b>
<b>Coagulopathy</b>	<b>4.3</b>	<b>&lt;0.001</b>
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

# Management of Acute GI Bleeding

## Initial Management

IV Access

Hemodynamic Assessment

CBC, PT/ PTT, LFTs, electrolytes/creatinine

Type and Cross

Resuscitation Measures

NPO

## Assess Initial Risk

- Age >60 years
- Comorbidity
- Low systolic blood pressure
- Shock
- Ongoing bleed
- Prolonged PT
- Erratic mental status

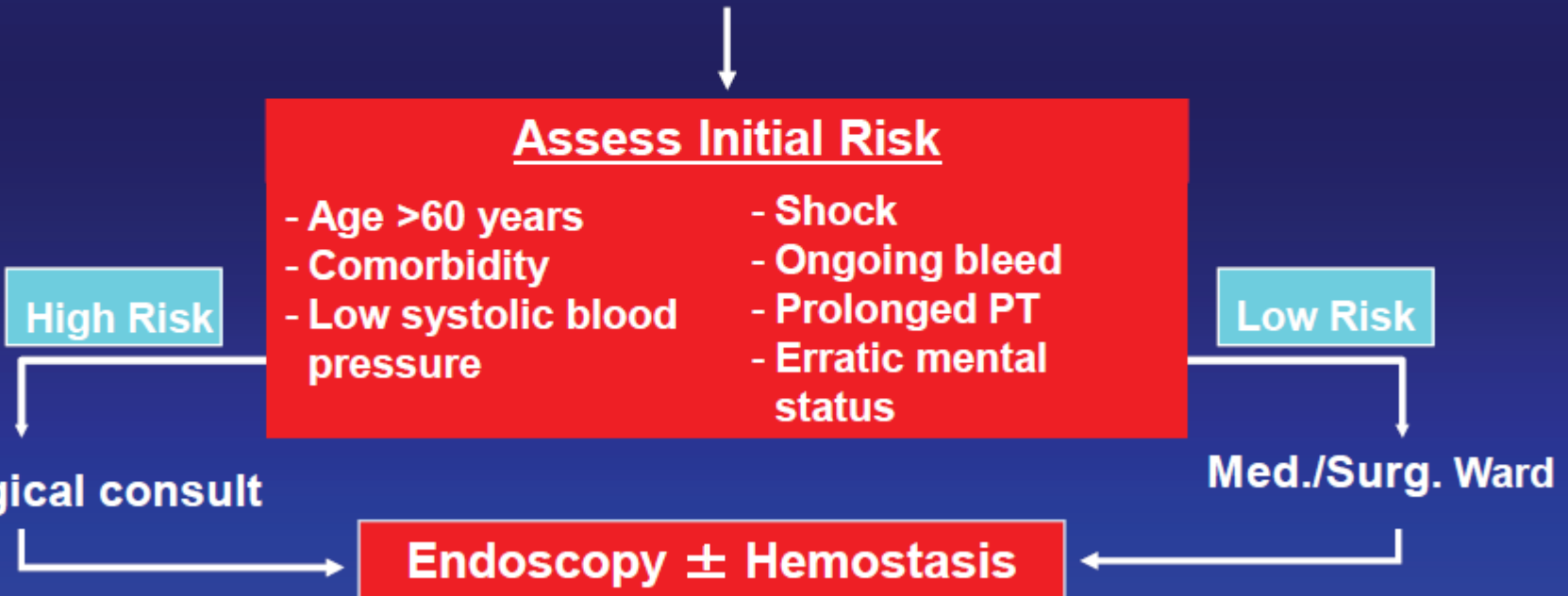
High Risk

Low Risk

ICU/Surgical consult

Med./Surg. Ward

Endoscopy ± Hemostasis



# Management of Acute GI Bleeding (cont' d)

**Endoscopy ± Hemostasis**



**Evaluate Risk for Rebleed**

**High Risk**

(active bleed,  
visible vessel)

adherent clot

**Low Risk**

(clean base, flat spot)

**Therapeutic Endoscopy**  
**IV PPI**  
**ICU**  
**Surgical Consult**

**Treat Underlying Ulcer**  
**Oral PPI**  
**Ward (or even D/C)**