

# Αιμορραγία Πεπτικού

ΑΝΑΣΤΑΣΙΑ ΑΝΤΩΝΙΑΔΟΥ

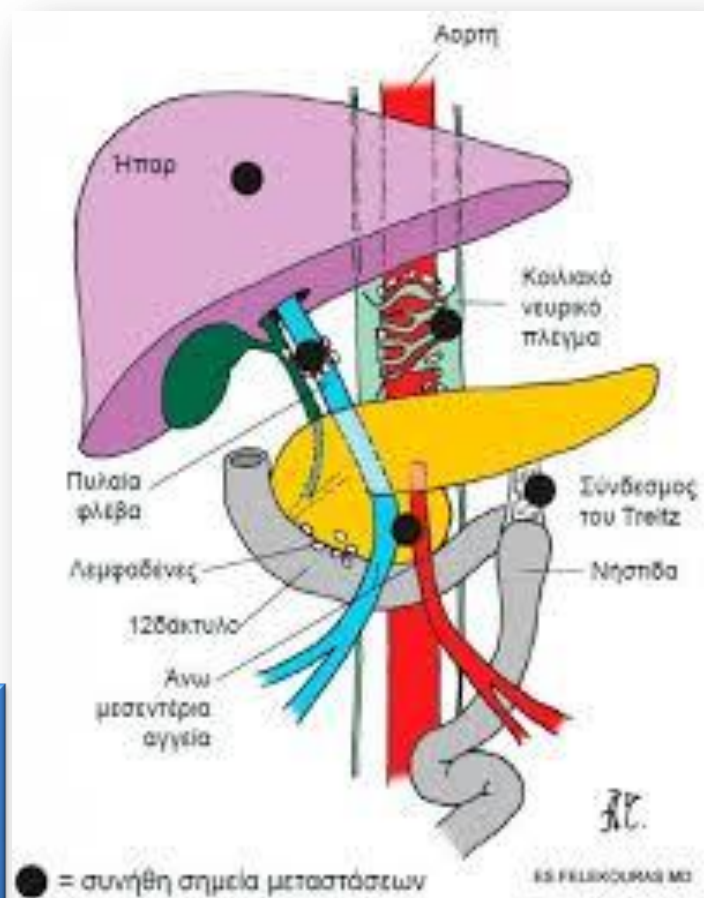
# Αιμορραγία Πεπτικού

Από το ανώτερο (UGIB)  
ή το κατώτερο πεπτικό (LGIB)  
(όριο ο σύνδεσμος του Treitz)

ΟΞΕΙΑ ή ΧΡΟΝΙΑ

Αιματέμεση  
Μέλαινα  
Αιματοχεσία

Μικροσκοπική  
απώλεια αίματος  
Θετική Hb  
κοπράνων  
Μικροκυτταρική  
αναιμία



# Οξεία αιμορραγία πεπτικού: κλινικές εκδηλώσεις

- **Αιματέμεση:** έμετος με ερυθρό αίμα ή σαν καφές
- **Μέλαινα:** μαύρη δύσοσμη κένωση
- **Αιματοχεσία :** κένωση με ζωηρό ερυθρό χρώμα ή βυσσινόχροη
- Πρόσμιξη αίματος στην κένωση
- Επάλειψη της κένωσης με αίμα ευθρό

Δυνητικά : συμπτώματα αναιμίας ή αιμοδυναμικής αστάθειας: στηθάγχη, δύσπνοια, σύγχυση, ορθοστατική υπόταση, ταχυκαρδία, υπόταση, shock

# Πιθανή προέλευση της αιμορραγίας ανάλογα με την κλινική εκδήλωση

| Clinical Indicator    | Probability of Upper GI Source | Probability of Lower GI Source |
|-----------------------|--------------------------------|--------------------------------|
| Hematemesis           | Almost certain                 | Rare                           |
| Melena                | Probable                       | Possible                       |
| Hematochezia          | Possible                       | Probable                       |
| Blood-streaked stool  | Rare                           | Almost certain                 |
| Occult blood in stool | Possible                       | Possible                       |

**Αιματέμεση**

Συνήθη αίτια

Πεπτικό έλκος  
Αιμορραγική (διαβρωτική) γαστρίτιδα  
Οισοφαγίτιδα  
Κιρσοί οισοφάγου  
Καρκίνος στομάχου  
Καρκίνος οισοφάγου  
Σύνδρομο Mallory-Weiss  
Έλκη (βλάβες) από stress

Σπάνια αίτια

Αγγειοδυσπλασία και άλλες αγγειακές βλάβες στομάχου  
Άλλοι όγκοι στομάχου

**Μέλαινα**

Συνήθη αίτια

Όλα τα συνήθη αίτια αιματέμεσης  
Όγκοι δεξιού κόλου  
Αγγειοδυσπλασία δεξιού κόλου

Σπάνια αίτια

Αγγειοδυσπλασία και άλλες αγγειακές βλάβες στομάχου ή λεπτού εντέρου  
Αρτηριοεντερικό συρίγγιο  
Άλλοι όγκοι στομάχου ή λεπτού εντέρου  
Νόσος του Crohn  
Εκκόλπωμα του Meckel  
Έμφρακτο λεπτού εντέρου

**Αίμα αναμεμιγμένο με τα κόπρανα ή αποβολή αμιγούς αίματος**

Συνήθη αίτια

Εκκολπώματα παχέος εντέρου  
Πολύποδες παχέος εντέρου  
Καρκίνος εγκάρσιου, κατιόντος ή σιγμοειδούς  
Φλεγμονώδης νόσος εντέρου  
Αγγειοδυσπλασία  
Ισχαιμική κολίτιδα  
Λοιμώδης κολίτιδα

Σπάνια αίτια

Αρτηριοεντερικό συρίγγιο  
Εκκόλπωμα του Meckel

**Αίμα που επικαλύπτει τα κόπρανα**

Συνήθη αίτια

Αιμορροΐδες  
Πρωκτίτιδα  
Ραγάδες  
Καρκίνος του πρωκτού ή του ορθού

Σπάνια αίτια

Νόσος του Crohn του πρωκτού

# Narrowing the DDx: Upper or Lower Source?

- Predictors of UGI source:
  - Age <50
  - Melenic stool
  - BUN/Creatinine ratio
    - If ratio  $\geq 30$ , think upper GIB

# Αιμορραγία ανωτέρου πεπτικού

- Συχνότητα : 100 περιπτώσεις ανα 100,000 πληθυσμού
- Συχνότερη στους άνδρες
- Συνολική θνητότητα 6-10%. Η αιτία θανάτου συνήθως είναι συννοσηρότητα
- 4 φορές συχνότερη από την αιμορραγία κατώτερου πεπτικού
- Στο 80% των περιπτώσεων αυτοπεριορίζεται
- Συχνότερη αιτία (27-40%) το πεπτικό έλκος
- Εξέταση εκλογής με διαγνωστικό αλλά και θεραπευτικό ρόλο, η οισοφαγογαστροσκόπηση

# Αιμορραγία ανωτέρου πεπτικού

- Hematemesis - 40-50%
- Melena - 70-80%
- Hematochezia - 15-20%
- Either hematochezia or melena - 90-98%
- Syncope - 14.4%
- Presyncope - 43.2%

Κατά την  
εισαγωγή

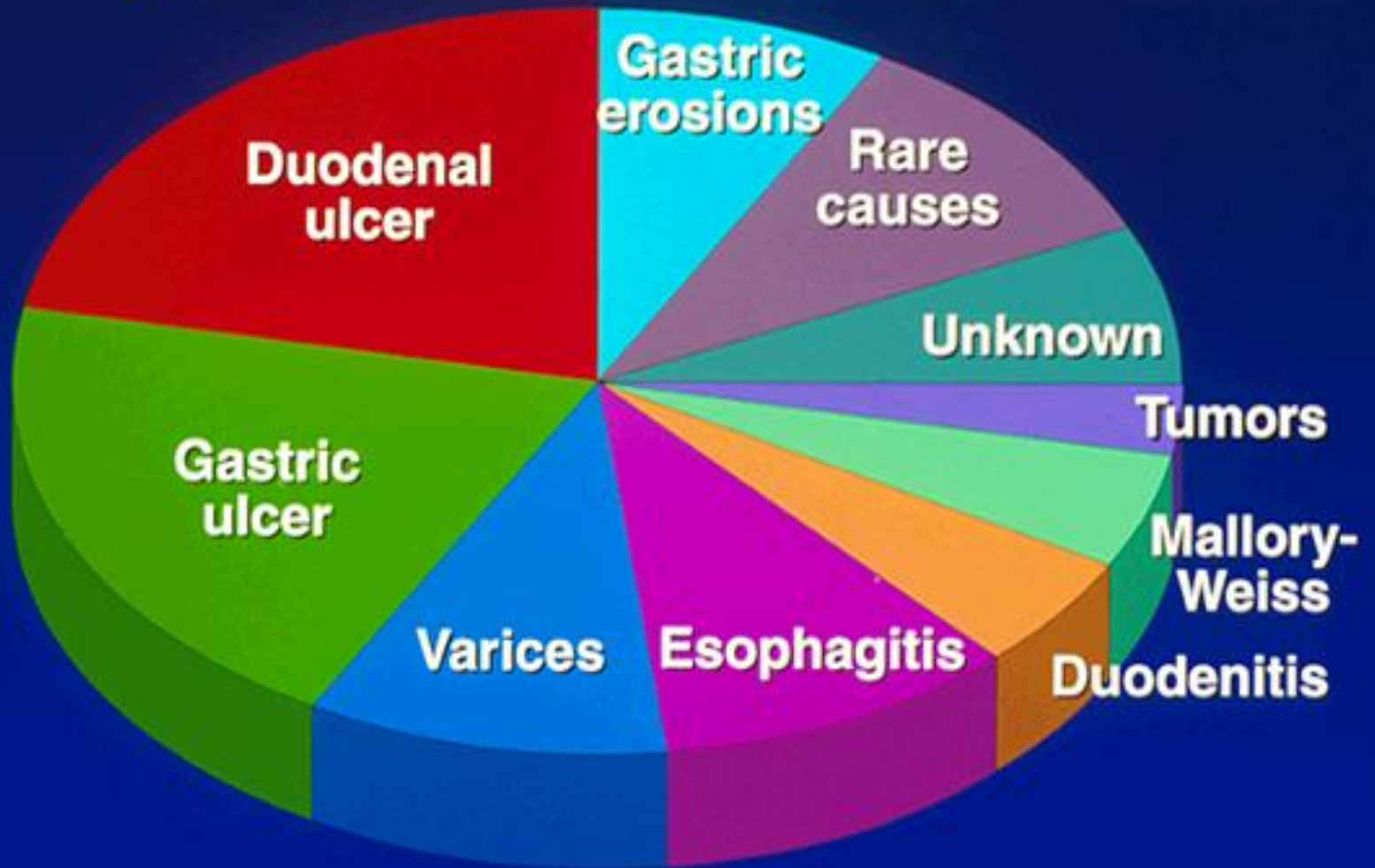
- Dyspepsia - 18%
- Epigastric pain - 41%
- Heartburn - 21%
- Diffuse abdominal pain - 10%
- Dysphagia - 5%
- Weight loss - 12%
- Jaundice - 5.2

30 ημέρες πριν  
την εισαγωγή



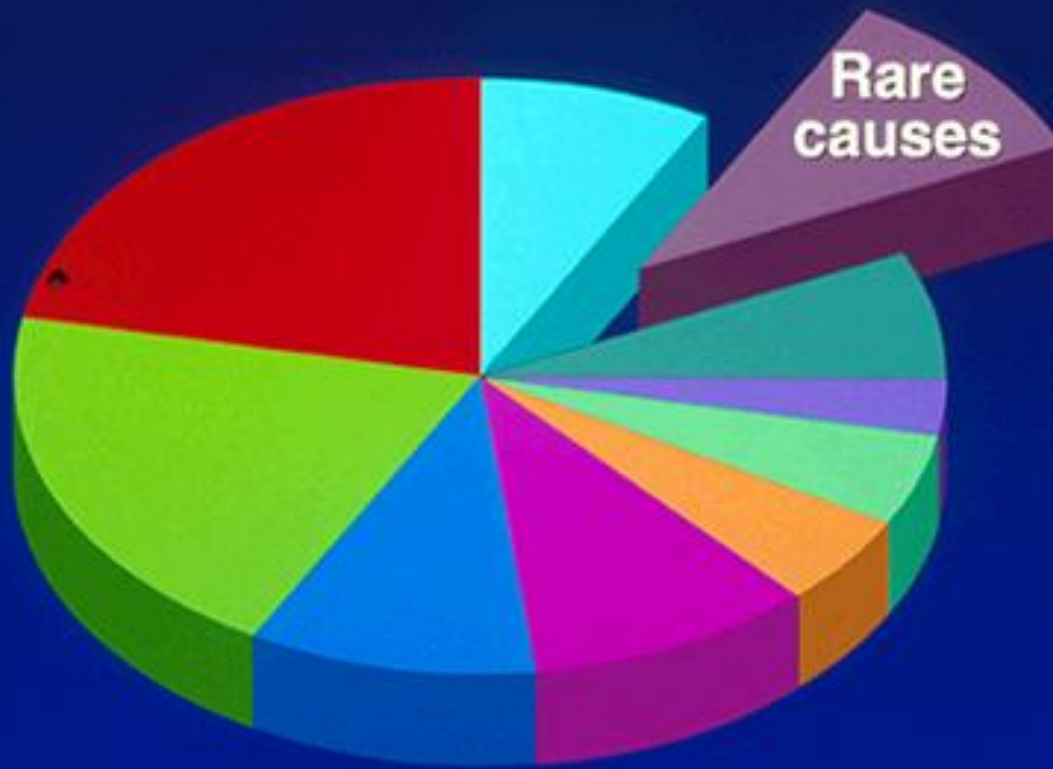
# UGIB : AITIA

## *UGI Bleeding*



# UGIB : AITIA

## *UGI Bleeding*



**AVMs**  
**Stomal ulcer**  
**Dieulafoy's lesion**  
**Watermelon stomach**  
**Hemobilia**  
**Connective tissue disorder**  
**Kaposi's sarcoma**  
**Aorto-enteric fistula**  
**Benign tumors**  
**Others**



**Συχνότερα αίτια αιμορραγίας ανώτερου πεπτικού με βάση τα ενδοσκοπικά ευρήματα. Στο 20% των περιπτώσεων η γαστροσκόπηση μπορεί να είναι αρνητική**

| <b>Cause of bleeding</b>        | <b>Relative frequency</b><br><i>(% of those in whom any abnormality was identified at endoscopy)</i> |
|---------------------------------|--|
| Peptic ulcer                    | 44   |
| Oesophagitis                    | 28   |
| Gastritis/erosions              | 26   |
| Erosive duodenitis              | 15   |
| Varices                         | 13   |
| Portal hypertensive gastropathy | 7  |
| Malignancy                      | 5  |
| Mallory Weiss tear              | 5  |
| Vascular malformation           | 3  |

# UGIB : βαρύτητα αιμοδυναμικής επιβάρυνσης

|  | Class 1                | Class 2           | Class 3                  | Class 4                  |
|--|------------------------|-------------------|--------------------------|--------------------------|
| Blood Loss, mL                         | Up to 750              | 750-1500          | 1500-2000                | >2000                    |
| Blood Loss,%<br>blood volume           | Up to 15%              | 15-30%            | 30-40%                   | >40%                     |
| Pulse Rate, bpm                        | < 100                  | >100              | >120                     | >140                     |
| Blood Pressure                         | Normal                 | Normal            | Decreased                | Decreased                |
| Respiratory Rate                       | Normal or<br>Increased | Decreased         | Decreased                | Decreased                |
| Urine Output,<br>mL/h                  | >35                    | 30-40             | 20-30                    | 14-20                    |
| CNS/Mental<br>Status                   | Slightly<br>anxious    | Mildly<br>anxious | Anxious,<br>confused     | Confused,<br>lethargic   |
| Fluid<br>Replacement, 3-<br>for-1 rule | Crystalloid            | Crystalloid       | Crystalloid and<br>blood | Crystalloid and<br>blood |

## UGIB : βαρύτητα αιμοδυναμικής επιβάρυνσης

Σημαντική η παρουσία ορθοστατικής υπότασης. (A positive tilt test is defined as an SBP decrease of 10 mm Hg and a pulse rate increase of 20 bpm with standing compared to the supine position)

Σηματοδοτεί απώλεια τουλάχιστον 1000 ml αίματος και διπλασιάζει τη θνητότητα

## Αιμορραγία ανωτέρου πεπτικού : Διαστρωμάτωση κινδύνου

- Identify patients at high risk for adverse outcomes
- Helps determine disposition (ICU vs. floor vs. outpatient)
- May help guide appropriate timing of endoscopy

## Αιμορραγία ανωτέρου πεπτικού : Διαστρωμάτωση κινδύνου

| NASOGASTRIC ASPIRATE | STOOL COLOR          | MORTALITY RATE (%) |
|----------------------|----------------------|--------------------|
| Clear                | Red, brown, or black | 10                 |
| Coffee Grounds       | Brown or black       | 10                 |
|                      | Red                  | 20                 |
| Red Blood            | Black                | 10                 |
|                      | Brown                | 20                 |
|                      | Red                  | 30                 |

## Αιμορραγία ανωτέρου πεπτικού : Διαστρωμάτωση κινδύνου

Παράγοντες κινδύνου για μη ελεγχόμενη αιμορραγία  
και θάνατο

- Ηλικία (>60)
- Οξεία αιμοδυναμική επιβάρυνση
- Συννοσηρότητες
- Φάρμακα όπως ασπιρίνη ή NSAIDS
- Αιμορραγία σε ήδη νοσηλευόμενο ασθενή
- >6 μεταγγίσεις
- Διαταραχές πήξεως

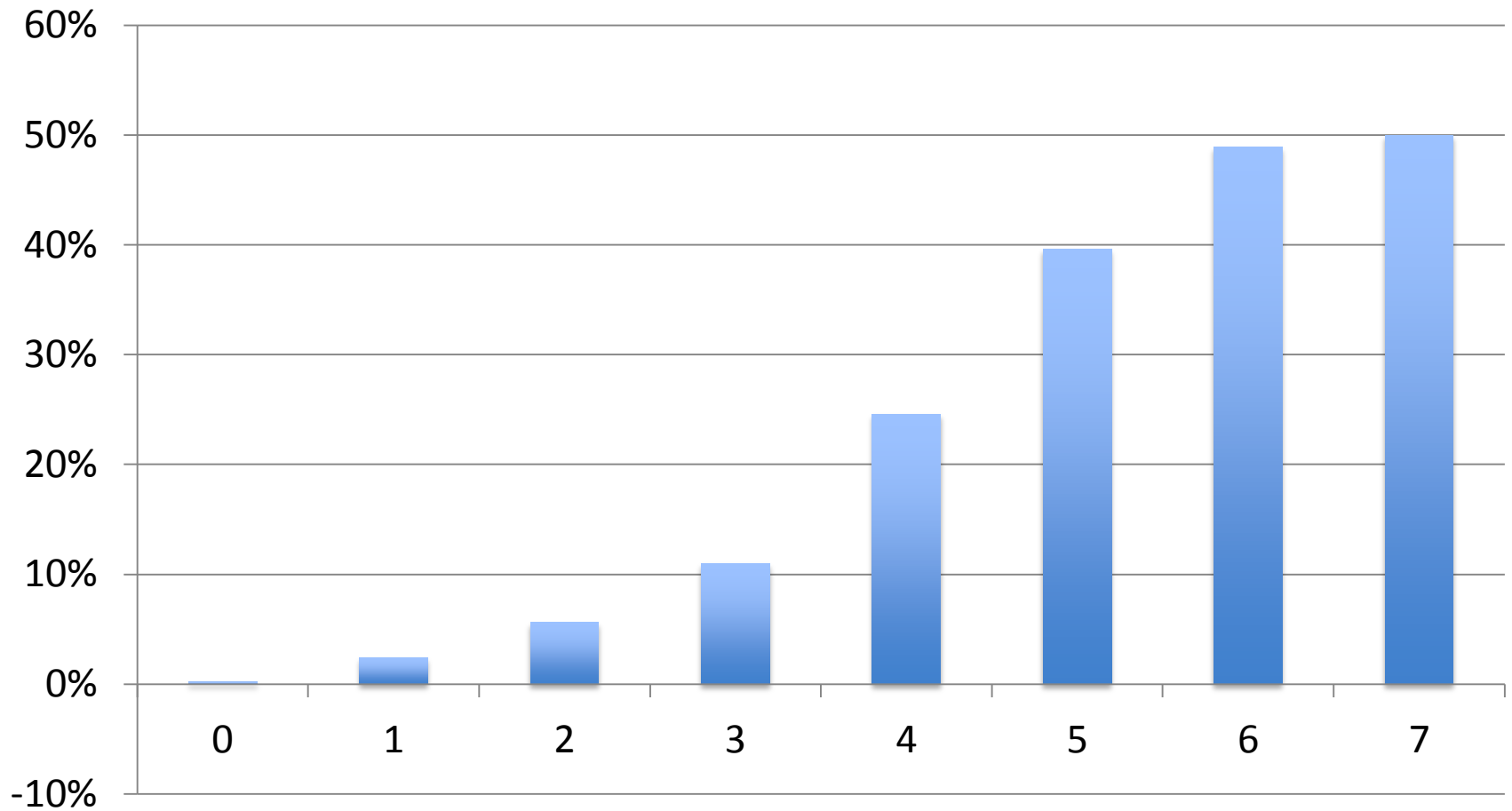


# Rockall Scoring System

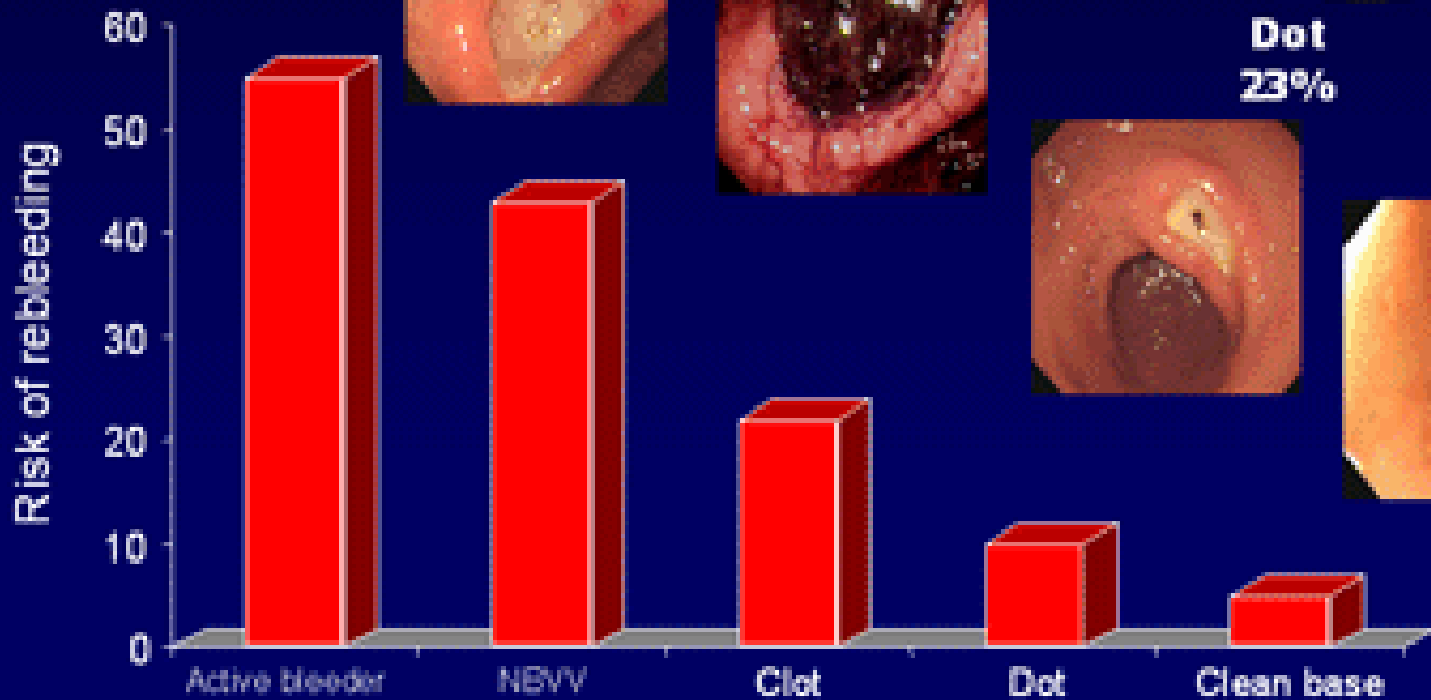
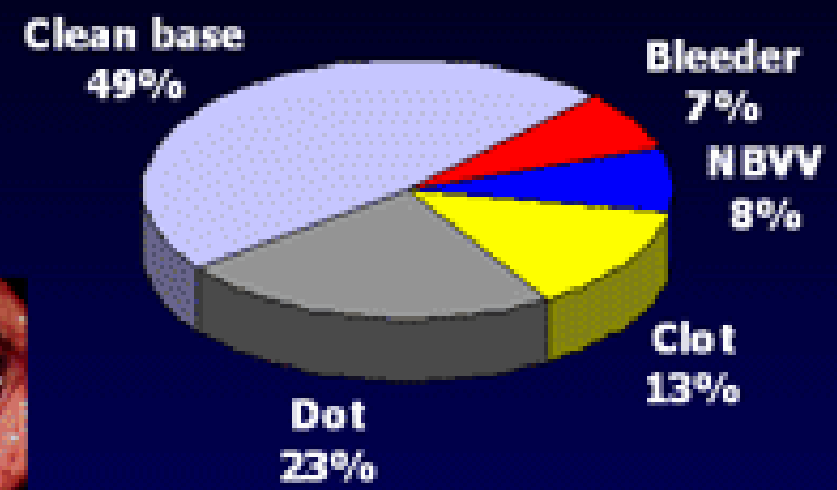
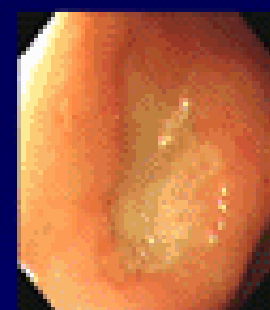
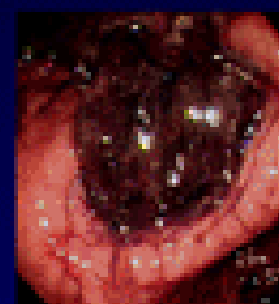
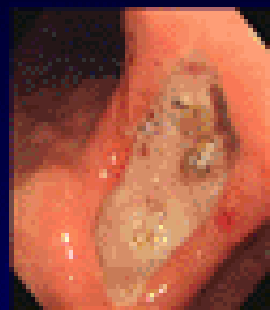
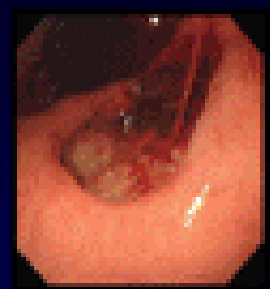
- Validated predictor of mortality in patients with UGIB
- 2 components: clinical + endoscopic

| Variable  | 0                                       | 1                            | 2  | 3  |
|---|---|------------------------------|--|--|
| <b>Age</b>  | <60                                     | 60-79                        | ≥ 80   |  |
| <b>Shock</b>  | No<br>SBP ≥ 100<br>P<100                | Tachy-<br>SBP ≥ 100<br>P>100 | Hypotension-<br>SBP <100   |  |
| <b>Comorbidity</b>                                      | No major                                |                              | Cardiac failure,<br>CAD, other major   | Renal failure,<br>liver failure,<br>malignancy |
| <b>Diagnosis</b>  | Mallory weiss,<br>no lesion , no<br>SRH | All other<br>diagnoses       | Malignancy of<br>upper GI tract  |  |
| <b>Major stigmata of<br/>recent<br/>hemorrhage(SRH)</b> | none, or dark<br>spot only              |                              | blood in<br>upper GI tract,<br>adherent clot,<br>visible or<br>spurting vessel |  |

# Clinical Rockall Score – Mortality Rates



# Stigmata of Bleeding: Risks for Rebleeding and Prevalence



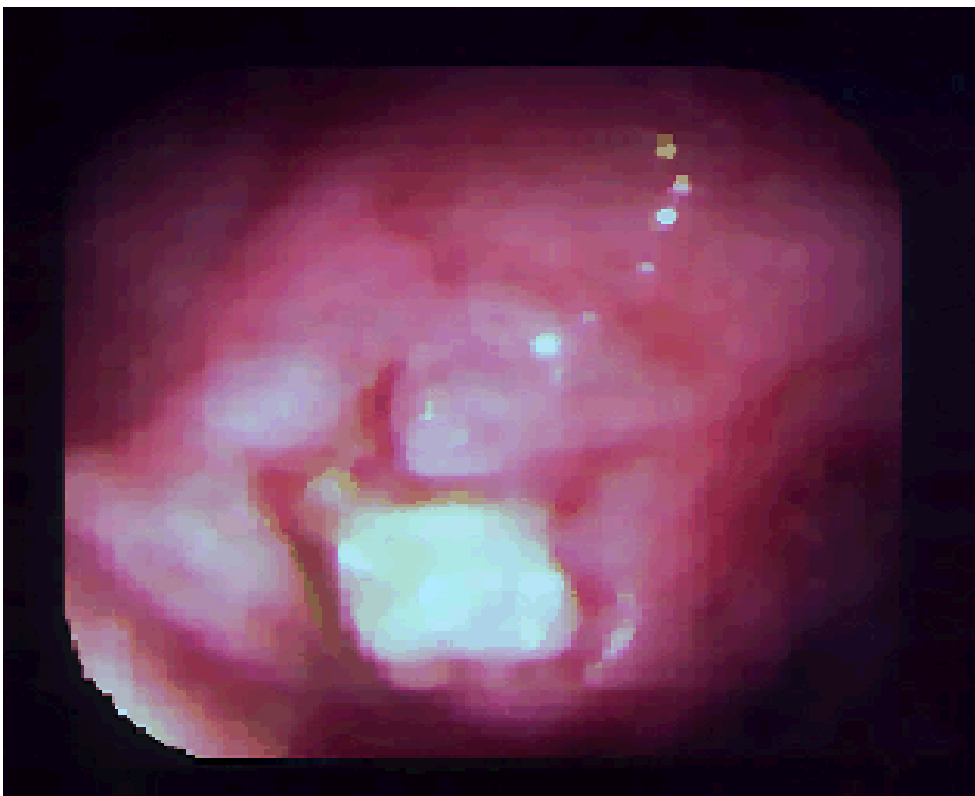
## Αιμορραγία ανωτέρου πεπτικού : Διαστρωμάτωση κινδύνου (ενδοσκοπική εικόνα)

| Ulcer Characteristics | Prevalence Rate, % | Rebleeding Rate, % | Surgery Rate, % | Mortality Rate, % |
|-----------------------|--------------------|--------------------|-----------------|-------------------|
| Clean base            | 42                 | 5                  | 0.5             | 2                 |
| Flat spot             | 20                 | 10                 | 6               | 3                 |
| Adherent clot         | 17                 | 22                 | 10              | 7                 |
| Visible vessel        | 17                 | 43                 | 34              | 11                |
| Active bleeding       | 18                 | 55                 | 35              | 11                |

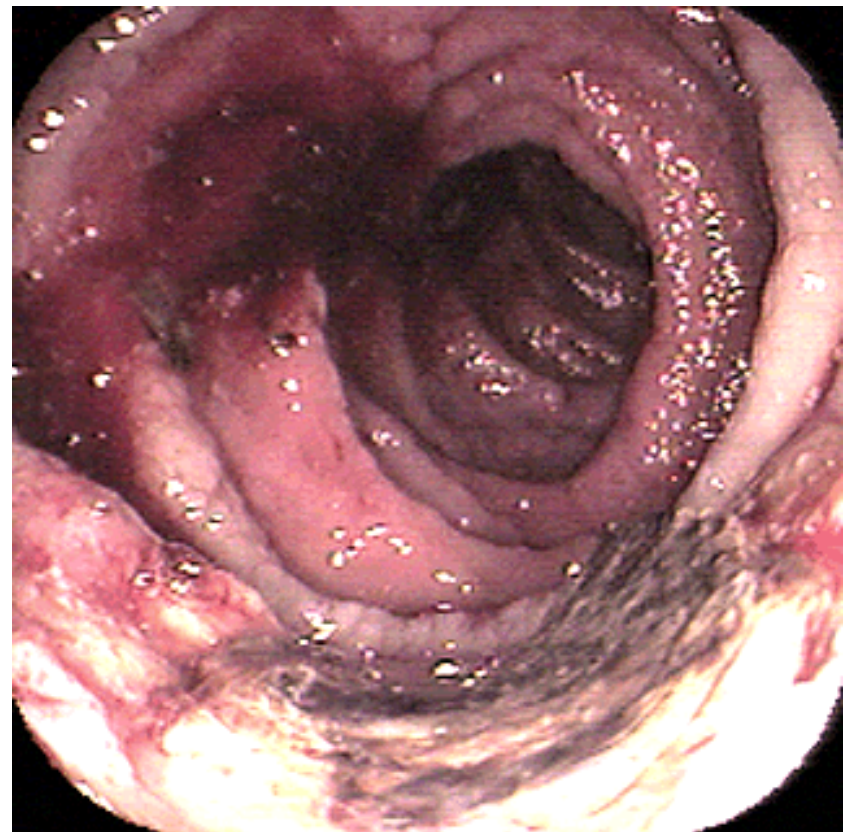


A Mallory-Weiss tear

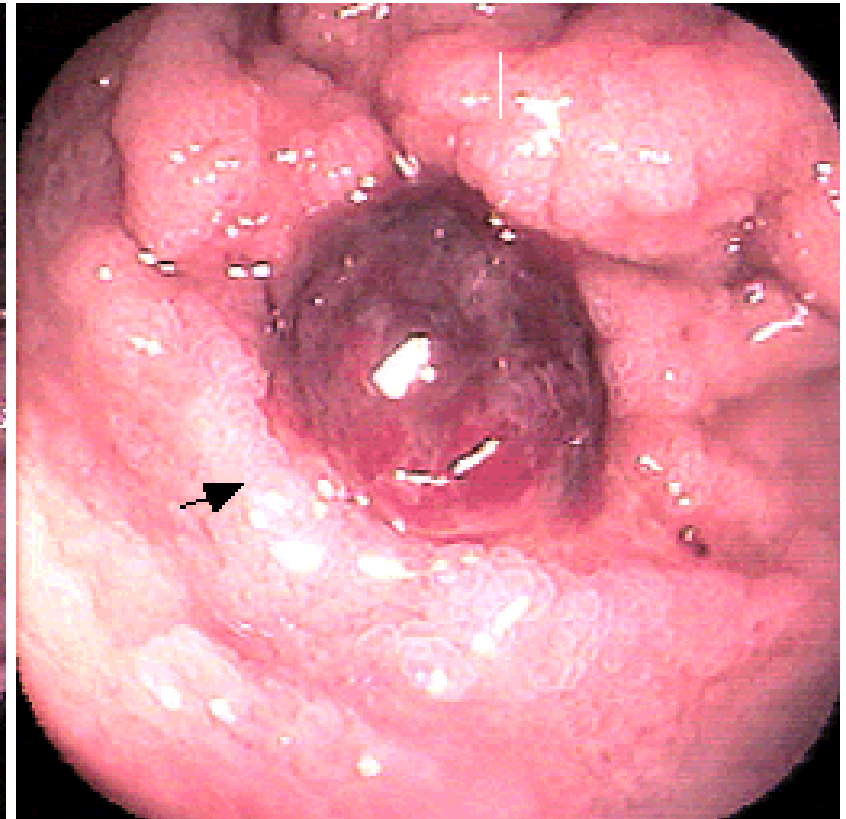
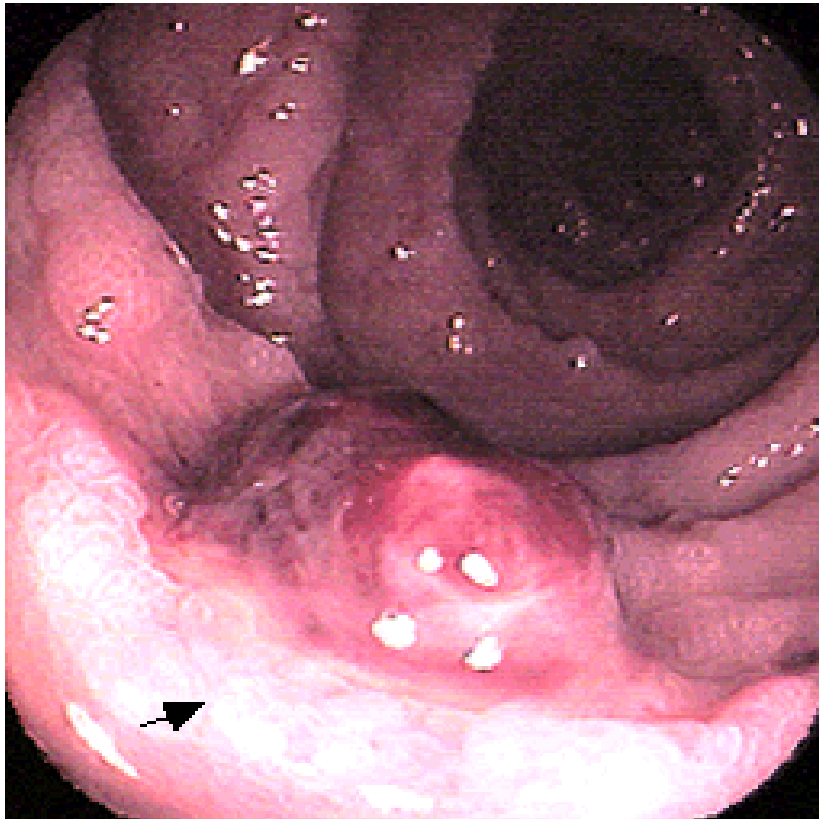




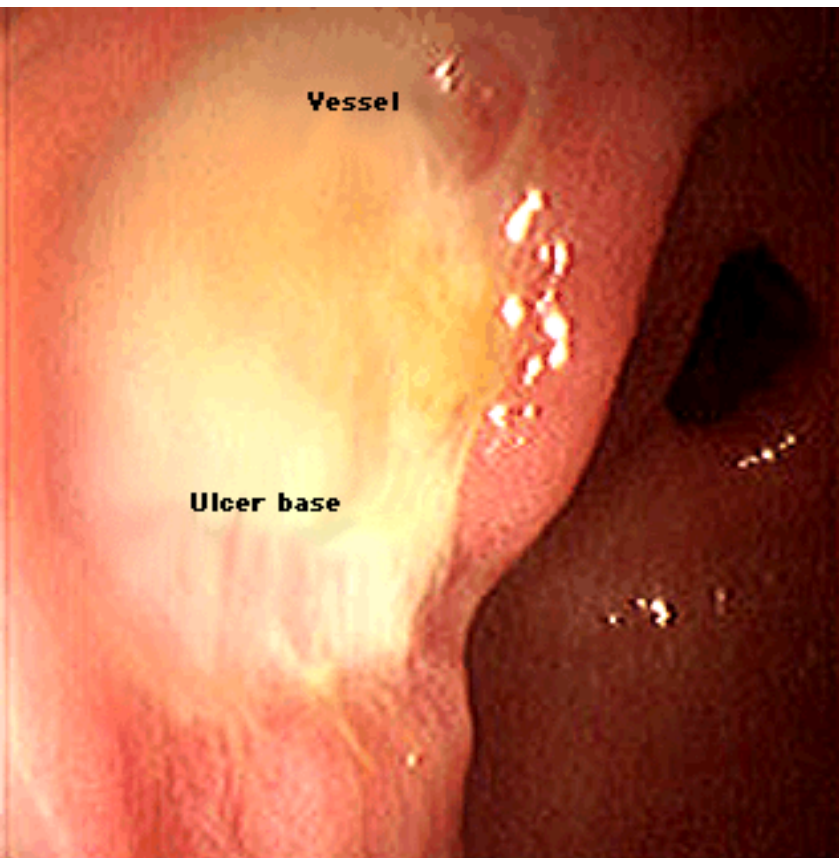
**Peptic ulcer** Upper endoscopy demonstrates a peptic ulcer with a clean base. Courtesy of Rome Jutabha, MD and Dennis M Jensen, MD.



**Duodenal ulcer** Appearance of a duodenal ulcer that had a visible vessel following injection therapy with epinephrine and thermal coagulation. Note that the visible vessel has been flattened. Courtesy of Eric D Libby, MD.



**Visible vessel** Duodenal ulcer in a patient with recent upper gastrointestinal bleeding. The ulcer base (arrows) is visible as the whitish rim underlying the protruding vessel. The erythematous mound in the center of the ulcer represents an arteriole that has eroded into the lumen of the duodenum. Courtesy of Eric D Libby, MD.



**Gastric ulcer with a visible vessel** Ulcer in the gastric antrum seen on endoscopy. The visible vessel appears as a small protuberance in the one o'clock position. Courtesy of Eric D Libby, MD.

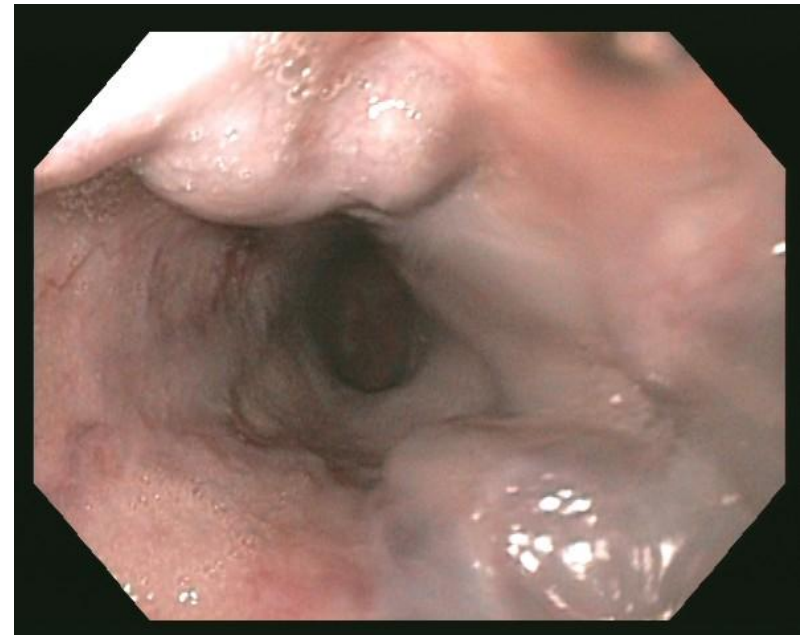


**Bleeding gastric ulcer** Endoscopy shows an actively bleeding gastric ulcer in the lesser curvature. Courtesy of Rome Jutabha, MD and Dennis M Jensen, MD.



# Variceal Bleeding

- Occurs in 1/3 of patients with cirrhosis
- 1/3 initial bleeding episodes are fatal
- Among survivors, 1/3 will rebleed within 6 weeks
- Only 1/3 will survive 1 year or more



# Predictors of large esophageal varices

- Severity of liver disease (Child Pugh)
- Platelet count < 88K
- Palpable spleen
- Platelet count/spleen diameter (mm) ratio <909

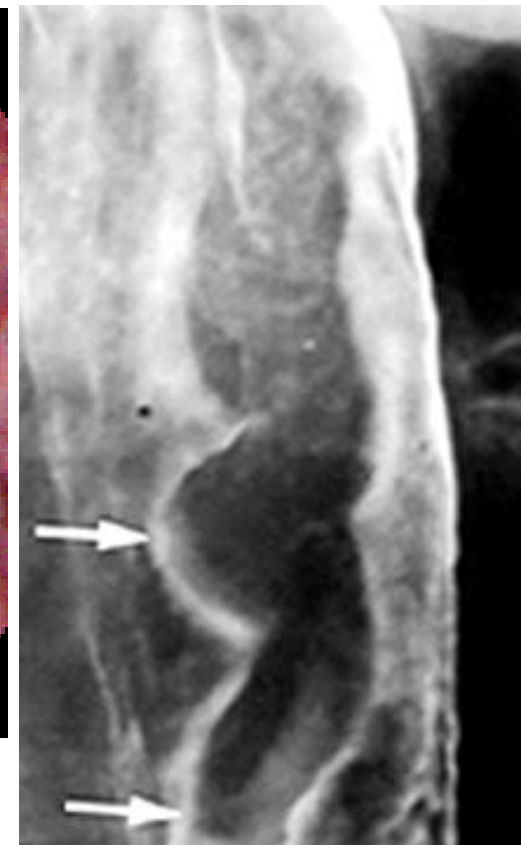
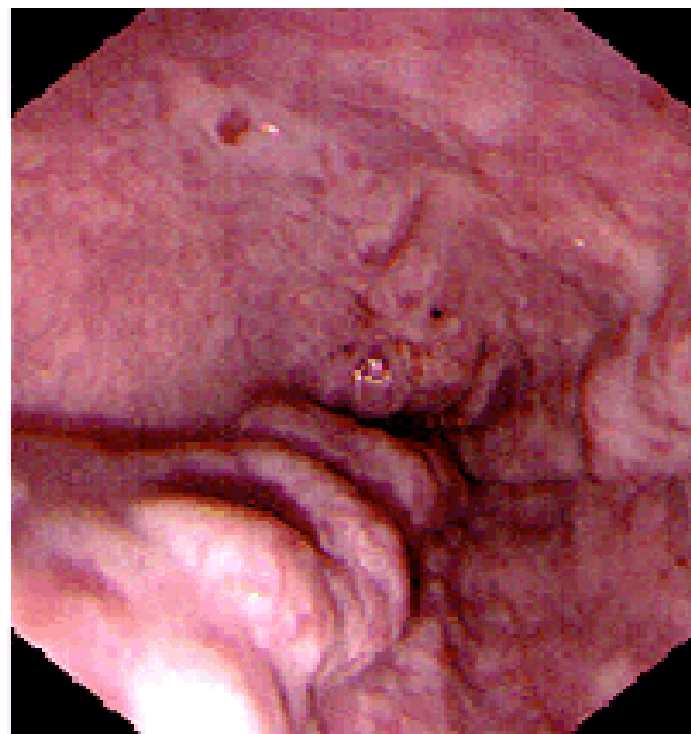
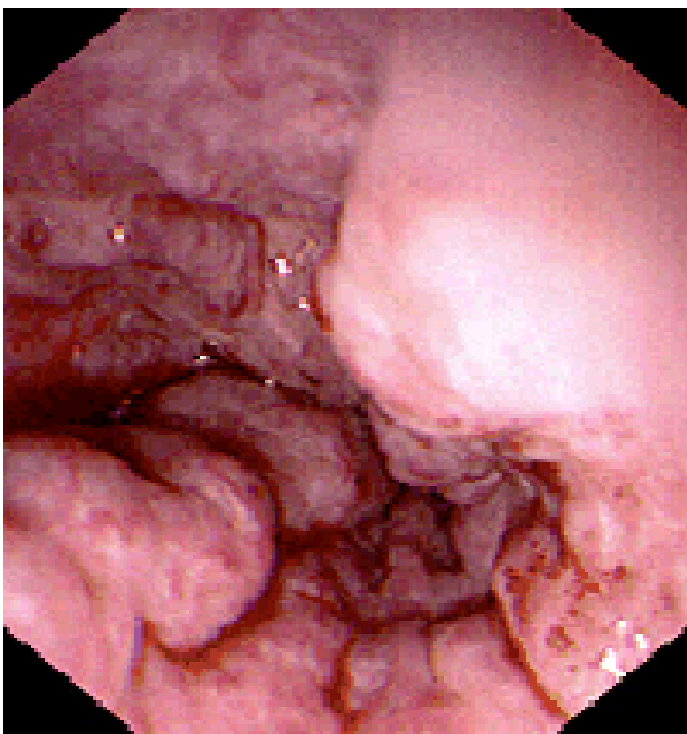
Gut 2003;52:1200

J Clin Gastroenterol 2010;44:146

J Gastroenterol Hepatol 2007;22:1909

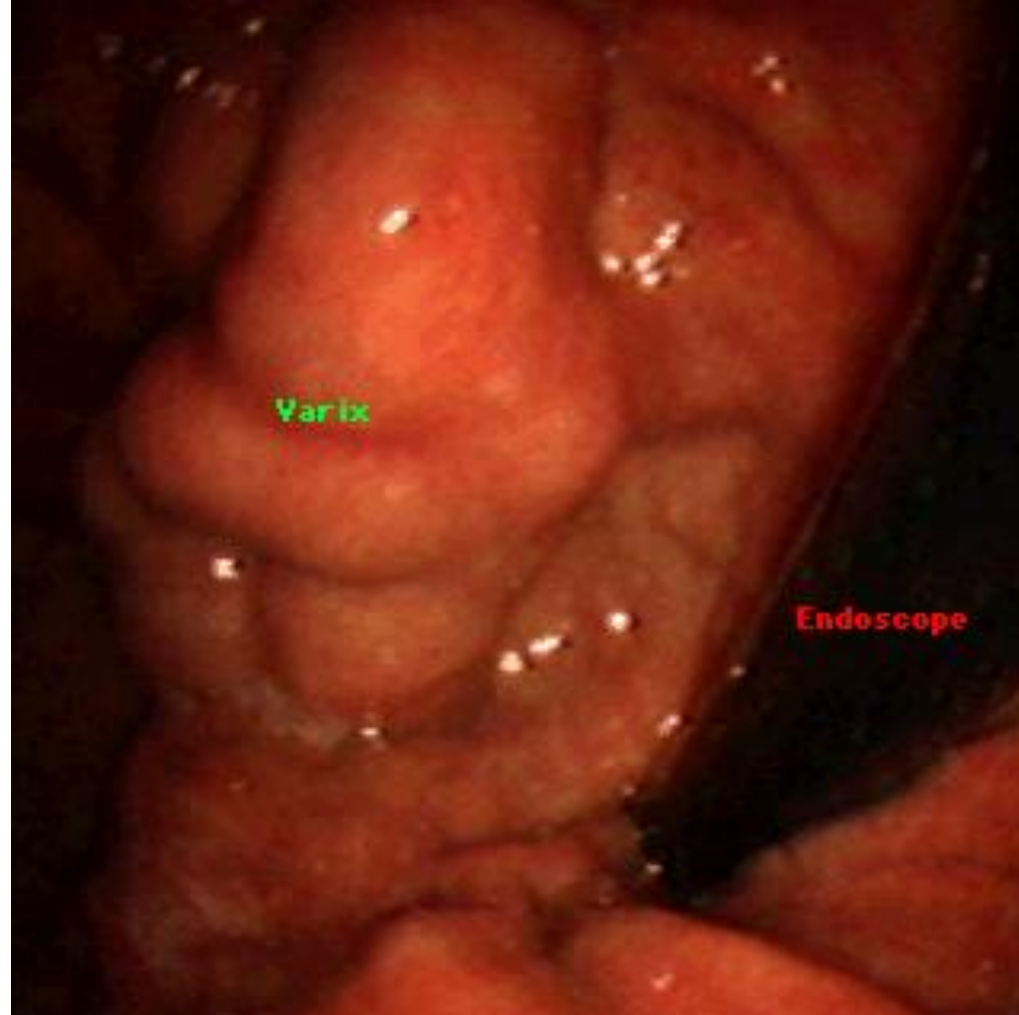
Arch Intern Med 2001;161:2564

Am J Gastroenterol 1999;94:3103



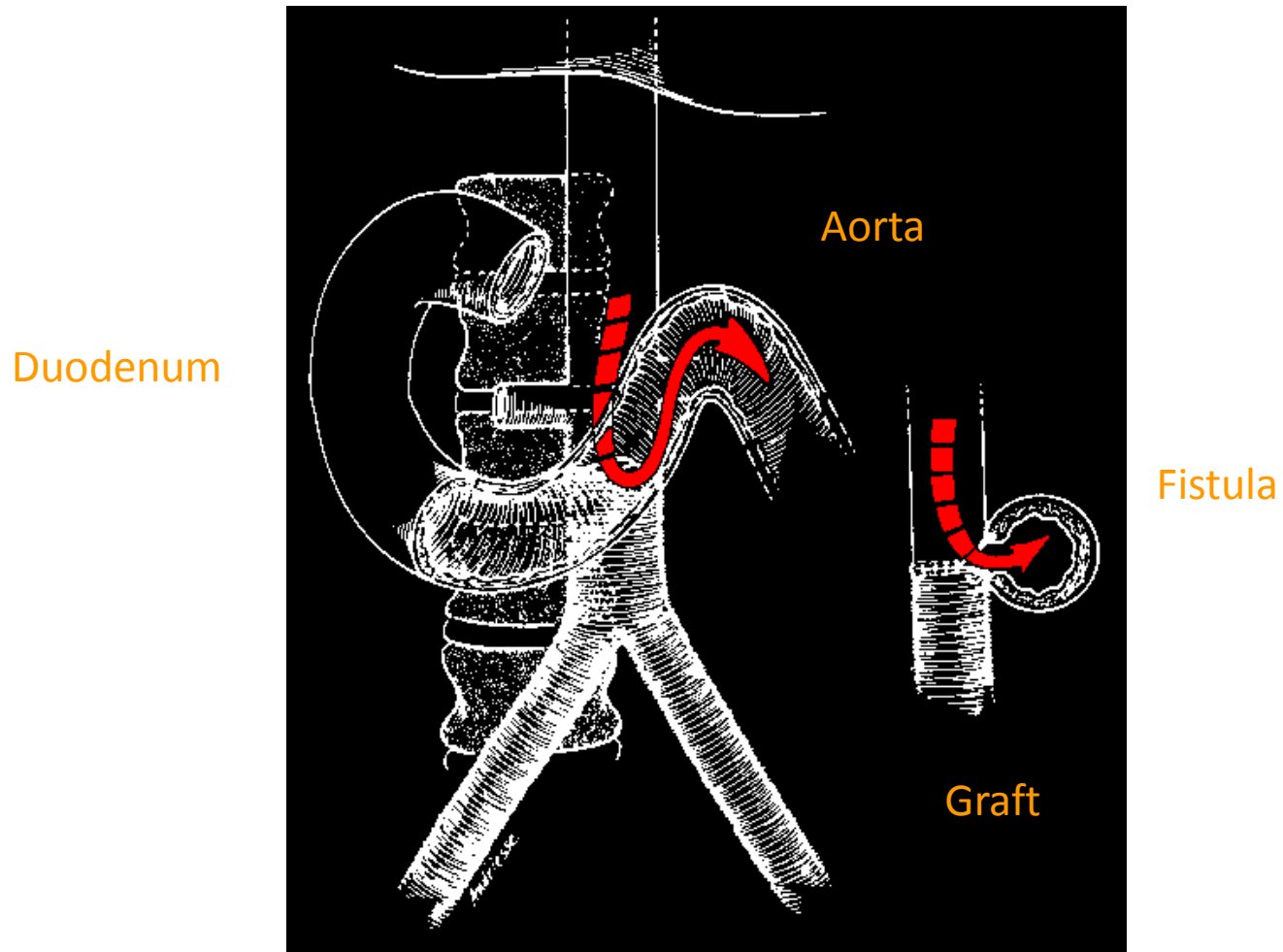
**Esophageal varices** Endoscopic images from a patient with esophageal varices who presented with hematemesis. The varices appear as markedly dilated and tortuous columns of veins in the mid and distal esophagus. The varices were treated with injection sclerotherapy emergently and later with variceal banding. Courtesy of JB McGee, MD.

**Esophageal varix** Double contrast esophagram shows a distended serpentine intramural varix (arrows) in the wall of the distal esophagus. Courtesy of Jonathan Kruskal, MD.



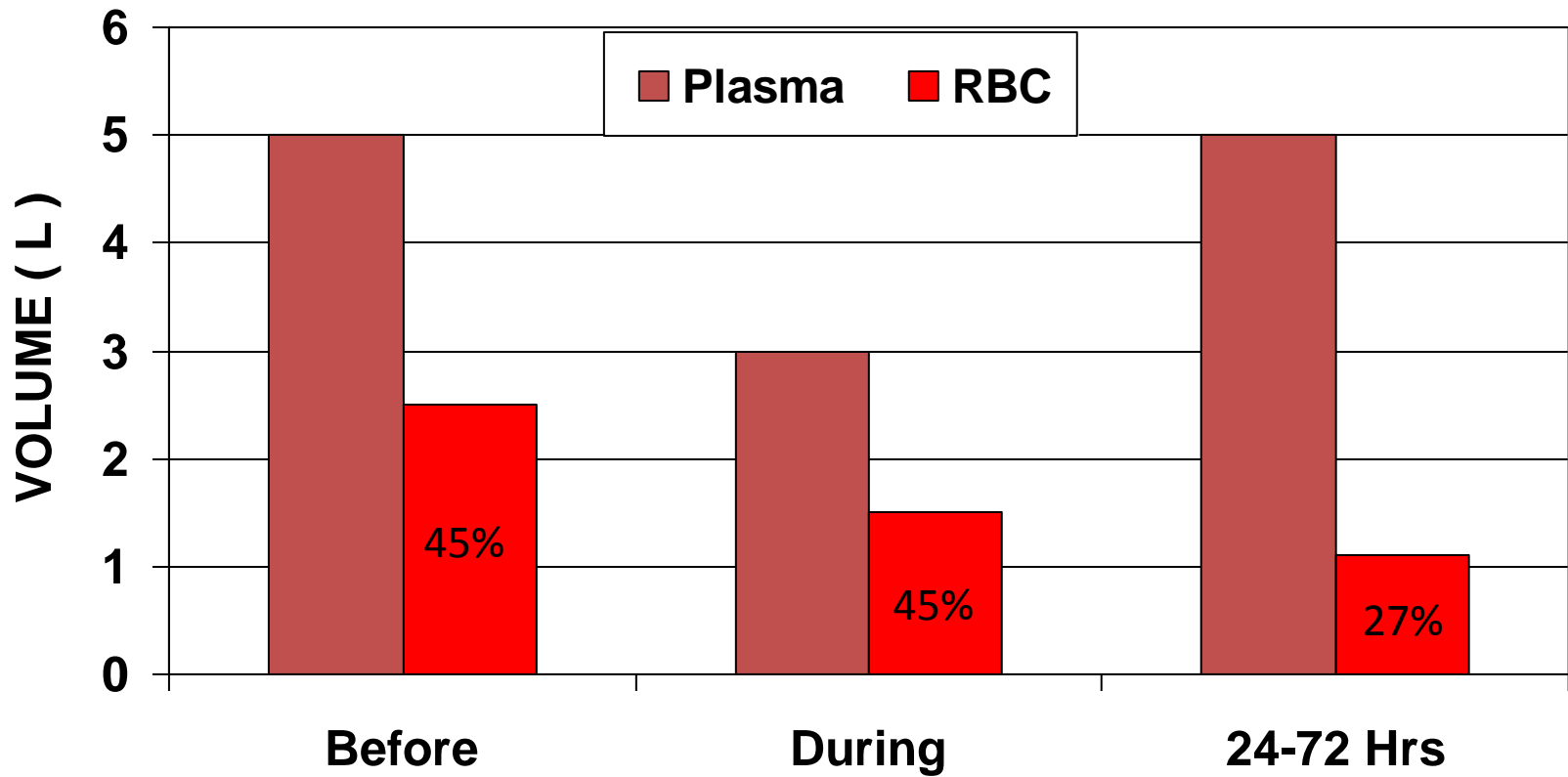
**Gastric varix** Upper endoscopy of a gastric varix in the fundus of the stomach. Gastric varices can arise in conjunction with esophageal varices. They can also be isolated when they result from segmental portal hypertension due to obstruction of the splenic vein by pancreatic carcinoma or chronic pancreatitis. Courtesy of Rome Jutabha, MD, and Dennis M Jensen, MD.

# Aortoduodenal Fistula



# Acute Bleeding

Changes Before and After 2 Liter Bleed



# Acute UGIB

## Surgery

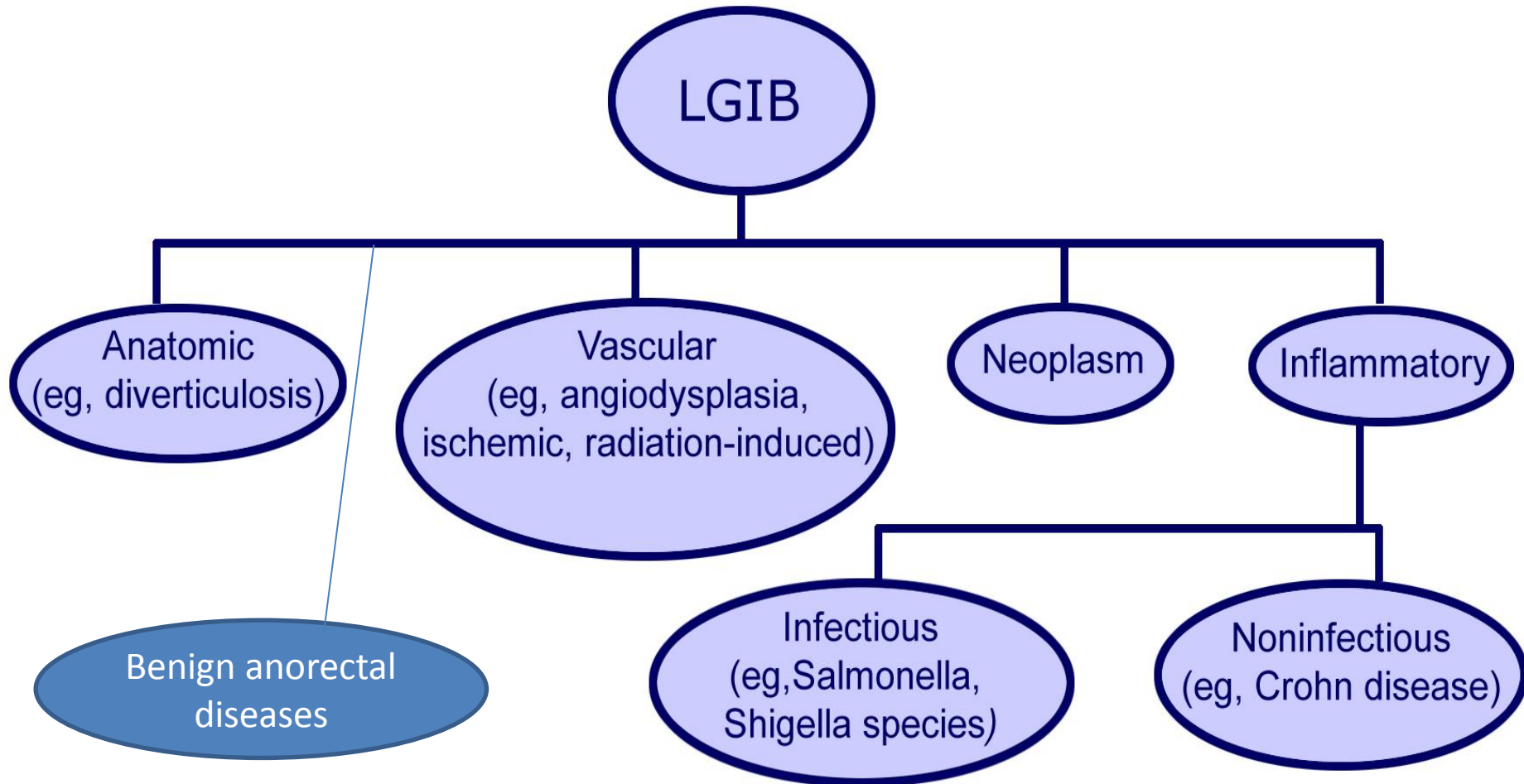
- Recurrent bleeding despite endoscopic therapy
- > 6-8 units pRBCs

## Αιμορραγία κατώτερου πεπτικού (LGIB)

- 20-33% των αιμορραγιών πεπτικού
- 20-27 περιπτώσεις ανα 100,000 πληθυσμού
- συνολική θνητότητα 10-20%
- αυτοπεριοριζόμενη στο 80%(rebleeding 33%)
- κυριώτερο αίτιο η εκκολπωμάτωση. 20% των εκκολπωμάτων (εξάυτών 25% είναι στο δεξιό κόλο)
- Κυριώτερα αίτια σημαντικής αιμορραγίας η εκκολπωμάτωση (30-50%) και οι αγγειοδυσπλασίες (20-30%)
- Σπάνια σε φλεγμονώδη νόσο του εντέρου
- συχνότερη σε άτομα >60 (εκκολπώματα, ισχαιμική κολίτις, ακτινική κολίτις, αγγειοδυσπλασίες, Ca)
- η αιμορραγία από αιμορροΐδες σε άτομα <50)



# Αιμορραγία κατώτερου πεπτικού (LGIB)



| Lower Gastrointestinal Bleeding in Adults   | Percentage of Patients |
|---|------------------------|
| <b>Diverticular disease</b> <ul style="list-style-type: none"> <li>• Diverticulosis/diverticulitis of small intestine</li> <li>• Diverticulosis/diverticulitis of colon</li> </ul>                                    | <b>60%</b>             |
| <b>Inflammatory bowel disease</b> <ul style="list-style-type: none"> <li>• Crohn disease of small bowel, colon, or both</li> <li>• Ulcerative colitis</li> <li>• Noninfectious gastroenteritis and colitis</li> </ul> | <b>13%</b>             |
| <b>Benign anorectal diseases</b> <ul style="list-style-type: none"> <li>• Hemorrhoids</li> <li>• Anal fissure</li> <li>• Fistula-in-ano</li> </ul>  | <b>11%</b>             |
| <b>Neoplasia</b> <ul style="list-style-type: none"> <li>• Malignant neoplasia of small intestine</li> <li>• Malignant neoplasia of colon, rectum, and anus</li> </ul>   | <b>9%</b>              |
| <b>Coagulopathy</b>   | <b>4%</b>              |
| <b>Arteriovenous malformations (AVMs)</b>   | <b>3%</b>              |

# Lower GI Bleed

- Differential Diagnosis

- **Diverticulosis** (# 1 cause)

Large volume, painless

- Angioectasias

- Hemorrhoids

- Colitis (IBD, Infectious, Ischemic)

Smaller volume, pain,  
diarrhea

- Neoplasm

- Post-polypectomy

- Dieulafoy's lesion

Figure 1: Types of lower GI bleeding

## LOWER GI BLEEDING

```
graph TD; A[LOWER GI BLEEDING] --> B[MASSIVE BLEEDING]; A --> C[MODERATE BLEEDING]; A --> D[OCCULT BLEEDING];
```

### MASSIVE BLEEDING

1. Patients >65 years of age with multiple medical problems
2. Present as a hematochezia or bright red blood per rectum.
3. Hemodynamically unstable
  - SBP=90 mmHg
  - HR>100/min
  - Low urine output
4. Hemoglobin level=6g/dl
5. Most commonly due to
  - Diverticulosis
  - Angiodysplasias
6. Mortality rate may be as high as 21%.

### MODERATE BLEEDING

1. Patients with any age.
2. May present as hematochezia or melena.
3. Hemodynamically stable patients.
4. Long list of diseases including benign anorectal, congenital, inflammatory, and neoplastic diseases may cause moderate amount of acute or chronic bleeding.

### OCCULT BLEEDING

1. Patients with any age.
2. Patients present with microcytic hypochromic anemia due to chronic blood loss.
3. Long list of diseases including congenital, inflammatory, and neoplastic diseases may cause chronic occult bleeding.

# LGIB – Risk Stratification

- Predictors of severe\* LGIB:

- HR>100
- SBP<115
- Syncope
- nontender abdominal examination
- bleeding during first 4 hours of evaluation
- aspirin use
- >2 active comorbid conditions

0 factors: ~6% risk

1-3 factors: ~40%

>3 factors: ~80%

\* Defined as continued bleeding within first 24 hours (transfusion of 2+ Units, decline in HCT of 20+%) and/or recurrent bleeding after 24 hours of stability

# LGIB – Risk Factors for Mortality

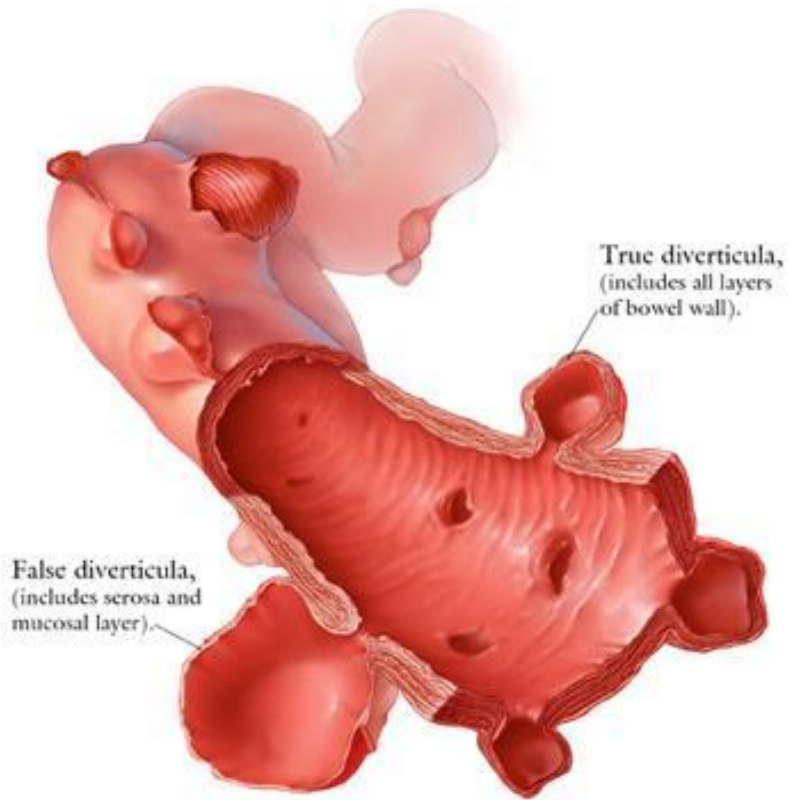
- **Age**
- **Intestinal ischemia**
- **Comorbid illnesses**
  
- Secondary bleeding (developed during admission for a separate problem)
- Coagulopathy
- Hypovolemia
- Transfusion requirement (>6)
- Male gender

# Acute LGIB

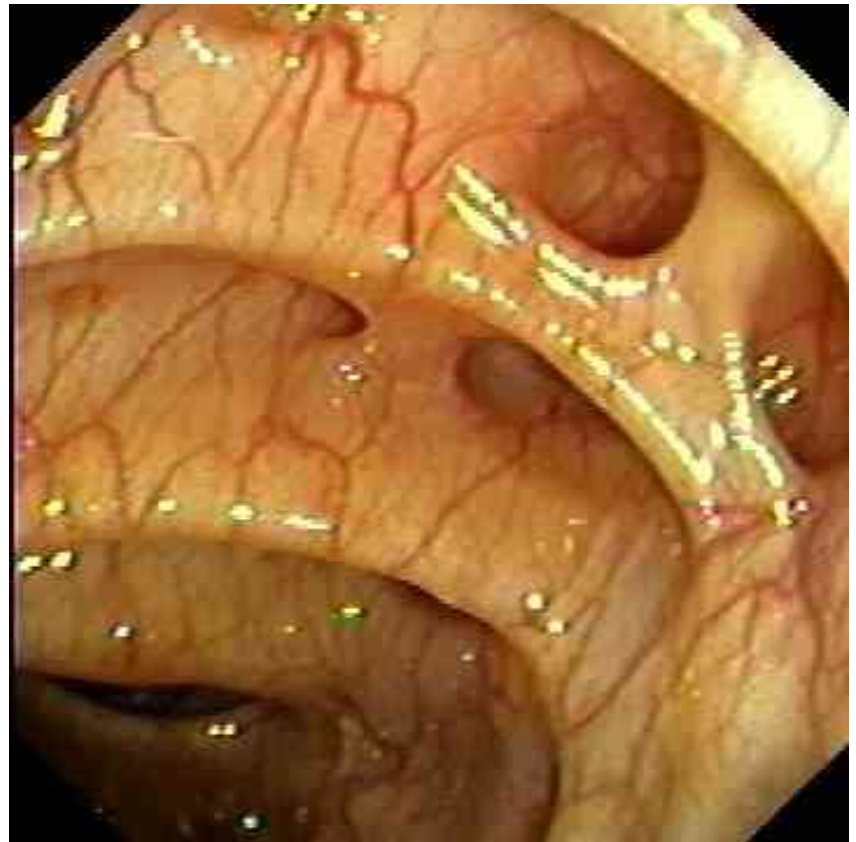
## Evaluation

| Study           | Yield % | Comments           |
|-----------------|---------|--------------------|
| Colonoscopy     | 69-80   | Therapeutic        |
| Arteriography   | 40-78   | 1 ml/min,<br>risks |
| Tagged RBC Scan | 20-72   | Localization       |

# Diverticulosis

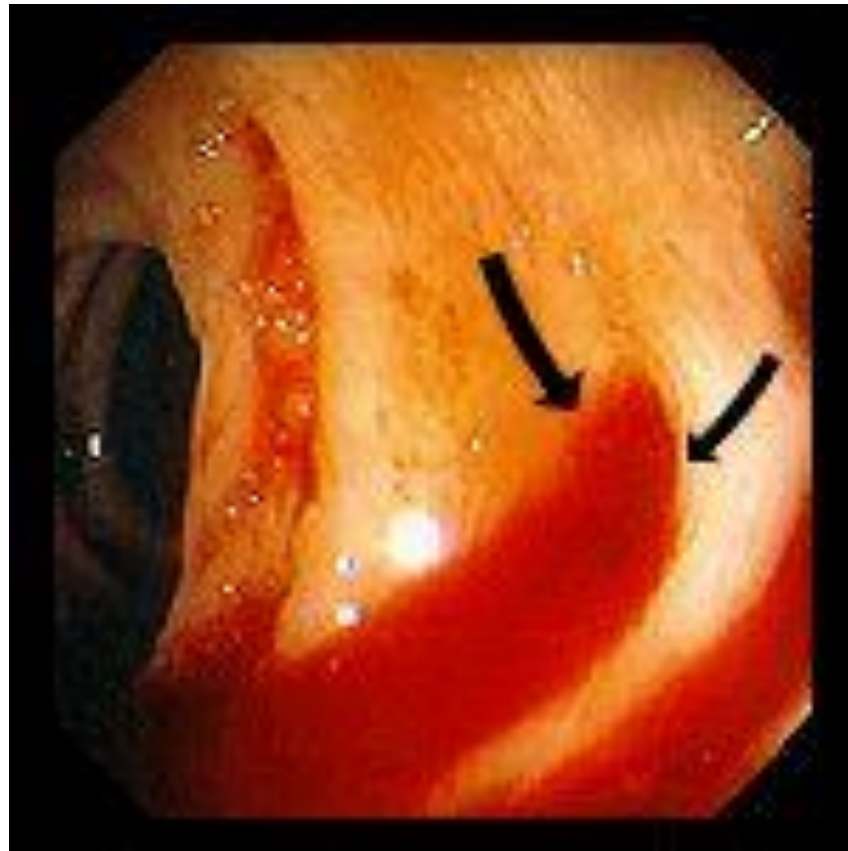


Diverticulosis

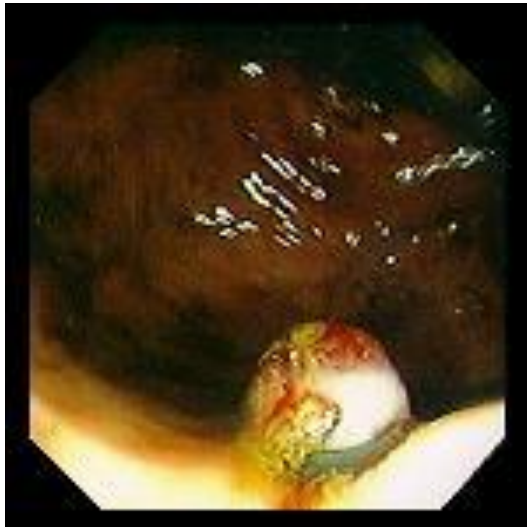




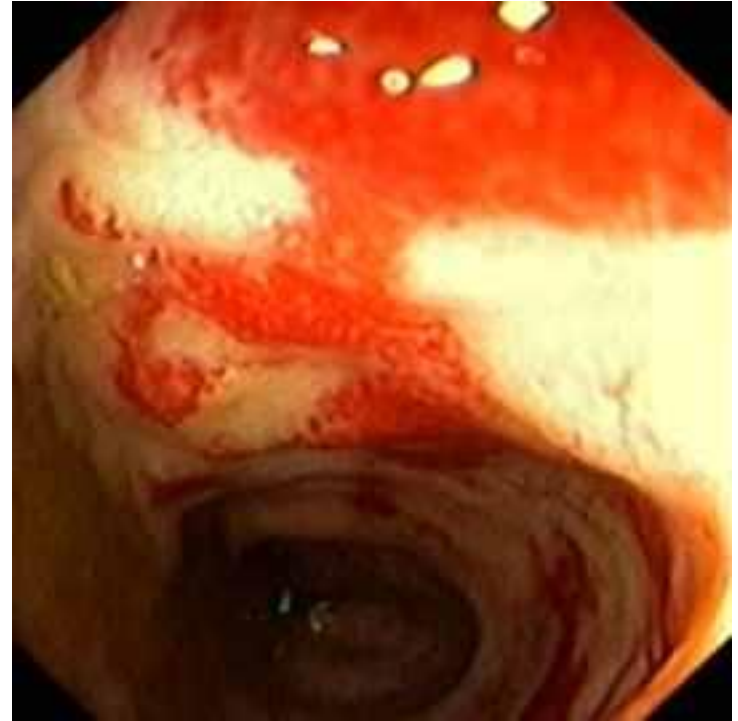
# Diverticular Bleeding



# Hemorrhoids

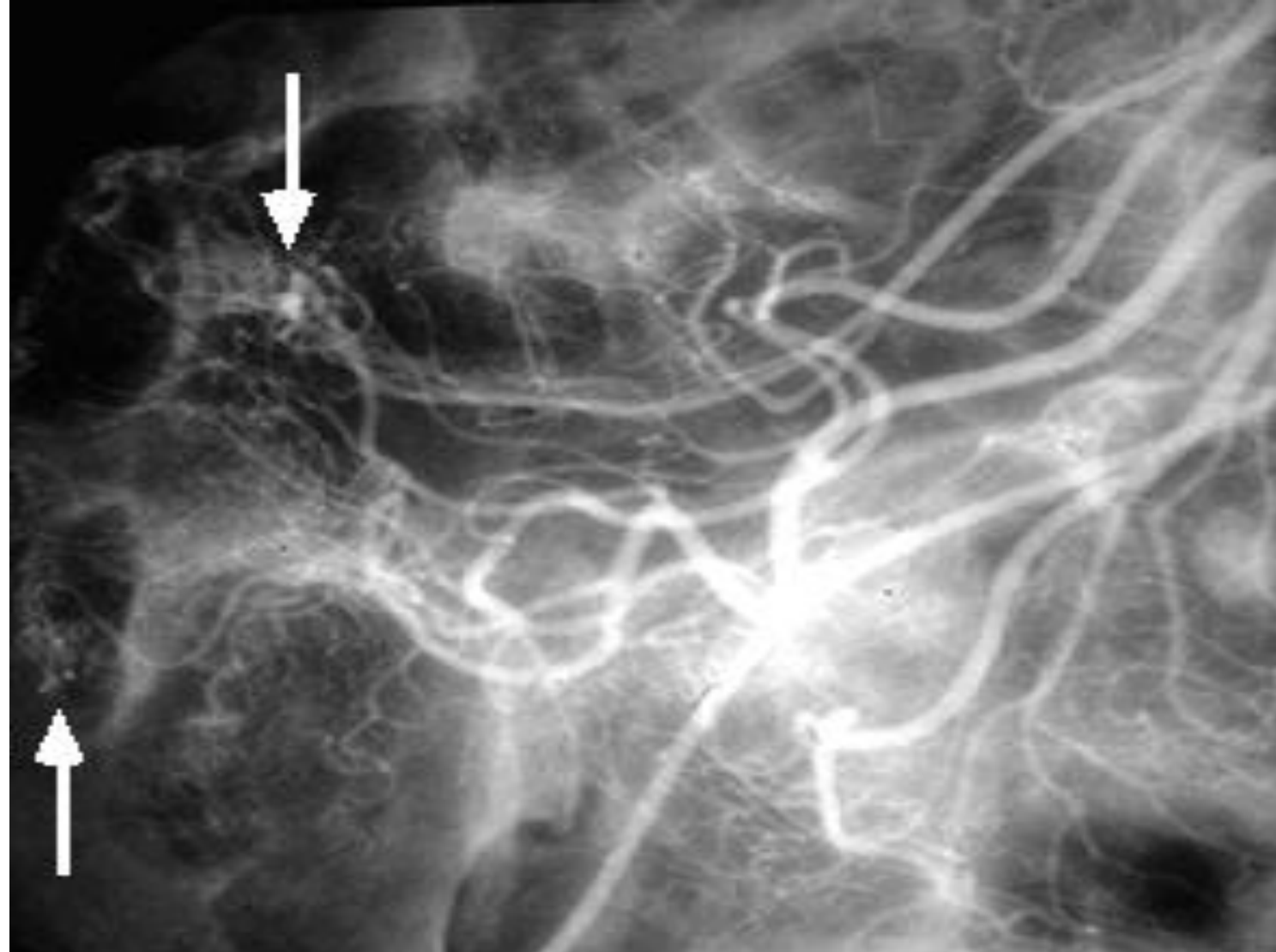


# Radiation Proctitis

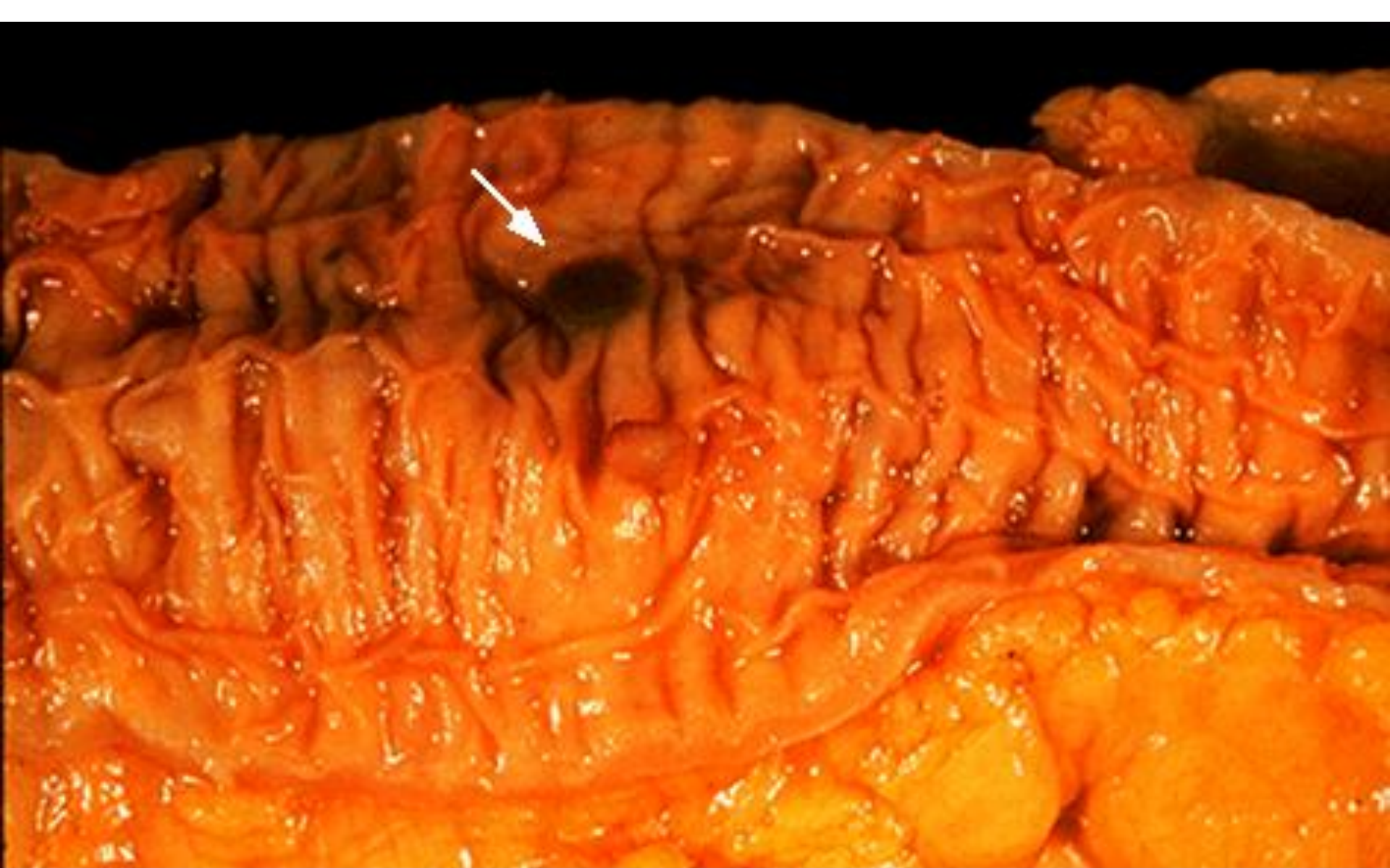




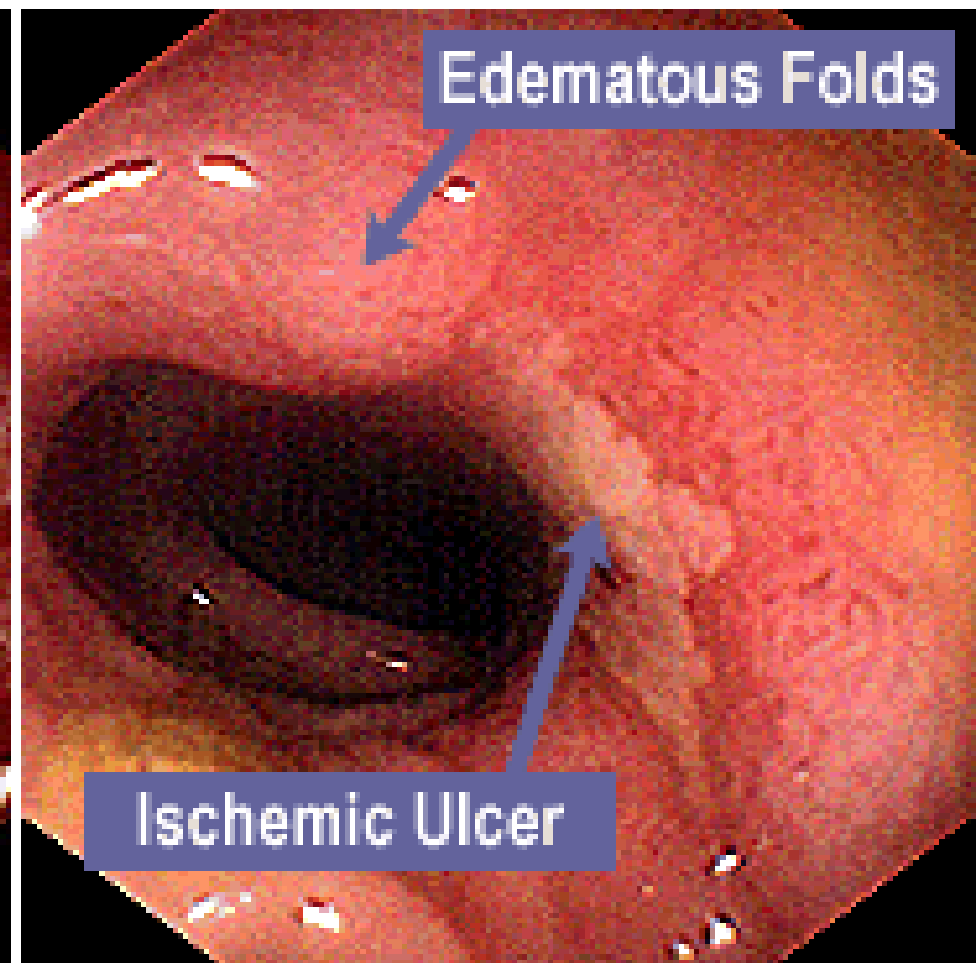
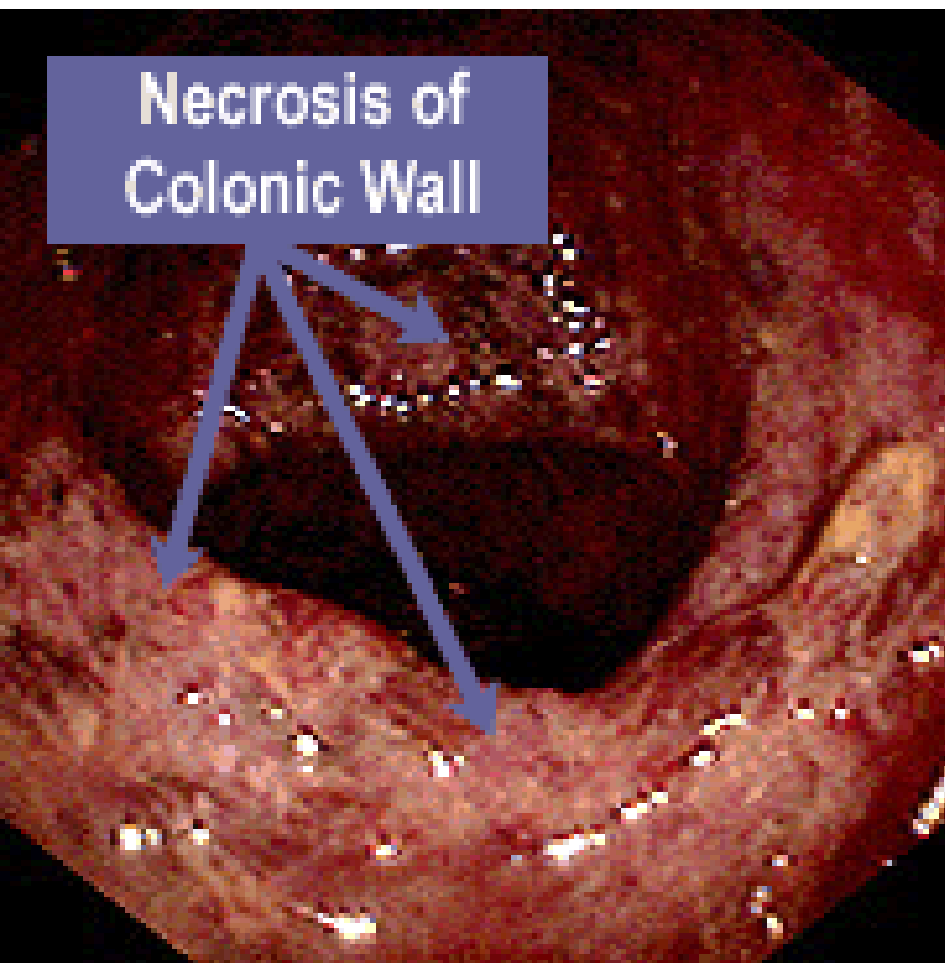
**Angiodysplasia** Angiodysplasia appears endoscopically as peripherally expanding dilated capillaries with a central origin measuring between 0.1 to 1.0 cm in diameter. Courtesy of Rome Jutabha, MD.



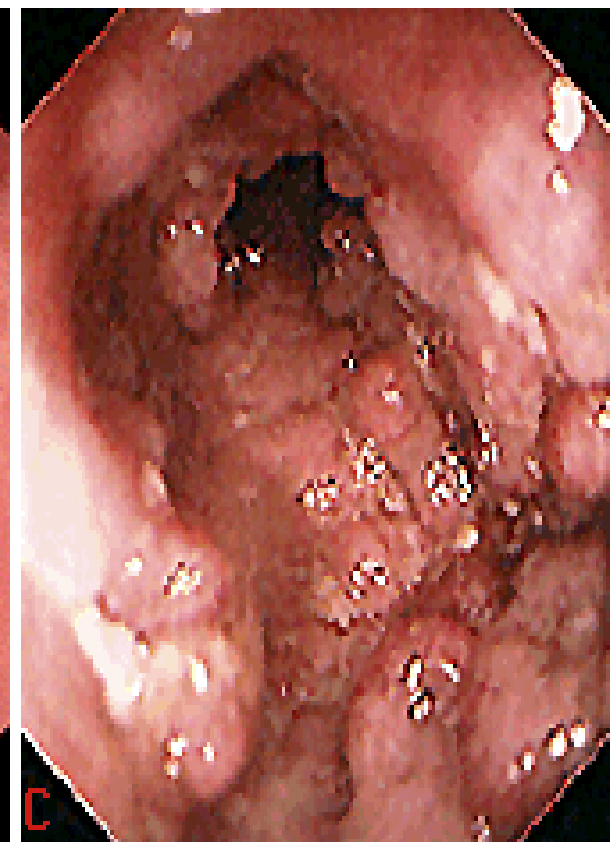
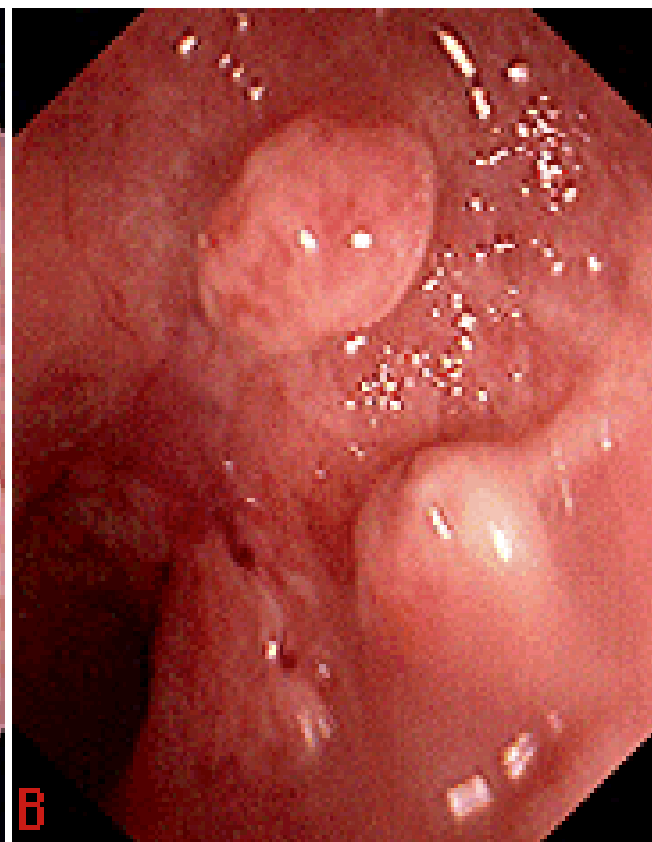
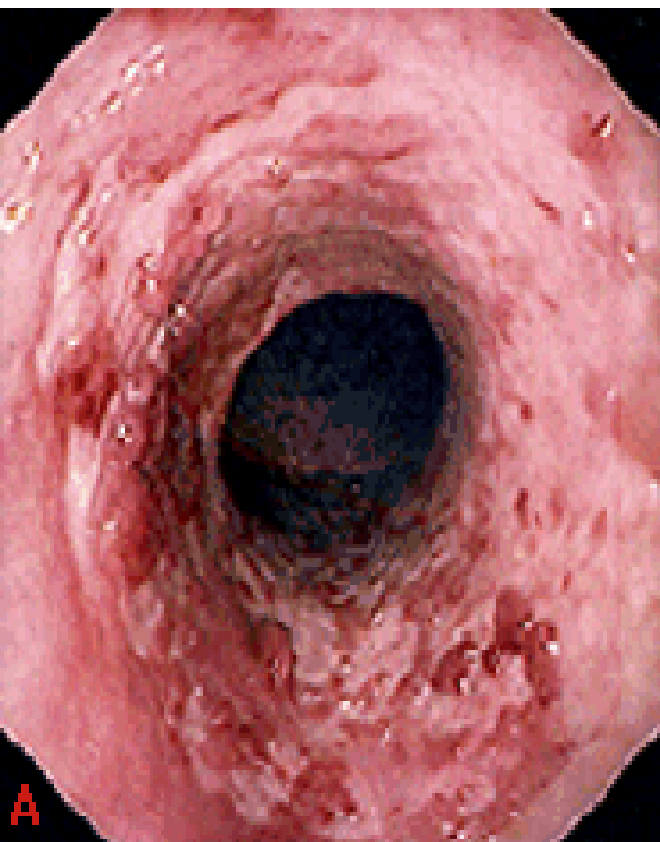
**Angiodysplasia of the colon** A superior mesenteric arteriogram demonstrates puddling of contrast material in tortuous distended vessels in the cecal wall (arrows). Courtesy of Jonathan Kruskal, MD.



**Angiodysplasia of the colon** Gross specimen of the colon with angiodysplasia shows a focal mucosal hemorrhagic area. Courtesy of Robert Odze, MD.



**Ischemic colitis** Endoscopy of ischemic colitis may reveal continuous necrosis and mucosal friability that resembles ulcerative colitis (left panel); discrete ulcers with surrounding edema may also be seen (right panel).  
Courtesy of James B McGee, MD.

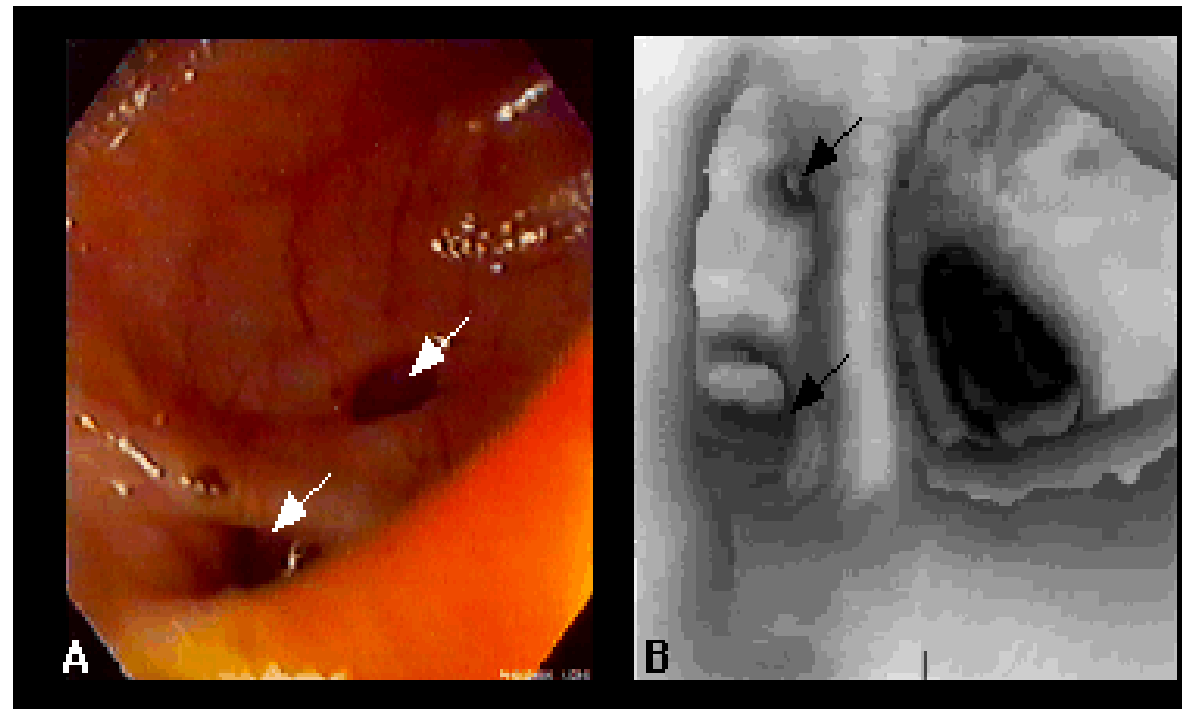


**Ulcerative colitis** Endoscopic appearance of ulcerative colitis. Extensive ulceration of the mucosa is the most common endoscopic finding (panel A). The surface is irregular, friable, and erythematous, with loss of the normal vascular markings. Pseudopolyps may form as a reaction to inflammation (panel B); these can become quite extensive (panel C). Courtesy of James B McGee, MD.

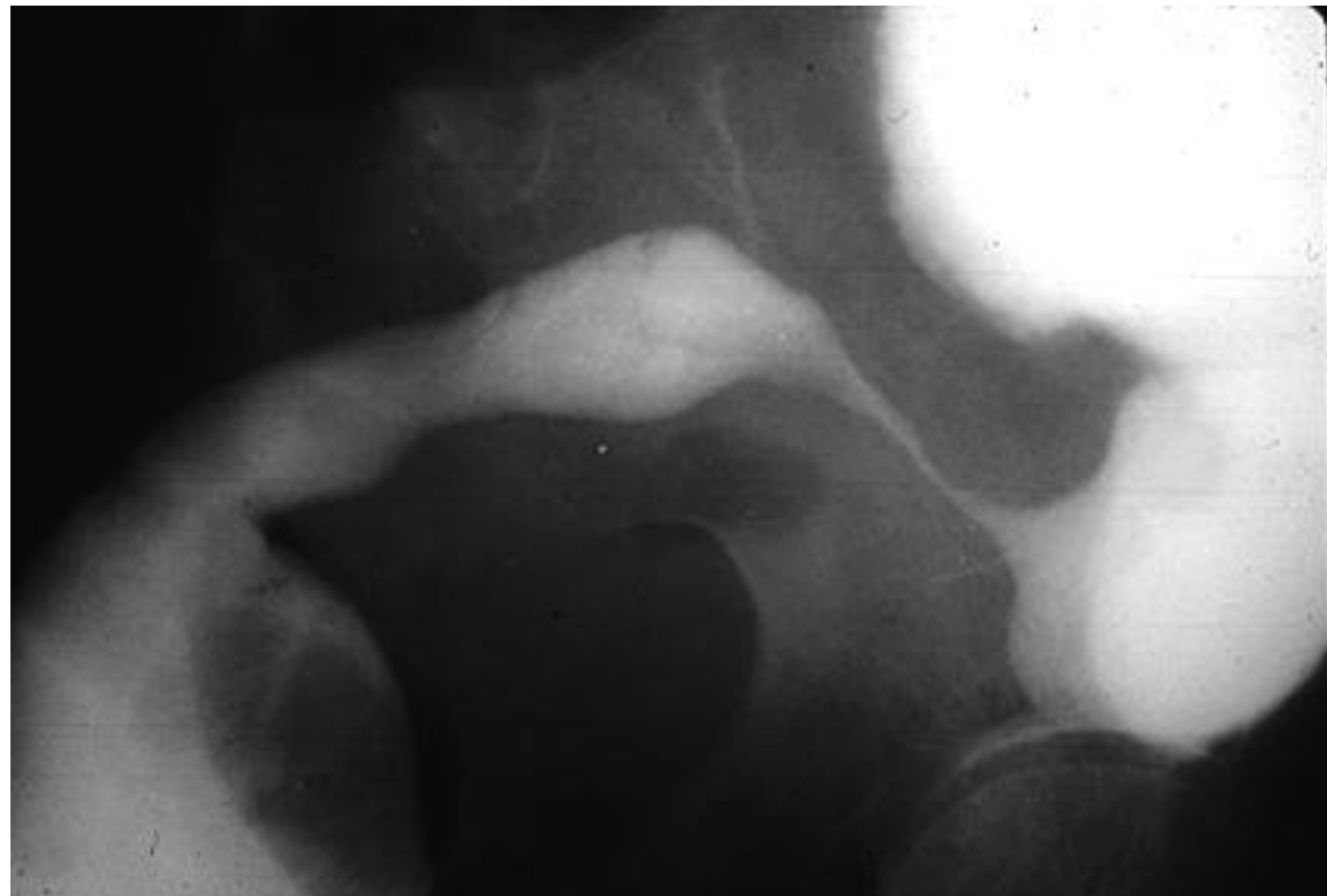




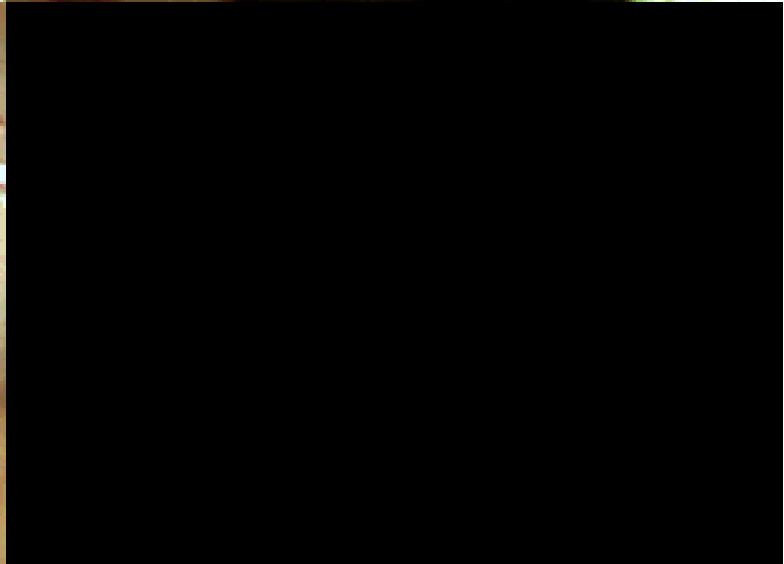
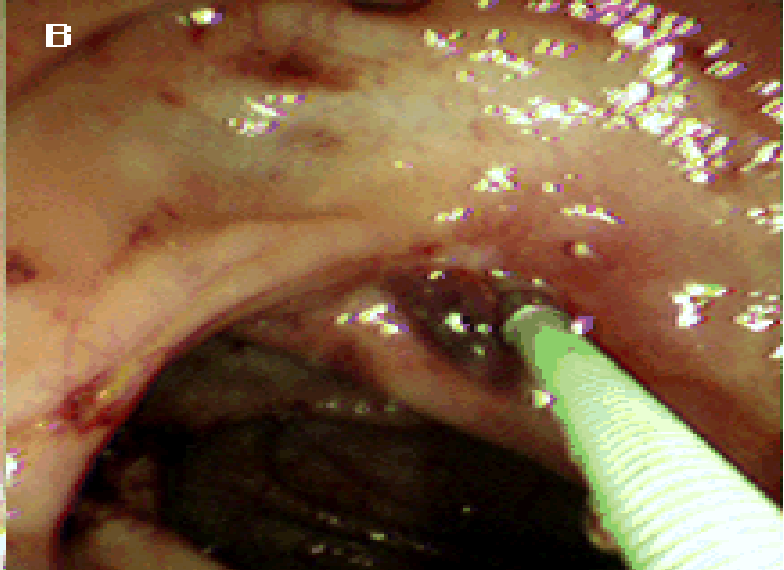
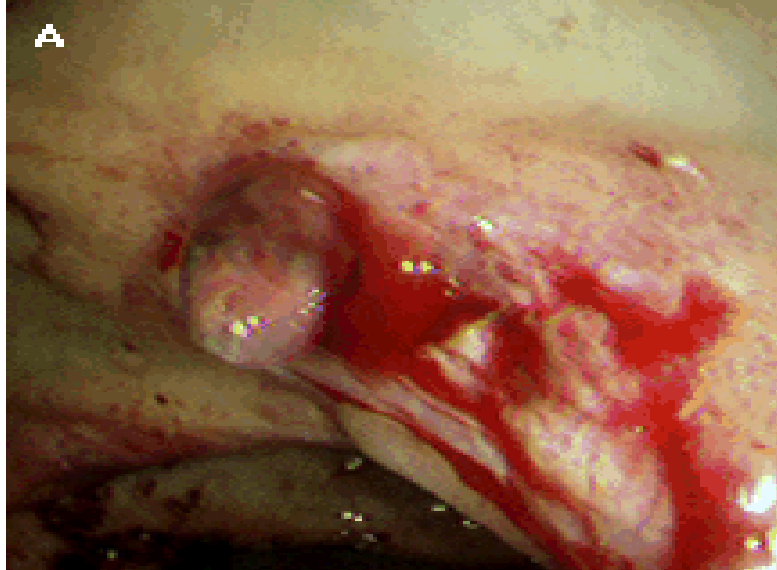
**Colonic polyp** Virtual colonoscopy shows a small polyp in the transverse colon. Courtesy of Jonathan Kruskal, MD, PhD.



**Virtual colonoscopy of colonic diverticulosis** Panel A: Diverticula as seen on routine colonoscopy (arrows). Panel B: 3-D reconstruction of the diverticuli (arrows) is shown by virtual colonoscopy in which air insufflation of the colon is performed in conjunction with CT scanning. Courtesy of AK Hara, CD Johnson, JE Reed, Mayo Clinic, Rochester, MN.



**Sigmoid cancer developing in ulcerative colitis** Barium enema study demonstrates a focal stricture in the sigmoid colon caused by an infiltrating cancer. The adjacent bowel is featureless and folds are absent, findings characteristic of chronic ulcerative colitis. Courtesy of Norman Joffe, MD.

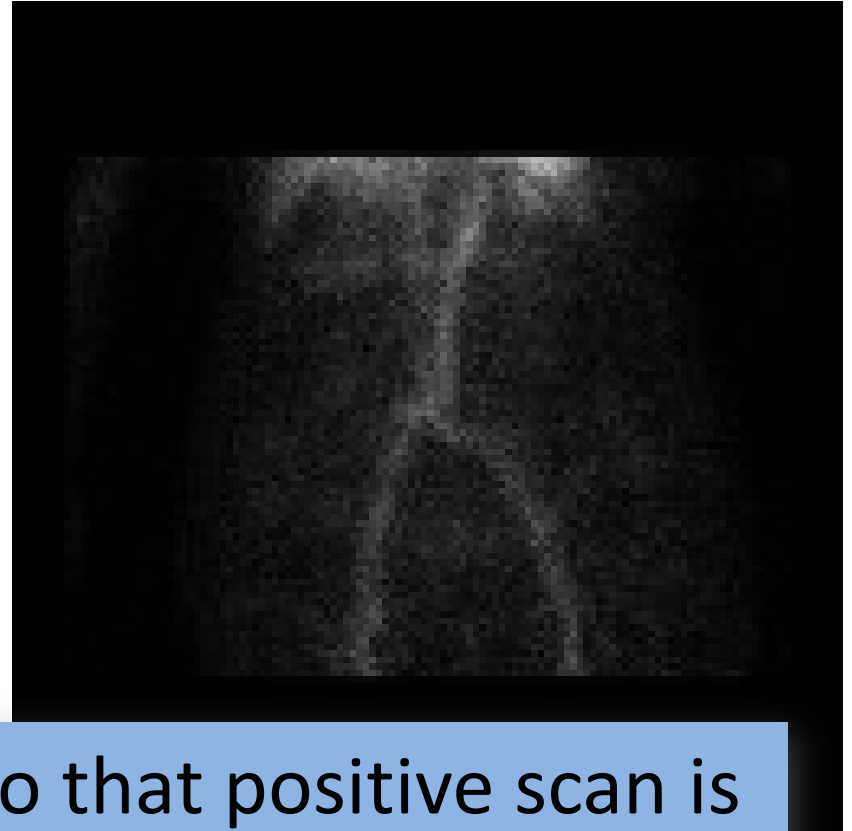


**Treatment of lower gastrointestinal bleeding** (A) Cecal ulcer with bleeding visible vessel; (B) Injection therapy of cecal ulcer with epinephrine 1:10,000 dilution; (C) Combination therapy of cecal ulcer with epinephrine injection followed by hemocclipping x 2. The dark pigmented area to the right of the hemoclips is due to India ink injection for mucosal tattooing. Courtesy of Sammy Saab, MD and Rome Jutabha, MD.

# Radiographic Studies

## Tagged RBC scan

- Noninvasive, highly sensitive (0.05-0.1 ml/min)
- Ability to localize bleeding source correctly only ~66%
- More accurate when positive within 2 hours (95-100%)
- Lacks therapeutic capability

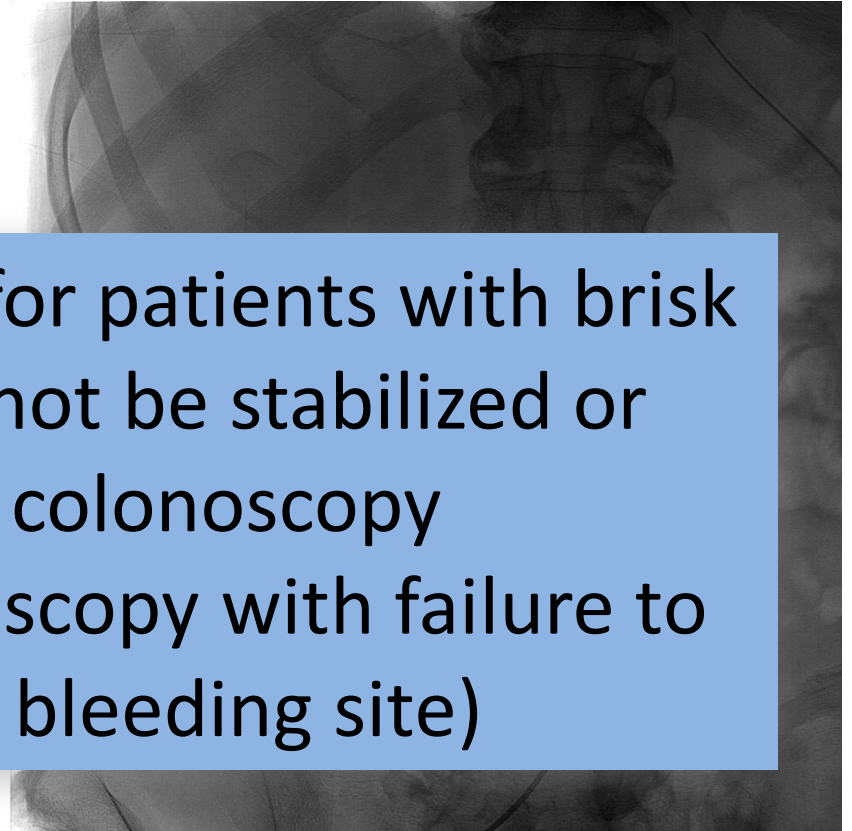


Coordinate with IR so that positive scan is followed closely by angiography

# Radiographic Studies

## Angiography

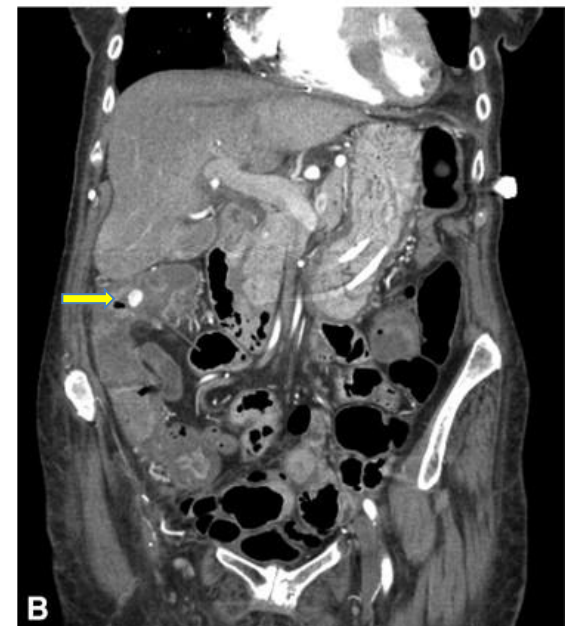
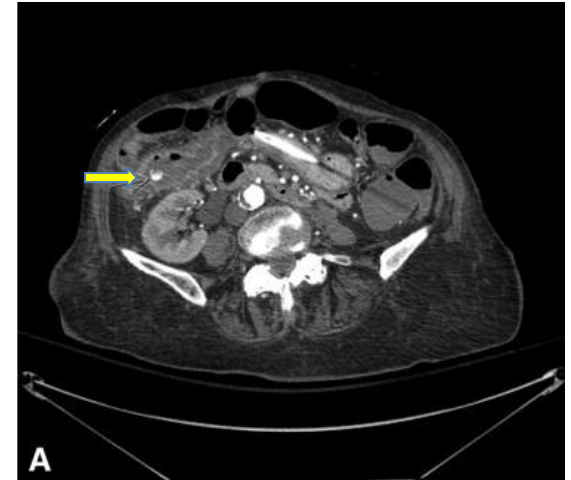
- Detects bleeding rates of 0.5-1 ml/min
- T Recommended test for patients with brisk bleeding who cannot be stabilized or prepped for colonoscopy (or have had colonoscopy with failure to localize/treat bleeding site)
- C in hematomas, thromboses, dissection



# Radiographic Studies

## Multi-Detector CT (CT angio)

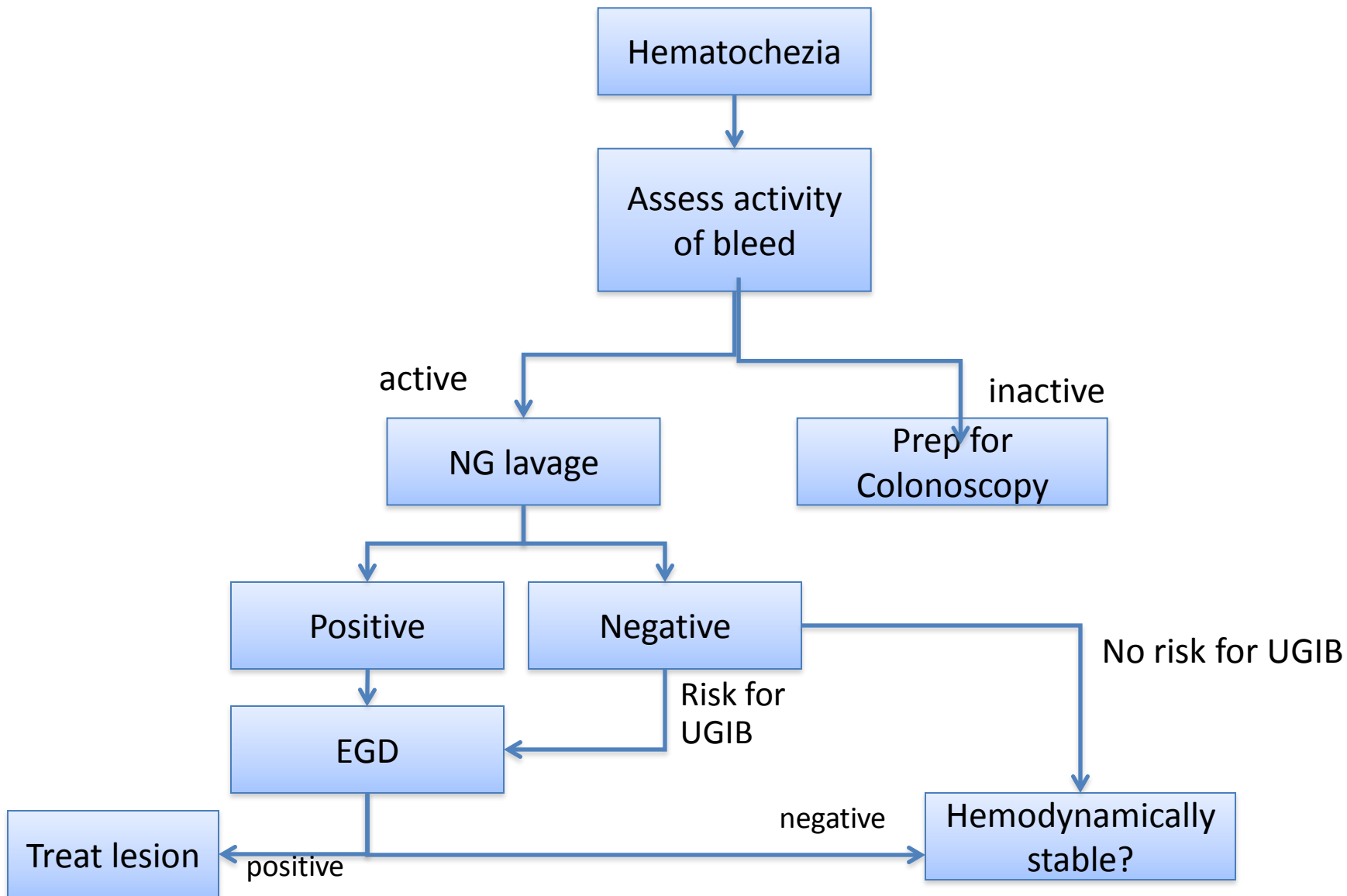
- Readily available, can be performed in ER within 10 minutes
- Can detect bleeding rate of 0.5 ml/min
- Can localize site of bleeding (must be active) and provide info on etiology
- Useful in the actively bleeding but hemodynamically stable patient



# Role of Surgery

- Reserved for patients with life-threatening bleed who have failed other options
- General indications: hypotension/shock despite resuscitation, >6 U PRBCs transfused
- Preoperative localization of bleeding source important

# Algorithmic Evaluation of Patient with Hematochezia





# Algorithmic Evaluation of Patient with Hematochezia

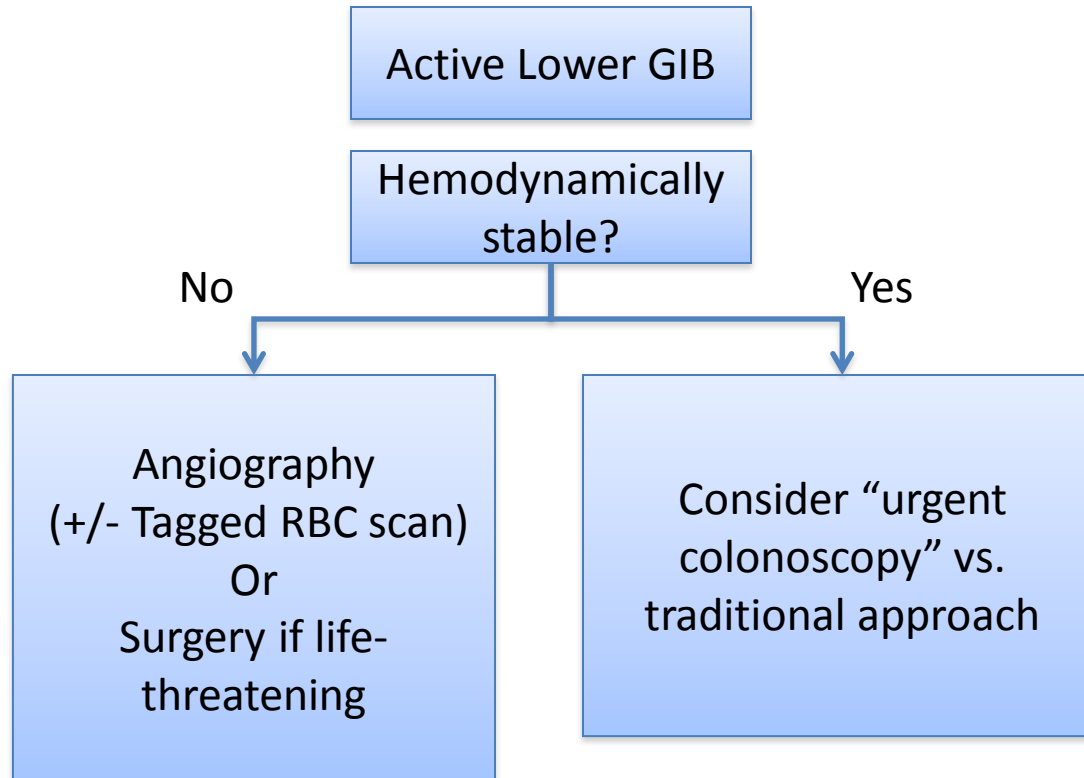
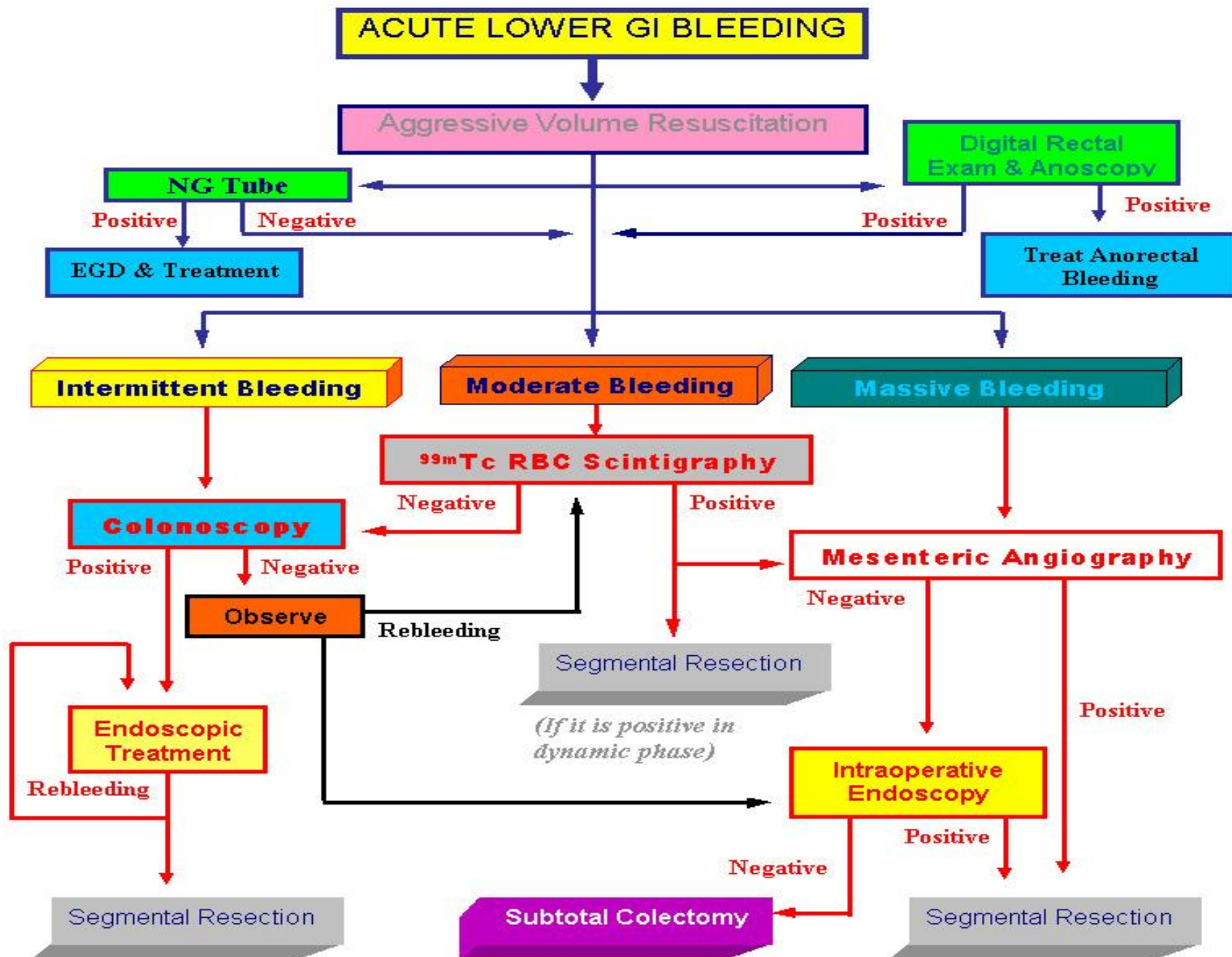
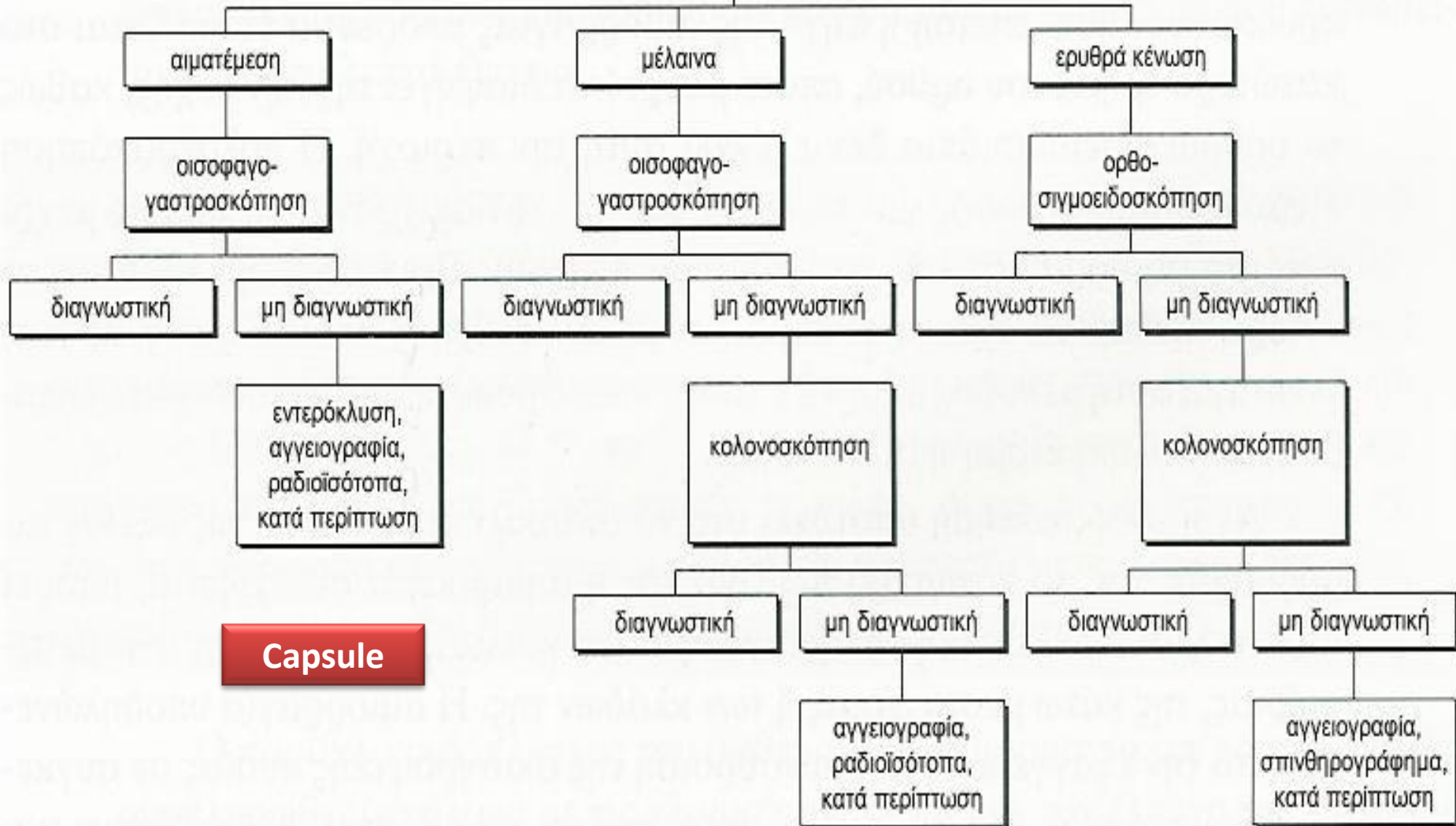


Figure 2: Algorithm for massive lower gastrointestinal bleeding.



# αιμορραγία από το πεπτικό



**Capsule**

ΣΧΗΜΑ 45. Σειρά διαγνωστικών ενεργειών σε περιπτώσεις αιμορραγίας από το πεπτικό.

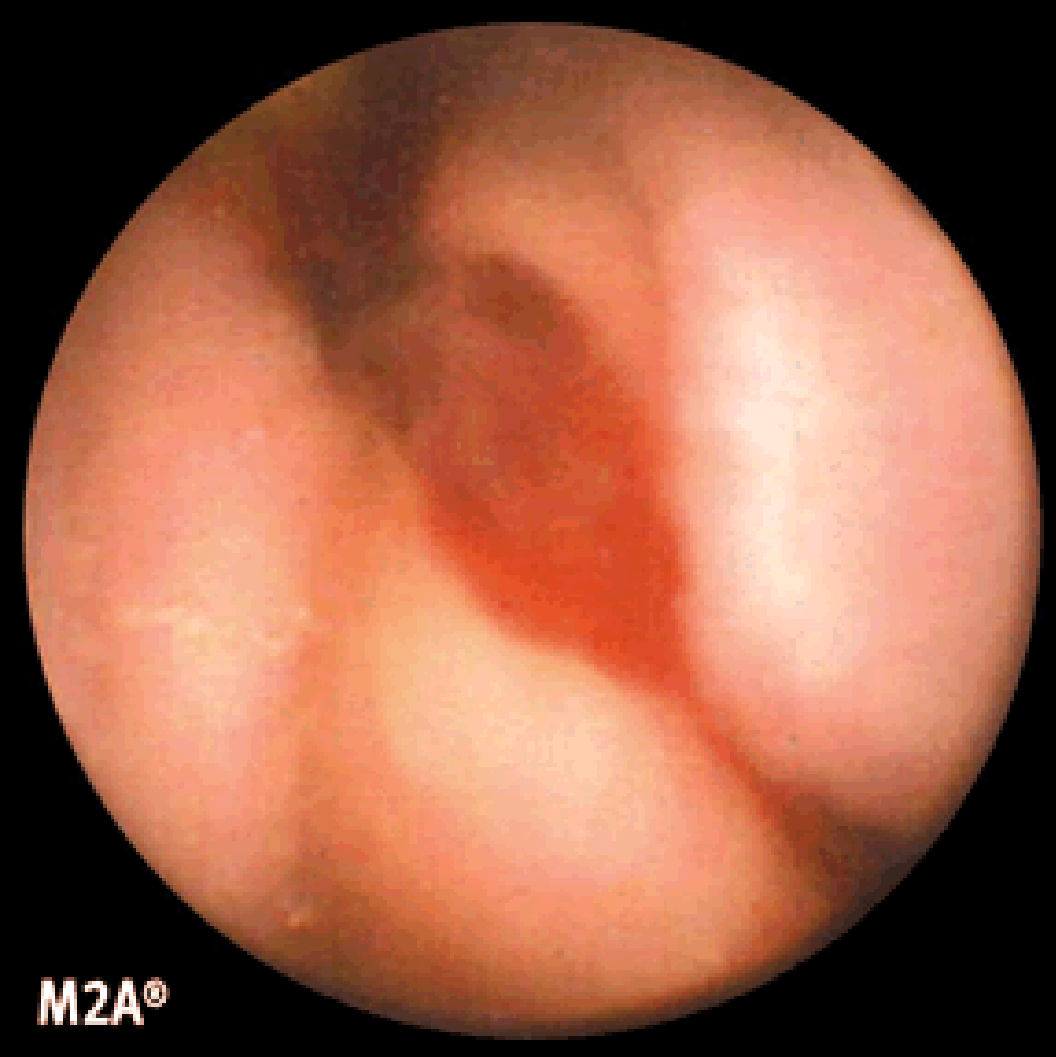


**Photograph of the Pillcam SB capsule (originally named the M2A capsule).**

Courtesy of Given Imaging Inc.



Courtesy of Given Imaging Inc.



**Duodenal bleeding** Bleeding site in duodenum identified during capsule endoscopy. Courtesy of Given Imaging Inc.

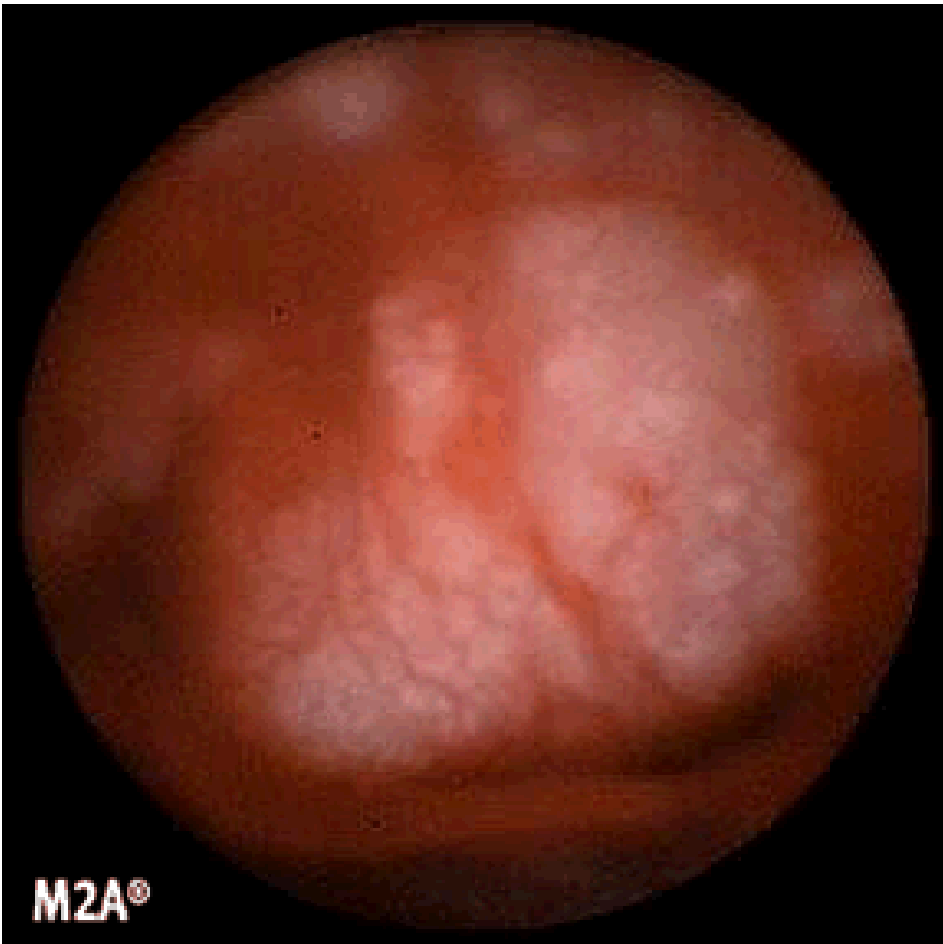


**Crohn's disease** Small bowel ulceration as seen during capsule endoscopy. Courtesy of Given Imaging Inc.



M2A®

**Small bowel stricture** An ulcerated small bowel stricture due to nonsteroidal antiinflammatory agents as seen during capsule endoscopy. Courtesy of Given Imaging Inc.



M2A®

**Celiac disease** Small bowel bleeding in an area with villous atrophy in a patient with celiac disease as seen during capsule endoscopy. Courtesy of Given Imaging Inc.