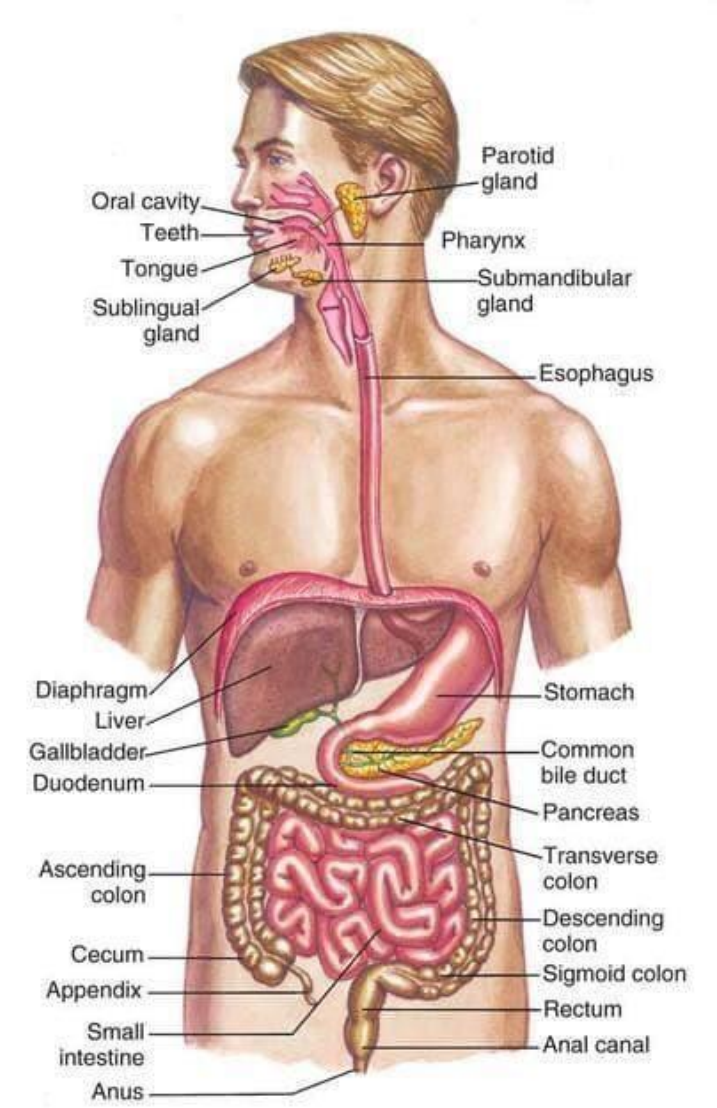
# UPPER & LOWER GASTROINTESTINAL BLEEDING

# Presentation Objectives

- Anatomical feature of GI tract ,line mark for upper & lower GI .
- Clinical features .
- CAUSES OF UGIB.
- Investigation and treatment .
- LGIB .
- Chronic GI bleeding Aetiology.
- Iron deficiency anemia: causes , clinical presentation, investigation, treatment .
- Other causes of chronic GI bleeding with it’s investigation .

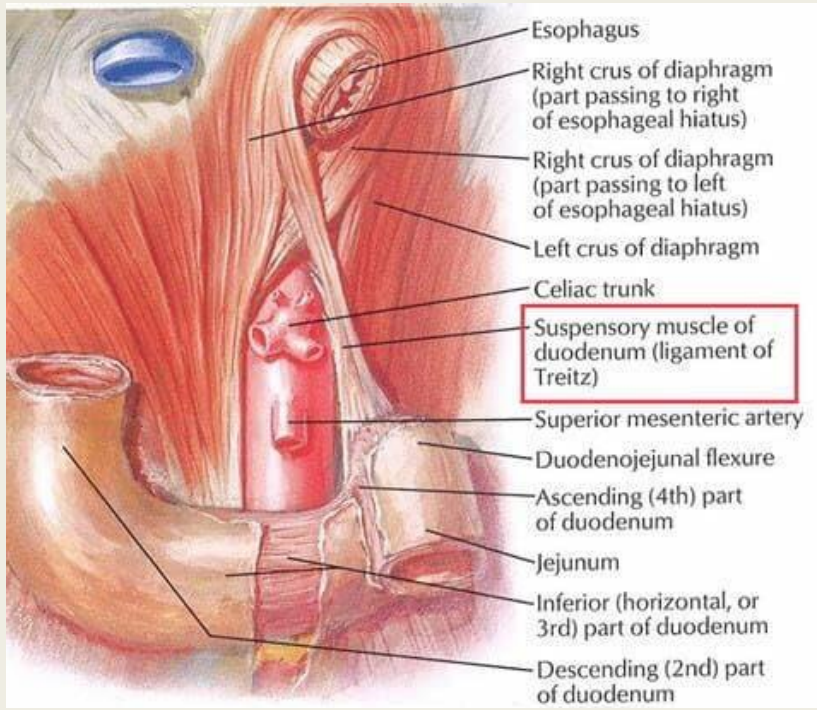
# Anatomy of GI

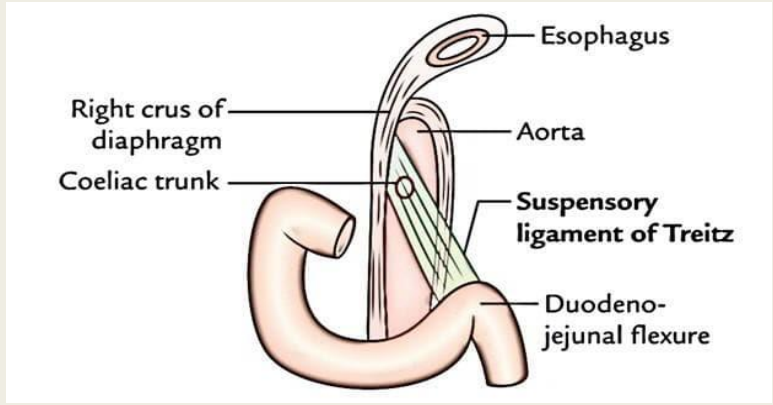
- Extends from the mouth to the anus, and comprises several organs with distinct functions.
- Separating the organs are independently controlled thickened sphincters that assist in the gut compartmentalization.
- Gut wall: is organized into well-defined layers that contribute to the functional activities in each region.



# Line mark for GI treact

- One of the most important cut – off for upper and lower GI tract is ligament of treitz.
- It is located in the 4th portion of the duodenum (the last 2 inches) .
- It connects the fourth portion of the duodenum to the diaphragm near the splenic flexure of the colon .



# CLINICAL FEATURES

# Type of bleeding

## Hematemesis

- **vomiting blood**; suggests upper GI bleeding**.**
- Indicates **moderate to severe** bleeding that may be ongoing.

-Only with upper GI causes

# Note

- If the source of bleeding is **above the gastro-oesophageal sphincter**, as with oesophageal varices, fresh blood may **well up** in the mouth, as well as being **actively vomited**
- With (**Mallory–Weiss syndrome**), fresh blood appears only after the patient has **vomited forcefully several times**.

# “Coffee grounds ”emesis

suggests upper GI bleeding as well as a **lower rate of bleeding ;**enough time for vomitus to transform into “coffee grounds"

# Melena

- **black, tarry, liquid, foul-smelling stool,** Caused by degradation of hemoglobin by bacteria in the colon
- presence of melena indicates that blood has remained in GI tract for **several hours**.

-The further the bleeding site is from the rectum, the more likely melena will occur.

-Melena suggests **upper GI bleeding 90% of the time**. Occasionally, the jejunum or ileum is the source. It is unusual for melena to be caused by a colonic lesion, but if it is, the ascending colon is the most likely site

# Note

- dark stools– matt black stools  can also result from bismuth, oral iron, spinach, charcoal, and licorice.

# Hematochezia

-**bright red blood per rectum**) BRBPR)

-This usually represents a **lower GI source** (typically left colon or rectum).

It may result from **massive upper GI bleeding** -5-10% of cases - that is bleeding very briskly so that blood does not remain in colon to turn into melena and patient often has some degree of hemodynamic instability.

| Clinical indicator | Probability of UGIB | Probability of LGIB |
|---|---|---|
| Haematemesis | Almost certain | - |
| melena | Probable | possible |
| Haematochezia | Possible (if brisk) | Probable |
| Blood on the surface of stool | rare | Almost certain |

## volume depletion

-dry mucous membranes, hypotension, tachycardia, decreased tissue turgor, oliguria/anuria

-However, **vital signs may also be normal** when significant hemorrhage is present.

-Blood volume loss of at least **15** percent –**Orthostatic hypotension** a) 20 naht erom fo erusserp doolb cilotsys eht ni esaercedmmHg and/or an increase in heart rate of 20 beats per minute when moving from recumbency to standing)

-Blood volume loss of at least **40** percent –**Supine hypotension.**

## Occult blood in stool

-source of bleeding may be anywhere along GI tract.

## anemia

-Will be discussed  later

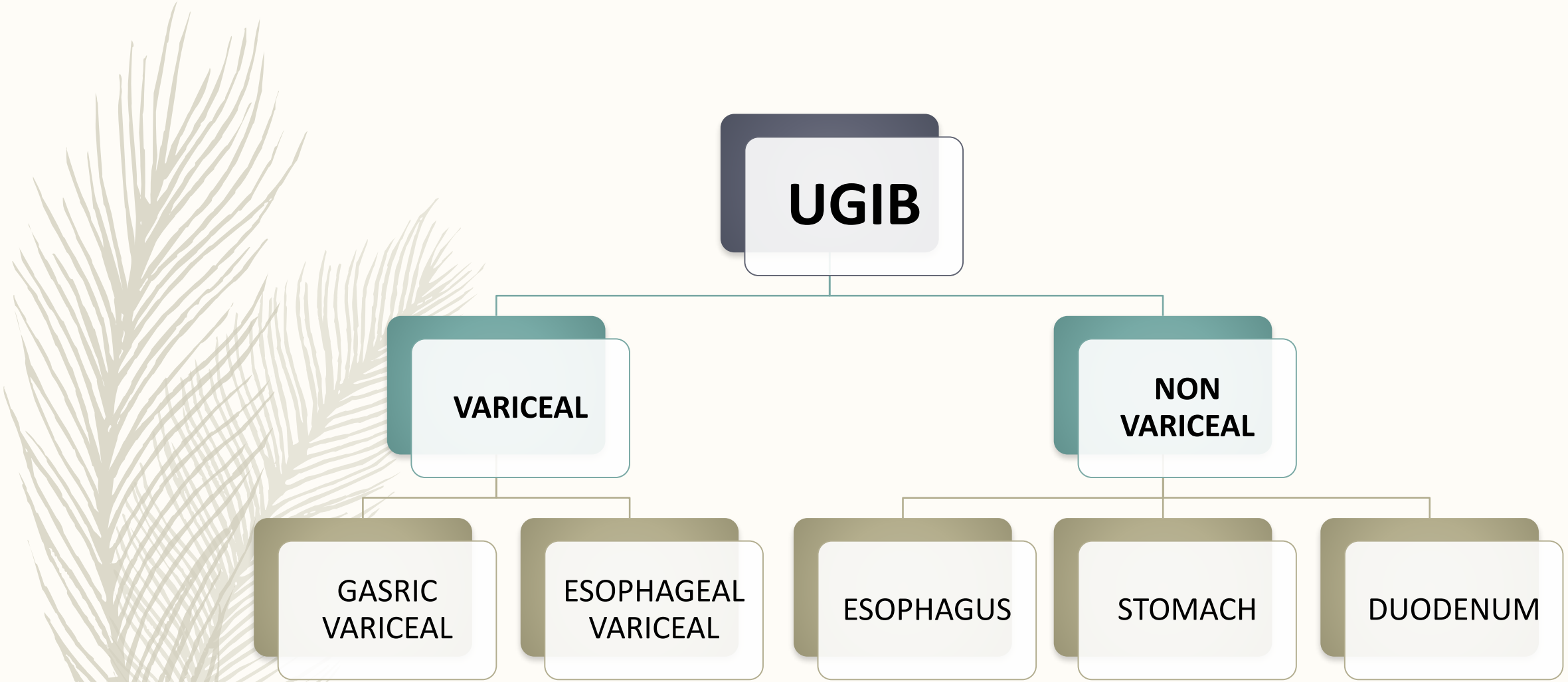
-The history and physical examination should include a search for evidence of **causative illness and significant comorbid illnesses**.

- **Examples**

*The presence of abdominal pain, especially if severe and associated with rebound tenderness or involuntary guarding, raises concern for perforation.

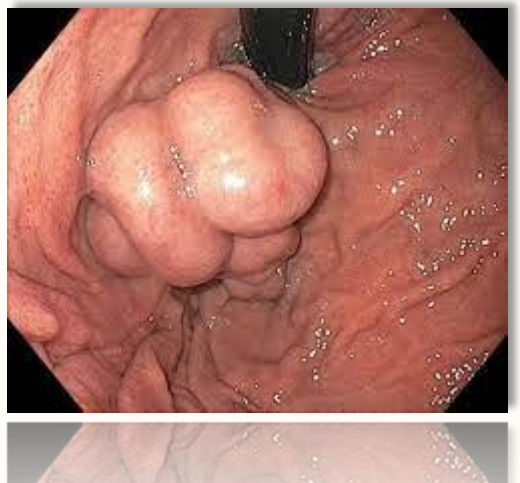
*ask about :Alchohol, non-Steroidal anti-inflammatory drugs ,glucocorticoid ingestion,clopidogrel and anticoagulants

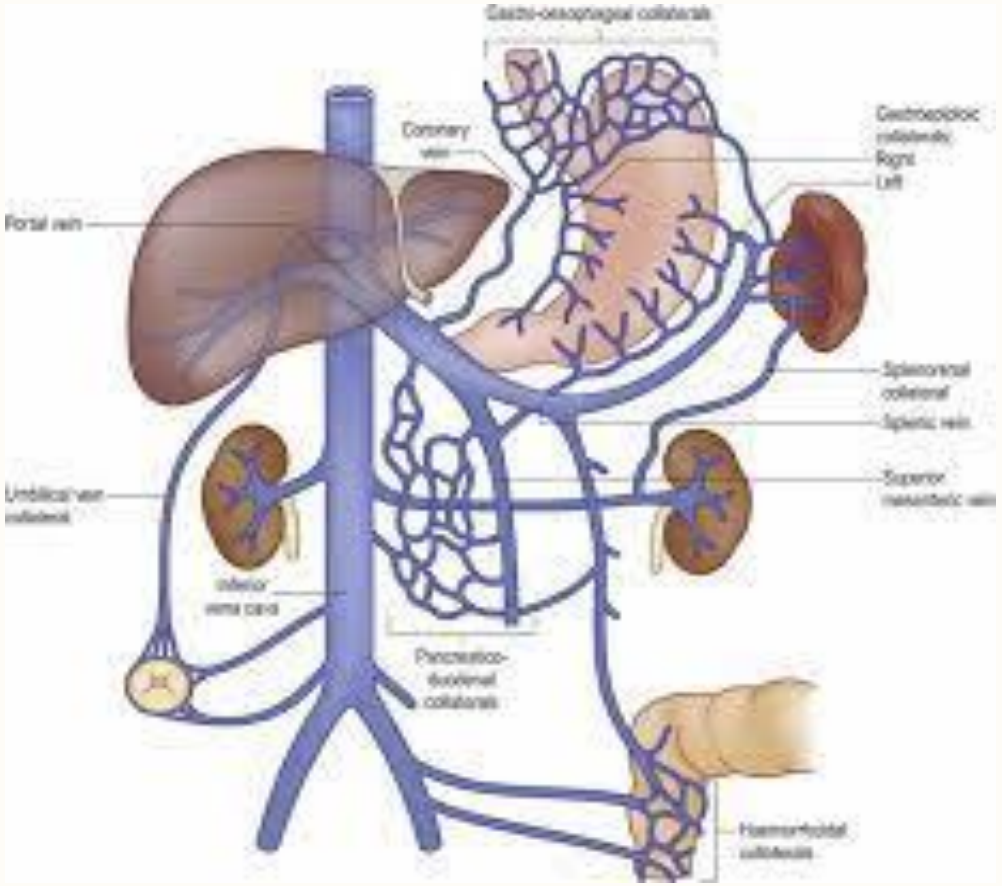
# Causes Of UGIB


UGIB
VARICEAL
NON VARICEAL
GASRIC VARICEAL
ESOPHAGEAL VARICEAL
ESOPHAGUS
STOMACH
DUODENUM

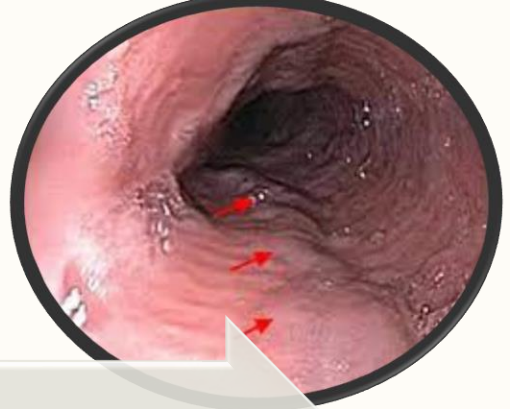
1-. **High pressure in the portal veins** or portal hypertension is a primary cause for this condition, and it is found in liver cirrhosis patients.

2- Portal vein thrombosis .





# Esophageal Varices



## Definition

- Esophageal varices are enlarged veins in the esophagus. They're often due to obstructed blood flow through the portal vein, which carries blood from the intestine, pancreas and spleen to the liver

## Risk Factor

- High portal blood pressure.
- Large varices.
- Severe liver disease.
- Ongoing alcohol consumption.

## •Clinical presentation

- Vomiting large amounts of blood. Black, tarry or bloody stools

## ESOPHAGUS

- Esophageal Ulcer
- Reflux Esophagitis
- Mallory – Weiss Tear
- Esophageal cancer

## STOMACH

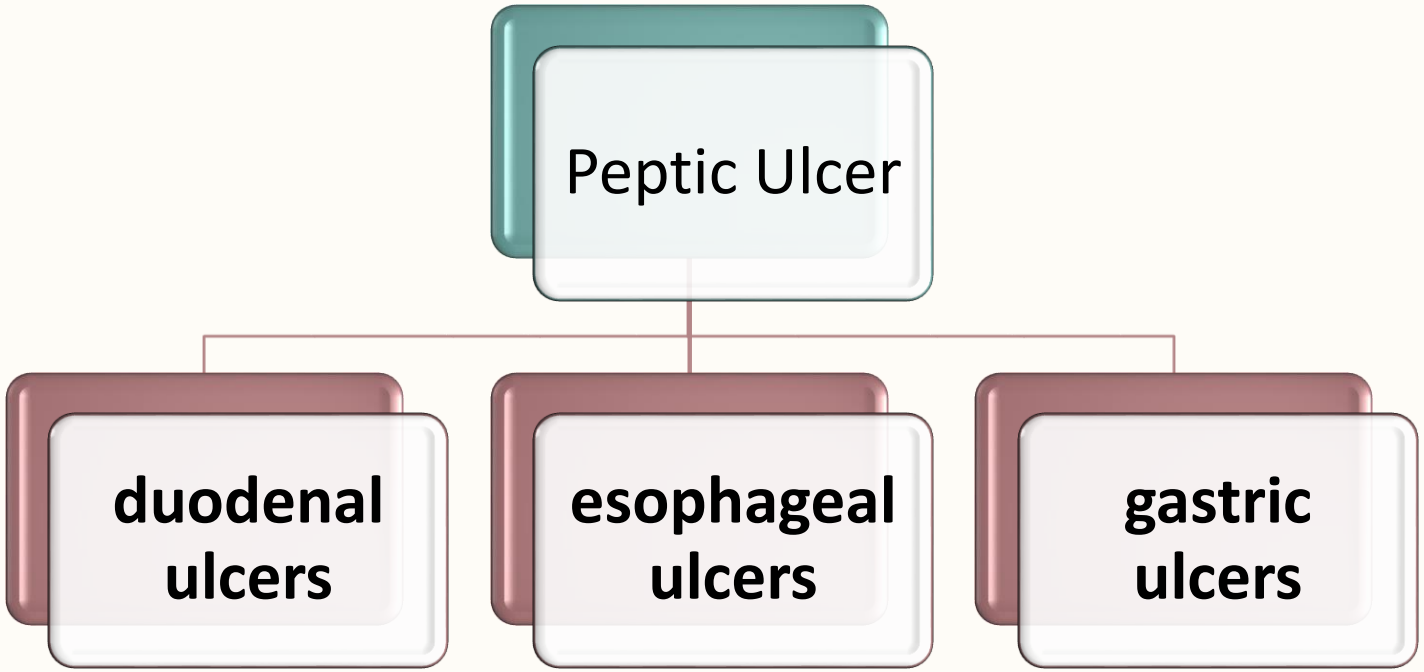
- Gastric Ulcer
- Gastric erosion
- Gastric Cancer

## DUODENUM

- Duodenal Ulcer

# Peptic Ulcer Disease

There's a layer of mucus in digestive tract that helps protect the gut lining. When there's too much acid or not enough mucus, the acid erodes the surface of stomach or small intestine. The result is an open sore that can bleed.



## causes

- *Helicobacter pylori* (*H. pylori*)
- NSAID
- Acid hypersecretory states such as Zollinger-Ellison syndrome

## Risk factor

- smoking
- drinking too much alcohol
- emotional stress and dietary factors

## Duodenal Ulcer

- Pain relived by meal
- Don’t require biopsy.
- Melena occurs

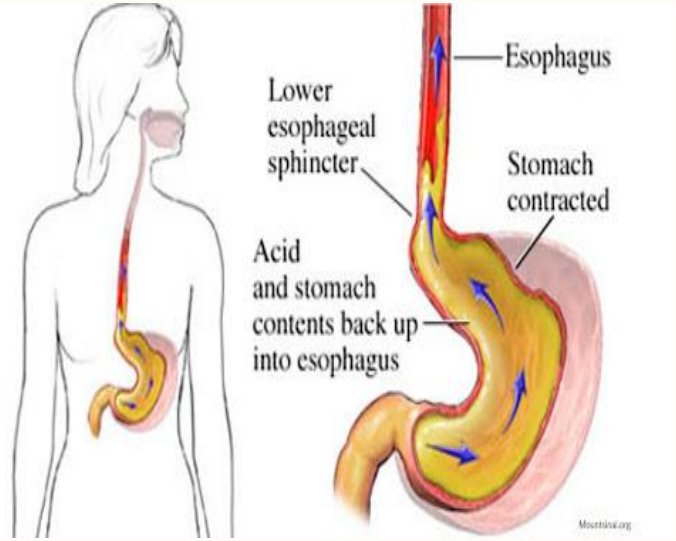
## Gastric Ulcer

- Pain increased by meal.
- Require a biopsy to rule out malignancy.
- Vomiting occurs.

# Reflux Esophagitis

## definition

- is an esophageal mucosal injury that occurs secondary to retrograde flux of gastric contents into the esophagus.

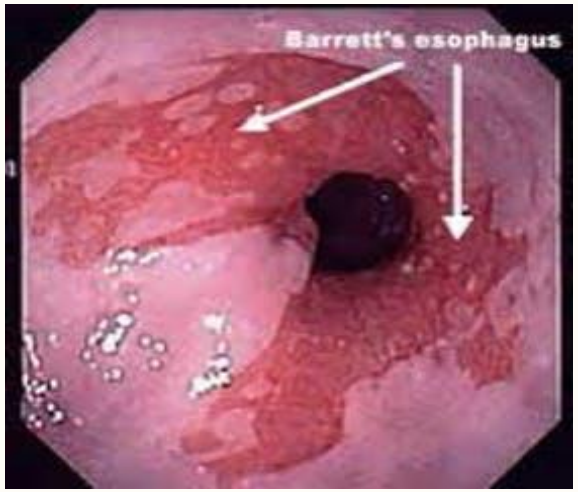



## causes

- **Gastro-esophageal junction dysfunction.**
- **Impaired esophageal acid clearance .**

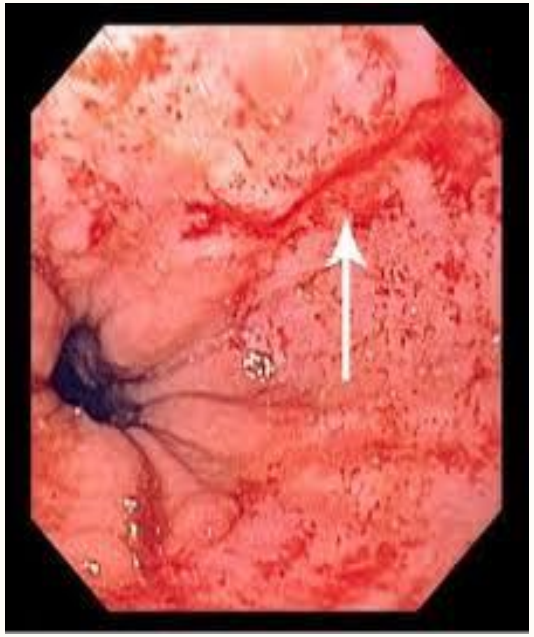
## Risk factor

- Eating immediately before going to bed.
- Excessively large and fatty meals.
- Dietary factors such as excess alcohol, caffeine, chocolate and mint–flavored foods.
- Smoking.
- Extra weight, including from pregnancy.



# Mallory- Weiss Syndrome

| | |
|---|---|
| definition | · Longitudinal mucosal laceration or tear at GEJ . |
| causes | · Forceful vomiting , it usually occurs after repeated episodes of vomiting , but it may also occur after just one episode . |
| Risk factor | · It is most commonly associated with being drinking in alcoholics , but any disorder that causes vomiting can induce the mucosal tear. |
| Clinical Presentation | · Hematemesis is always present ------> it varies from streaks of blood in vomitus to massive bright red blood. |



# INVESTIGATIONS AND MANAGEMENT OF ACUTE UPPER GI BLEEDING

# INITIAL EVALUATION

- The initial evaluation of a patient with a suspected clinically significant acute upper GI bleed includes a history, physical examination, and laboratory tests.
- The goal of the evaluation is to assess the severity of the bleed, identify potential sources of the bleed, and determine if there are conditions present that may affect subsequent management.
- The information gathered as part of the initial evaluation is used to guide decisions regarding triage, resuscitation, empiric medical therapy, and diagnostic testing.

# History

- History of presenting symptom : Onset , color , amount , associated symptoms…
- Past medical history :Up to 60 percent of patients with a history of an upper GI bleed are bleeding from the same lesion.
- Drug history : NSAIDs, aspirin, clopidogrel and warfarin
- Some drugs May alter the clinical presentation, such as bismuth, charcoal, licorice, and iron, which can turn the stool black
- Social history : smoking , alcohol abuse

## Potential bleeding sources suggested by a patient's past medical history include:

| Past medical history | Source of bleeding |
|---|---|
| liver disease or alcohol abuse | Varices or portal hypertensive gastropathy |
| abdominal aortic aneurysm | Aorto-enteric fistula |
| renal disease, aortic stenosis, or hereditary hemorrhagic telangiectasia | Angiodysplasia |
| H.pylori infection | Peptic ulcer |

## Specific causes of upper GI bleeding may be suggested by the patient's symptoms

| patient's symptoms | Source of bleeding |
|---|---|
| Upper abdominal pain | Peptic ulcer |
| Odynophagia, gastroesophageal reflux, dysphagia | Esophageal ulcer |
| Emesis, retching, or coughing prior to hematemesis | Mallory-Weiss tear |
| Jaundice, abdominal distention (ascites) | Variceal hemorrhage portal hypertension |
| Dysphagia, early satiety, involuntary weight loss, cachexia | Malignancy |

# Physical examination

- **Shock ?**

  - Pulse rate

  -BP

  -cold peripheries?

  -conscious level

- **General**

  -Stigmata of chronic liver disease

- **Abdominal**

  -Tenderness

  -Mass

  - Hepatosplenomegaly

- **Comorbidity**

-IDH

-HF

-CKD

-Malignancy

# Basic investigations and laboratory tests

- **Full blood count.**

Chronic or subacute bleeding —> anaemia

Hb concentration may be normal after sudden, major bleeding until haemodilution occurs. ( poor indicator of the need to transfuse)

Thrombocytopenia —> hypersplenism in chronic liver disease.

- **Urea and electrolytes**. —> **renal failure**.

The blood urea rises as the absorbed products of luminal blood are metabolised by the liver; an elevated blood urea with normal creatinine concentration implies severe bleeding.

- **Liver function tests.** —> chronic liver disease.
- **Prothrombin time.**

Check when there is a clinical suggestion of liver disease or patients are anticoagulated .

- **Cross-matching**.

At least 2 units of blood should be cross-matched if a significant bleed is suspected

# Risk assessment

- All guidelines recommend use of a scoring system on admission
- Several exist : **Blatchford** , AIMS65 , Rockall , PNED
- Objectively quantify risk of death or intervention

Blatchford score (Box 21.16), which can be calculated at the bedside.

A score of 2 or less : good prognosis
while progressively higher scores : poorer outcomes.

**21.16 Modified Blatchford score: risk stratification in acute upper gastrointestinal bleeding**

| Admission risk marker | Score component value |
|---|---|
| **Blood urea** | |
| ≥25 mmol/L (70 mg/dL) | 6 |
| 10–25 mmol/L (28–70 mg/dL) | 4 |
| 8–10 mmol/L (21.4–28 mg/dL) | 3 |
| 6.5–8 mmol/L (18.2–22.4 mg/dL) | 2 |
| <6.5 mmol/L (18.2 mg/dL) | 0 |
| **Haemoglobin for men** | |
| <100 g/L (10 g/dL) | 6 |
| 100–119 g/L (10–11.9 g/dL) | 3 |
| 120–129 g/L (12–12.9 g/dL) | 1 |
| ≥130 g/L (13 g/dL) | 0 |
| **Haemoglobin for women** | |
| <100 g/L (10 g/dL) | 6 |
| 100–119 g/L (10–11.9 g/dL) | 1 |
| ≥120 g/L (12 g/dL) | 0 |
| **Systolic blood pressure** | |
| <90 mmHg | 3 |
| 90–99 mmHg | 2 |
| 100–109 mmHg | 1 |
| >109 mmHg | 0 |
| **Other markers** | |
| Presentation with syncope | 2 |
| Hepatic disease | 2 |
| Cardiac failure | 2 |
| Pulse ≥100 beats/min | 1 |
| Presentation with melaena | 1 |
| None of the above | 0 |

# The Rockall score used to assess the risk of mortality in gastrointestinal bleeding

**6.5 Prediction of the risk of mortality in patients with upper gastrointestinal bleeding: Rockall score**

| Criterion | Score |
|---|---|
| **Age** | |
| <60 years | 0 |
| 60–79 years | 1 |
| >80 years | 2 |
| **Shock** | |
| None | 0 |
| Pulse >100 beats per minute and systolic blood pressure >100 mmHg | 1 |
| Systolic blood pressure <100 mmHg | 2 |
| **Comorbidity** | |
| None | 0 |
| Heart failure, ischaemic heart disease or other major illness | 2 |
| Renal failure or disseminated malignancy | 3 |
| **Endoscopic findings** | |
| Mallory–Weiss tear and no visible bleeding | 0 |
| All other diagnoses | 1 |
| Upper gastrointestinal malignancy | 2 |
| **Major stigmata of recent haemorrhage** | |
| None | 0 |
| Visible bleeding vessel/adherent clot | 2 |
| Total score | |
| Pre-endoscopy (maximum score = 7) | Score 4 = 14% mortality pre-endoscopy |
| Post-endoscopy (maximum score = 11) | Score 8+ = 25% mortality post-endoscopy |

*Reproduced from Rockall TA, Logan RF, Devlin HB, et al. Risk assessment after acute upper gastrointestinal haemorrhage. Journal of the British Society of Gastroenterology 1996; 38(3):316, with permission from BMJ Publishing Group Ltd.*

# Management of non variceal UGIB

Resuscitation and oxygen

Endoscopy

Drug therapy

Monitoring

Surgery

# Resuscitation and oxygen

- Airway , breathing , circulation (A – B – C)
- intravenous access – 2 large bore i.v. cannulae
- blood transfusion/colloid

Indications for blood transfusion are:

a. SHOCK (pallor, cold nose, systolic BP below 100 mmHg, pulse >100 b.p.m.)

b. Haemoglobin <100 g/L in patients with recent or active bleeding

Transfusion must be monitored to avoid overload leading to heart failure, particularly in the elderly

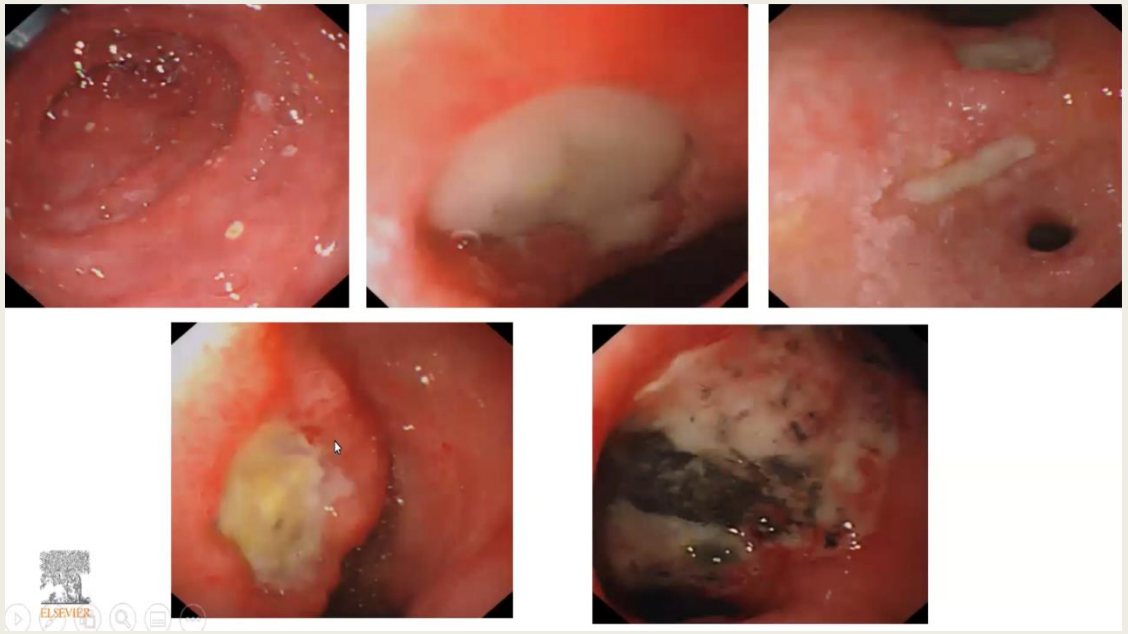
- plasma expanders or 0.9% saline are given until the blood becomes available
- IV crystalloid fluids — 500 mls < 15 minutes
- Stop antiplatelets or anticoagulants

# Endoscopy

- Endoscopy can detect the cause of the haemorrhage in 80% or more of cases .
- should be performed as soon as possible after the patient has been resuscitated
- **Stable patient** (Rockall 0 or 1): **endoscopy < 24 hours**
- **Unstable** : **endoscopy < 12 hours**
- Some patients need endoscopy more urgently if not responding to resuscitation
- Calculation of the postendoscopy Rockall score gives an indication of the risk of rebleeding and death.

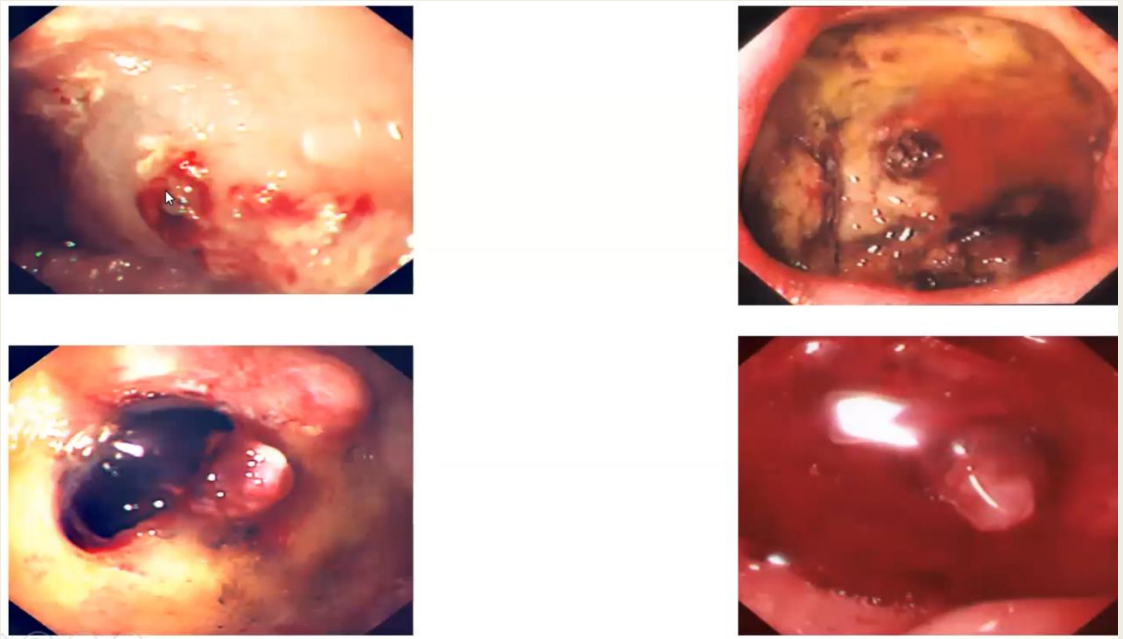
# Bleeding ulcers

- **With high vs. low risk stigmata of recent bleeding**



Duodenal ulcers without high risk stigmata

These are called clean based , they do not have visible vessels,  not actively bleeding, don’t need active intervention, will heal by themselves



Duodenal ulcers with high risk stigmata

Ulcers have eroded into branches of gastroduodenal artery ,these lesions are not going to heal by themselves and they need endoscopic intervention to stop bleeding

# Bleeding ulcers

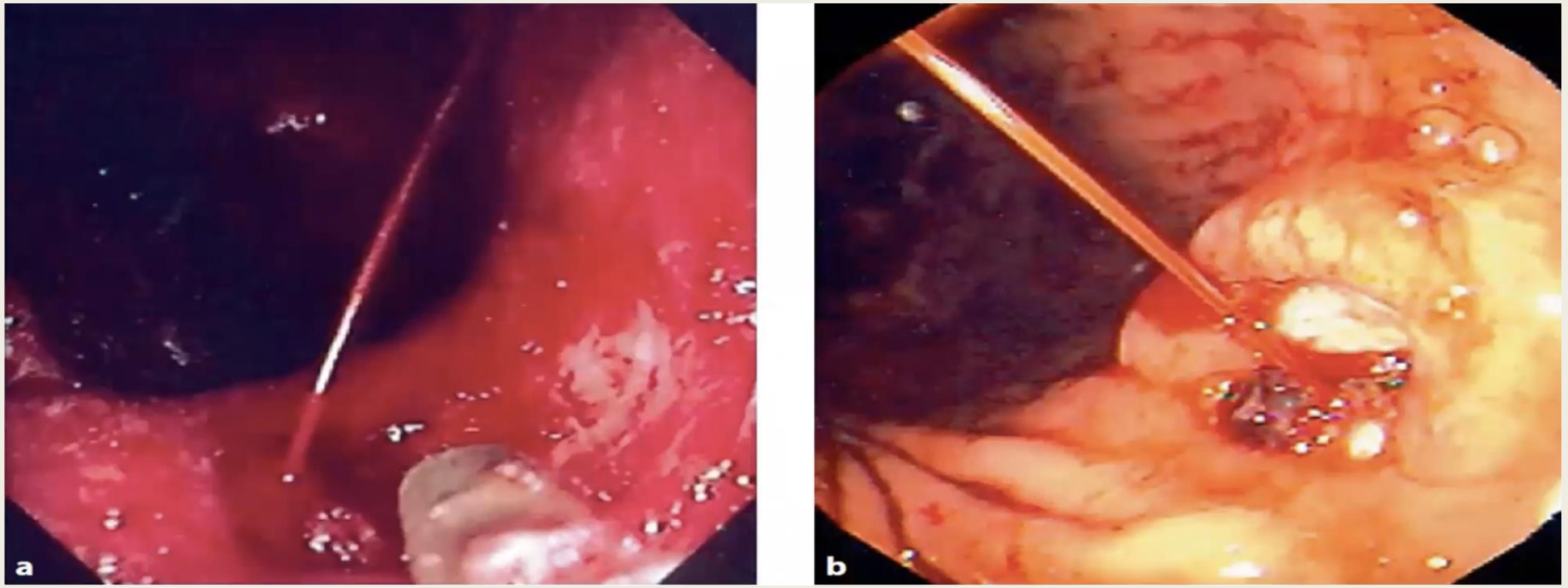
- Bleeding ulcers and those with stigmata of recent bleeding should be treated with two or three haemostatic methods, usually:

1. **injection with epinephrine (adrenaline)**
2. **thermal coagulation** (with heater probe, bipolar probe, laser or argon plasma coagulation) or
3. **endoscopic clipping**

because dual and triple therapy is more effective than monotherapy in reducing rebleeding.

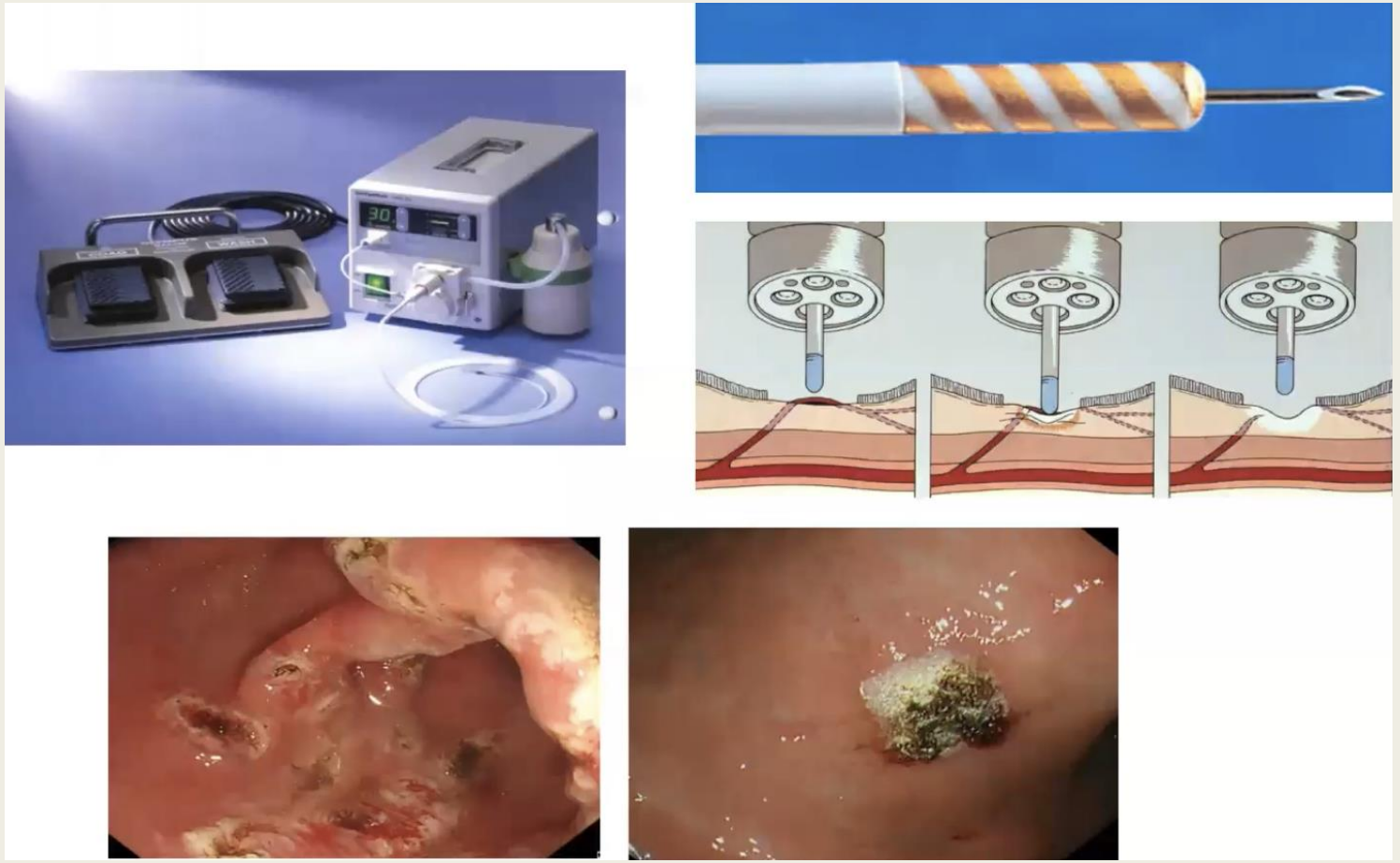
# 1. injection with epinephrine

- Injection with 1:10,000 – 100,000 dilute epinephrine

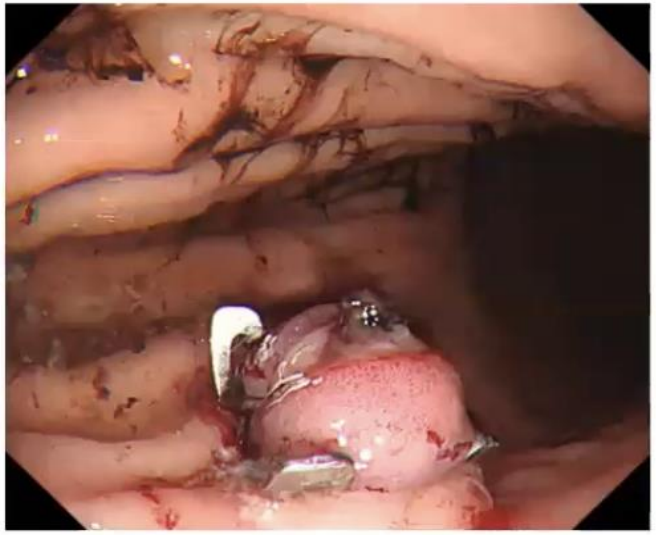


# 2. Thermal modality

- Electrocautery Using a heater probe

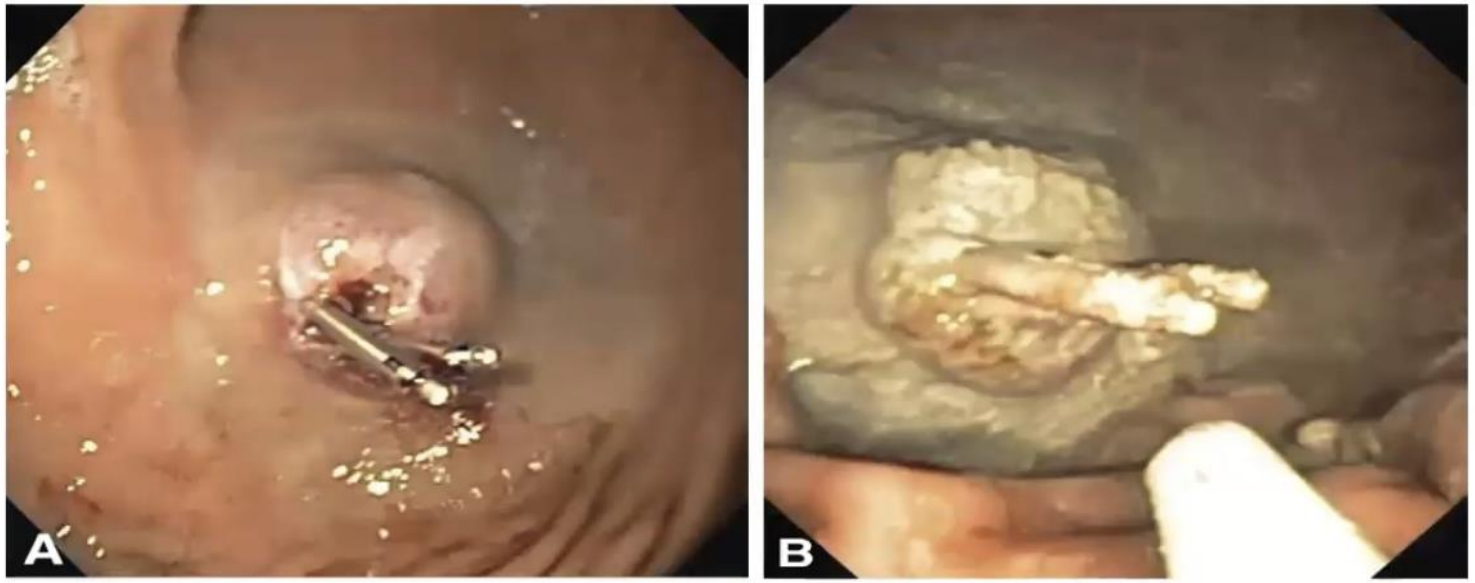


# 3. Mechanical modality



# Heamostatic powders “hemospray”

- A biologically inert haemostatic mineral powder (TC325, ‘haemospray’)
- used as **rescue therapy** when **standard therapy fails**.
- This stop active bleeding and, combined with IV (PPI) , prevent rebleeding, thus avoiding the need for surgery

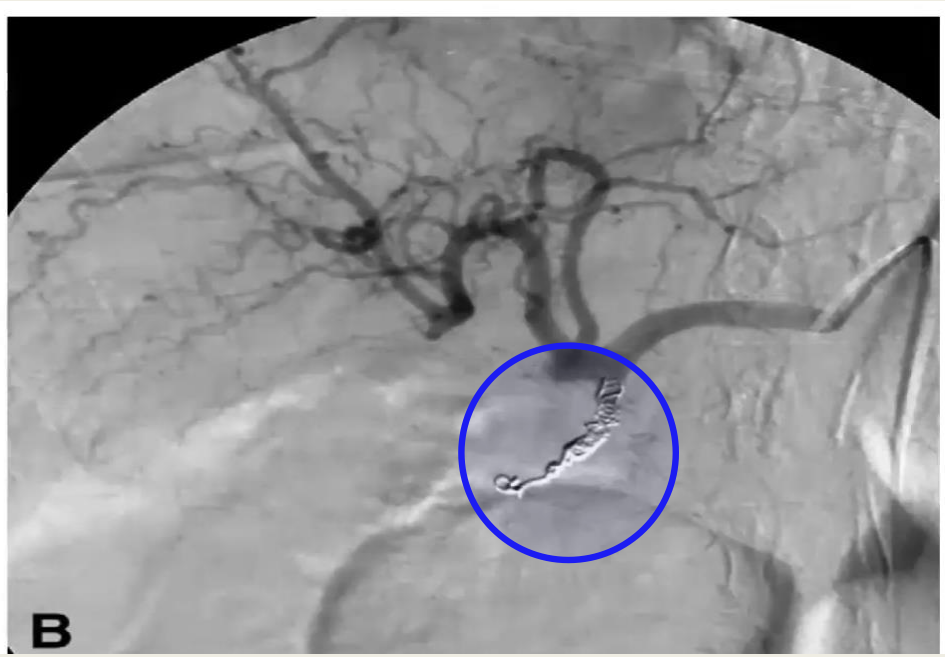



# Transcatheter arterial embolisation

- When endoscopy fails

1. Failed primary heamostasis
2. Rebleeding
3. Lower GI Bleeding not visualised

- Patient unfit for laporotomy




# Post endoscopy plan Drug therapy

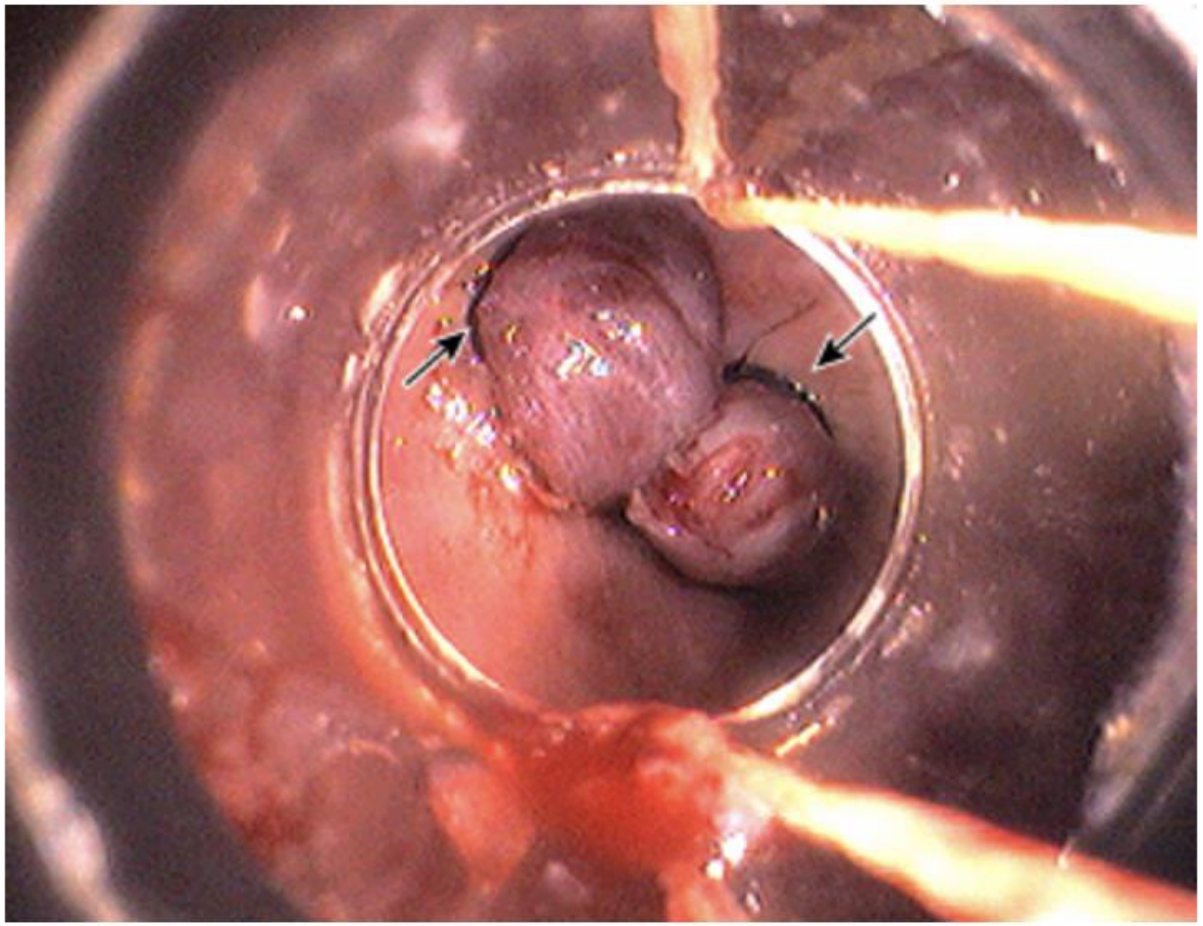
- IV PPI 72 hours – reduces rebleeding and need for surgery
- H.Pylori eradication (if positive)
- Avoid NSAIDs if possible
- Plan for restarting antiplatelet or antithrombotic agents(discuss with cardiologist )

# Management of variceal bleeding

- **Oesophageal band ligation**
- **Balloon temponade**
- Transjugular intrahepatic porto-systemic shunt (TIPSS)
- Vasoconstrictor therapy (terlipressin ,somatostatin)

# Oesophageal band ligation

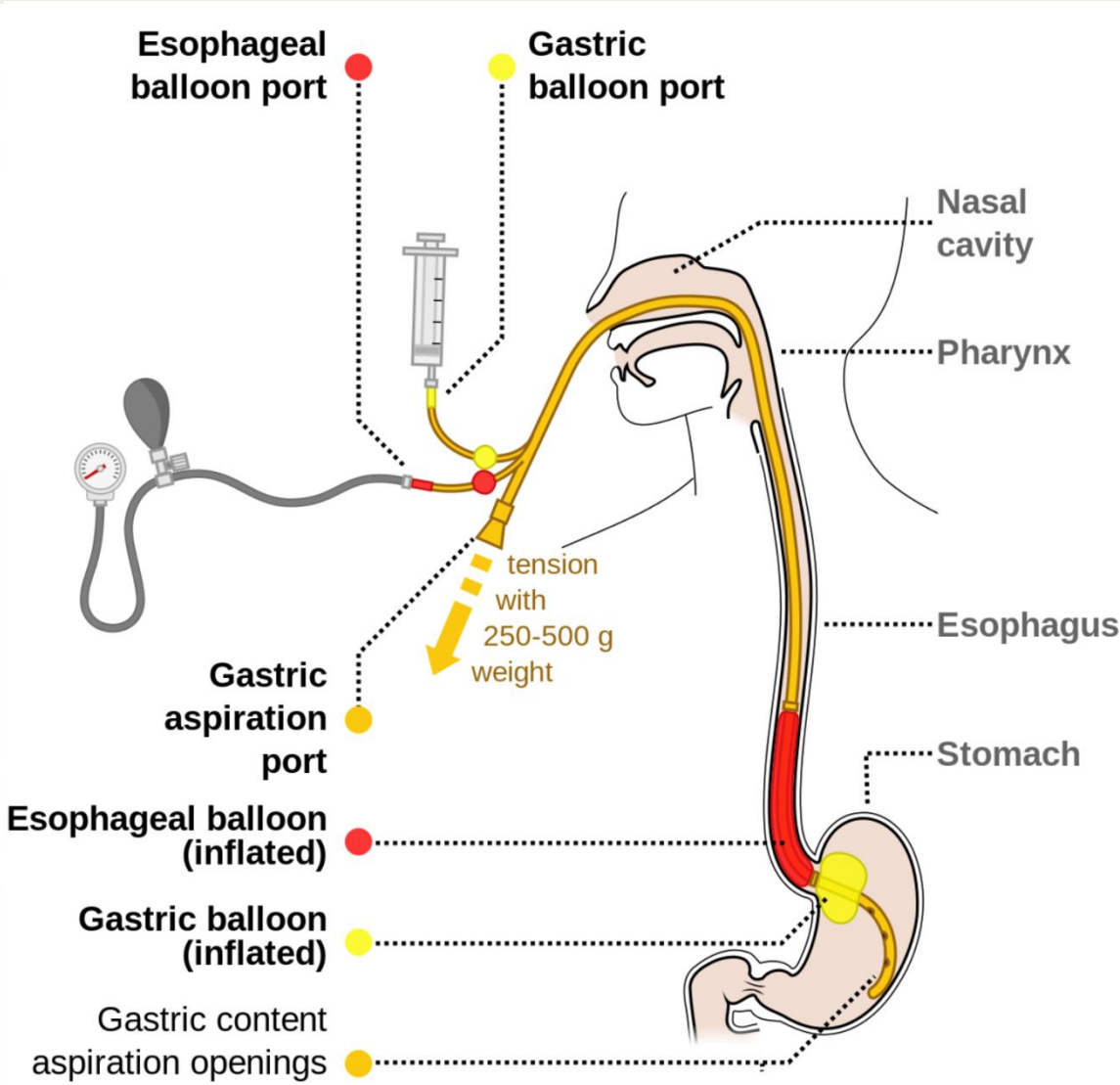
## Esophageal varix band ligation



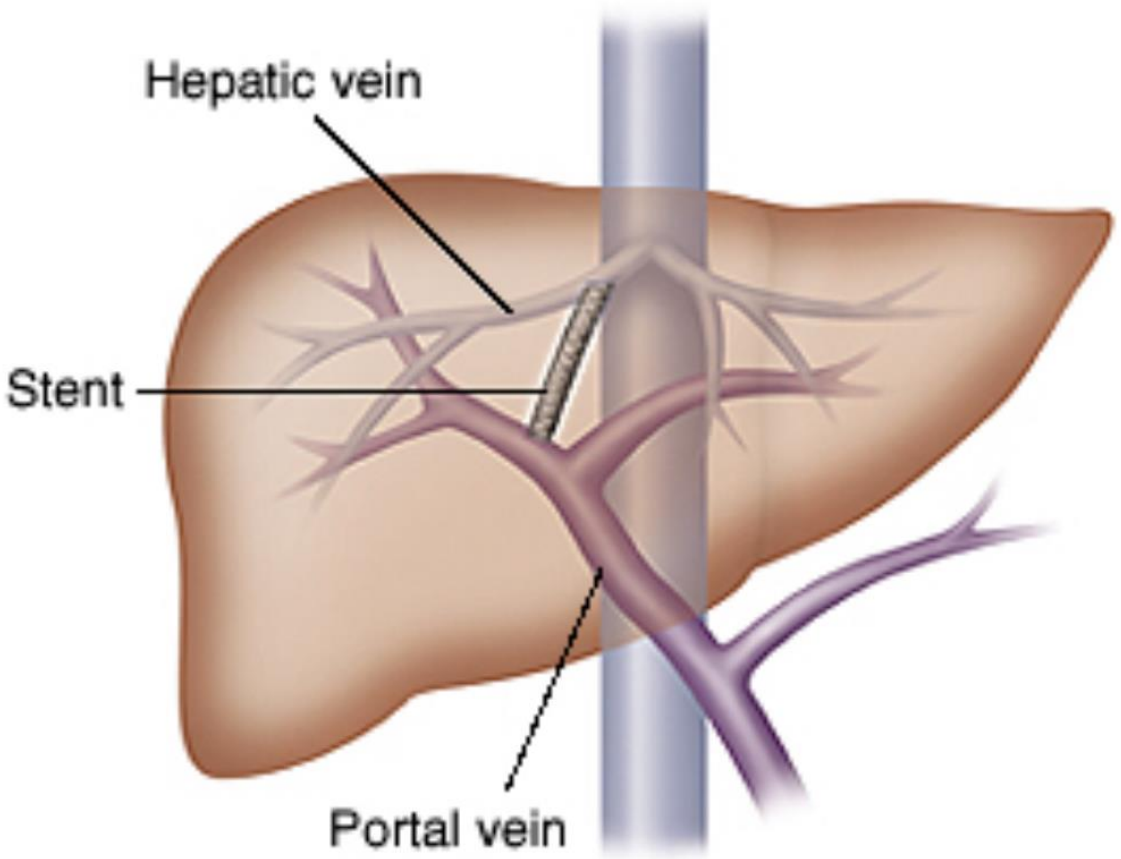
Endoscopy shows two varices in the distal esophagus that have been banded. The black bands are indicated with the arrows. The two strings in the right of the field are connected to the trigger device used to deploy the bands.

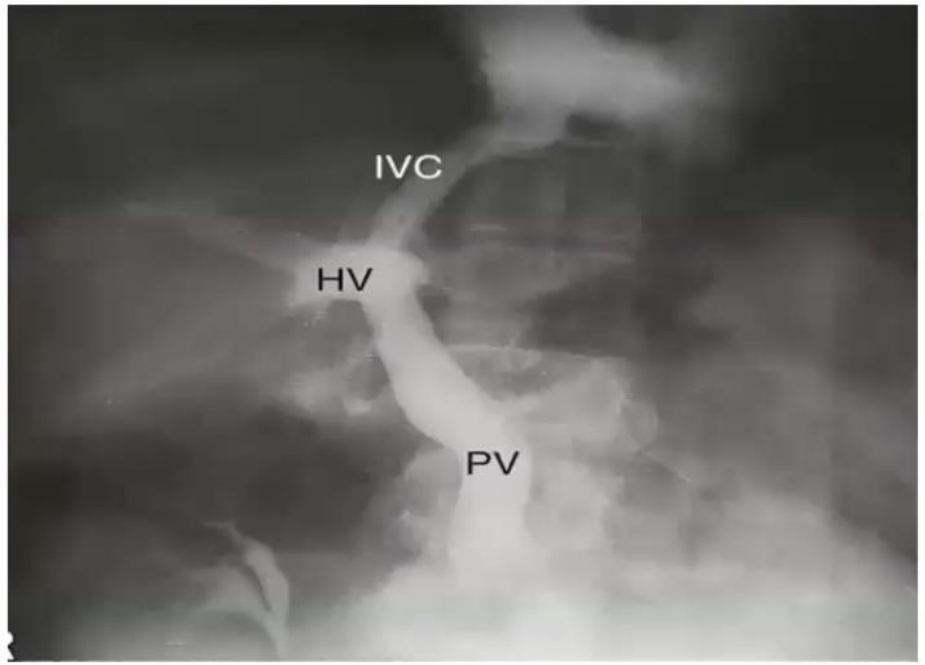
# Balloon temponade

Sengstaken tube



# Transjugular intrahepatic porto-systemic shunt (TIPSS)



# Gastric carcinoma.

- Most do not have large bleeds
- but surgery is occasionally necessary for uncontrolled or repeat bleeding.
- Usually, surgery can be delayed until the patient has been fully evaluated .
- Oozing from gastric cancer is very difficult to control endoscopically.
- Radiotherapy can occasionally be successful.

# Monitoring

- Patients should be closely observed, with hourly measurements of pulse, blood pressure and urine output.

# Surgery

- Surgery  indications

1. endoscopic haemostasis fails to stop active bleeding
2. rebleeding occurs

- **angiographic embolisation — effective alternative to surgery in frail patients.**
- The choice of operation depends on : the site and diagnosis of the bleeding lesion.
- Surgical options :

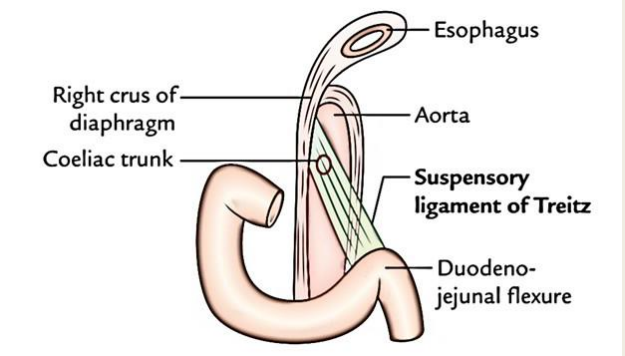
1. Underrunning
2. Pyloroplasty
3. Local excision
4. Partial gastrectomy

## Emergency Box 6.1

### Management of acute gastrointestinal bleeding

- History and examination. Note co-morbidity
- Monitor the pulse and blood pressure half-hourly
- Take blood for haemoglobin, urea, electrolytes, liver biochemistry, coagulation screen, group and cross-matching (2 units initially)
- Establish intravenous access – 2 large bore i.v. cannulae
- Give blood transfusion/colloid if necessary. Indications for blood transfusion are:
  a. SHOCK (pallor, cold nose, systolic BP below 100 mmHg, pulse >100 b.p.m.)
  b. Haemoglobin <100 g/L in patients with recent or active bleeding
- Oxygen therapy
- Urgent endoscopy in shocked patients/liver disease
- Continue to monitor pulse and BP
- Re-endoscope for continued bleeding/hypovolaemia
- Surgery if bleeding persists

# LOWER GI BLEEDING




- The source of the bleeding is distal to the ligament of Treitz, usually in the colon.
- ~ 20–30% of all GI hemorrhage
- **Occult GI bleeding**: bleeding in quantities too small to be macroscopically (requires chemical tests or microscopic examination to be detected)
- **Overt GI bleeding**: macroscopically observable bleeding with accompanying clinical symptoms (e.g., anemia, tachycardia)

# Clinical features

- Hematochezia: bright red blood per rectum

This usually represents lower GI source

Also it may result from massive upper gi bleeding and patient often has some degree of hemodynamic instability

- Melena : black tarry foul smelling stool
- Most commonly due to bleeding in the upper gi tract
- Can also occur in bleeding from the small bowel or the right colon

# Etiology

| | |
|---|---|
| inflammatory | **Diverticulosis**<br>**IBD** |
| Vascular | Hemorrhoids<br>Ischemic colitis<br>Angiodyplasia |
| Tumors | Colorectal cancer<br>Colonic polyps |

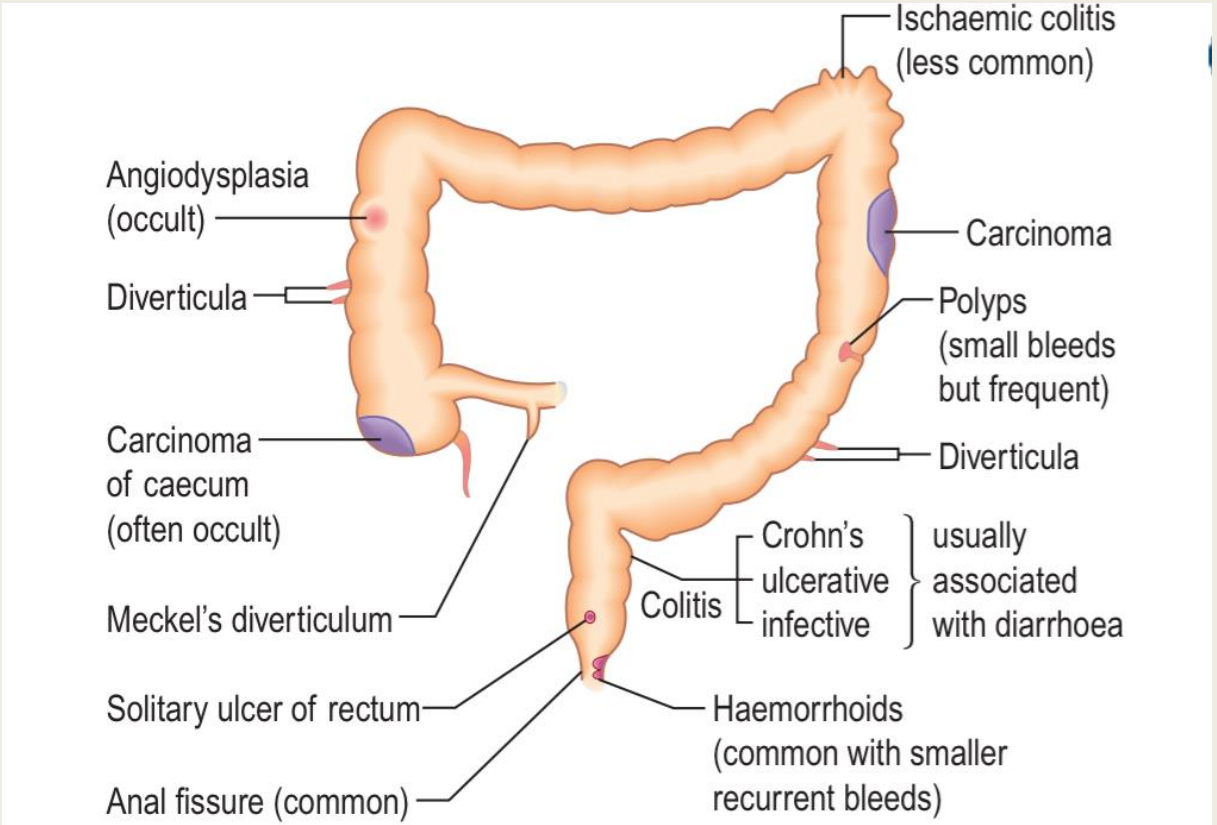
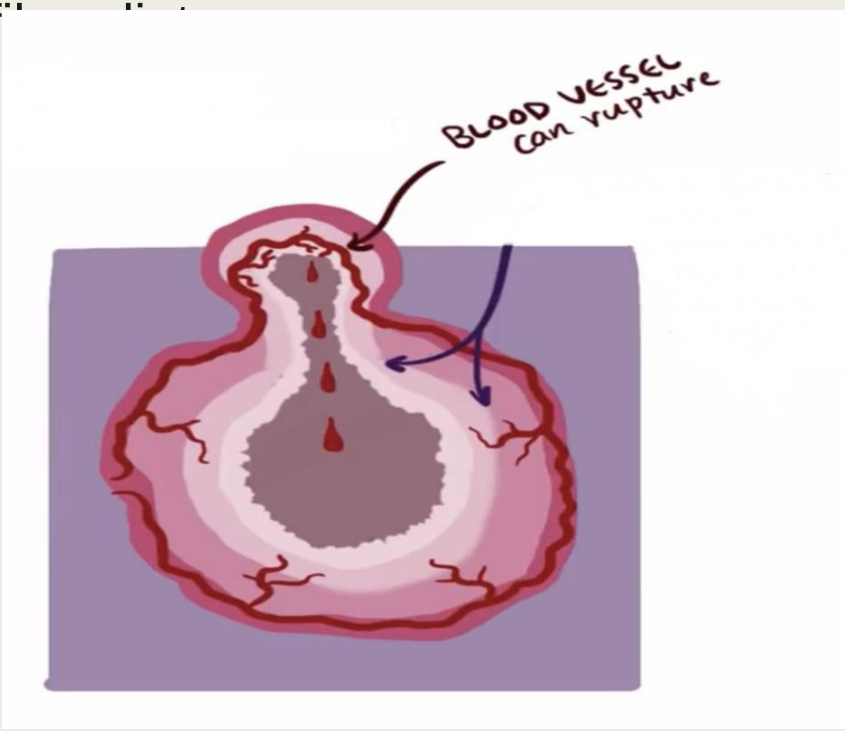



**Figure 6.22 Causes of lower gastrointestinal bleeding.** The sites shown are illustrative – many of the lesions can be seen in other parts of the colon.

# Diverticulosis

Diverticulosis is the presence of one or more diverticula  in the colon. Incidence increases with age.

About 80--85% are asymptomatic. It has been assumed that diverticulosis is caused by a low-fiber diet and can be warded off by a high-f



- Diverticular bleeding occurs in only a small percentage  of patients with diverticulosis. Even so, diverticular bleeding is the most common cause of colonic bleeding  in the elderly
- Diverticular bleeding usually originates in the right colon, and typically stops spontaneously.
- Patients classically present with "painless, maroon stool," but color can actually vary from red to black.
- Diagnose diverticular bleeding with colonoscopy
- Ttt done by colonscopy by thermocoagulation

Injecting epinephrine

# Angiodysplasia

- dilated veins in submucosa of colon
- Is the sec most common lower gi bleeding in the eldery
- Bleeding in angiodysplasia may be occult to severe.
- usual bleeding site is the right colon (cecum, ascending).
- In about 90% of patients bleeding stops spontaneously
- Diagnosed by coloncopy


200 Pt

# Hemorrhoids

- A condition characterised by thickened areas of anal mucosa that consist of arteriovenous blood vessels, smooth muscle
- Can be asymptomatic or present with rectal bleeding, pain, prolapse, and pruritus. Categorized into internal (above the dentate line), external (below the dentate line), and mixed (above and below the dentate line)
- Presentation : hematochazia
- Diagnosed by proctoscopy
- ttt: fiber diet and drink a lot of water

# Ischemic colitis

- Presentation: typically a sudden LLQ  pain with an urge to defecate followed by passage of  red-to-maroon stool within I day.
- Diagnosed by colonscopy

# Colorectal cancer

- A malignancy arising from the colon or rectum.
- Clinical signs are often nonspecific and can include a change in bowel habits, rectal bleeding, iron deficiency anemia, and weight loss.
- Diagnosed by colonscopy

# History

- Ask about previous GI Bleeding
- Recent colonoscopy or surgeries
- Known Inflammatory Bowel Disease
- Bleeding disorders
- NSAID, Anticoagulant or Antiplatelet use
- Ask about pain which may suggest colitis
- Hematochezia which suggests diverticular bleeding
- 10-15% of patients who describe severe hematochezia will have an upper GI source
- Change in bowel habits suggesting cancer

# Physical examination

Rectal exam

- Look for any hemorrhoids at the source of bleeding
- Appreciate color and character of stool

•Differential diagnosis:

**DIAGNOSIS OF CONDITIONS PRESENTING WITH RECTAL BLEEDING BUT NO PAIN:**

- Blood mixed with stool → colon carcinoma
- Blood streak on stool→ rectal carcinoma
- Blood after defaecation→ haemorrhoids
- Blood and mucus→ colitis
- Blood alone→ diverticular disease

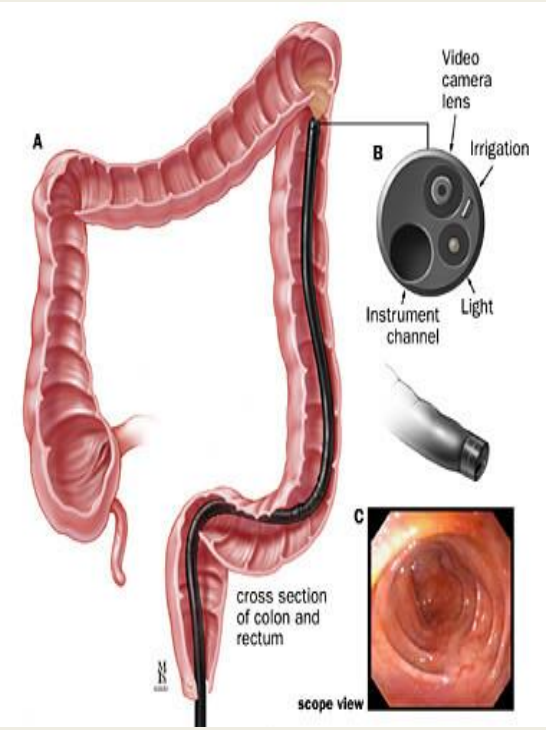
## A diagnosis is made using the history, examination includ-
## ing rectal examination and the following investigations as

1. Laboratory tests

- Stool guaiac for occult blood
- Hemoglobin level
- Mean corpuscular volume : patients with acute bleeding have normocytic RBCs
- Coagulation profile (platelet count  /pt/ptt/INR)
- LFTs and renal function

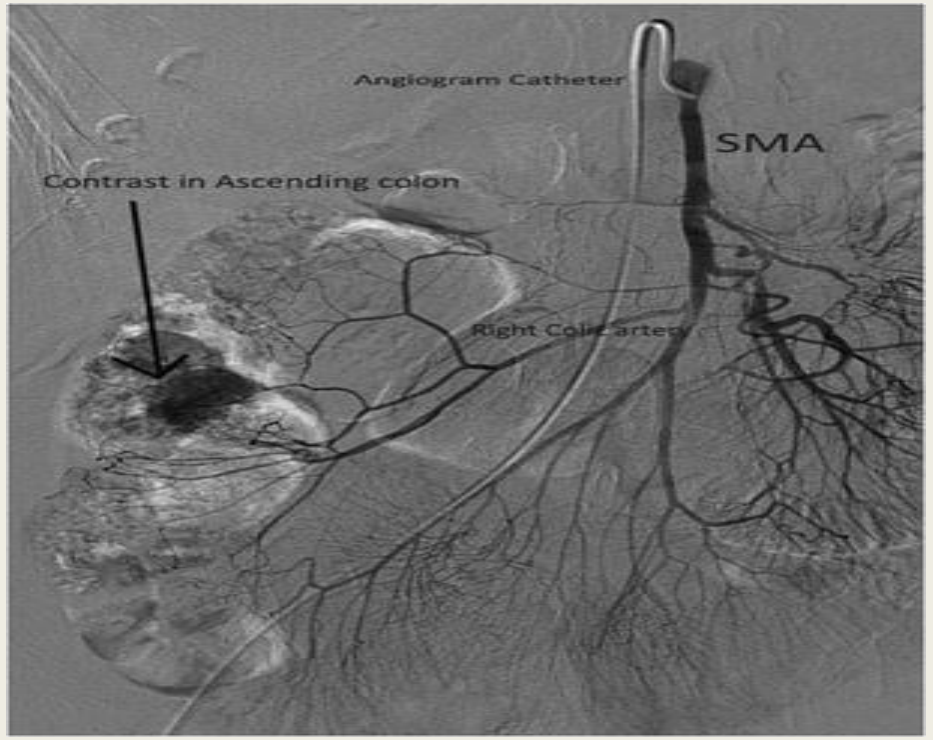
# 2. Sigmoidoscopy & colonoscopy:

- 60cm flexible colonoscopy following bowel preparation
- Combined with proctoscopy to detect hemorrhoids/colorect cancer/angiodyplasia/bowel ischemia
- Contraindications of sigmoidoscopy & colonoscopy:
  - Shock
- Complications of sigmoidoscopy & colonoscopy:
  - perforation



# 3. Angiography

- **Indications**
  - Consider as the initial test in patients with suspected LGIB and hemodynamically instability refractory to resuscitation.
  - Further workup of patients with ongoing bleeding and negative endoscopy
- CT angiography (CTA): allows for rapid source localization to help target hemostatic interventions
- Note: should be performed during active bleeding


Angiogram Catheter
SMA
Contrast in Ascending colon
Right Colic artery

# Management

Most acute lower GI bleeds start and stop spontaneously.

The few patients who continue bleeding and are haemodynamically unstable need resuscitation using the same principles as for upper GI bleeding

# CHRONIC GASTROINTESTINAL BLEEDING

# Aetiology

- Common

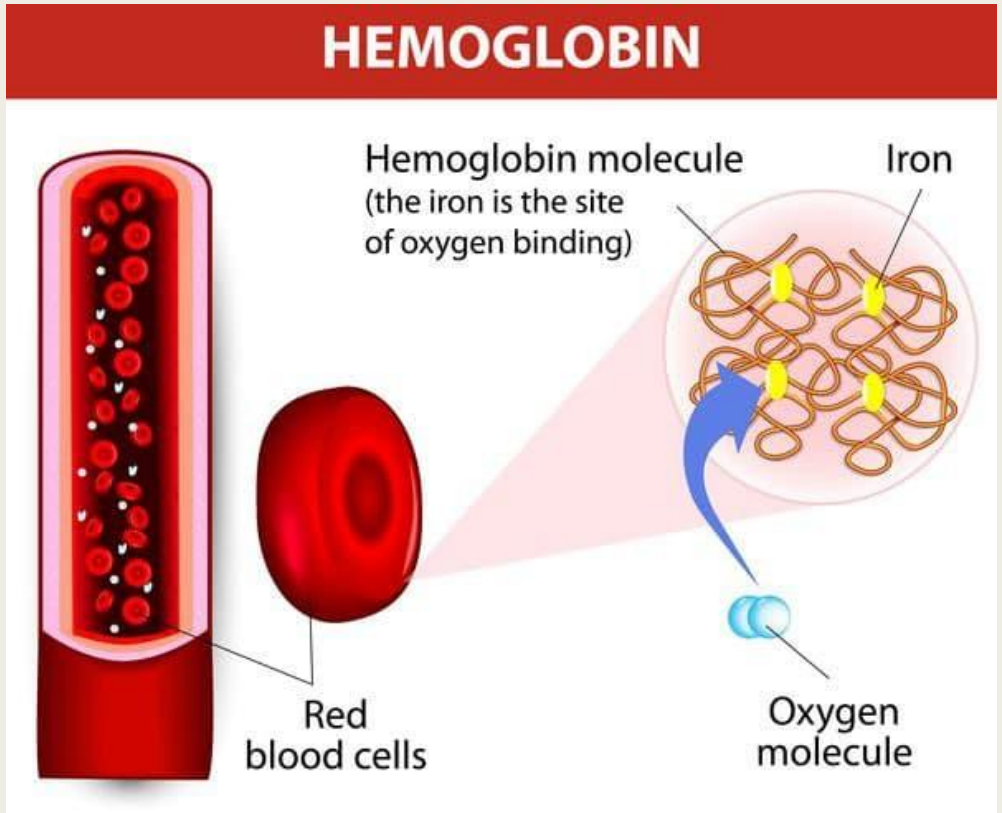
Iron deficiency anemia.

- Rarly

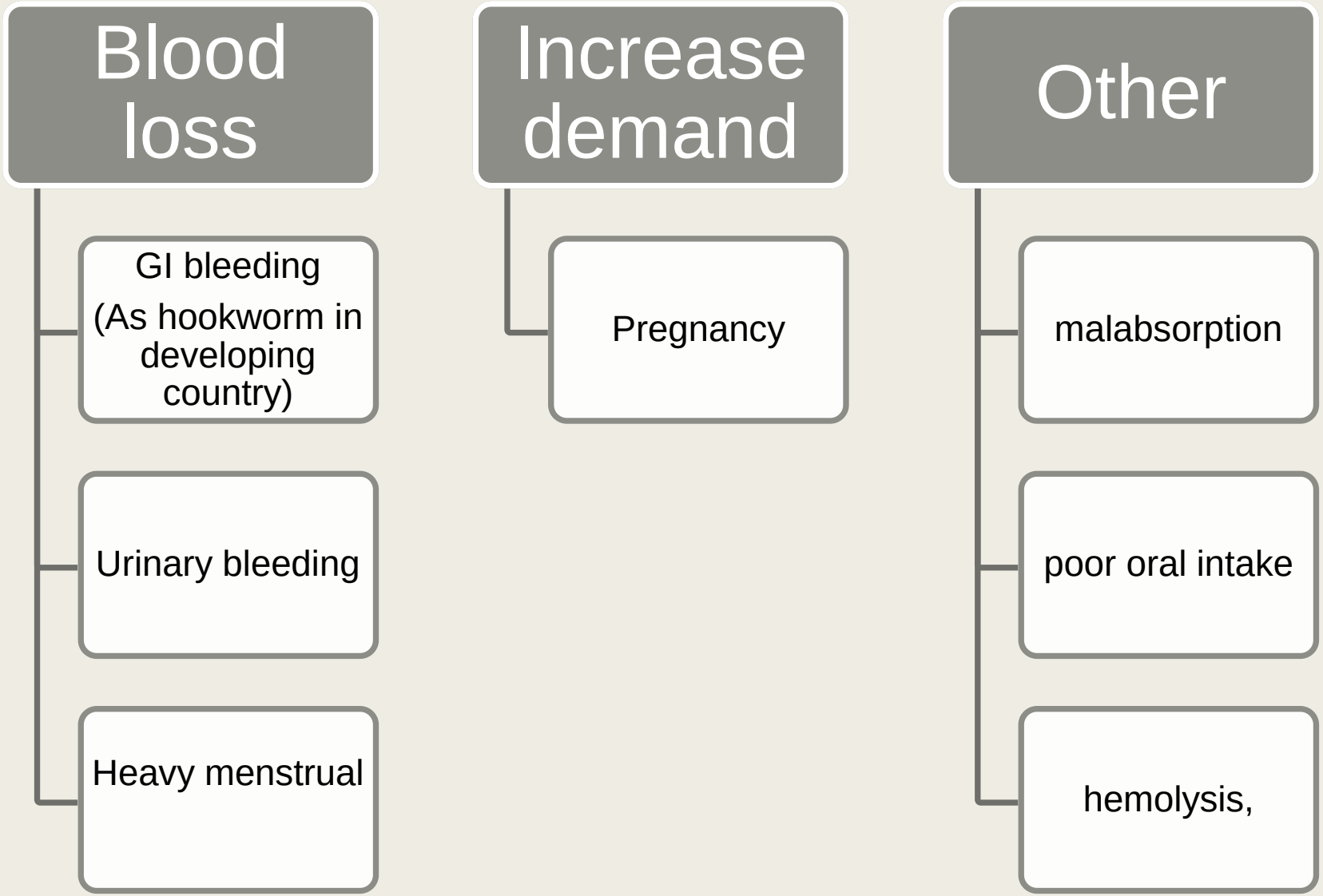
- oesophageal varices.
- duodenal ulcers .
- diverticular disease.
- Cancer(stomach or right colon).
- coeliac disease.

# Iron deficiency anemia

- Role of iron in erythropoiesis.
- A man requires 1 mg per day and a woman 2–3 mg per day on average.



# Causes


Blood loss
GI bleeding
(As hookworm in developing country)
Urinary bleeding
Heavy menstrual
Increase demand
Pregnancy
Other
malabsorption
poor oral intake
hemolysis,

# Clinical Presentation

- Symptoms specific to iron deficiency are rare and cannot be relied upon to determine the diagnosis.
- Iron deficiency anemia as a specific diagnosis is determined by laboratory findings, not symptoms.

# Symptoms

- brittle nails.

- spoon-shaped nails (Koilonychia).

# Symptoms

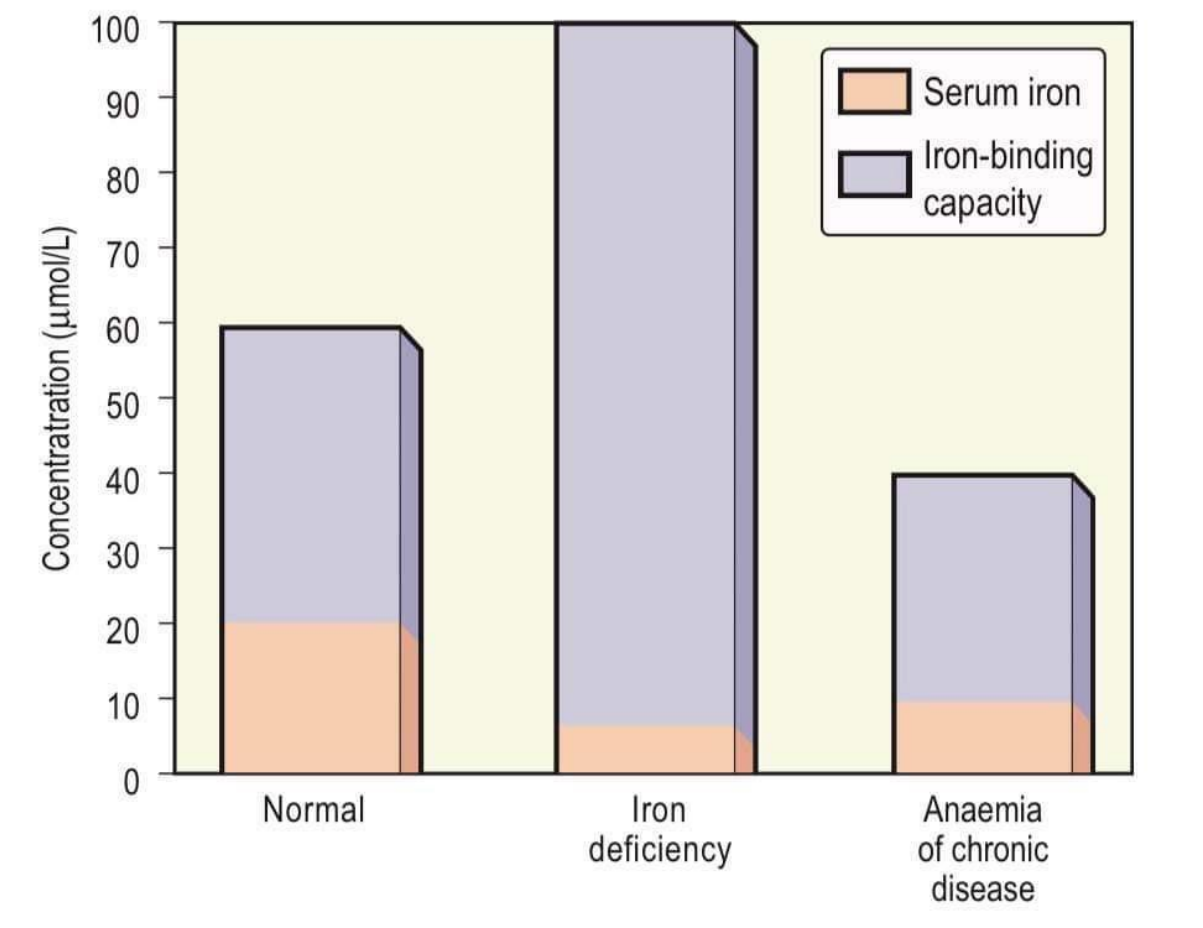
- pica.

- Glossitis.

# laboratory findings

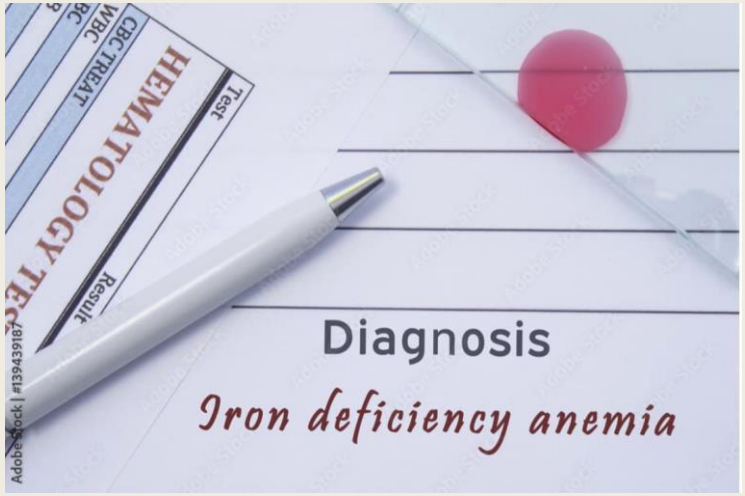
| | |
|---|---|
| **Serum Fe** | **Decrease** |
| **Serum ferritin** | **Decrease** |
| **Total iron binding capacity** | **Increase** |
| **Red blood cell distribution width** | **Increase** |
| **Reticulocytes** | **Decrease** |
| **Mean carpuscular** | **Decrease (late)** |
| **Platelet** | **Increase** |

# laboratory findings



# laboratory findings

- Low ferritin has good specificity (>99%) but poor sensitivity (60%).
- The ferritin level may be falsely elevated because it is an acute phase reactant and may be elevated in other inflammatory states or with malignancy.
- The most specific test, although rarely necessary, is a bone marrow biopsy looking for stainable iron stores.



# Investigation for other causes

Upper gastrointestinal endoscopy

CT colonography

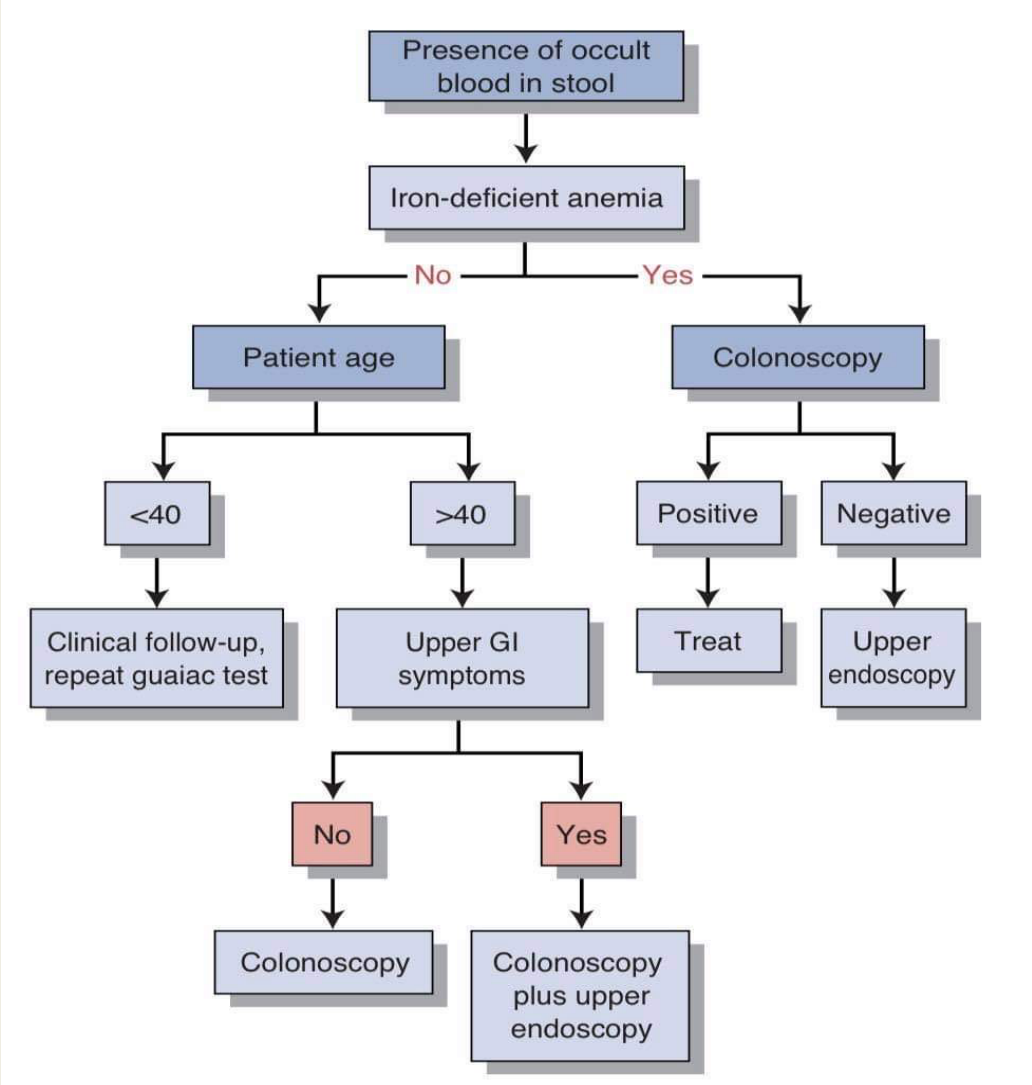
Colonoscopy

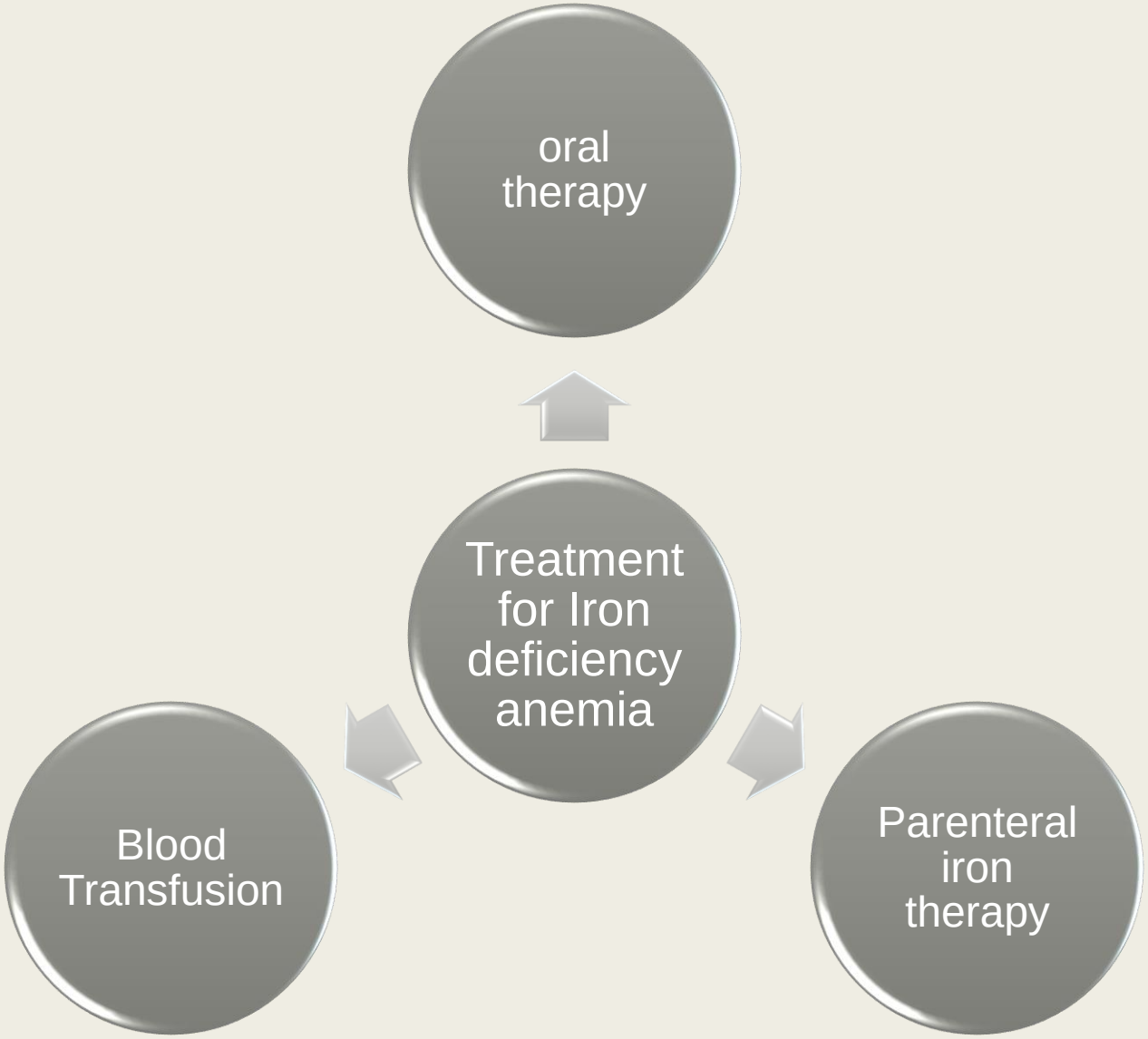
Unprepared CT

# Investigation for other causes

- If gastroscopy, colonoscopy and duodenal biopsy have not revealed the cause, investigation of the small bowel is necessary. Capsule endoscopy is the diagnostic investigation of choice, but currently has no therapeutic ability.
- Bleeding lesions can be identified and later treated with balloon-assisted enteroscopy.
- Occasionally, intravenous technetium-labelled colloid may be used to demonstrate a potential bleeding site in a Meckel’s diverticulum.

# Treatment


Presence of occult blood in stool
Iron-deficient anemia
No
Yes
Patient age
Colonoscopy
<40
>40
Positive
Negative
Clinical follow-up, repeat guaiac test
Upper GI symptoms
Treat
Upper endoscopy
No
Yes
Colonoscopy
Colonoscopy plus upper endoscopy


oral therapy
Treatment for Iron deficiency anemia
Blood Transfusion
Parenteral iron therapy

# Sources

- Harrison’s principle of internal medicine
- Kumar & Clark’s Clinical Medicine
- Davidson’s Principles and Practice of Medicine
- STEP-UP to MEDICINE
- Essentials of Kumar & Clark’s Clinical Medicine
- KAPLAN - STEP 2 CK Lecture Notes 2018 Internal Medicine
- MedStudy Internal Medicine
- Macleod’s clinical examination
- Up to date website
- Amboss

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THE END