

Upper Gastrointestinal Bleeding

Objectives

The student is expected to describe and explain the etiology, clinical features and complications of the following condition:

Upper gastrointestinal bleeding

- Peptic ulcer disease
- Gastroesophageal varices
- Portal hypertensive gastropathy
- Gastroduodenal tumors
- Dieulafoy's lesion
- Mallory Weiss syndrome
- Others

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- Important
- ★ Golden notes
- Extra

[Summary File](#)

[Editing File](#)



Useful resources:



[Ninja Nerd's Video \(very helpful\)](#)

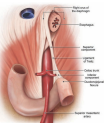


[Ninja Nerd's Notes](#)



[Online Meded's Summary](#)

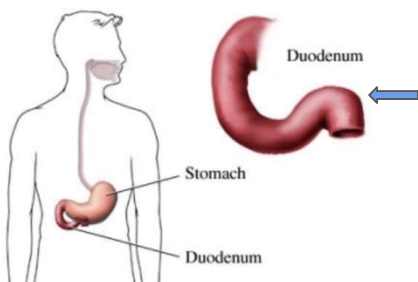
Terminology

| | | |
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| Ligament of Treitz | Formed by a peritoneal fold between the right crus of the diaphragm and the duodenojejunal flexure. |  |
| Upper GIT bleeding | The bleeding is proximal to the ligament of Treitz. It accounts for more than 80% of acute GIT bleeding. Peptic ulcer disease and variceal bleeding are the most common causes. | |
| Lower GIT bleeding | The bleeding is distal to the ligament of Treitz. Colon diverticula and angiodysplasia accounting for most of the cases. The small intestine is the source of bleeding in less than 5% of patients. | |
| Overt GI bleeding | Macroscopically observable bleeding with accompanying clinical symptoms (e.g., anemia, tachycardia) | |
| Occult GIT bleeding | This is the bleeding which is not apparent to the patients or physician, and the patient present with symptoms of iron deficiency anemia with or without a positive fecal occult blood test. Bleeding in quantities too small to be macroscopically observable (requires chemical tests or microscopic examination to be detected) | |
| Obscure GIT bleeding | This is the bleeding that recurs or persists after a negative initial evaluation using endoscopy and radiologic imaging. | |

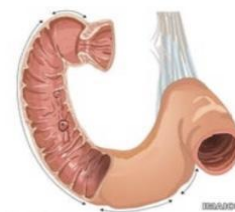
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| Occult Blood Test (OBT) | <ul style="list-style-type: none"> • It is a guaiac slide test (benzidine, phenolphthalein, Ortho toluidine) • Normal stool has 2.5 cc of blood daily. • Melena has 50-100 cc of blood per day. • Positive OBT: IS 10-50 CC OF BLOOD/DAY IN THE STOOL. • Iron does not give positive OBT. • False-positive results is high. |
|--------------------------------|--|



Upper VS lower GI bleeding:



Blue arrow Anatomical landmark: 4th part of duodenum is suspended by Ligament of Treitz (anything above its level is considered upper GI and anything below is lower GI)



Another reason for this classification is that upper GI scopes can't exceed the 4th part of duodenum and lower GI scopes can't reach the terminal ileum. (We start the management with scoping) Even though nowadays we have techniques that can scope the small intestines like capsule endoscopy and balloon follow through, their use is limited to diagnosis and biopsies.

GI Bleeding

“Determination of the site of bleeding is important for directing diagnostic interventions with minimal delay. However, attempts to localize the source should never precede appropriate resuscitative measures”

GI bleedings are a TOP EMERGENCY!

Sebastian textbook of surgery 20th edition



➤ General Approach for trauma and GI bleeding patients:

1. ABCs

Once airway and breathing are ensured, the patient's hemodynamic status becomes the main concern and forms the basis for further management.

2. Assessing magnitude of bleeding

Try to estimate it by asking the patient and through some signs the severity of the bleeding can be determined based on simple clinical parameters:

- Obtundation (reduced level of consciousness)
- Agitation
- Hypotension (systolic blood pressure <90 mm Hg in the supine position)
- Resting heart rate over 100 beats/min
- Cool clammy extremities
- Decreased pulse pressure
- Postural changes in blood pressure should be elicited (fall in BP > 10 mm Hg or increase in pulse > 20 beats/min reflects significant blood loss)

3. Resuscitation

- Use two large-bore intravenous lines.
- If patient is stable, begin resuscitation with isotonic crystalloid solution
- For patients in hemorrhagic shock, initiate a balanced blood component resuscitation.
- Place Foley catheter to facilitate monitoring of intravascular volume status
- When patient with trauma came the ER we give him 1 bolus (2L N.S I.V) STAT (in 15 min)
- Ex. When a patient come with blood pressure of 60/40, that's mean he lost half of his blood volume, you should give him 5-6 blood units on large gauge needle (14)
- The role is whenever a patient loses a fluid it should be replaced with a similar fluid, blood should be replaced with blood, burned patients lost plasma so you should replace it with plasma.



GI Bleeding

4. History

Onset

Today vs 2 months ago

Frequency

Massive Hemorrhage: It is defined as:

- **Continued bleeding with hemodynamic instability** (Hypovolemic shock, Irreversible shock “ **In the ER there is 1 golden hour between Hemorrhage and irreversible shock**”, Multi-organ failure, Acute respiratory distress syndrome, Death)
- **Signs of poor perfusion**
 - **HB drop more than 2 gm/dl**
 - **Transfusion requirement of more than 2 units PRBC in 24 hrs)**
 - **Blood loss of the patient's circulating volume in a 24-hour period**
 - **50% of total blood volume lost in less than 3 hours**
 - **Bleeding in excess of 150 ml/min**

Types

- **Hematemesis** vomiting fresh blood usually caused by upper GIT bleeding although, rarely, bleeding from the pharynx or nose can be responsible. It may be bright red or older (coffee grounds appearance which is due to hemoglobin to methemoglobin oxidation)
- **Melena** passing black dark stool per anus sticky and foul smelling (upper GI or proximal colon bleed) due to oxidizing of iron and partly digested HB by bacteria(heme to hematin)
- The stool greenish character of patients on iron supplements should not be confused with melena. This can be distinguished by performing a guaiac test that detects the presence of fecal occult blood, which tests negative in those on iron supplementation.
- **Hematochezia** passage of fresh blood per anus bright red bloody stool mainly from distal GIT but it can happen if the patient is suffering from proximal GIT severe bleeding, So first thing you want to rule out massive GI bleeding **(IF THE PATIENT IS HYPOTENSIVE AND NOT STABLE, MOSTLY IT'S A MASSIVE UGI BLEEDING, so in this case you do endoscopy not colonoscopy)**

Chronic blood loss present with symptoms of anemia

- Fatigue
- Pallor
- Cold extremities (hands and feet)
- Shortness of breath
- Dizziness
- Palpitation
- Syncope, angina, and even myocardial infarction

Present with symptoms of haemorrhage

- Tachycardia (is the **FIRST** clinical feature of haemorrhage. Even if the patient clinically looks fine)
- Sweating (any patient you see sweating in the ER is in shock)
- Confusion
- Cold extremities (hands and feet)
- Decreased urine output
- Hypotension (the **LAST** clinical feature of haemorrhage. The range of systolic 100-140, The range of diastolic is 60-90, so the cutoff is 100/60. The blood pressure usually starts to decrease after 50% (2.5L) of blood loss)

Types of shock

- Hypovolemic shock
- Low blood pressure and raised blood rate: Mild hypovolemia (<20%), Moderate hypovolemia (20-40%), Severe hypovolemia (>40%)

[Click here for hypovolemic shock classification](#)

5. Physical Examination

- **Epigastric tenderness** = peptic ulcer disease or gastritis
- **Stigmata of liver disease** jaundice, spider nevi, palmar erythema, flapping tremor and caput medusae may suggest variceal bleeding
- **Telangiectasias** can be found in any part of GIT
- **Masses**
- **Splenomegaly** with portal hypertension
- **Adenopathy** indicates malignancy
- **Rectal examination** is a part of the abdominal examination (don't forget for your OSCE and career)

Signs of the presence of blood in the abdomen:

- 1- Abdominal Tenderness
- 2- Distension
- 3- Rebound tenderness
(When you remove your hand. The abdominal wall shakes causing severe somatic pain)
- 4- Guarding and rigidity
- 5- Decreased or absent bowel sounds
- 6- Bleeding PR

GI Bleeding

6. Localization of the site of bleeding



Nasogastric tube aspiration:

- Insertion of a nasogastric tube and examination of the aspirate is important in distinguishing upper from lower GIT bleeding. Useful to evaluate the rate of ongoing bleeding and to be used for gastric lavage and removal of the blood from the stomach to permit endoscopy.
- Gross blood or coffee grounds appearance: likely upper GI source.
- Bile, but no blood: strongly suggestive of lower GI source.
- Clear nonbilious effluent: cannot rule out a duodenal source of bleeding.
- Although the findings of the nasogastric tube aspirate could be helpful in localizing the source of bleeding, almost all patients with significant GIT bleeding should undergo upper GIT endoscopy.

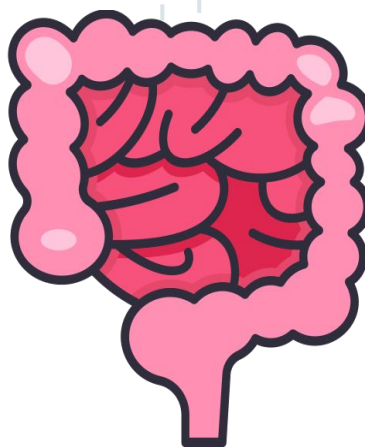


Endoscopy:

- How can we inspect the upper GIT? **EGD**, How far can you go in endoscopy? **To the duodenum**
- How do you inspect the lower GIT? **colonoscopy**, How far can you go in colonoscopy? **To the distal ileum**
- How can you examine the lumen of GIT that the endoscopy and colonoscopy can't reach? By the **capsule endoscopy** (camera takes a lot of pictures then it comes out).

Esophagogastroduodenoscopy (EGD):

- For upper GI source, it has 95% diagnostic accuracy if used within the first 24 hours.
- Should be performed within 24 hours from the arrival of the patient to the emergency, even in stable patients.
- If negative, It direct the attention to a lower GIT source and performance of colonoscopy.
- May also be used as a therapeutic modality: sclerotherapy, thermal coagulation, clipping or banding of varices.



Capsule endoscopy:

- Camera takes a lot of pictures then it comes out.
- Their use is limited to diagnosis and biopsies.
- The appropriate study for obscure bleeding, usually the small bowel where endoscopy and colonoscopy can't reach.

Anoscopy/Proctoscopy/sigmoidoscopy/colonoscopy:

- Overall diagnostic accuracy is up to 97%
- Done in stable patients non-urgently.
- Lack of adequate bowel preparation in the acute setting may render these tests inconclusive.

GI Bleeding

6. Localization of the site of bleeding cont.

The following measures are used when endoscopy is nondiagnostic



Angiography:

- May be required in cases of massive bleeding from the upper or lower GIT, precluding endoscopy.
- To visualize the bleeding by selective angiography, the bleeding must be relatively brisk (**approximately 0.5 to 1.0 mL/minute**) “**in Davidson greater than 1 mL/min**”
- Indicated as the initial test in patients with suspected LGIB and hemodynamically instability refractory to resuscitation and as workup of patients with ongoing bleeding and negative endoscopy.
- Can be used for therapeutic interventions, including vasopressin infusion and embolization of bleeding vessels.



Technetium-labelled RBC scan (tagged RBC scan):

- RBCs scan in nuclear medicine they inject the patient with tagged RBCs and then scan it and it tells you where the site of bleeding is.
- When colonoscopy is nondiagnostic bleeding **at a rate 0.1 to 0.5 mL/min** is required to identify the source.
- **Most sensitive test for ongoing bleeding.**



CT angiography:

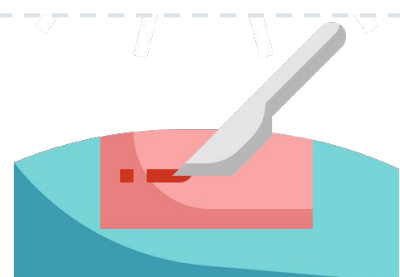
- CT Angiography (give contrast and take pictures in the arterial).
- Used when bleeding source difficult to identify.
- Detects bleeds 0.3 to 0.5 ml/min



Surgery (not easy):

- Consider if other therapeutic options have failed.
- Consider in hemodynamically unstable patients with ongoing bleeding.

Click and watch how exploratory laparotomy aggressive is



Upper GI Bleeding



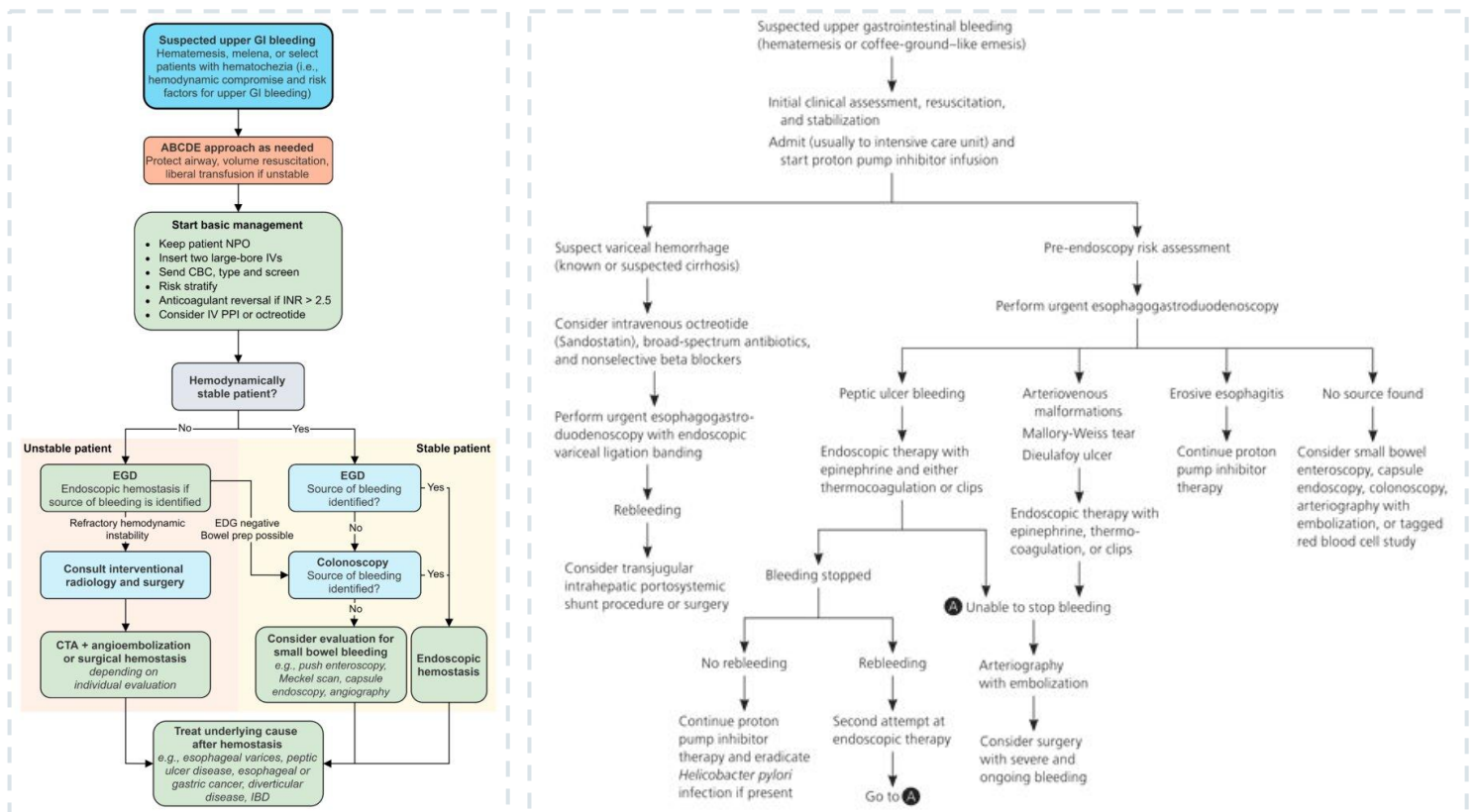
Differential diagnosis (DDx):

Determining whether the bleeding is variceal or not will aid in management and resuscitation

| NONVARICEAL BLEEDING | 80% | PORTAL HYPERTENSIVE BLEEDING | 20% |
|-----------------------------|---------|---------------------------------|------|
| Gastric and duodenal ulcers | 30%-40% | Gastroesophageal varices | >90% |
| Gastritis or duodenitis | 20% | Hypertensive portal gastropathy | <5% |
| Esophagitis | 5%-10% | Isolated gastric varices | Rare |
| Mallory-Weiss tears | 5%-10% | | |
| Arteriovenous malformations | 5% | | |
| Tumors | 2% | | |
| Others | 5% | | |



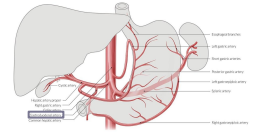
Approach to upper GI bleeding:



Upper GI Bleeding

Peptic Ulcer disease

- **Most common cause** of upper GI bleeding is PUD (duodenal ulcer is 2/3 of PUD cases and it's most common site is duodenal bulb).
 - Approximately 10% to 15% of patients with peptic ulcer disease develop bleeding at some point in the course of their disease (mild bleeding).
 - Bleeding develops as a consequence of acid-peptic erosion of the mucosal surface. **muscular layer is rich in vessels**
 - The most significant hemorrhage occurs when duodenal or gastric ulcers penetrate into **branches of the gastroduodenal artery (GDA)**.
- Very Important "you may get asked": Gastroduodenal artery is the most common artery that may bleed "this question will haunt you for the rest of your life"
- Chronic peptic ulcer disease can cause fistula with aorta.

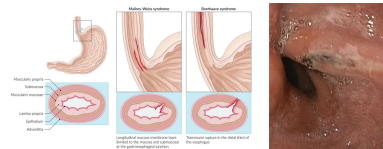


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| <p>Etiology</p> | <ul style="list-style-type: none"> • Helicobacter pylori (The most common cause) • NSAIDs (induces type 5 in Daintree Johnson Classification) • Stress • Smoking • Increased acid secretion (e.g. Zollinger-Ellison Syndrome) • Genetic factors | |
| <p>★ Clinical Features</p> | <p>Acute</p> | <ul style="list-style-type: none"> • Recurrent well-localised epigastric pain (classically, the pain of a gastric ulcer occurs during eating and is relieved by vomiting. Patients with duodenal ulceration describe pain when they are hungry and pain is relieved by food, antacids, milk and vomiting.) • Heartburn • Anorexia • Waterbrash (a sudden flow of saliva into the mouth) • Intolerance of certain foods • Intermittent vomiting may occur • Haematemesis and melaena may complicate all forms of peptic ulceration. |
| <p>Daintree Johnson Classification</p> | <p>If the ulcer is positioned in the upper part of the stomach what is the probability that it's an acid caused ulcer? Low probability due to gravity the acid will always accumulate in the lower part.</p> | |
| <p>Management</p> | <p>The aims of management of bleeding peptic ulcers are to identify the bleeding point, arrest the bleeding (bleeding ceases spontaneously in 90% of patients) and prevent recurrence.</p> | |
| <p>Medical management</p> | | <ul style="list-style-type: none"> ○ Proton pump inhibitors (e.g. omeprazole, lansoprazole) "loading dose 80 mg IV" ○ H. pylori treatment and eradication (PPI + Metronidazole + Clarithromycin + Amoxicillin "2 weeks course") ○ Stop ulcerogenic medications (e.g. NSAIDs) |
| <p>Endoscopic management (First line) Manage at least by dual therapy.</p> | | <ul style="list-style-type: none"> ○ Epinephrine injection ○ Heater probes and coagulation (cauterization) ○ Application of clips (Since PUD bleeding is caused by rupture of a vessel, the best approach is through clipping) ○ Sclerotherapy ○ Banding ○ Spraying with hemospray ○ Suturing ○ For gastric ulcer, biopsy should always be performed to rule out malignancy. |
| <p>Angiography (Second line)</p> | | <p>If endoscopy does not identify the bleeding point (active bleeding of greater than 1 mL/ml), angiography should be used and selective embolization can be used to stop the bleeding and thus avoid the need for surgery.</p> |
| <p>Surgery (Third line)</p> | | <p>Emergency surgery may be indicated if endoscopic therapy is unable to control the bleeding, Giant duodenal ulcer (ulcer >2 cm) will most likely require surgical intervention. Type of operation used depends on the site of the bleeding ulcer and the comorbidity of the patient:</p> <ul style="list-style-type: none"> • Bleeding duodenal ulcer may simply be under-run with sutures, through a duodenotomy and started on H. pylori eradication therapy empirically • Bleeding gastric ulcer must always be biopsied to determine its nature <ul style="list-style-type: none"> ○ In young fit patients, the ulcer should be excised completely by taking a small wedge resection. ○ In elderly patients or those with significant comorbidity, under-running of the ulcer may be preferable ○ If the pathology confirms malignancy, the patient should have accurate staging and further treatment as indicated. H. pylori eradication is indicated for benign ulcers. |
| <p>Forrest classification</p> | <p>After the management based on the appearance of the ulcer you can predict if it's going to rebleed or not.</p> <ul style="list-style-type: none"> • Stage I: active hemorrhage (Ia: spurting arterial hemorrhage; Ib: oozing hemorrhage) • Stage II: inactive hemorrhage (IIa: lesion with a visible vessel; IIb: lesion with an adherent clot; IIc: flat lesion covered with hematin) • Stage III: lesion without active hemorrhage (flat ulcer base) <ul style="list-style-type: none"> ○ Low risk (Forrest IIc-III): can usually be managed as outpatients with PPI therapy. ○ Higher risk (Forrest I-IIb): Typically require inpatient care | |
| <p>Complications</p> | <ul style="list-style-type: none"> • Acid gastric juice will enter the peritoneal cavity if a peptic ulcer erodes the wall of the stomach or duodenum at a point where it is only covered by visceral peritoneum. This causes a chemical peritonitis, which later becomes infected with bacteria. • Carcinoma of the stomach is a common cause of death in men. Pernicious anaemia, gastric polyps and chronic gastric ulcers are known to be pre-malignant conditions, but the majority of gastric ulcers arise spontaneously. Helicobacter pylorides is an important predisposing factor. • Pyloric stenosis occurs in adults with cicatrizing peptic ulceration of their pylorus or duodenum, or carcinoma of the antrum of the stomach. | |

Upper GI Bleeding

Mallory-Weiss Tear

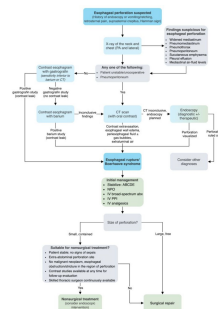
- History of heavy **drinking** (alcoholics), also happens in pregnant women, cancer patients on chemo, losing weight by inducing vomiting (causes a tear in the esophagogastric junction).
- **Longitudinal Mucosal and submucosal tears** that occur near the gastroesophageal junction. (Not full thickness tear. Full thickness tear is classified as perforation) (MaLLory-Weiss: Longitudinal Lacerations)
- Most tears occur along the lesser curvature.
- Such lesions represent 5% to 10% of cases of upper GIT bleeding.



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| Etiology | ★ Classically, these lesions develop in alcoholic patients after a period of intense retching and vomiting. (Retching = forceful projectile vomiting due to strong contraction of the diaphragm) |
| Clinical Features | <ul style="list-style-type: none"> • 90% of bleeding episodes are self-limited. • Acute presentation. |
| Diagnosis | Although the diagnosis is based on the history, endoscopy is frequently required to confirm the diagnosis. |
| Management | Supportive therapy is the main treatment because 90% of bleeding episodes are self-limited. |

Boerhaave Syndrome

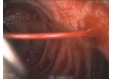
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| Mechanism | Barogenic esophageal rupture |
| Causes | <ul style="list-style-type: none"> • Intake of large amounts of alcohol (binge drink) or food in the recent past • Repeated episodes of retching vomiting (most common cause) • Prolonged coughing • Straining during childbirth delivery and defecation • Epileptic Seizures • Weightlifting • Abdominal trauma • Iatrogenic (e.g. endoscopy) |
| Pathophysiology | <ul style="list-style-type: none"> • Severe vomiting/increased intrathoracic pressure → rupture of all layers of the esophageal wall (<u>transmural</u> perforation) in contrast to mallory tear which only involve submucosa & mucosa • In > 90% of cases, the rupture occurs in the distal third of the esophagus on the left dorsolateral wall surface. The musculature of the left distal dorsolateral esophageal wall is weaker and therefore offers less resistance. If it happens in the abdominal part (poreferation of the left upper quadrant and upper abdominal pain) then the patient will have poreferation of the mediastinum part of the esophagus and free air mediastinum. |
| Clinical Features | <ul style="list-style-type: none"> • Depends on the location • Mackler's Triad: mid-epigastric and/or lower chest pain that often radiates to the back, vomiting and subcutaneous emphysema. mediastinal crunch (Hamman's sign) heard with stethoscope • Pleural pain worsen by neck flexion and swallowing. • Septic shock very rapidly |
| Diagnosis | <ul style="list-style-type: none"> • Initial: X-ray • Confirmatory: Contrast leak on contrast esophagography (gold standard) • CT: Inconclusive x-ray and esophagography, pneumoperitoneum detected on x-ray or uncooperative patient |
| Management | <ul style="list-style-type: none"> • Initial: <ul style="list-style-type: none"> ○ Stabilize ABCDE ○ NPO ○ Broad spectrum IV antibiotics ○ IV PPI ○ IV analgesics • Non-surgical treatment: small contained perforation • Surgical treatment (Closure of the ruptured esophageal segment, Last resort: esophagectomy) Indicated in : <ul style="list-style-type: none"> ○ Hemodynamic instability ○ Patients who do not fulfill the criteria for conservative management ○ Clinical deterioration during conservative management |



Upper GI Bleeding

Dieulafoy's lesion

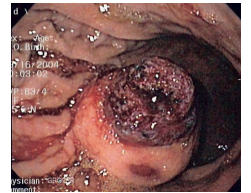
- Dieulafoy's lesions are vascular **arterial** malformations characterized by abnormally large diameter submucosal arterioles which do not decrease in size as they approach the mucosa, **if it gets irritated by acidity of the stomach it ruptures causing a massive bleeding.**
- Found primarily along the lesser curve of the stomach within 6 cm of the gastroesophageal junction.
- 75% in stomach but can occur throughout the gastrointestinal tract.



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| Etiology | Not well understood |
| Clinical Features | <ul style="list-style-type: none"> High pressure arterial bleeding. Healthy, then sudden massive fresh bleeding, then shock status that responds to resuscitation (need massive blood transfusion) |
| Management | <ul style="list-style-type: none"> Endoscopic control is often successful. Thermal, clipping or sclerosant therapy is effective in the majority of cases. Angiographic coil embolization can be successful in cases that endoscopic therapy fail Surgery: if these approaches are unsuccessful. Oversewn of the lesion or excision, partial gastrectomy if the bleeding point is not identified |

Gastroduodenal Tumors (Neoplasms)

- Neoplasms such as gastrointestinal stromal tumors (**GIST**) and adenocarcinomas rarely cause UGIB.
- Occasionally, might bleed persistently, rebleeding rate is high. **They don't commonly bleed, but once they bleed the rebleeding rate is high. Rebleeding increase the risk of malignancy.**
- Most characteristic of the **GI stromal tumor (GIST)** You must remember this tumor.
- GI stromal tumor is the most common tumor that may cause bleeding. Why? Because it grows from stroma**
- If significant bleeding does occur from a GIST, resection with negative margins can be considered.
- Although it may occur with other tumors, including adenocarcinoma and lymphomas particularly after initiation of chemotherapy**
- Adenocarcinoma rarely presents with massive hemorrhage and frequently can be managed with endoscopic therapy.
- It presents in different histological grades, If malignant, surgical resection is indicated.**
- Tumors which present with hemorrhage are often late stage.
- Presents with melena, if massive bleeding then it is severe. +ve occult blood**



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| Clinical Features | Usually associated with chronic anemia (Microcytic Hypochromic anemia) or hemoccult-positive stool (blood that is invisible to the naked eye, sensitive but not specific). |
| Management (GIST treatment is a possible exam question) | <p>Endoscopic therapy is often successful in controlling the bleeds, but the rebleeding rate is high. Therefore surgical resection is indicated when malignancy is diagnosed</p> <ul style="list-style-type: none"> Wedge resection is the recommended palliative procedure for control of bleeding and should be carefully considered along with goals of care. Curative surgery requires more radical resection If not resectable we administer tyrosine kinase inhibitor like Imatinib (Gleevec) Radiation therapy is an alternative. |

Hemobilia

Blood inside the biliary duct.

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| Etiology | <ul style="list-style-type: none"> Liver biopsy Biliary instrumentation Hepatocellular carcinoma Cholangiocarcinoma Post-cholecystectomy Injury due to ERCP Trauma Coagulopathies in elderly post simple procedures. |
| Clinical Features | Jaundice, Right upper quadrant pain and GI bleeding. |
| Diagnosis | Angiography is the diagnostic modality of choice |
| Management | <ul style="list-style-type: none"> Treated by correcting the coagulopathy, if it fails treat by embolization, if it fails treat by surgery. Angiographic embolization is the preferred treatment |

Upper GI Bleeding

Aortoenteric Fistula

Aortoenteric fistulas are classified as:

- **Primary:**
 - Erosion of the aneurysm into the adjacent bowel.
 - Infection
 - Neoplasm (most commonly pancreatic cancer)
 - Radiation therapy
- **Secondary:**
 - Previous endovascular stent or graft aneurysm repair. (Most common cause)

Etiology

After repairing an aortic aneurysm with a graft, this graft can erode the bowel wall forming a fistula between the bowel and the aorta, leading to bleeding from aorta to the intestine and bacteremia.

Clinical Features

Associated with bacteremia and sepsis.

Diagnosis

- **Urgent upper GIT endoscopy** is mandatory because diagnosis at this stage can be lifesaving which will show bleeding in the third or fourth portion of the duodenum.
- **CT scan with intravenous contrast** will reveal air around the graft which suggest the presence of infection, possibly pseudoaneurysm and rarely a leak of intravenous contrast into the duodenal lumen.

Management

Management endovascular stenting through the femoral artery +/- open surgical repair

Portal Hypertensive Gastropathy

- A diffuse dilation of the mucosal and submucosal venous plexus with overlying gastritis and may exude blood
- Rarely causes major bleeding even in the absence of well-developed visible varices

Management

Treatment includes octreotide infusion, TIPS and rarely surgery

Upper GI Bleeding

Gastroesophageal Varices

- A lethal cause of bleeding.
- The most common cause of portal hypertension is cirrhosis.
- Related to infection or alcohol history. Caused by liver fibrosis/cirrhosis and has clinical signs of liver disease such as jaundice.
- Most commonly the result of bleeding from varices veins. As they enlarge, the overlying mucosa becomes increasingly tenuous, excoriating with minimal trauma.
- **Most common in the distal lower third of esophagus.**
- May also develop in the fundus of the stomach and the hemorrhoidal plexus of the rectum and the umbilicus (caput medusa)
- When portal vein pressure increase, veins will develop collaterals "Shunts" which will cause the Varices, Caput medusa & Hemorrhoids depending on the site of shunts.
- Approximately 30% of patients with cirrhosis and portal hypertension, and 30% in this group develop variceal bleeding. (most common manifestation of non-cirrhosis portal hypertension is upper GI bleeding)
- Variceal hemorrhage is associated with an increased risk of rebleeding, increased need for transfusions, longer hospital stays, and increased mortality
- Causes painless hematemesis .
- 6-week mortality rate after the first bleeding episode is almost 20%. Thus after initial management with scope we don't wait for the next episode to intervene, rather 10 days-2 weeks post-scope we scope again and search for prominent veins and band them (veins→banding, arteries →clipping).
- Once an episode occur, you shouldn't ignore it:
 - You need firstly to act with the bleeding vessels.
 - Then, occlude every dilate vessel.
 - Then reschedule visit to occlude any additional vessel.

| | | |
|---|---|--|
| <p>Etiology</p> | <p>Variceal hemorrhage occurs from portal hypertension, because of the portosystemic shunt. So the blood is trying to move from the portal system into the systemic system which will cause varices. It happens in splenorenal, mesenteric, rectal vessels or around the umbilicus. The left gastric vein (portal system) is trying to anastomose with azygos vein (caval system) in the chest so it starts to become bigger and bigger which will cause more blood to accumulate in the systemic system.</p> |  |
| <p>Diagnosis</p> | <ul style="list-style-type: none"> • Patients presenting with acute upper gastrointestinal bleeding are examined for evidence of chronic liver disease. • The key investigation during an episode of active bleeding is endoscopy. | |
| <p>Management</p> | <p>Active resuscitation</p> | <ul style="list-style-type: none"> ○ Replace blood loss quickly (threshold for transfusion RBC is HB 7 g/dl), resuscitation done cautiously aiming for haemoglobin (Hb) of 8 g/L as over-resuscitation can increase mortality . ○ Correction of any coagulation abnormality. ○ Antibiotic prophylaxis should be administered (7 days course). ○ Octreotide is the vasoactive agent of choice. Continuous intravenous infusion of octreotide results in temporary bleeding control and allows time for patient resuscitation and appropriate diagnostic and therapeutic procedures. |
| | <p>Endoscopy and control of bleeding</p> | <ul style="list-style-type: none"> ○ Endoscopic variceal ligation (EVL) is the first-line treatment . ○ Sclerotherapy being reserved for those where band ligation is not possible .  |
| | <p>Balloon tamponade</p> | <p>A procedure in which 2 balloons are inflated (gastric and esophageal balloons), to apply pressure on bleeding blood vessels, compress the vessels, and stop the bleeding. Used if haemorrhage is torrential and prevents direct injection, The four-lumen Minnesota tube has largely replaced the three-lumen Sengstaken–Blakemore tube. Tamponade Should be regarded as a holding measure. (not left in place for more than 24–36 hours)</p>  |
| | <p>Portal decompression</p> | <p>Indicated in cases of refractory variceal bleeding that cannot be controlled endoscopically. But portosystemic encephalopathy can be troublesome. The approaches of decompression include:</p> <ul style="list-style-type: none"> ○ Liver transplant and while waiting for transplant perform TIPS ○ Transjugular intrahepatic portosystemic shunt (TIPS): A needle catheter inserted via the internal jugular vein → passed along to hepatic vein → pierced through liver parenchyma to intrahepatic branch of the portal vein → expandable metal stent is placed → side-to-side portocaval shunt (moving blood form the portal system into the systemic system) ○ Surgical shunting  |
| <p>How to treat Variceal bleeding in sequence? (possible MCQ) ABC → PPI → octreotide, non selective BB, antibiotics → endoscopy. (Davidson: Same as dr. hussam's sequence but <u>PPI</u> was <u>not</u> mentioned) Re bleeding? Consider TIPS and surgery</p> | | |
| <p>Prevention</p> | <ul style="list-style-type: none"> • Prevention of recurrent bleeding should be a priority once the initial bleeding has been controlled. The risk of recurrent bleeding is highest in the initial few hours to days after the first episode. • Medical therapy to prevent recurrence includes non- selective beta blocker (nadolol), and antiulcer agent (PPI or sucralfate) <ul style="list-style-type: none"> ○ Non-selective beta blocker mechanism: inhibits beta-2-adrenergic receptors in the gastrointestinal tract → splanchnic vasoconstriction → ↓ portal and collateral blood flow → ↓ portal hypertension • Endoscopic therapy to prevent rebleeding involve the eradication of varices, occlude every dilated vessel. Then reschedule visit to occlude any additional vessel. | |

Upper GI Bleeding

Other causes

| | |
|--|---|
| <p>Stress gastritis (Curling Ulcer)</p> | <ul style="list-style-type: none"> ● Arise as a consequence of extreme stress resulting from shock ● Happens due to inflammatory stress “cytokine storm” (e.g. burn victim, trauma, long term ICU admission, sepsis) where the gastric mucosa is inflamed and starts to slough and necrosis exposing the muscular layer which will start to bleed. ● The problem here that there is no single source of bleeding, it’s multiple spots. Treated by reversing the underlying cause and PPI to suppress the acid, if that fails you must take the patient to the OR (gastrostomy and suture of the bleeding site). |
| <p>Esophagitis</p> | <p>Pathophysiology: This occurs when acid pepsin refluxes up out of the stomach into the oesophagus through the lower esophageal sphincter onto the squamous epithelium lining the oesophagus, which is not able to resist these powerful chemicals. In many instances the reflux occurs because of gastro-oesophageal junction incompetence</p> <p>Etiology: Hiatus hernia, severe GERD, medications (e.g. bisphosphonates), irritating agents, corrosives and the most common cause is candidiasis with chemotherapy and immunocompromised patients.</p> <p>Presentation:</p> <ul style="list-style-type: none"> ● Heartburn, which is a severe burning discomfort felt in the centre of the chest behind the heart (epigastrium), often at night. The frequency and severity of the heartburn is made worse by lying flat, so patients sleep propped up on pillows to try to reduce its occurrence. Heartburn is often initiated by bending, stooping or heavy lifting. ● Bitter taste developing in the mouth, which is often accompanied by flatulence and coughing if any of the refluxing acid spills over into the lungs. <p>Examination:</p> <ul style="list-style-type: none"> ● Physical examination rarely reveals any diagnostic signs. ● The diagnosis relies on endoscopy and other investigations. <p>Treatment:</p> <ul style="list-style-type: none"> ● Acid suppressive therapy (e.g. Ranitidine, omeprazole), endoscopic control of the bleeding (electrocoagulation or heater probe), targeted therapy in patients with an infectious cause, but surgery is seldom necessary. |
| <p>Gastric antral vascular ectasia (GAVE)</p> | <ul style="list-style-type: none"> ● Telangiectasia of the gastric antrum. ● Known as "watermelon stomach". It rarely causes acute severe bleeding and most patients present with persistent iron deficiency anemia due to continued occult blood loss. ● Endoscopic therapy is highly effective for persistent, transfusion-dependent bleeding. ● The preferred endoscopic therapy is argon plasma coagulation. ● Failure of endoscopic therapy indicates the need for antrectomy |
| <p>Iatrogenic bleeding</p> | <p>This bleeding may follow a therapeutic or diagnostic procedure such as:</p> <ul style="list-style-type: none"> ● Percutaneous transhepatic procedures (hemobilia) ● Endoscopic sphincterotomy. It is often mild and self-limited, but if it persists it may require epinephrine injection. Surgical intervention is rarely required. ● Percutaneous endoscopic gastrostomy (PEG) placement. ● Recent upper GIT surgery (suture line or staple line). Therapeutic endoscopy should be performed with minimal air insufflation to avoid anastomotic disruption ● e.g. perforation by a scope or ERCP. |
| <p>Pancreatitis</p> | <ul style="list-style-type: none"> ● Can cause hemorrhage (hemosuccus pancreaticus) if the enzyme gets in contact with any blood vessels which lead to digestion and hemorrhage and often due to the erosion of the pancreatic pseudocyst into the blood vessels (most commonly a splenic artery pseudoaneurysm) or pancreatic pseudocyst rupture. ● Angiography is the diagnostic modality of choice and angiographic embolization is the preferred treatment |

Summary

Dr. Hussam's Summary

A patient presented with GI bleeding:

- First check if the patient is stable or not.
- Stabilize the patient if not stable.
- Look for liver stigmata or any signs of liver cirrhosis. If present it might indicate variceal bleeding.
- **Variceal bleeding:** start Octreotide (sandostatin), non-selective BB, antibiotics and perform endoscopy and do variceal banding or sclerotherapy and the last option is to do TIPS.
- **PUD:** PPI + dual therapy. If it **rebleeds** we do a second scope with another dual therapy. If it **rebleeds** either do angioembolization or surgery. (In duodenal ulcer its okay to go with angiography although the risk if ischemia is high. Gastric has a lot of blood supply so angio isn't the best option it's better to go to surgery)
- **Arteriovenous malformation (Dieulafoy lesion or Mallory-Weiss tear):** Treat with endoscopy by whatever modality.
- **Erosive gastritis due to reflux:** Antireflux medication (PPI)
- Make sure that the ulcer isn't caused by a cancer.
- **Aortoenteric fistula:** Go endovascular through the femoral artery, and deploy a stent to stop the bleeding and then after the recovery you can go and resect the fistula and reconstruct again.
- **GI Stromal Tumor (GIST):** If it's resectable → Surgery. If it's not resectable or potentially resectable → First line: tyrosine kinase inhibitors like **Imatinib** (Gleevec)

Recall

Q1: What is the definition of upper GI bleeding?

Answer: Bleeding proximal to the ligament of Treitz.

Q2: What are the symptoms of upper GI bleeding?

Answer: Hematemesis, melena and coffee ground emesis

Q3: What are the DDX of upper GI bleeding?

Answer: PUD, esophageal varices, Mallory Weiss tear, Neoplasm and Aortoduodenal fistula.

Q4: What is the initial treatment?

Answer: IVFs: Lactated Ringer's; packed red blood cells as needed, IV x 2, Foley catheter to follow urine output, discontinue aspirin and nasogastric tube (NGT).

Q5: How can you have an upper GI bleeding with only clear succus back in the NGT?

Answer: Duodenal bleeding ulcer can bleed distal to the pylorus with the NGT sucking normal non-bloody gastric secretions! If there is any questions regarding UGI bleeding, perform EGD.

Summary

| | Etiology | Clinical features | Work up |
|----------------------|--|--|---|
| PUD | <ul style="list-style-type: none"> • Helicobacter pylori • NSAIDs • Stress • Smoking • Increased acid secretion | <ul style="list-style-type: none"> • Recurrent well-localised epigastric pain • Heartburn • Anorexia • Waterbrash | <ul style="list-style-type: none"> • Medical: PPI, H. pylori eradication • Endoscopy (at least dual): clipping, Epinephrine injection, Sclerotherapy or Banding • Surgery: <ul style="list-style-type: none"> ○ Duodenal: under-run with sutures ○ Gastric: do biopsy <ul style="list-style-type: none"> ■ Young: excise ■ Elderly: under-run |
| Mallory-Weiss Tear | Alcoholic patients after a period of intense retching and vomiting. | 90% of bleeding episodes are self-limited | <ul style="list-style-type: none"> • Diagnosis based on the history • Endoscopy is confirmatory • Supportive therapy |
| Dieulafoy's lesion | - | High pressure arterial bleeding | <ul style="list-style-type: none"> • Endoscopic: Thermal, clipping or sclerosant therapy. • Angiographic: coil embolization if endoscopy fail. • Surgery: if these approaches are unsuccessful. |
| Neoplasms | - | <ul style="list-style-type: none"> • Rarely cause UGIB • May present as ulcerative lesions that persistently bleed (Most characteristic of the GI stromal tumor) • Chronic anemia • Hemoccult-positive stool | <ul style="list-style-type: none"> • Surgery: <ul style="list-style-type: none"> ○ Palliative: Wedge resection ○ Curative: Radical resection • If not resectable: Imatinib |
| Hemobilia | <ul style="list-style-type: none"> • Coagulopathies in elderly post simple procedures. • Biliary instrumentation • Liver biopsy • Hepatocellular carcinoma • Post-cholecystectomy • Injury due to ERCP • Trauma | <ul style="list-style-type: none"> • Jaundice • Right upper quadrant pain • GI bleeding | <ul style="list-style-type: none"> • Diagnosis: Angiography • Management: <ul style="list-style-type: none"> ○ Correct the coagulopathy ○ Failed? embolization ○ Failed? Surgery |
| Aortoenteric Fistula | <ul style="list-style-type: none"> • Primary: <ul style="list-style-type: none"> ○ Erosion of the aneurysm into bowel ○ Infection ○ Neoplasm (pancreatic) ○ Radiation • Secondary: stent or graft aneurysm repair (Most common) | Associated with bacteremia and sepsis | <ul style="list-style-type: none"> • Urgent upper GIT endoscopy: bleeding in the third or fourth portion of the duodenum. • CT scan with IV contrast: reveal air around the graft, rarely a leak of IV contrast into the duodenal lumen. • Management: endovascular stenting +/- open repair. |

Summary

| | Etiology | Clinical features | Work up |
|--|--|---|--|
| Gastroesophageal Varices | Portal hypertension | Painless hematemesis | <ul style="list-style-type: none"> ● Active resuscitation: <ul style="list-style-type: none"> ○ Resuscitation cautiously aiming for (Hb) of 8 g/L ○ Octreotide, Antibiotic ● Endoscopy: <ul style="list-style-type: none"> ○ Ligation is the first-line ○ Sclerotherapy if band ligation is not possible ● Balloon: four-lumen Minnesota (holding measure) ● Portal decompression: TIPS or surgical if refractory ● Liver transplant: Severe liver disease |
| Portal Hypertensive Gastropathy | Portal hypertension | Rarely causes major bleeding. | Treatment includes octreotide infusion, TIPS and rarely surgery. |
| Stress gastritis | Extreme stress resulting from shock. | - | <ul style="list-style-type: none"> ● Treated by reversing the underlying cause and PPI to suppress the acid. ● If fails > OR (gastrotomy and suture of the bleeding site). |
| Esophagitis | <ul style="list-style-type: none"> ● Severe GERD ● Irritating agents (drugs, radiation) ● Candidiasis | - | <ul style="list-style-type: none"> ● Acid suppressive therapy ● Endoscopic control of the bleeding |
| Gastric antral vascular ectasia (GAVE) | - | <ul style="list-style-type: none"> ● Watermelon stomach ● Rarely causes acute severe bleeding ● Iron deficiency anemia | <ul style="list-style-type: none"> ● Endoscopic therapy: argon plasma coagulation ● Antrectomy: if endoscopy failed |
| Iatrogenic bleeding | Therapeutic or diagnostic procedure/ | - | Therapeutic endoscopy should be performed with minimal air insufflation to avoid anastomotic disruption. |
| Pancreatitis | Enzyme gets in contact with any blood vessels. | hemorrhage (hemosuccus pancreaticus) | Angiography is the diagnostic modality of choice and angiographic embolization is the preferred treatment. |

438's Quiz

Q1: Which of the following statements is true regarding H.pylori?

- A) The organism is round shaped.
- B) It has the ability to hydrolase urea with production of ammonia.
- C) Treatment is recommended in asymptomatic patients.

Q2: Common sites of peptic ulcer includes:

- A) First part of the duodenum.
- B) Esophagus.
- C) Fundus of the stomach.

Q3: Which of the following is a predisposing factor for gastric ulcers?

- A) Gastric acid.
- B) NSAIDs.
- C) Smoking.

Q4: A 50 Y/O man presents to the outpatients clinic with an 8 - week history of bleeding from his back end. This is typically bright red and copious during or following stool. The patient has had no change in his bowel habits, no weight loss or family Hx of bowel cancer, what is the most appropriate course of action?

- A) Perform rubber band and ligation of hemorrhoids.
- B) Blood tests including CEA.
- C) Flexible sigmoidoscopy.

Q5: A Patient is rushed to the ER following a large amount of hematemesis, what is the best initial step?

- A) Resuscitate with crystalloid solution.
- B) Cross match and blood transfusion.
- C) Maintain ABC.

Answers

| | | | |
|----|-----|----|---|
| Q1 | B | Q4 | C |
| Q2 | A | Q5 | C |
| Q3 | B&C | | |

438's Quiz

Explanations

Q1 Explanation: *Helicobacter pylori* is spiral shaped and resides in the mucous layer of the stomach. Its ability to produce ammonia, an alkali, results in increased gastrin release due to a negative feedback. *H. pylori* infection is very common and population infection rates of 80–90 percent are not unusual. It appears that most infection is acquired in childhood and the probability of infection is inversely related to socioeconomic group. At present, eradication therapy is recommended for patients with duodenal ulcer disease, but not for non-ulcer dyspepsia or in asymptomatic patients who are infected. *H. pylori* is now classified by the WHO as a class 1 carcinogen.

Q2 Explanation: The common sites for peptic ulcers are the first part of duodenum and the lesser curve of stomach, but they may occur in the oesophagus, the stoma following gastric surgery and Meckel's diverticulum. It is now widely accepted that *H. pylori* is the most important factor in the development of peptic ulceration. The other major factor is the ingestion of NSAIDs. Patients with gastric ulcers have relatively normal levels of gastric acid secretion. Kissing ulcers refer to two adjacent ulcers on the anterior and posterior walls of the duodenum.

Q3 Explanation: The most common causes of haematemesis are bleeding peptic ulcer (60%), erosions (26 %), Mallory–Weiss tear (4 %) and esophageal varices (4 %). Whatever the cause, the principles of management are identical – initial resuscitation followed by urgent investigations to determine the cause of bleeding and definitive therapy. There are numerous endoscopic measures to control peptic ulcer bleeding, such as injections and argon diathermy. The criteria for surgical intervention – patients continuing to bleed, rebleed, visible vessel at ulcer base, a spurting vessel or an ulcer with a clot on the base – are statistically likely to require surgical treatment. Elderly and unfit patients are more likely to die from the bleed than younger patients and hence should have early surgery. In general, anyone needing more than 6 units of blood needs surgery.

Q5 Explanation: The most likely diagnosis here is haemorrhoids, however, a left-sided colorectal adenocarcinoma must be excluded, despite the low index of suspicion. Such patients should be reassured, but advised to undergo a flexible sigmoidoscopy to exclude cancer or colonic polyps. Patients with change in bowel habit would need a colonoscopy. Treating the patient for haemorrhoids without excluding malignancy is not acceptable. An examination under anaesthetic will not allow sufficient visualisation of the left colon unless a flexible sigmoidoscopy was also done as part of the procedure. Blood tests and CEA levels should not be used to diagnose or exclude colonic malignancy.

439's Quiz

Q1: A 45-year-old man presents to the emergency department with a history of coffee-ground vomiting. He also reports that for 2 days his stool appeared darker than usual. Which of the following gives the most sensitive guide as to the severity of his gastrointestinal haemorrhage?

- A) Haemoglobin
- B) Systolic blood pressure
- C) Pulse rate
- D) Volume of vomitus/melaena
- E) Lying and standing blood pressure

Q2: A patient is admitted from the emergency department following a large-volume haematemesis. Esophagogastroduodenoscopy is performed, which identifies a posteriorly positioned duodenal ulcer that is actively bleeding. The vessel responsible is?

- A) Gastroduodenal artery
- B) Abdominal aorta
- C) Right gastric artery
- D) Left gastric artery
- E) Right gastroepiploic artery

Q3: A 50-year-old man without any prior medical problems began taking ibuprofen 800 mg three times daily for lower back pain after a work-related injury. He subsequently developed nausea followed by hematemesis and melena. He now presents to the emergency department for further evaluation. On the basis of this presentation and epidemiologic studies, what is the most likely cause of the suspected upper gastrointestinal (GI) hemorrhage?

- A) Peptic ulcer
- B) Mallory-Weiss tear
- C) Esophagitis
- D) Esophageal varices
- E) Dieulafoy lesion

Q4: Which of the following will be most helpful in identifying the location of an acute bleed?

- A) Computed tomography (CT) scan with intravenous (IV) contrast only.
- B) Repeated nasogastric saline lavages that return bright red blood.
- C) Technetium-labeled red blood cell (RBC) scan in a patient who has had a total colectomy.
- D) Mesenteric angiography in a patient with an intermittent GI bleed of 0.1 mL/min

Answers

| | | | |
|----|---|----|---|
| Q1 | E | Q4 | B |
| Q2 | A | | |
| Q3 | A | | |

439's Quiz

Explanations

Q1 Explanation: This scenario is strongly suggestive of a diagnosis of gastrointestinal bleeding. This patient will require an endoscopy, but the timing of such will be determined by his haemodynamic status. Systolic blood pressure and heart rate can be difficult to interpret in patients with a good cardiopulmonary reserve; the most sensitive way of identifying decompensation following haemorrhage is to dynamically test the cardiovascular reserve by assessing for postural drop. Equally, vital signs can be difficult to interpret in patients with pre-existing comorbidities such as hypertension. A blood pressure of 110/80 mmHg in an individual with a baseline systolic pressure of 180 mmHg indicates profound shock; however, this relative hypotension will be easily missed. Similarly, medications such as β -blockers or digitalis will prevent a normal tachycardic response to hypovolemia. Decompensation in these patients is also most accurately identified by comparing lying and standing blood pressures. A patient's haemoglobin level may indicate the need for transfusion (aim for haemoglobin >8.0 g/dL), but it is a poor marker of severity of haemorrhage in the absence of a baseline level. Furthermore, following an acute haemorrhage the haemoglobin level may be normal if the dilutional effect of fluid replacement has not had time to affect the result. Volume of melaena and vomit is an extremely unreliable marker and is seldom worth consideration.

Q2 Explanation: Detailed knowledge of the arterial supply of the stomach is not required for undergraduate exams, however certain facts should be remembered. All the blood supply to the stomach is derived from the coeliac plexus, which branches from the abdominal aorta at the level of T12. The lesser curve is supplied by the right and left gastric vessels, the greater curve of the right and left gastroepiploic vessels. The right gastroepiploic artery is a branch of the gastroduodenal artery. The gastroduodenal artery passes underneath the first part of the duodenum, closely associated with its posterior wall; it is this vessel which classically causes major haemorrhage in the event of posterior erosion by a duodenal ulcer.

Q3 Explanation: This patient began taking a nonsteroidal anti-inflammatory drug (NSAID) and subsequently presented with melena and hematemesis indicative of upper GI bleeding. Both epidemiologic data and the clinical history support peptic ulcer disease as the most likely cause of the bleeding.

Good Luck!



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