### Emergency - Upper gastrointestinal haemorrhage

#### Definitions in upper gastrointestinal (UGI) haemorrhage

- **UGI haemorrhage**: bleeding that arises proximal to the ligament of Treitz i.e. from the oesophagus, stomach or duodenum
- **Haematemesis**: vomiting of blood from the UGI tract
- **Coffee-ground vomit**: vomiting of dark brown granular matter presumed to be digested blood
- **Melaena**: passage of black, tarry stools presumed to be digested blood from the UGI tract
- **Haematochezia**: passage of blood per rectum usually due to a LGI haemorrhage but occasionally due to an UGI haemorrhage with rapid transit time

#### Aetiology of UGI haemorrhage

- **Oesophagus**
  - Oesophageal varices
  - Oesophagitis
  - Oesophageal carcinoma
  - Mallory-Weiss tear
- **Stomach**
  - Gastric ulcer
  - Gastritis
  - Gastric carcinoma
- **Duodenum**
  - Duodenal ulcer
  - Duodenitis
- **Other**
  - Thrombocytopenia
  - Coagulopathy
  - Aorto-enteric fistula

#### Pathophysiology of UGI haemorrhage

- **The commonest cause of UGI haemorrhage is peptic ulcer disease**, which may occur in the stomach (gastric ulcer) or duodenum (duodenal ulcer)
- **Peptic ulcer disease** is commonly due to infection with *Helicobacter pylori* and/or non-steroidal anti-inflammatory drug (NSAID) use
  - Helicobacter pylori directly disrupts the mucosal barrier and causes inflammation of the gastric and duodenal mucosa
  - NSAIDs inhibit the enzyme cyclo-oxygenase, reducing the synthesis of prostaglandins which are responsible for stimulating alkaline mucus secretion, thereby exposing the UGI mucosa to damage from gastric acid
- **Oesophageal varices** are dilated porto-systemic anastomotic veins that occur due to portal hypertension secondary to chronic liver disease

#### History in UGI haemorrhage

- **Haematemesis**
  - If so what volume? Enough to fill a cup? A bowl? A saucepan?
- **Coffee-ground vomiting (volume?)**
- **Melaena (volume?)**
- **Haematochezia (volume?)**
- Abdominal pain
- Malignancy red flags
  - Cachexia
  - Anorexia
  - Night sweats
  - Dysphagia
  - Dyspnoea
- Severity assessment
  - Light-headedness
  - Loss of consciousness
- Causes assessment
  - Chronic liver disease
  - Alcohol misuse
  - NSAIDs or steroids
  - Warfarin
- Past medical history
  - Previous GI bleed
  - Known PUD/varices
  - Malignancy
  - Liver disease
  - Known cardiovascular/respiratory disease (fitness to undergo sedation and/or intubation for endoscopy)

Examination in UGI haemorrhage
- Airway
  - May be compromised by reduced conscious level
- Breathing
  - Kussmaul’s breathing: hyperventilation to compensate for metabolic acidosis manifesting as ‘air hunger’
- Circulation
  - Cold, pale peripheries
  - Prolonged capillary refill times (CRT >2 s)
  - Decreased skin turgor
  - Reduced jugular venous pressure (JVP)
  - Sunken eyes
  - Dry lips, mouth and tongue
  - Tachycardia
  - Postural hypotension
  - Absolute hypotension
- Disability
  - Confusion
  - Reduced conscious level
- Exposure
  - Abdominal examination
    - Guarding/rigidity
    - Masses
  - Per rectum (PR) examination to look for melaena or haematochezia
  - Signs of chronic liver disease
    - Jaundice, ascites
    - Hands: clubbing, Dupuytren’s contracture, palmar erythema
    - Spider naevi
- Gynaecomastia
- Portal hypertension: splenomegaly and caput medusae
- Encephalopathy

**Risk stratification of UGI haemorrhage (pre-endoscopy Rockall score)**

- **Age**
  - <60 years (0)
  - 60-79 years (1)
  - ≥80 years (2)
- **Shock**
  - No shock ie heart rate (HR) <100 bpm & systolic blood pressure (SBP) >100 mmHg (0)
  - Tachycardia ie HR >100 bpm & SBP >100 mmHg (1)
  - Hypotension ie HR >100 bpm & SBP <100 mmHg (2)
- **Co-morbidity**
  - No major co-morbidity (0)
  - Cardiac failure, ischaemic heart disease (2)
  - Renal failure, hepatic failure, disseminated malignancy (3)

- A score of zero is associated with a predicted mortality of 0.2%
- A score of seven is associated with a predicted mortality of 50%
- Only patients with a Rockall score of zero can be safely managed as an outpatient; consider for discharge and outpatient follow-up if:
  - Age <60 years and
  - No evidence of haemodynamic instability and
  - No significant co-morbidity and
  - No witnessed haematemesis or haematochezia
- Rockall score ≥1 should not be discharged; consider for admission and early UGI endoscopy if:
  - Age >60 years or
  - Haemodynamic instability or
  - Known chronic liver disease or
  - Witnessed haematemesis or haematochezia

**Initial investigation of UGI haemorrhage**

- Venous blood gas (VBG) looking for a lactic acidosis indicative of shock
- Full blood count (FBC): anaemia may not be apparent initially after acute haemorrhage
- Urea & electrolytes (U&Es): deamination of amino acids from digestion of blood proteins may lead to disproportionately elevated urea
- Liver function tests (LFTs)
- Coagulation
- Cross-match
- Erect chest radiograph (CXR) looking for pneumoperitoneum indicative of bowel perforation

**Further investigation of UGI haemorrhage**

- UGI endoscopy is the definitive investigation and management
- *Helicobacter pylori* testing for those with peptic ulcer disease

**Initial management of UGI haemorrhage**

- Assess the patient from an ABCDE perspective
• Maintain a patent airway: use manoeuvres, adjuncts, supraglottic or definitive airways as indicated and suction any sputum or secretions
• Deliver high flow oxygen 15L/min via reservoir mask and titrate to achieve oxygen saturations ($S_{p}O_{2}$) 94-98% or 88-92% if known to have COPD
• Attach monitoring
  o Pulse oximetry
  o Non-invasive blood pressure
  o Three-lead cardiac monitoring
• Request 12 lead ECG and portable CXR
• Obtain intravenous (IV) access and take bloods and VBG
• Fluid resuscitation
  o Guided by clinical context
  o Treat shock aggressively
  o Give boluses of crystalloid 250-500 ml IV and re-assess after each
  o Aim for permissive hypotension so as not to disrupt any clots that have formed or are in the process of forming
  o Shock refractory to fluid resuscitation should be considered for referral to critical care for insertion of arterial and central lines and vasoactive drug therapy (vasopressors and/or inotropes)
  o Transfusion
    ▪ Be aware that anaemia from haemorrhage will not be apparent initially and will be exacerbated by crystalloid fluid resuscitation
    ▪ Once ≥30% of circulating volume is lost, red transfusion should be initiated, ideally with fully cross-match blood, or with type specific or even group O rhesus negative (O negative) in an emergency. A trigger of Hb<8 if often used
    ▪ In variceal bleeding, a transfusion trigger of 7 is reasonable
    ▪ Transfusion with additional products such as platelets, fresh frozen plasma, cryoprecipitate may be necessary
    ▪ Activate the major haemorrhage protocol if necessary
  o Give PCC to anyone actively bleeding on warfarin
• Catheter to monitor fluid balance
• Antibiotics
  o Give broad spectrum antibiotics e.g. co-amoxiclav 1.2g TDS iv or tazocin 4.5g iv TDS to all patients with UGI haemorrhage and chronic liver disease. This has been shown to have a significant reduction on mortality
• Terlipressin
  o Give terlipressin 2g iv to all patients with suspected variceal haemorrhage prior to UGI endoscopy
  o It acts as a splanchnic vasoconstrictor, reducing portal hypertension and the degree of variceal haemorrhage
  o Contraindicated in patients with cardiovascular disease due to the risk of ischaemia: must have non-ishaemic ECG and be intravascularly replete prior to giving
• Prokinetic
  o Metoclopramide 10mg IV can be given to empty the stomach contents to allow better views at endoscopy
• UGI endoscopy
  o UGI endoscopy is the definitive investigation and management
  o Techniques include band ligation, clipping, injections of sclerosants and thermal coagulation
  o Timing depends on pre-endoscopy Rockall score and clinical context; if the patient is unstable and/or has active bleeding then UGI endoscopy should be performed once resuscitation has taken place
  o If immediate UGI endoscopy is unnecessary, it should be performed within 24 hours
If UGI endoscopy fails to control haemorrhage, arterial embolisation or surgery may be required; the treatment of choice for uncontrolled variceal haemorrhage is transjugular intrahepatic portosystemic shunting (TIPS)

- Proton pump inhibitors (PPIs)
  - Current NICE guidance is NOT to give acid-suppression (PPIs, H2-RA) to patients with suspected non-variceal bleeds prior to endoscopy.
  - IV PPIs eg omeprazole 40 mg IV should be given following UGI endoscopy in patients found to have peptic ulcer disease
  - In practice however, this is still commonly given prior to endoscopy

Further management of UGI haemorrhage

- Sengstaken-Blakemore tube
  - In torrential UGI haemorrhage secondary to oesophageal varices consider balloon tamponade via insertion of a Sengstaken-Blakemore tube
  - The tube is inserted down the oesophagus, the gastric balloon inflated, then pulled back to occlude the gastro-oesophageal junction
  - The oesophageal balloon is then inflated to tamponade oesophageal varices
- Stop aspirin, NSAIDs and anticoagulants
- Warfarin may need urgent reversal depending on the international normalised ration (INR)
- Eradication therapy for those who test positive for Helicobacter pylori

Common questions concerning UGI haemorrhage:

- Define the term UGI haemorrhage in terms of its source of origin
  - Bleeding that arises proximal to the ligament of Treitz i.e. from the oesophagus, stomach or duodenum
- List the two main causes of UGI haemorrhage
  - Peptic ulcer disease
  - Oesophageal varices
- List the signs of chronic liver disease that you would look for in a patient with UGI haemorrhage
  - Clubbing
  - Dupuytren’s contracture
  - Palmar erythema
  - Jaundice
  - Spider naevi
  - Gynaecomastia
  - Ascites
  - Splenomegaly
  - Caput medusa
  - Testicular atrophy
- What tool is used to risk stratify patients with UGI haemorrhage?
  - Pre-endoscopy Rockall score
- List the three components of this risk stratification tool
  - Age
  - Shock
  - Co-morbidities
- What is the definitive investigation and management of UGI haemorrhage?
  - UGI endoscopy
- What pharmacological components are there to managing UGI haemorrhage?
  - Fluid resuscitation
  - Antibiotics
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- What non-pharmacological procedure may be life-saving in torrential UGI haemorrhage due to oesophageal varices?
  - Sengstaken-Blakemore tube