HAEMOPTYSIS

Haemoptysis is defined as the expectoration of blood from the respiratory tract that originates below the vocal cords.

Epidemiology:

- Most cases are mild, with blood-tinged sputum or minute amounts of frank blood.
    - Most common cause is bronchitis.
- Rarely accompanied by massive blood loss.
    - > 600mL of blood in any 24 hour period.
    - Occurs in 1-5% of haemoptysis patients.
    - Mortality approaches 80%.

Pathophysiology:

- Blood originates from the tracheobronchial capillaries that become disrupted with vigorous coughing or minor bronchial infections.
- Massive haemoptysis almost exclusively involves one of the two sets of vessels that constitute the lung's dual blood supply.
    - Erosion into these is usually associated with arteritis, trauma, bronchiectasis or malignancy.
    - Results in sudden & profound haemorrhage.
    - 90% of massive haemoptysis requiring embolisation results from *bronchial circulation* (a higher pressure system).
- Modes of vessel injury include;
    - Acute & chronic inflammation
        - eg. bronchitis, arteritis
    - Local infection
        - eg. abscess, TB, aspergillosis
    - Trauma
        - incl. endobronchial procedures
    - Invasion (tumour)
    - Infarction (PE).
    - Fistula formation
        - eg. aortobronchial fistulae
- Diffuse alveolar haemorrhage can be seen with autoimmune vasculitides
        - incl. Wegener's granulomatosis, SLE and Goodpasture's syndrome.

Whilst haemodynamic instability can occur as a result of massive haemoptysis, the most lethal sequelae is hypoxia resulting from ventilation-

BOX 31-1 DIFFERENTIAL DIAGNOSIS: HEMOPTYSIS

Airway Disease
Bronchitis (acute or chronic)
Bronchiectasis
Neoplasm (primary and metastatic)
Trauma
Foreign body

Parenchymal Disease
Tuberculosis
Pneumonia/lung abscess
Fungal infection
Neoplasm

Vascular Disease
Pulmonary embolism
Arteriovenous malformation
Aortic aneurysm
Pulmonary hypertension
Vasculitis (Wegener's granulomatosis, SLE, Goodpasture's syndrome)

Hematologic Disease
Coagulopathy (cirrhosis or warfarin therapy)
Disseminated intravascular coagulation
Platelet dysfunction
Thrombocytopenia

Cardiac Disease
Congenital heart disease (especially in children)
Valvular heart disease
Endocarditis

Miscellaneous
Cocaine
Post-procedural injury
Tracheal-arterial fistula

Diagnostic Approach:

Differential considerations:
Patients with apparent haemoptysis may have bleeding from nasal, oral or hypopharyngeal sites. These locations should be carefully inspected during evaluation.

- Occasionally gastric and upper duodenal bleeding may pose as a mimic of haemoptysis. Inspection and pH testing may be helpful in this instance.

Rapid Assessment & Stabilisation:

Airway:
Consideration of standard indications for emergent airway management is crucial, with early intubation in the setting of the hypoxic patient with massive haemoptysis. This would include respiratory failure, poor gas exchange, haemodynamic instability & inability to clear secretions.

Large bore endotracheal tubes (size 8.0 or greater) should be used to facilitate emergent fiberoptic bronchoscopy. Options for intubation include mainstem bronchial intubation (left is more difficult) and double-lumen tubes (allows for lung isolation).

Breathing:
A mitigating maneuver in patients with known lateralising sources of bleeding is the *"lung down"* position, where the patient is positioned so the bleeding lung is more dependent.

- Ideally this promotes protection & ventilation of the unaffected lung.

Circulation:
Two large bore IV cannula / rapid infusers, with early notification to blood bank and activation of local massive transfusion protocols.

Pivotal Findings:

History:

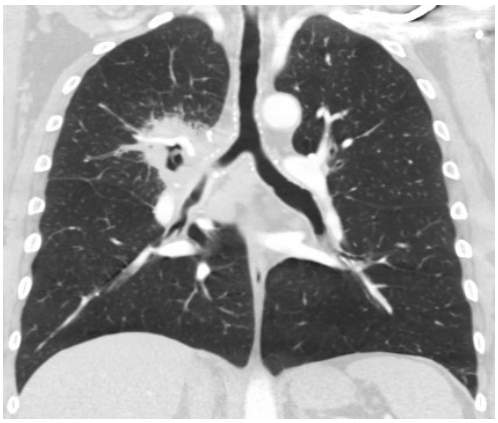
- Rate / volume / appearance of bleeding.
- Prior parenchymal pulmonary disorders.
    - Bronchiectasis / recurrent pneumonia / COPD / bronchitis / TB / fungi.
- Presence of inflammatory disorders.
    - Goodpasture's / SLE / Wegener's
- Platelet dysfunction / thrombocytopenia / coagulopathy.
- Primary or secondary pulmonary tumours.
- Travel history (?TB).

Physical Examination:

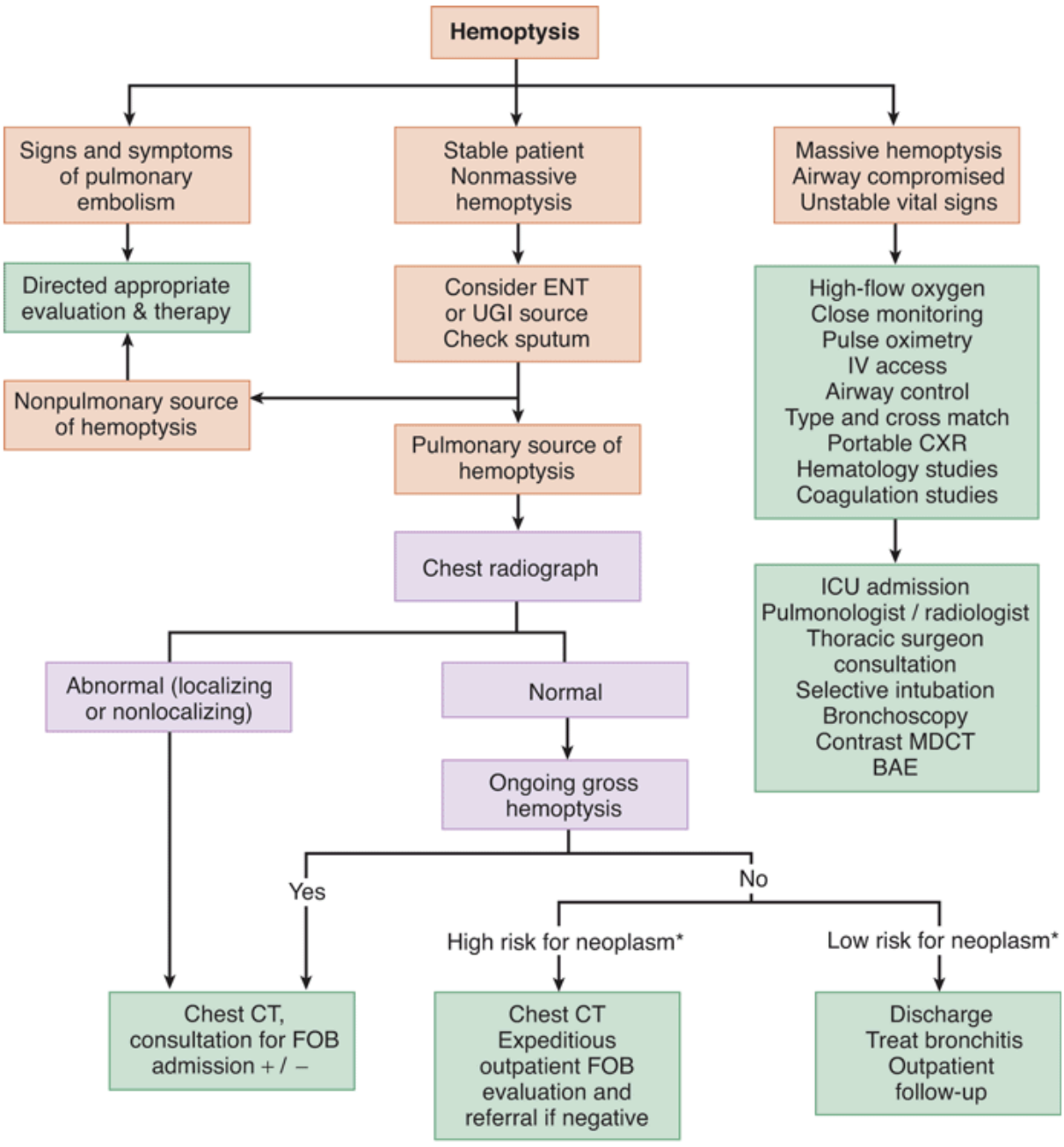
- Targeted examination may suggest the location/aetiology of bleeding in only 50% of cases.
- Focal adventitious breath sounds may hint towards pneumonia or abscess.
- New heart murmurs --> endocarditis w/ septic emboli.
- Signs of DVT --> PE and infarction.
- Evidence of coagulopathy or bleeding diathesis.

Ancillary Testing:

- FBC / Coags / Group & Hold or Crossmatch.
- Renal function (?vasculitis, ?pre-CT contrast).
- CXR.
    - Sensitivity is marginal.
- High-resolution CT-chest.
    - Principle diagnostic tool.
    - Will determine the next step (bronchoscopy vs other interventions).

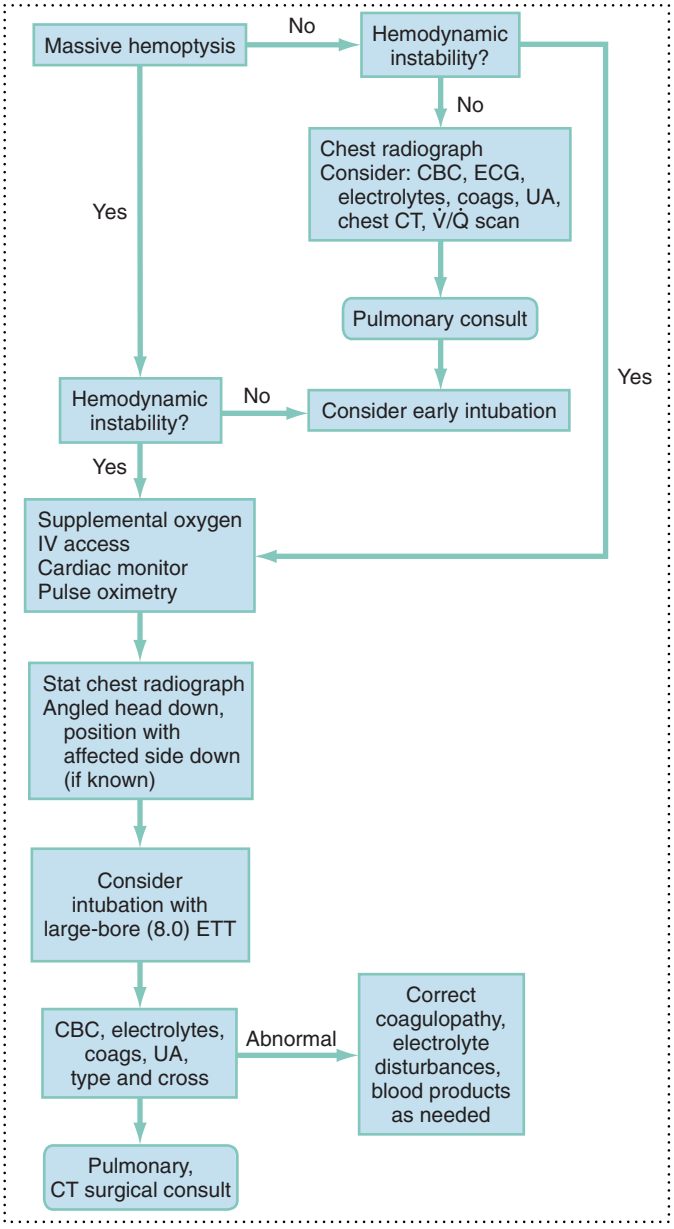


Tintinalli suggests the following diagnostic evaluation.



Management:

The challenge to the Emergency Physician is to rapidly assess the need for airway control prior to haemodynamic stabilisation.



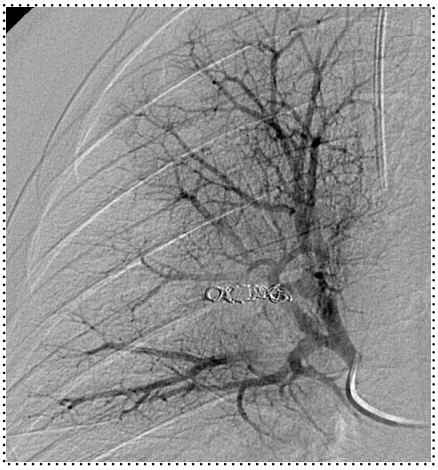
Essentially, unless the CXR is diagnostic or the patient is too unstable, the next appropriate investigation is CT-Chest.

- Will determine whether angiography is indicated.

Bronchoscopy:

Facilitates both localisation of bleeding and therapeutic intervention.

- Balloon / topical haemostatic tamponade
- Thermocoagulation
- Injection of vasoactive agents.



Interventional Angiography:

Bronchial artery embolisation is an effective first line therapy.

- Highly successful (91-98%)
- High rate of early re-bleed.

Surgery:

Emergency thoracotomy is reserved for life-threatening haemoptysis or persistent, rapid bleeding (following failed bronchoscopy & embolisation).

Disposition:

Healthy patients with streaking only & normal vitals can be discharged w/ close followup. High risk patients & those with moderate or large bleeding need admission. All patients w/ massive haemoptysis require Intensive Care admission and a multidisciplinary treatment approach.