



Hemoptysis

Confirm the source, quantify the volume, protect the good lung · Patients asphyxiate, they do not exsanguinate

BAD LUNG DOWN
bleeding side dependent

IS IT ACTUALLY FROM THE LUNG? *get this wrong and the whole workup is wrong*

HEMOPTYSIS

Bright red, frothy, alkaline, mixed with sputum, preceded by coughing and often a gurgling or tickling sensation the patient can localize to one side. A history of **lung disease, smoking or bronchiectasis** supports it.

HEMATEMESIS

Dark, coffee-ground, acidic, mixed with food, preceded by nausea and retching. **Swallowed blood from either source confuses both.** If genuinely uncertain, **a nasogastric aspirate and early endoscopy settle it** — and a variceal bleed treated as hemoptysis is lethal.

PSEUDHEMOPTYSIS

Bleeding from the nose, gums, oropharynx or a tracheostomy site that is coughed back up. **Examine the nose and mouth before scanning the chest.** Rarely, *Serratia marcescens* colonization produces a red pigment that mimics blood entirely.

MASSIVE HEMOPTYSIS *a resuscitation problem before it is a diagnostic one*

- 1 Define it physiologically, not by volume alone. Thresholds around **100 to 600 mL in 24 hours** are quoted, but **any bleeding causing gas exchange or hemodynamic compromise counts**. The anatomical dead space is only about 150 mL, so **a modest volume can drown the patient**. Death is from asphyxiation.
- 2 Position the **bleeding side down** to keep blood out of the healthy lung using gravity, and give **high-flow oxygen**. If the side is unknown, use the history, the chest film, or previous imaging. **Call respiratory, interventional radiology, thoracic surgery and critical care simultaneously** — not sequentially.
- 3 Secure the airway early if bleeding is brisk. Intubate with a **large endotracheal tube (8.0 or bigger)** so a bronchoscope will pass. Consider **selective intubation of the non-bleeding mainstem bronchus** or a bronchial blocker to isolate the bleeding lung.
- 4 Correct the **coagulopathy**: stop anticoagulants and antiplatelets, **reverse them actively**, and correct platelets and clotting factors. **Tranexamic acid** reduces bleeding and is given nebulized in non-massive hemoptysis and intravenously in severe bleeding.
- 5 CT angiography then bronchial artery embolization. About 90% of bleeding comes from the bronchial arteries — a systemic, high-pressure circulation — which is why embolization is the **definitive first-line treatment** and controls the great majority of cases. **Rebleeding is common**, so it buys time to treat the cause rather than replacing that. Surgery is reserved for failed embolization or a localized surgical lesion.

FIND THE CAUSE *ordered roughly by how often you will meet them*

Category	Detail
Airway disease	Nebulized tranexamic acid 500 mg three times daily reduces bleeding and the need for invasive procedures in non-massive hemoptysis; IV 1 g over 10 min then 1 g over 8 h is the alternative when the airway is soiled or nebulization is impractical.
Infection	Pneumonia, lung abscess, and tuberculosis — globally the leading cause, including via an aspergilloma in an old TB cavity and bronchiectasis from previous disease. Send sputum for acid-fast bacilli and isolate if TB is plausible.
Malignancy	Bronchogenic carcinoma , and endobronchial metastases. A normal chest radiograph does not exclude it : a smoker over 40 with hemoptysis needs CT and bronchoscopy regardless of the plain film.
Cardiovascular	Pulmonary embolism with infarction , left heart failure, mitral stenosis , and arteriovenous malformations in hereditary hemorrhagic telangiectasia . Rarely an aorto-bronchial fistula — a herald bleed before catastrophic hemorrhage. Hemoptysis in pulmonary embolism reflects a peripheral infarct , so its presence says nothing reassuring about clot burden. Suspect hereditary hemorrhagic telangiectasia in a younger patient with recurrent epistaxis, mucocutaneous telangiectasia and a family history.
Diffuse alveolar hemorrhage	Vasculitis and pulmonary-renal syndromes : granulomatosis with polyangiitis, anti-GBM disease, lupus. Hemoptysis is absent in up to a third , so suspect it on diffuse infiltrates with a falling hemoglobin , and confirm on progressively bloodier sequential BAL aliquots . Send ANCA, anti-GBM and urinalysis with microscopy — missing this costs kidneys.
Iatrogenic and other	Anticoagulation and antiplatelets (which usually unmask a lesion rather than cause the bleed alone), post-biopsy, pulmonary artery rupture from a Swan-Ganz catheter , cocaine, and catamenial hemoptysis timed to menstruation. No cause is found in a substantial minority.

THE WORKUP *what to order and in what order*

INVESTIGATIONS

Chest radiograph, complete blood count, coagulation screen, group and save or crossmatch, renal function and urinalysis. Then **CT of the chest — with angiography if bleeding is significant**, since it localizes the source, defines bronchial artery anatomy for the interventional radiologist, and identifies the cause in one study. **Bronchoscopy** localizes active bleeding and permits local measures, and is essential when malignancy is suspected. Add **sputum for culture, acid-fast bacilli and cytology**, and an **autoimmune screen** where the picture fits.

THE OUTPATIENT WITH A SMALL BLEED

Do not dismiss minor hemoptysis. Small volumes are commonly the first sign of a bronchial tumor, and a herald bleed can precede a catastrophic one. **Anyone over 40 with a smoking history and any hemoptysis needs cross-sectional imaging**, and referral for bronchoscopy if imaging is negative but suspicion persists. **Anticoagulation is an explanation only after a lesion has been excluded** — the drug often reveals rather than causes the pathology.

PEARLS & PITFALLS

- **Lie the patient bleeding-side down.** Gravity protecting the good lung is the single highest-value maneuver available to you.
- **Volume is a poor guide.** 150 mL fills the dead space, so judge severity by gas exchange and hemodynamics.
- **Intubate with a big tube** if you intubate at all — a small one blocks with clot and blocks the bronchoscope.
- **A normal chest radiograph does not exclude cancer.** Image and scope the smoker regardless.
- **Diffuse alveolar hemorrhage often has no hemoptysis** — look for infiltrates with a falling hemoglobin and check ANCA, anti-GBM and the urine.
- **Never blame the anticoagulant alone.** Investigate for the underlying lesion it has unmasked.

