

Hemoptysis

Coughing up blood (Hemoptysis) means blood from the lungs, and how much blood tells you how fast to act.

THE ONE-LINE TRUTH

Blood is coming from the lower airway — the breathing tubes and lungs — not the nose, mouth, or throat.

The chain — how it unfolds

1. A blood vessel wall in or near the lung weakens and cracks open. — why: Infection (TB, pneumonia), chronic inflammation (bronchiectasis), tumor invasion, autoimmune attack (GPA, Goodpasture), or a congenital weak spot (AVM) erodes the vessel wall. Bronchial arteries — fed by the aorta at high pressure (120/80 mmHg) — are the most common source of massive bleeding because even a small tear releases a lot of blood fast.
2. Blood pours into the airways (trachea, bronchi, bronchioles) or alveoli (air sacs). — why: The cracked vessel empties directly into the breathing space. If the bleed is from a bronchial artery or large pulmonary vessel, blood fills the airways like water filling a straw. If it is from alveolar capillaries (diffuse alveolar bleeding (hemorrhage)), blood floods the air sacs where oxygen is supposed to cross into the bloodstream.
3. Blood blocks air from moving down the airways, and oxygen cannot reach the alveoli. — why: Blood clots fast when it hits air, forming plugs in the bronchi and bronchioles. Even liquid blood coats the airway walls and pools in low spots, creating a physical barrier. The alveoli downstream of a blocked airway collapse (atelectasis), and any alveoli filled with blood cannot exchange oxygen or carbon dioxide — they become dead space.
4. Oxygen levels in the blood drop (hypoxemia), and the brain senses danger. — why: Chemoreceptors in the carotid arteries and brainstem detect falling O₂ and rising CO₂. The brainstem (medulla oblongata) immediately signals the body to breathe faster and the heart to beat faster, trying to push whatever oxygen is left to the brain, heart, and kidneys.

5. The patient coughs hard and repeatedly, bringing up bright red or dark blood mixed with frothy coughed-up mucus (sputum), and breathes fast (tachypnea) and shallow. — why: Coughing is the only reflex the body has to clear the airway. Irritant receptors in the bronchi fire, triggering the cough center in the medulla. Fast, shallow breathing (instead of slow, deep breaths) happens because the patient is trying to avoid triggering more coughing and because the work of breathing through narrowed, blood-filled airways is exhausting.
6. The danger is not bleeding to death — the danger is drowning in your own blood before your body runs out of volume. — why: A person has about 5 liters of blood and can survive losing 1–2 liters over time (the body compensates by squeezing vessels and making the heart beat faster). But if even 200–300 mL of blood fills the airways faster than it can be coughed out, it blocks the windpipe (trachea) or mainstem bronchi, cutting off all airflow. The patient cannot breathe in or out, oxygen saturation drops to zero in seconds, the heart stops from lack of oxygen (hypoxic cardiac arrest), and death follows in minutes — long before the body runs out of blood.
7. The body tries to survive by raising heart rate, squeezing blood vessels, and shunting blood away from bleeding areas, but these are compensations — not the sickness itself. — why: A fast heart rate (Tachycardia), high blood pressure, and pale, sweaty skin are the sympathetic nervous system (fight-or-flight) flooding the body with adrenaline (epinephrine) and noradrenaline (norepinephrine) to keep the brain and heart alive. Oxygen-starved (Hypoxic) vasoconstriction (blood vessels in low-oxygen lung areas squeeze shut) redirects blood to healthier parts of the lung. These responses buy time, but they are not fixing the real problem — the bleeding vessel and the blocked airway.
8. Every clinical sign — cough, frothy pink or bright red blood, low oxygen, unilateral crackles or wheezing, anxious appearance, sitting upright and leaning forward — traces back to the same root cause: a vessel leaking into the lung, which blocks oxygen from moving through the airway. — why: The history and physical exam always point upstream to the break. Bright red, frothy blood = bronchial artery or large airway source; pink, frothy coughed-up mucus (sputum) that looks like foam = alveolar bleeding (hemorrhage) (blood mixed with surfactant and air in the air sacs); unilateral crackles or decreased breath sounds = blood or clot blocking one side; fever and night sweats = TB or infection; weight loss and smoking history = cancer; recent PE or leg swelling = pulmonary embolism (a clot lodging in a lung artery) with tissue death from blocked blood flow (infarction); sinusitis and kidney failure = GPA or Goodpasture. Every clue is a breadcrumb leading back to which vessel broke and why.

Spot it — what you see, and why

- Coughing up blood that is bright red, frothy, and mixed with air bubbles: Blood comes from the lungs or airways (the breathing tubes). When you cough it up, air mixes with it and makes it frothy and bright red, not dark like vomit. There is no food in it because it never went through the stomach.
- Shortness of breath or feeling like you cannot get enough air: Blood in the airways blocks air from flowing smoothly into the lung tissue. Also, if a lot of blood fills the air sacs (the tiny balloons where oxygen moves into your blood), less oxygen can get through.
- Cough that keeps happening or gets worse: Your airway is irritated by the blood itself, or by whatever is causing the bleeding (like infection, inflammation, or a growth). The cough reflex tries to clear the blood out.
- Chest pain on one side, especially when you breathe in deeply: The lining around the lung (the pleura) or the lung tissue itself may be inflamed or damaged. Breathing stretches that sore area and causes sharp pain.
- Fever and chills: If an infection (like pneumonia or tuberculosis) is the cause, your immune system raises your body temperature to fight the germs. Chills happen as your body resets its thermostat higher.
- Weight loss you did not try for, or feeling very tired all the time: Chronic diseases (like tuberculosis or lung cancer) drain your energy and make your body burn through its own stores. This leads to weight dropping and constant fatigue.

Red flags — act now

- Coughing up more than a few teaspoons of blood at once, or blood that keeps coming in large amounts (this can block your airway or mean a major vessel is torn)
- Sudden trouble breathing, very fast breathing, or blue lips or fingertips (signs your oxygen is dangerously low)
- Feeling dizzy, confused, or about to pass out (your brain is not getting enough oxygen or you have lost a lot of blood)
- Chest pain that is severe, crushing, or spreads to your arm or jaw (could be a heart problem or a clot in the lung artery)
- History of recent surgery, long travel, or a known clotting disorder (raises the chance of a pulmonary embolism (a clot lodging in a lung artery), a clot blocking the lung)

Treat it — in this order

1. Position bleeding lung down (lateral decubitus with bad side down), give oxygen, and prepare for intubation with a double-lumen tube if massive bleed → Gravity keeps blood in the damaged lung instead of spilling into the good lung. Oxygen flows through the healthy side while you buy time to stop the bleed. A double-lumen tube isolates the lungs so the good one stays clear.
2. Bronchial artery embolization (interventional radiology threads a catheter into the bronchial artery and blocks it with coils or particles) → Stops blood flow to the damaged vessel by closing the artery upstream. This is the main fix for massive bleeds (more than 200 mL in 24 hours or life-threatening) because most lung blood comes from the bronchial arteries, not the pulmonary arteries.
3. Stop anticoagulants (warfarin, heparin, DOACs) and antiplatelet drugs (aspirin, clopidogrel); reverse warfarin with vitamin K and four-factor prothrombin complex concentrate (PCC), or reverse dabigatran with idarucizumab → Lets the body form a clot to seal the broken vessel instead of the drug keeping blood liquid and flowing.
4. Rigid bronchoscopy with tamponade (packing with gauze or a balloon), topical epinephrine (squirted onto the bleeding site to shrink vessels), or cold saline lavage (washing with icy salt water to clot blood) → Directly packs or clots the bleeding point under direct vision so blood stops entering the airway. Rigid scope has a wide barrel so you can see better and pass tools in massive bleeds.
5. Treat the underlying cause: antibiotics (amoxicillin-clavulanate or a fluoroquinolone) for bronchiectasis or bacterial bronchitis, four-drug anti-TB therapy (rifampin, isoniazid, pyrazinamide, ethambutol) for tuberculosis, antifungals (voriconazole or amphotericin) for aspergilloma (fungal ball), chemotherapy or radiation for lung cancer, immunosuppressants (cyclophosphamide and steroids) for granulomatosis with polyangiitis or Goodpasture syndrome → Fixes the broken step upstream — kills the infection, shrinks the tumor, or stops the immune attack — so the vessel stops being destroyed and can heal.

Your top priorities at the bedside

1. Apply continuous pulse oximetry and place the patient on high-flow oxygen or non-rebreather mask to keep oxygen saturation above 90 percent — why: Blood fills alveoli (air sacs) and blocks gas exchange (oxygen moving into blood). Low oxygen in the blood (Hypoxemia) (low oxygen) causes organ damage within minutes. Oxygen buys time while we find and stop the bleeding source.

2. Position the patient sitting upright or with the suspected bleeding lung down if the side is known — why: Gravity keeps blood in the bad lung and prevents it from spilling into the good lung. If blood floods both lungs, the patient cannot oxygenate at all and will need emergency intubation (breathing tube placement).
3. Establish two large-bore IV lines (18-gauge or bigger) and send blood for type-and-cross, complete blood count, PT/INR, PTT, and basic metabolic panel — why: Massive coughing up blood (hemoptysis) causes hypovolemia (low blood volume) and bleeding-driven (hemorrhagic) shock (not enough blood to perfuse organs). Large IVs allow rapid fluid resuscitation (giving saline or blood fast). Labs show anemia (low red blood cells), coagulation problems (clotting disorders), and readiness for transfusion.