

PULMONARY EDEMA

DISEASE / PATHOLOGY

- Abnormal fluid accumulation in lung interstitium/alveoli causing impaired oxygen exchange.
- Cardiogenic: increased pulmonary capillary hydrostatic pressure, usually left-sided heart failure.
- Noncardiogenic: increased capillary permeability, e.g., ARDS, sepsis, aspiration, transfusion reaction.
- Fluid-filled alveoli decrease lung compliance and cause severe V/Q mismatch and hypoxemia.
- Acute pulmonary edema is a medical emergency.

RISK FACTORS

- Heart failure, MI/ischemia, hypertension crisis, valvular disease, dysrhythmias.
- Renal failure/fluid overload, excessive IV fluids, medication nonadherence, high sodium intake.
- ARDS/sepsis, pneumonia, aspiration, smoke inhalation, high altitude, neurogenic injury.
- Transfusion-associated circulatory overload (TACO) or transfusion-related acute lung injury (TRALI).
- Older age and underlying cardiac/renal disease increase risk.

SIGNS AND SYMPTOMS

- Acute: sudden severe dyspnea, orthopnea, anxiety, tachypnea, tachycardia, diaphoresis.
- Lung sounds: crackles/rales, wheeze possible; pink frothy sputum is classic severe finding.
- Hypoxemia: low SpO₂, cyanosis, restlessness, confusion.
- Cardiogenic clues: S₃, JVD, peripheral edema, weight gain, hypertension or hypotension if shock.
- Urgent: respiratory distress, altered LOC, chest pain, severe hypotension, or frothy sputum.

DIAGNOSTIC TESTING

- Diagnosis is clinical plus CXR: bilateral infiltrates, vascular congestion, Kerley B lines, cardiomegaly if HF.
- Pulse ox/ABG show hypoxemia; rising CO₂ signals fatigue/ventilatory failure.
- BNP/NT-proBNP supports HF cause; troponin/ECG assess MI/ischemia.
- BMP monitors renal function and K⁺ before/after diuretics; daily weights and strict I&O trend response.
- Echo evaluates cardiac function/valves if cardiogenic cause suspected.

TREATMENT

- Immediate: high Fowler position, oxygen, rapid respiratory/cardiac assessment, notify provider/rapid response as needed.
- Noninvasive ventilation/CPAP/BiPAP may be needed; prepare for intubation if failing or altered LOC.
- Cardiogenic: IV loop diuretic if fluid overloaded; nitrates reduce preload/afterload if BP allows.
- Hold/clarify nitrates if severe hypotension or recent PDE-5 inhibitor use; monitor BP closely.
- Monitor K⁺, Mg, renal function, urine output, lung sounds, SpO₂, and response to diuresis.
- Need-to-know: morphine is not routine first-line; prioritize oxygenation/ventilation and cause-specific therapy.
- Positive pressure ventilation (CPAP/BiPAP) decreased preload which allows heart to pump fluid out of lungs.

PATIENT EDUCATION

- Heart failure teaching: daily weights, low-sodium diet, fluid limits if ordered, take diuretics as prescribed.
- Report weight gain of 2-3 lb/day or 5 lb/week, increasing swelling, orthopnea, or new nighttime dyspnea.
- Keep follow-up for BP, renal labs, potassium, and heart failure medication adjustment.
- Avoid stopping cardiac/diuretic medications without provider guidance.
- Call 911 for severe shortness of breath, chest pain, pink frothy sputum, fainting, or confusion.
- For transfusion reaction symptoms: report sudden dyspnea, fever/chills, back pain, or chest tightness immediately.

ADDITIONAL NOTES:

- Priority: sit upright + oxygen/ventilatory support; pulmonary edema can deteriorate fast.
- Exam trap: crackles from fluid overload need diuresis; wheeze does not always mean asthma/COPD.
- Before furosemide: check BP, K⁺, renal function, and ability to void when possible.