

**20.** A 65-year-old man is referred to you to evaluate his increasing shortness of breath over the last 3 years. He has a history of asthma as a child, severe knee injuries following a motor vehicle accident 4 years ago, and he smoked cigarettes until 10 years ago. His physical examination is unremarkable except for obesity (height 1.65 m, weight 85 kg, BMI 31.2 kg/m<sup>2</sup>). Pulse oximetry showed Sp<sub>o</sub><sub>2</sub> of 96% breathing room air, and the chest radiograph was normal.

Pulmonary function tests reveal the following:

		% predicted
FVC (L)	1.28	40
FEV <sub>1</sub> (L)	0.95	37
FEV <sub>1</sub> /FVC (%)	74	
Vital capacity (VC)	1.30	40
Total lung capacity (TLC) (L)	3.66	68
Slow vital capacity (SVC) (L)	1.34	42
Expiratory reserve volume (ERV) (L)	0.09	
Residual volume (RV) (L)	2.11	110
DLCO (mL/mmHg/min)	17.4	74

The technician reports that the patient made good efforts, and you confirm that the values were reproducible.

What is the most likely cause of his shortness of breath?

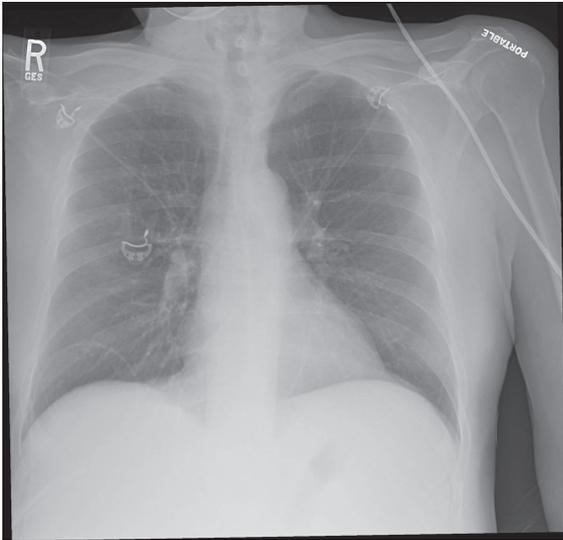
- A. Interstitial lung disease (ILD)
- B. Obesity
- C. Neuromuscular disease
- D. Pulmonary vascular disease

**21.** A 72-year-old man is transferred to your hospital in shock and intubated for acute hypoxemic respiratory failure. The patient was well until about 2 weeks ago, when he started complaining of decreased appetite, fatigue, and low-grade fevers followed by dyspnea and dry cough. His wife reports they returned recently from a vacation to northern Minnesota where they hiked and camped in wooded areas. On examination, he is lethargic and obtunded. Lung examination reveals clear fields, and a regular rate and rhythm is noted on heart examination. Laboratory data include a hemoglobin of 5.6 g/dL (56 g/L), platelets 36 x 10<sup>3</sup>/μL (36 x 10<sup>9</sup>/L), WBC 6,300/μL (6.3 x 10<sup>9</sup>/L), creatinine 3.2 mg/dL (32 μmol/L), HCO<sup>-</sup> 14 mEq/L (14 mmol/L), aspartate aminotransferase (AST) 45 U/L (0.45 μkat/L), bilirubin 1.8 mg/dL (18 μmol/L), and lactate 13 mg/dL (1.3 mmol/L). A urinalysis revealed hemoglobinuria. A 12-lead electrocardiogram showed normal sinus rhythm without ST segment changes or other signs of ischemia.

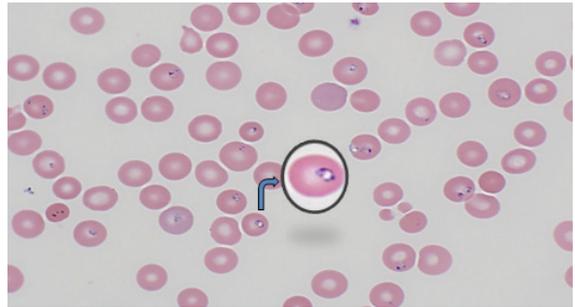
After volume resuscitation, the patient stabilizes and is extubated. A chest radiograph is shown in Figure 21-A, and CT angiogram was negative for thromboembolic disease. A thin prep blood smear is shown in Figure 21-B.

Which of the following medications should be initiated?

- A. Atovaquone and azithromycin
- B. Quinine
- C. Doxycycline
- D. Chloroquine



**Figure 21-A** Anteroposterior chest radiograph.



**Figure 21-B** Thin prep blood smear from blood specimen collected from patient.

**22.** A 60-year-old man with COPD presents with exertional dyspnea. He is maintained on a long-acting beta agonist and a long-acting muscarinic antagonist and reports no recent exacerbations. On exam, lungs are clear to auscultation. Spirometry reveals an FEV<sub>1</sub> of 35% predicted. Resting oxygen saturation on room air is 93%. Upon completion of a 6-min walk test, oxygen saturation falls to 86%. On 2 L/min oxygen via nasal cannula, he walks the same distance and his oxygen saturation does not fall below 92%.

You prescribe 2 L/min supplemental oxygen for exertion and sleep and tell the patient which of the following about studies involving similar patients with COPD?

- A. They demonstrate that he will live longer if he adheres to supplemental oxygen.
- B. They show that wearing oxygen will reduce the number of COPD exacerbations.
- C. They reveal better outcomes if oxygen is worn 24 hours a day.
- D. They do not demonstrate improvement in quality of life with supplemental oxygen.

**23.** You are asked to see a 65-year-old woman who has been admitted to ICU after becoming unresponsive with a pulseless electrical activity (PEA) arrest while undergoing physical therapy for back pain and muscular spasms. Prior to this event, she was noted to have labile pulse rates that had dipped below 30/min followed by escalating pulse rates greater than 120/min. She was resuscitated and her vital signs stabilized. She is afebrile. On examination, the patient is responsive but was noted to have symmetric progressive muscle weakness over days with barely perceptible deep tendon reflexes. She is intubated and receiving mechanical ventilatory support.

Her past medical history includes peripheral vascular disease and a biliary neoplastic lesion with low-grade dysplasia for which she had undergone prior surgery and was receiving total parenteral nutrition (TPN) to maintain her weight. She had recovered from a diarrheal illness 6 weeks prior to her most recent sentinel event.

Hepatic transaminases as well as a CBC, serum electrolytes, and creatinine levels were normal. A lumbar puncture revealed clear spinal fluid with normal cell counts and elevated protein levels.

Which of the following would be the next best step?

- A. Administer plasmapheresis.
- B. Start intravenous atropine.
- C. Start high-dose corticosteroids.
- D. Administer thiamine.

**24.** Which of the following statements regarding the effects of opioids on sleep-related breathing disorders is most correct?

- A. Low or normal body mass index is a risk factor for opioid-induced sleep-disordered breathing.
- B. Obstructive sleep apnea is a more common complication of opioid use than central sleep apnea.
- C. The pattern of central sleep apnea due to opioid use is polysomnographically indistinguishable from that of other forms of central sleep apnea.
- D. Methadone has a lower risk of inducing sleep-disordered breathing than other opioids.

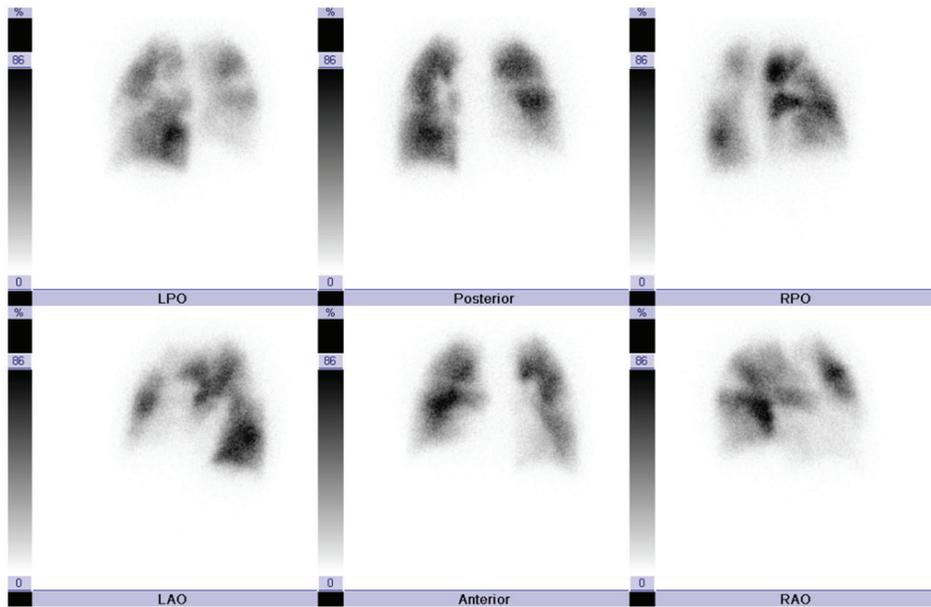
**25.** A 39-year-old woman with a history of systemic lupus erythematosus (SLE) and antiphospholipid syndrome (APS), treated with warfarin, is evaluated for progressive dyspnea and lower extremity edema. Physical examination is notable for jugular venous distention to the angle of the mandible. A parasternal heave, an accentuated P2 component of S2, and a tricuspid regurgitant murmur are appreciated.

Echocardiography shows marked right ventricular enlargement and hypertrophy, depressed right ventricular systolic function, dilation of the inferior vena cava, and flattening of the interventricular septum throughout the cardiac cycle, moderate tricuspid regurgitation, and an estimated pulmonary artery systolic pressure (PASP) of 100 mm Hg. Radionuclide ventilation-perfusion (V/Q) scintigraphy shows multiple segmental wedge-shaped mismatched perfusion defects in both lungs with preserved ventilation (Figure 25-A). CT pulmonary angiography demonstrates extensive proximal organized embolic material with partial and complete filling defects, mural defects along the walls of the right and left interlobar pulmonary artery, and areas of incomplete recanalization resulting in intraluminal webs (Figure 25-B). Right heart catheterization reveals a mean pulmonary artery pressure (mPAP) of 57 mm Hg, pulmonary artery wedge pressure (PAW) of 13 mm Hg, cardiac index of 2.3 L/min/m<sup>2</sup>, and pulmonary vascular resistance of 782 dynes-sec-cm<sup>5</sup>. Pulmonary angiography confirms appropriate proximally accessibility of thrombi.

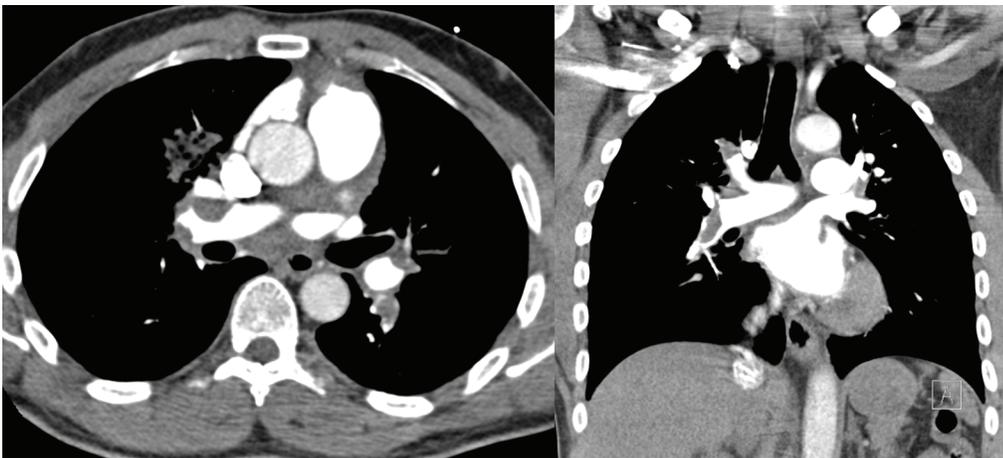
The patient undergoes successful pulmonary thromboendarterectomy (PTE) with some improvement in postoperative hemodynamics. On postoperative day one, she develops significantly increased oxygen requirements on the ventilator. A chest radiography obtained at the time is shown in Figure 25-C.

Which of the following is correct about the this patient's perioperative complication?

- A. Perioperative methylprednisolone reduces its incidence.
- B. Its incidence is higher in patients with significantly elevated preoperative right atrial pressure (RAP) and total pulmonary resistance (TPR).
- C. Perioperative use of inhaled nitric oxide (iNO) reduces the incidence of this complication.
- D. Perioperative use of a low tidal volume (6 mL/kg vs 10 mL/kg) ventilation strategy reduces the incidence of this complication.



**Figure 25-A** V/Q scintigraphy shows multiple segmental wedge-shaped mismatched perfusion defects in both lungs



**Figure 25-B** CT pulmonary angiogram demonstrates extensive proximal organized embolic material with partial and complete filling defects, mural defects along the walls of the right and left interlobar pulmonary artery, and areas of incomplete recanalization resulting in intraluminal webs.