

QUESTION

1. A patient with a long history of chronic obstructive pulmonary disease (COPD) is admitted to the hospital with an acute exacerbation. The patient is currently on a long-term low-dose inhaled corticosteroid and a long-acting beta₂-agonist. The patient's vital signs are stable, but the patient reports increased shortness of breath and a productive cough with yellowish sputum. The patient's oxygen saturation is 92% on 2L of oxygen. The patient's physical examination is unremarkable. The patient's chest X-ray shows hyperinflation of the lungs and a flattened diaphragm. The patient's arterial blood gas (ABG) shows a pH of 7.38, a partial pressure of carbon dioxide (pCO₂) of 45 mmHg, a partial pressure of oxygen (pO₂) of 80 mmHg, and a bicarbonate (HCO₃⁻) of 26 mEq/L. The patient's serum electrolytes are within normal limits. The patient's white blood cell count (WBC) is 12,000 cells/mm³ with a left shift. The patient's sputum culture is positive for *Streptococcus pneumoniae*. The patient is started on a 14-day course of intravenous (IV) amoxicillin-clavulanate. The patient's symptoms improve over the course of treatment, and the patient is discharged on the same long-term medications. The patient is advised to continue to take their medications as prescribed and to avoid smoking. The patient is scheduled for a follow-up appointment in 4 weeks.

Parameter	Normal Range	Patient Value
pH	7.35-7.45	7.38
pCO ₂	35-45 mmHg	45 mmHg
pO ₂	80-100 mmHg	80 mmHg
HCO ₃ ⁻	22-28 mEq/L	26 mEq/L
WBC	4,000-11,000 cells/mm ³	12,000 cells/mm ³

2. A patient with a long history of chronic obstructive pulmonary disease (COPD) is admitted to the hospital with an acute exacerbation. The patient is currently on a long-term low-dose inhaled corticosteroid and a long-acting beta₂-agonist. The patient's vital signs are stable, but the patient reports increased shortness of breath and a productive cough with yellowish sputum. The patient's oxygen saturation is 92% on 2L of oxygen. The patient's physical examination is unremarkable. The patient's chest X-ray shows hyperinflation of the lungs and a flattened diaphragm. The patient's arterial blood gas (ABG) shows a pH of 7.38, a partial pressure of carbon dioxide (pCO₂) of 45 mmHg, a partial pressure of oxygen (pO₂) of 80 mmHg, and a bicarbonate (HCO₃⁻) of 26 mEq/L. The patient's serum electrolytes are within normal limits. The patient's white blood cell count (WBC) is 12,000 cells/mm³ with a left shift. The patient's sputum culture is positive for *Streptococcus pneumoniae*. The patient is started on a 14-day course of intravenous (IV) amoxicillin-clavulanate. The patient's symptoms improve over the course of treatment, and the patient is discharged on the same long-term medications. The patient is advised to continue to take their medications as prescribed and to avoid smoking. The patient is scheduled for a follow-up appointment in 4 weeks.

ANSWER

1. The patient's ABG shows a pH of 7.38, a pCO₂ of 45 mmHg, a pO₂ of 80 mmHg, and a bicarbonate of 26 mEq/L. This is a compensated respiratory acidosis. The patient's chest X-ray shows hyperinflation of the lungs and a flattened diaphragm, which is consistent with COPD. The patient's sputum culture is positive for *Streptococcus pneumoniae*, which is a common cause of acute exacerbation in COPD. The patient is started on a 14-day course of intravenous (IV) amoxicillin-clavulanate, which is appropriate for the treatment of bacterial pneumonia. The patient's symptoms improve over the course of treatment, and the patient is discharged on the same long-term medications. The patient is advised to continue to take their medications as prescribed and to avoid smoking. The patient is scheduled for a follow-up appointment in 4 weeks.

2. The patient's ABG shows a pH of 7.38, a pCO₂ of 45 mmHg, a pO₂ of 80 mmHg, and a bicarbonate of 26 mEq/L. This is a compensated respiratory acidosis. The patient's chest X-ray shows hyperinflation of the lungs and a flattened diaphragm, which is consistent with COPD. The patient's sputum culture is positive for *Streptococcus pneumoniae*, which is a common cause of acute exacerbation in COPD. The patient is started on a 14-day course of intravenous (IV) amoxicillin-clavulanate, which is appropriate for the treatment of bacterial pneumonia. The patient's symptoms improve over the course of treatment, and the patient is discharged on the same long-term medications. The patient is advised to continue to take their medications as prescribed and to avoid smoking. The patient is scheduled for a follow-up appointment in 4 weeks.