

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: temperature 38.2°C, heart rate 110 bpm, respiratory rate 22 breaths per minute, and oxygen saturation 88% on 2L oxygen. The patient is experiencing increased dyspnea, wheezing, and a productive cough with yellow-green sputum. The patient's arterial blood gas (ABG) shows: pH 7.35, PaCO₂ 45 mmHg, PaO₂ 60 mmHg, HCO₃⁻ 28 mmol/L, and H₂O 92%. The patient's chest X-ray shows hyperinflation and flattened diaphragms. The patient's sputum culture is pending.

Parameter	Normal Range	Patient Value
Temperature	36.1°C - 37.8°C	38.2°C
Heart Rate	60 - 100 bpm	110 bpm
Respiratory Rate	12 - 20 breaths per minute	22 breaths per minute
Oxygen Saturation	95% - 100%	88% on 2L oxygen
pH	7.35 - 7.45	7.35
PaCO ₂	35 - 45 mmHg	45 mmHg
PaO ₂	80 - 100 mmHg	60 mmHg
HCO ₃ ⁻	22 - 28 mmol/L	28 mmol/L
H ₂ O	91% - 96%	92%

2. The patient's condition is worsening, and the patient's oxygen saturation is now 82% on 4L oxygen. The patient's respiratory rate is 24 breaths per minute, and the patient's heart rate is 120 bpm. The patient's ABG shows: pH 7.30, PaCO₂ 50 mmHg, PaO₂ 55 mmHg, HCO₃⁻ 30 mmol/L, and H₂O 90%. The patient's chest X-ray shows hyperinflation and flattened diaphragms. The patient's sputum culture is pending.

3. The patient's condition is still worsening, and the patient's oxygen saturation is now 80% on 6L oxygen. The patient's respiratory rate is 26 breaths per minute, and the patient's heart rate is 130 bpm. The patient's ABG shows: pH 7.25, PaCO₂ 55 mmHg, PaO₂ 50 mmHg, HCO₃⁻ 32 mmol/L, and H₂O 88%. The patient's chest X-ray shows hyperinflation and flattened diaphragms. The patient's sputum culture is pending.

ANSWERS



4. The patient's condition is still worsening, and the patient's oxygen saturation is now 78% on 8L oxygen. The patient's respiratory rate is 28 breaths per minute, and the patient's heart rate is 140 bpm. The patient's ABG shows: pH 7.20, PaCO₂ 60 mmHg, PaO₂ 45 mmHg, HCO₃⁻ 34 mmol/L, and H₂O 85%. The patient's chest X-ray shows hyperinflation and flattened diaphragms. The patient's sputum culture is pending.

5. The patient's condition is still worsening, and the patient's oxygen saturation is now 75% on 10L oxygen. The patient's respiratory rate is 30 breaths per minute, and the patient's heart rate is 150 bpm. The patient's ABG shows: pH 7.15, PaCO₂ 65 mmHg, PaO₂ 40 mmHg, HCO₃⁻ 36 mmol/L, and H₂O 82%. The patient's chest X-ray shows hyperinflation and flattened diaphragms. The patient's sputum culture is pending.