

### 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 long-term therapy with a long-acting beta<sub>2</sub>-agonist (LABA) and an inhaled corticosteroid (ICS). The patient's current symptoms include increased sputum production, dyspnea, and wheezing. The patient's oxygen saturation is 88% on room air. The patient's arterial blood gas (ABG) shows a pH of 7.35, a partial pressure of carbon dioxide (P<sub>a</sub>CO<sub>2</sub>) of 45 mmHg, a partial pressure of oxygen (P<sub>a</sub>O<sub>2</sub>) of 55 mmHg, and a bicarbonate (HCO<sub>3</sub><sup>-</sup>) of 28 mEq/L. The patient's chest X-ray shows hyperinflation and flattened diaphragms. The patient's current medications include a LABA, an ICS, and a short-acting beta<sub>2</sub>-agonist (SABA). The patient's current oxygen therapy is 2 L of oxygen via nasal cannula. The patient's current vital signs are: heart rate 100 bpm, blood pressure 120/80 mmHg, respiratory rate 20 breaths per minute, and temperature 37.5°C. The patient's current laboratory values are: white blood cell count (WBC) 12,000/mm<sup>3</sup>, hemoglobin (Hb) 12 g/dL, and hematocrit (Hct) 36%.

Parameter	Normal Range	Current Value
pH	7.35-7.45	7.35
P <sub>a</sub> CO <sub>2</sub>	35-45 mmHg	45 mmHg
P <sub>a</sub> O <sub>2</sub>	80-100 mmHg	55 mmHg
HCO <sub>3</sub> <sup>-</sup>	22-28 mEq/L	28 mEq/L
WBC	4,000-10,000/mm <sup>3</sup>	12,000/mm <sup>3</sup>
Hb	12-16 g/dL	12 g/dL
Hct	36-47%	36%

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 long-term therapy with a long-acting beta<sub>2</sub>-agonist (LABA) and an inhaled corticosteroid (ICS). The patient's current symptoms include increased sputum production, dyspnea, and wheezing. The patient's oxygen saturation is 88% on room air. The patient's arterial blood gas (ABG) shows a pH of 7.35, a partial pressure of carbon dioxide (P<sub>a</sub>CO<sub>2</sub>) of 45 mmHg, a partial pressure of oxygen (P<sub>a</sub>O<sub>2</sub>) of 55 mmHg, and a bicarbonate (HCO<sub>3</sub><sup>-</sup>) of 28 mEq/L. The patient's chest X-ray shows hyperinflation and flattened diaphragms. The patient's current medications include a LABA, an ICS, and a short-acting beta<sub>2</sub>-agonist (SABA). The patient's current oxygen therapy is 2 L of oxygen via nasal cannula. The patient's current vital signs are: heart rate 100 bpm, blood pressure 120/80 mmHg, respiratory rate 20 breaths per minute, and temperature 37.5°C. The patient's current laboratory values are: white blood cell count (WBC) 12,000/mm<sup>3</sup>, hemoglobin (Hb) 12 g/dL, and hematocrit (Hct) 36%.

### ANSWER

1. The patient's current symptoms and ABG results indicate an acute exacerbation of COPD. The patient's oxygen saturation is 88% on room air, which is below the target range of 90-95%. The patient's ABG shows a pH of 7.35, a P<sub>a</sub>CO<sub>2</sub> of 45 mmHg, a P<sub>a</sub>O<sub>2</sub> of 55 mmHg, and a bicarbonate of 28 mEq/L. The patient's chest X-ray shows hyperinflation and flattened diaphragms. The patient's current medications include a LABA, an ICS, and a SABA. The patient's current oxygen therapy is 2 L of oxygen via nasal cannula. The patient's current vital signs are: heart rate 100 bpm, blood pressure 120/80 mmHg, respiratory rate 20 breaths per minute, and temperature 37.5°C. The patient's current laboratory values are: WBC 12,000/mm<sup>3</sup>, Hb 12 g/dL, and Hct 36%.

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