

QUESTION

A 20-year-old male patient with a long history of asthma is brought to the emergency department by ambulance. He is unable to breathe and is cyanotic. His vital signs are: heart rate 120 beats per minute, blood pressure 90/60 mmHg, respiratory rate 30 breaths per minute, and oxygen saturation 88% on 4 L oxygen. The patient has a history of asthma and has been taking albuterol inhalers. He has no other medical history and is on no other medications.



The patient's arterial blood gas (ABG) results are: pH 7.35, PO₂ 55 mmHg, PCO₂ 35 mmHg, and HCO₃⁻ 22 mmol/L. The patient's chest X-ray shows hyperinflation of the lungs and flattened diaphragms, consistent with severe asthma.

The patient is intubated and placed on mechanical ventilation. The ventilator settings are: tidal volume 600 mL, respiratory rate 12 breaths per minute, and positive end-expiratory pressure (PEEP) 5 cmH₂O. The patient's ABG results after intubation are: pH 7.30, PO₂ 100 mmHg, PCO₂ 45 mmHg, and HCO₃⁻ 22 mmol/L.