

Chapter 09: Ventilatory Assistance
Sole: Introduction to Critical Care Nursing, 7th Edition

MULTIPLE CHOICE

1. A patient has coronary artery bypass graft surgery and is transported to the surgical intensive care unit at noon and is placed on mechanical ventilation. Interpret the initial arterial blood gas levels

pH: 7.31

PaCO₂: 48 mm Hg

Bicarbonate: 22 mEq/L

PaO₂: 115 mm Hg

O₂ saturation: 99%

- | | |
|----|-----------------------------------------------------------|
| a. | Normal arterial blood gas levels with a high oxygen level |
| b. | Partly compensated respiratory acidosis; normal oxygen |
| c. | Uncompensated metabolic acidosis with high oxygen levels |
| d. | Uncompensated respiratory acidosis; hyperoxygenated |

ANS: D

The high PaO₂ level reflects hyperoxygenation; the PaCO₂ and pH levels show respiratory acidosis. The respiratory acidosis is uncompensated as indicated by a pH of 7.31 (acidosis) and a normal bicarbonate level. No metabolic compensation has occurred.

DIF: Cognitive Level: Analyze/Analysis

REF: Box 9-3 | Table 9-3

OBJ: Describe methods for assessing the respiratory system, including physical assessment, interpretation of arterial blood gases, and noninvasive techniques.

TOP: Nursing Process Step: Assessment

MSC: NCLEX Client Needs Category: Physiological Integrity

2. The provider orders the following mechanical ventilation settings for a patient who weighs 75 kg. The patient's spontaneous respiratory rate is 22 breaths/min. Which arterial blood gas abnormality may occur if the patient continues to be tachypneic at these ventilator settings?

Settings:

Tidal volume: 600 mL (8 mL per kg)

FiO₂: 0.5

Respiratory rate: 14 breaths/min

Mode assist/control

Positive end-expiratory pressure: 10 cm H₂O

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|----|-----------------------|
| a. | Metabolic acidosis |
| b. | Metabolic alkalosis |
| c. | Respiratory acidosis |
| d. | Respiratory alkalosis |

ANS: D

Assist/control ventilation may result in respiratory alkalosis, especially when the

patient is breathing at a higher rate than the ventilator rate. Each time the patient initiates a spontaneous breath—in this case 22 times per minute—the ventilator will deliver 600 mL of volume.

DIF: Cognitive Level: Analyze/Analysis

REF: p. 186

OBJ: Relate complications associated with mechanical ventilation.

TOP: Nursing Process Step: Evaluation

MSC: NCLEX Client Needs Category: Physiological Integrity

3. A patient's ventilator settings are adjusted to treat hypoxemia. The fraction of inspired oxygen is increased from 0.6 to 0.7, and the positive end-expiratory pressure is increased from 10 to 15 cm H₂O. Shortly after these adjustments, the nurse notes that the patient's blood pressure drops from 120/76 mm Hg to 90/60 mm Hg. What is the most likely cause of this decrease in blood pressure?

- | | |
|----|----------------------------|
| a. | Decrease in cardiac output |
| b. | Hypovolemia |
| c. | Increase in venous return |
| d. | Oxygen toxicity |

ANS: A

Positive end-expiratory pressure increases intrathoracic pressure and may result in decreased venous return. Cardiac output decreases as a result, and is reflected in the lower blood pressure. It is essential to assess the patient to identify optimal positive end-expiratory pressure—the highest amount that can be applied without compromising cardiac output. Although hypovolemia can result in a decrease in blood pressure, there is no indication that this patient has hypovolemia. As noted, higher levels of positive end-expiratory pressure may cause a decrease, not an increase, in venous return. Oxygen toxicity can occur in this case secondary to the high levels of oxygen needed to maintain gas exchange; however, oxygen toxicity is manifested in damage to the alveoli.

DIF: Cognitive Level: Analyze/Analysis

REF: p. 184 | p. 196

OBJ: Relate complications associated with mechanical ventilation.

TOP: Nursing Process Step: Evaluation

MSC: NCLEX Client Needs Category: Physiological Integrity

4. The nurse is caring for a patient with an endotracheal tube. The nurse understands that endotracheal suctioning is needed to facilitate removal of secretions and that the procedure

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|----|-------------------------------------------------------|
| a. | decreases intracranial pressure. |
| b. | depresses the cough reflex. |
| c. | is done as indicated by patient assessment. |
| d. | is more effective if preceded by saline instillation. |

ANS: C

Suctioning is performed as indicated by patient assessment. Suctioning is associated with increases in intracranial pressure; therefore, it is important to hyperoxygenate the patient before suctioning to reduce this complication. Suctioning can stimulate the cough reflex rather than depress this reflex. Saline instillation is associated with negative physiological outcomes and is not recommended as part of the suctioning procedure; it does not loosen secretions,

which is a common misperception.

DIF: Cognitive Level: Understand/Comprehension

OBJ: Discuss methods for maintaining an open airway.

TOP: Nursing Process Step: Implementation

MSC: NCLEX Client Needs Category: Physiological Integrity

REF: p. 180

5. A patient is admitted to the progressive care unit with a diagnosis of community-acquired pneumonia. The patient has a history of chronic obstructive pulmonary disease and diabetes. A set of arterial blood gases obtained on admission without supplemental oxygen shows pH 7.35; PaCO₂ 55 mm Hg; bicarbonate 30 mEq/L; PaO₂ 65 mm Hg. These blood gases reflect:

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|----|----------------------------------------------------------------|
| a. | hypoxemia and compensated metabolic alkalosis. |
| b. | hypoxemia and compensated respiratory acidosis. |
| c. | normal oxygenation and partly compensated metabolic alkalosis. |
| d. | normal oxygenation and uncompensated respiratory acidosis. |

ANS: B

The PaO₂ of 65 mm Hg is lower than normal range (80 to 100 mm Hg), indicating hypoxemia. The high PaCO₂ indicates respiratory acidosis. The elevated bicarbonate indicates metabolic alkalosis. Because the pH is normal, the underlying acid-base alteration is compensated. Given the patient's history of chronic pulmonary disease and a pH that is at the lower end of normal range, it can be determined that this patient is hypoxic with fully compensated respiratory acidosis.

DIF: Cognitive Level: Analyze/Analysis

REF: Table 9-3 | Box 9-3

OBJ: Describe methods for assessing the respiratory system, including physical assessment, interpretation of arterial blood gases, and noninvasive techniques.

TOP: Nursing Process Step: Assessment

MSC: NCLEX Client Needs Category: Physiological Integrity

6. A patient's status worsens and needs mechanical ventilation. The pulmonologist wants the patient to receive 10 breaths/min from the ventilator but wants to encourage the patient to breathe spontaneously between the mechanical breaths at his own tidal volume. This mode of ventilation is called

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|----|-------------------------------------|
| a. | assist/control ventilation. |
| b. | controlled ventilation. |
| c. | intermittent mandatory ventilation. |
| d. | positive end-expiratory pressure. |

ANS: C

The intermittent mandatory ventilation mode allows the patient to breathe spontaneously between breaths. The patient will receive a preset tidal volume at a preset rate. Any additional breaths that he initiates will be at his spontaneous tidal volume, which will likely be lower than the ventilator breaths. In assist/control ventilation, spontaneous effort results in a preset tidal volume delivered by the ventilator. Spontaneous effort during controlled ventilation results in patient/ventilator dyssynchrony. Positive end-expiratory pressure (PEEP) is application of positive pressure to breaths delivered by the ventilator. PEEP is an adjunct to

both intermittent mandatory and assist/control ventilation.

DIF: Cognitive Level: Apply/Application

REF: p. 186

OBJ: Describe types and modes of mechanical ventilation.

TOP: Nursing Process Step: Implementation

MSC: NCLEX Client Needs Category: Physiological Integrity

7. A patient's endotracheal tube is not secured tightly. The respiratory care practitioner assists the nurse in taping the tube. After the tube is retaped, the nurse auscultates the patient's lungs and notes that the breath sounds over the left lung fields are absent. The nurse suspects that

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|----|------------------------------------------------------------|
| a. | the endotracheal tube is in the right mainstem bronchus. |
| b. | the patient has a left pneumothorax. |
| c. | the patient has aspirated secretions during the procedure. |
| d. | the stethoscope earpiece is clogged with wax. |

ANS: A

The endotracheal tube can become dislodged during repositioning and is likely to be in the right mainstem bronchus. It is important to reassess breath sounds after the retaping procedure. A pneumothorax would also result in diminished or absent breath sounds; however, it is not associated with repositioning the endotracheal tube. Aspiration may occur during the procedure but would be manifested in changes in the chest x-ray or by hypoxemia, for example. The stethoscope is not a factor.

DIF: Cognitive Level: Remember/Knowledge

REF: p. 191

OBJ: Formulate a plan of care for the mechanically ventilated patient.

TOP: Nursing Process Step: Evaluation

MSC: NCLEX Client Needs Category: Physiological Integrity

8. A mode of pressure-targeted ventilation that provides positive pressure to decrease the workload of spontaneous breathing through the endotracheal tube is

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|----|--------------------------------------|
| a. | continuous positive airway pressure. |
| b. | positive end-expiratory pressure. |
| c. | pressure support ventilation. |
| d. | T-piece adapter. |

ANS: C

Pressure support (PS) is a mode of ventilation in which the patient's spontaneous respiratory activity is augmented by the delivery of a preset amount of inspiratory positive pressure. Positive end-expiratory pressure provides positive pressure at end expiration during mechanical breaths, and continuous positive airway pressure provides positive pressure during spontaneous breaths. The T-piece adapter is used to provide oxygen with spontaneous, unassisted breaths.

DIF: Cognitive Level: Remember/Knowledge

REF: p. 187

OBJ: Describe types and modes of mechanical ventilation.

TOP: Nursing Process Step: N/A

MSC: NCLEX Client Needs Category: Physiological Integrity

9. The primary mode of action of neuromuscular blocking agents is

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|----|------------|
| a. | analgesia. |
|----|------------|

b.	anticonvulsant.
c.	paralysis.
d.	sedation.

ANS: C

Neuromuscular blocking agents cause respiratory muscle paralysis. They do not have sedative, analgesic, or anticonvulsant effects.

DIF: Cognitive Level: Remember/Knowledge REF: p. 198

OBJ: Formulate a plan of care for the mechanically ventilated patient.

TOP: Nursing Process Step: Implementation

MSC: NCLEX Client Needs Category: Physiological Integrity

10. One of the early signs of hypoxemia on the nervous system is

a.	cyanosis.
b.	restlessness.
c.	agitation.
d.	tachypnea.

ANS: B

Decreased oxygenation to the nervous system may result in restlessness and agitation—early signs of hypoxemia. Cyanosis is a late sign. Tachypnea may occur, but CNS changes tend to occur earlier. Agitation is not usually seen with hypoxemia.

DIF: Cognitive Level: Remember/Knowledge REF: Box 9-1

OBJ: Review the anatomy and physiology of the respiratory system.

TOP: Nursing Process Step: Assessment

MSC: NCLEX Client Needs Category: Physiological Integrity

11. The amount of effort needed to maintain a given level of ventilation is termed

a.	compliance.
b.	resistance.
c.	tidal volume.
d.	work of breathing.

ANS: D

Work of breathing is the amount of effort needed to maintain a given level of ventilation. Compliance is a measure of the distensibility, or stretchability, of the lung and chest wall. Resistance refers to the opposition to the flow of gases in the airways. Tidal volume is the volume of air in a typical breath.

DIF: Cognitive Level: Remember/Knowledge REF: p. 162

OBJ: Review the anatomy and physiology of the respiratory system.

TOP: Nursing Process Step: Assessment

MSC: NCLEX Client Needs Category: Physiological Integrity

12. Which of the following devices is best suited to deliver 65% oxygen to a patient who is spontaneously breathing?

a.	Face mask with non-rebreathing reservoir
b.	Low-flow nasal cannula

c.	Simple face mask
d.	Venturi mask

ANS: A

Face masks with reservoirs (partial rebreathing and non-rebreathing reservoir masks) provide oxygen concentration of 60% or higher. The addition of the reservoir increases the amount of oxygen available to the patient during inspiration and allows for the delivery of concentrations of 35% to 60% (partial rebreather) or 60% to 80% (non-rebreather), depending on the flowmeter setting, the fit of the mask, and the patient's respiratory pattern. The high-flow nasal cannula, not the traditional low-flow models, can provide higher flows. The simple face mask can deliver flows up to 60%. The Venturi mask allows better regulation of oxygen concentration and generally does not deliver more than 60% oxygen.

DIF: Cognitive Level: Remember/Knowledge

REF: p. 172

OBJ: Compare commonly used oxygen delivery devices.

TOP: Nursing Process Step: Planning

MSC: NCLEX Client Needs Category: Physiological Integrity

13. A patient is being mechanically ventilated in the synchronized intermittent mandatory ventilation mode at a rate of 4 breaths/min. His spontaneous respirations are 12 breaths/min. He receives a dose of morphine sulfate, and his spontaneous respirations decrease to 4 breaths/min. Which acid-base disturbance will likely occur?

a.	Metabolic acidosis
b.	Metabolic alkalosis
c.	Respiratory acidosis
d.	Respiratory alkalosis

ANS: C

The morphine caused respiratory depression. As a result, the frequency and depth of respiration is compromised, which can lead to respiratory acidosis.

DIF: Cognitive Level: Apply/Application

REF: p. 193 | Box 9-2

OBJ: Formulate a plan of care for the mechanically ventilated patient.

TOP: Nursing Process Step: Evaluation

MSC: NCLEX Client Needs Category: Physiological Integrity

14. A patient is being mechanically ventilated in the synchronized intermittent mandatory ventilation mode at a rate of 4 breaths/min. His spontaneous respirations are 12 breaths/min. He receives a dose of morphine sulfate, and his respirations decrease to 4 breaths/min. What adjustments may need to be made to the patient's ventilator settings?

a.	Add positive end-expiratory pressure (PEEP).
b.	Add pressure support.
c.	Change to assist/control ventilation at a rate of 4 breaths/min.
d.	Increase the synchronized intermittent mandatory ventilation respiratory rate.

ANS: D

The morphine caused respiratory depression. As a result, the frequency and depth of respiration is compromised, which can lead to respiratory acidosis. The respiratory rate on the mechanical ventilator needs to be increased. PEEP is added to improve oxygenation; it does not increase the rate or depth of respirations. Pressure support will not be effective in

increasing the rate of spontaneous respiration. Changing to assist/control ventilation is an option; however, the rate needs to be set higher than 4 breaths/min.

DIF: Cognitive Level: Analyze/Analysis

REF: p. 186

OBJ: Relate complications associated with mechanical ventilation.

TOP: Nursing Process Step: Evaluation

MSC: NCLEX Client Needs Category: Physiological Integrity

15. Current guidelines recommend the oral route for endotracheal intubation. The rationale for this recommendation is that nasotracheal intubation is associated with a greater risk for

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| a. | basilar skull fracture. |
| b. | cervical hyperextension. |
| c. | impaired ability to “mouth” words. |
| d. | sinusitis and infection. |

ANS: D

Nasotracheal intubation is associated with an increased risk for sinusitis, which may contribute to ventilator-associated infection. Nasal intubation is contraindicated in patients with basilar skull fracture. The procedure is sometimes performed in patients with cervical spine injury; the procedure can be done without hyperextending the neck. Patients with nasotracheal tubes are generally more comfortable and have a greater ability to “mouth words.”

DIF: Cognitive Level: Remember/Knowledge

REF: p. 191

OBJ: Discuss methods for maintaining an open airway.

TOP: Nursing Process Step: Evaluation

MSC: NCLEX Client Needs Category: Physiological Integrity

16. Oxygen saturation (SaO_2) represents

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|----|-----------------------------------------------------|
| a. | alveolar oxygen tension. |
| b. | oxygen that is chemically combined with hemoglobin. |
| c. | oxygen that is physically dissolved in plasma. |
| d. | total oxygen consumption. |

ANS: B

Oxygen saturation value reflects the saturation of the hemoglobin. It does not represent alveolar oxygen tension, oxygen that is dissolved in plasma, or total oxygen consumption.

DIF: Cognitive Level: Remember/Knowledge

REF: p. 165

OBJ: Review the anatomy and physiology of the respiratory system.

TOP: Nursing Process Step: Assessment

MSC: NCLEX Client Needs Category: Physiological Integrity

17. Pulse oximetry measures

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|----|-----------------------|
| a. | arterial blood gases. |
| b. | hemoglobin values. |
| c. | oxygen consumption. |
| d. | oxygen saturation. |

ANS: D

Pulse oximetry measures oxygen saturation in the peripheral tissues. It does not measure arterial blood gases, but it does estimate the PaO₂ that is obtained via a blood gas analysis. It does not measure hemoglobin levels or oxygen consumption.

DIF: Cognitive Level: Understand/Comprehension

REF: p. 169

OBJ: Describe methods for assessing the respiratory system, including physical assessment, interpretation of arterial blood gases, and noninvasive techniques.

TOP: Nursing Process Step: Assessment

MSC: NCLEX Client Needs Category: Physiological Integrity

18. A PaCO₂ of 48 mm Hg is associated with

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|----|-------------------------------------------|
| a. | hyperventilation. |
| b. | hypoventilation. |
| c. | increased absorption of O ₂ . |
| d. | increased excretion of HCO ₃ . |

ANS: B

PaCO₂ rises in patients with hypoventilation. Hyperventilation results in a decrease in PaCO₂. PaCO₂ does not affect oxygen absorption. Increased excretion of bicarbonate would result in metabolic acidosis.

DIF: Cognitive Level: Remember/Knowledge

REF: Box 9-2

OBJ: Review the anatomy and physiology of the respiratory system.

TOP: Nursing Process Step: Assessment

MSC: NCLEX Client Needs Category: Physiological Integrity

19. The nurse notes that the patient's arterial blood gas levels indicate hypoxemia. The patient is not intubated and has a respiratory rate of 22 breaths/min. The nurse's first intervention to relieve hypoxemia is to:

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|----|---------------------------------------------------------------------|
| a. | call the provider for an emergency intubation procedure. |
| b. | obtain an order for bilevel positive airway pressure (BiPAP). |
| c. | notify the provider of values and obtain a prescription for oxygen. |
| d. | suction secretions from the oropharynx. |

ANS: C

Oxygen is administered to treat or prevent hypoxemia. Oxygen should be considered a first-line treatment in cases of hypoxemia. Emergency intubation is not warranted at this time. BiPAP may be considered if administration of supplemental oxygen does not correct the hypoxemia. There is no indication that the patient requires suctioning.

DIF: Cognitive Level: Analyze/Analysis

REF: p. 171

OBJ: Describe methods for assessing the respiratory system, including physical assessment, interpretation of arterial blood gases, and noninvasive techniques.

TOP: Nursing Process Step: Implementation

MSC: NCLEX Client Needs Category: Physiological Integrity

20. A patient presents to the emergency department demonstrating agitation and complaining of numbness and tingling in his fingers. His arterial blood gas levels reveal the

following: pH 7.51, PaCO₂ 25, HCO₃ 25. The nurse interprets these blood gas values as:

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|----|--------------------------------------|
| a. | compensated metabolic alkalosis. |
| b. | normal values. |
| c. | uncompensated respiratory acidosis. |
| d. | uncompensated respiratory alkalosis. |

ANS: D

The low PaCO₂ and high pH values show respiratory alkalosis. The bicarbonate level is normal.

DIF: Cognitive Level: Analyze/Analysis

REF: Box 9-2

OBJ: Describe methods for assessing the respiratory system, including physical assessment, interpretation of arterial blood gases, and noninvasive techniques.

TOP: Nursing Process Step: Assessment

MSC: NCLEX Client Needs Category: Physiological Integrity

21. Positive end-expiratory pressure (PEEP) is a mode of ventilatory assistance that produces the following condition:

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|----|------------------------------------------------------------------------------------------------------------------------------------------|
| a. | Each time the patient initiates a breath, the ventilator delivers a full preset tidal volume. |
| b. | For each spontaneous breath taken by the patient, the tidal volume is determined by the patient's ability to generate negative pressure. |
| c. | The patient must have a respiratory drive, or no breaths will be delivered. |
| d. | There is pressure remaining in the lungs at the end of expiration that is measured in cm H ₂ O. |

ANS: D

PEEP is the addition of positive pressure into the airways during expiration. PEEP is measured in centimeters of water.

DIF: Cognitive Level: Remember/Knowledge

REF: pp. 183-184

OBJ: Describe types and modes of mechanical ventilation.

TOP: Nursing Process Step: Assessment

MSC: NCLEX Client Needs Category: Physiological Integrity

22. The nurse is caring for a patient who is mechanically ventilated. As part of the nursing care, the nurse understands that

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|----|----------------------------------------------------------------------------------------------|
| a. | communication with intubated patients is often difficult. |
| b. | controlled ventilation is the preferred mode for most patients. |
| c. | patients with chronic obstructive pulmonary disease wean easily from mechanical ventilation. |
| d. | wrist restraints are applied to all patients to avoid self-extubation. |

ANS: A

Communication difficulties are common because of the artificial airway. Restraints must be determined individually. Patients with chronic obstructive pulmonary disease often have difficulty weaning. Synchronized intermittent mandatory ventilation and assist/control ventilation are the commonly used modes.

DIF: Cognitive Level: Remember/Knowledge

REF: p. 198

OBJ: Formulate a plan of care for the mechanically ventilated patient.

TOP: Nursing Process Step: Evaluation

MSC: NCLEX Client Needs Category: Physiological Integrity

23. A patient is having difficulty weaning from mechanical ventilation. The nurse assesses the patient for which potential cause of this difficult weaning?

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|----|------------------------------------------|
| a. | Cardiac output of 6 L/min. |
| b. | Hemoglobin of 8 g/dL. |
| c. | Negative sputum culture and sensitivity. |
| d. | White blood cell count of 8000. |

ANS: B

The low hemoglobin level will decrease oxygen-carrying capacity and may make weaning difficult. A cardiac output of 6 L/min is normal. A negative sputum culture indicates absence of lower respiratory infection, which should promote rather than hinder weaning. A white blood cell count of 8000 is normal and indicates absence of infection, which should promote rather than hinder weaning.

DIF: Cognitive Level: Analyze/Analysis

REF: Box 9-10

OBJ: Explain methods for weaning patients from mechanical ventilation.

TOP: Nursing Process Step: Evaluation

MSC: NCLEX Client Needs Category: Physiological Integrity

24. A patient is admitted to the cardiac surgical intensive care unit after cardiac surgery with the following arterial blood gas (ABG) levels. What action by the nurse is best?

pH: 7.4

PaCO₂: 40 mm Hg

Bicarbonate: 24 mEq/L

PaO₂: 95 mm Hg

O₂ saturation: 97%

Respirations: 20 breaths/min

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|----|------------------------------------------------------------------|
| a. | Call the provider to request rapid intubation. |
| b. | Document the findings and continue to monitor. |
| c. | Request that another set of ABGs be drawn and run. |
| d. | Correlate the patient's O ₂ saturation with the ABGs. |

ANS: B

These are normal values. All parameters are within normal limits. No action other than documentation and continued observation is warranted.

DIF: Cognitive Level: Analyze/Analysis

REF: pp. 167-168

OBJ: Describe methods for assessing the respiratory system, including physical assessment, interpretation of arterial blood gases, and noninvasive techniques.

TOP: Nursing Process Step: Assessment

MSC: NCLEX Client Needs Category: Physiological Integrity

25. A patient is admitted to the cardiac surgical intensive care unit after cardiac

surgery. Four hours after admission to the surgical intensive care unit at 4 PM, the patient has stable vital signs and normal arterial blood gases (ABGs), and is placed on a T-piece for ventilatory weaning. The following information pertains to the 1900 assessment.

Assessments and Vital Signs	Nursing Action
Restless	Performs complete assessment
Increased to 110 beats/min	Suctions patient for pink, frothy secretions
Respirations 36 breaths/min Blood pressure 156/98 mm Hg	Obtains prescriptions from provider for ABGs, electrolyte levels, and portable chest x-ray
Sinus tachycardia	
10 PVCs/min	
Elevated pulmonary artery pressure	
Loud crackles throughout	
New ABGs: pH: 7.28	
PaCO ₂ : 46 mm Hg	
Bicarbonate: 22 mEq/L	
PaO ₂ : 58 mm Hg	
O ₂ saturation: 88%	

What action by the nurse is best?

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|----|-----------------------------------|
| a. | Prepare for rapid intubation. |
| b. | Increase the patient's oxygen. |
| c. | Prepare to administer a diuretic. |
| d. | Change the ventilator settings. |

ANS: C

These levels show respiratory acidosis. The bicarbonate is normal; therefore, no compensation has occurred. This patient is also hypoxicemic. The sputum indicates pulmonary edema. The nurse should prepare to administer a diuretic. The patient is already intubated. Increasing the oxygen by itself will not correct the situation. The ventilator settings may need to be changed; however, this is not usually performed by the nursing staff. The priority for the nurse is to address the problem.

DIF: Cognitive Level: Analyze/Analysis

REF: pp. 167-168 | Box 9-2

OBJ: Describe methods for assessing the respiratory system, including physical assessment, interpretation of arterial blood gases, and noninvasive techniques.

TOP: Nursing Process Step: Assessment

MSC: NCLEX Client Needs Category: Physiological Integrity

26. A patient is admitted to the cardiac surgical intensive care unit after cardiac surgery. Four hours after admission to the surgical intensive care unit at 4 PM, the patient has stable vital signs and normal arterial blood gases (ABGs), and is placed on a T-piece for ventilatory weaning. The following information pertains to the 1900 assessment.

Assessments and Vital Signs	Nursing Action
Restless	Performs complete assessment
Increased to 110 beats/min	Suctions patient for pink, frothy secretions
Respirations 36 breaths/min Blood pressure 156/98 mm Hg	Obtains prescriptions from provider for ABGs, electrolyte levels, and portable chest x-ray
Sinus tachycardia	
10 PVCs/min	
Elevated pulmonary artery pressure	
Loud crackles throughout	
New ABGs: pH: 7.28 PaCO ₂ : 46 mm Hg Bicarbonate: 22 mEq/L PaO ₂ : 58 mm Hg O ₂ saturation: 88%	

What interdisciplinary staff member does the nurse notify to assist in the care of this patient while preparing to give this patient diuretics?

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|----|--------------------------------------------------|
| a. | Respiratory therapist to adjust ventilator |
| b. | Social worker to notify family |
| c. | Phlebotomy to obtain another set of blood gasses |
| d. | Nursing assistant to help reposition the patient |

ANS: A

The next step for this patient is most likely ventilator setting changes as the patient was originally attempting to wean and now the patient's condition has deteriorated. The nurse calls the respiratory therapist for this. A social worker may be needed, but the question does not have information about family issues. The patient will need more lab drawn, but this is not the priority. Repositioning the patient is important for many reasons, but again is not the priority action.

DIF: Cognitive Level: Analyze/Analysis

REF: p. 200

OBJ: Describe methods for assessing the respiratory system, including physical assessment, interpretation of arterial blood gases, and noninvasive techniques.

TOP: Nursing Process Step: Evaluation

MSC: NCLEX Client Needs Category: Physiological Integrity

27. The nurse is caring for a mechanically ventilated patient and notes the high pressure alarm sounding. The nurse cannot quickly identify the cause of the alarm and notes the patient's oxygen saturation is decreasing and heart rate and respiratory rate are increasing. The nurse's priority action is to

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|----|---------------------------------------------------------------------------|
| a. | ask the respiratory therapist to get a new ventilator. |
| b. | call the rapid response team to assess the patient. |
| c. | continue to find the cause of the alarm and fix it. |
| d. | manually ventilate the patient while calling for a respiratory therapist. |

ANS: D

The nurse must quickly assess the patient and determine possible causes of the alarm. If the cause is not assessed within seconds, the nurse must manually ventilate the patient and secure assistance in troubleshooting the problem. The patient must be treated while the causes are being assessed by the nurse and respiratory therapist. Continuing to assess for the cause without manually ventilating the patient can result in patient compromise. The respiratory therapist, not the rapid response team, will assess and remedy the problem. A new ventilator may be needed, but that would be determined after the respiratory therapist has assessed the situation.

DIF: Cognitive Level: Analyze/Analysis

REF: p. 197

OBJ: Formulate a plan of care for the mechanically ventilated patient.

TOP: Nursing Process Step: Implementation

MSC: NCLEX Client Needs Category: Safe and Effective Care Environment

28. The nurse is caring for a patient whose ventilator settings include 15 cm H₂O of positive end-expiratory pressure (PEEP). What complication does the nurse assess the patient for?

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|----|---------------------------------------------------------------------|
| a. | Fluid overload secondary to decreased venous return |
| b. | High cardiac index secondary to more efficient ventricular function |
| c. | Hypoxemia secondary to prolonged positive pressure at expiration |
| d. | Low cardiac output secondary to increased intrathoracic pressure |

ANS: D

Positive end-expiratory pressure, especially at higher levels, can result in a decreased cardiac output and index secondary to increased intrathoracic pressure, which impedes venous return. Fluid overload is not an expected finding. The cardiac index would likely decrease, not increase, along with cardiac output. PEEP is used to treat hypoxemia; it does not cause it.

DIF: Cognitive Level: Analyze/Analysis

REF: p. 184 | p. 194

OBJ: Relate complications associated with mechanical ventilation.

TOP: Nursing Process Step: Assessment

MSC: NCLEX Client Needs Category: Physiological Integrity

29. When assessing the patient for hypoxemia, the nurse recognizes that an early sign of the effect of hypoxemia on the *cardiovascular* system is

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|----|---------------|
| a. | heart block. |
| b. | restlessness. |
| c. | tachycardia. |
| d. | tachypnea. |

ANS: C

Tachycardia can occur as a compensatory mechanism to increase cardiac output and oxygenation. Dysrhythmias may occur; however, they are not an early sign and tend to be premature ventricular contractions. Restlessness is an early neurological sign, whereas tachypnea is an early respiratory sign.

DIF: Cognitive Level: Remember/Knowledge

REF: Box 9-1

OBJ: Review the anatomy and physiology of the respiratory system.

TOP: Nursing Process Step: Assessment

MSC: NCLEX Client Needs Category: Physiological Integrity

30. The nurse is caring for a mechanically ventilated patient. The providers are considering performing a tracheostomy because the patient is having difficulty weaning from mechanical ventilation. Related to tracheostomy, the nurse understands which of the following?

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|----|-------------------------------------------------------------------------------------------|
| a. | Patient outcomes are better if the tracheostomy is done within a week of intubation. |
| b. | Percutaneous tracheostomy can be done safely at the bedside by the respiratory therapist. |
| c. | Procedures performed in the operating room are associated with fewer complications. |
| d. | The greatest risk after a percutaneous tracheostomy is accidental decannulation. |

ANS: D

Optimal timing of tracheostomy is not yet known. Percutaneous procedures done at the bedside are not associated with any higher risks than those done in the operating room. Trained physicians safely perform percutaneous tracheostomies at the bedside. The greatest risk for percutaneous tracheostomy is accidental decannulation because the trachea is not surgically attached.

DIF: Cognitive Level: Remember/Knowledge

REF: p. 178

OBJ: Formulate a plan of care for the mechanically ventilated patient.

TOP: Nursing Process Step: Implementation

MSC: NCLEX Client Needs Category: Safe and Effective Care Environment

31. The nurse is assessing the exhaled tidal volume (EV_T) in a mechanically ventilated patient. The rationale for this assessment is to

- | | |
|----|----------------------------------------------------------------------|
| a. | assess for tension pneumothorax. |
| b. | assess the level of positive end-expiratory pressure. |
| c. | compare the tidal volume delivered with the tidal volume prescribed. |
| d. | determine the patient's work of breathing. |

ANS: C

The EV_T is assessed to determine if the patient is receiving the tidal volume that is prescribed.

Volume may be lost because of leaks in the ventilator circuit, around the endotracheal tube cuff, or around a chest tube. The assessment will not detect a pneumothorax and does not assess positive end-expiratory pressure or work of breathing.

DIF: Cognitive Level: Remember/Knowledge

REF: p. 184

OBJ: Formulate a plan of care for the mechanically ventilated patient.

TOP: Nursing Process Step: Assessment

MSC: NCLEX Client Needs Category: Physiological Integrity

MULTIPLE RESPONSE

1. The nurse is caring for a mechanically ventilated patient and responds to a high inspiratory pressure alarm. Recognizing possible causes for the alarm, the nurse assesses for

which of the following? (*Select all that apply.*)

a.	Coughing or attempting to talk
b.	Disconnection from the ventilator
c.	Kinks in the ventilator tubing
d.	Need for suctioning
e.	Spontaneous breathing

ANS: A, C, D

Coughing, kinks, and mucus in the airway can cause the inspiratory pressure to increase; ventilator disconnects result in low-volume alarms. A disconnection from the ventilator would result in a low exhaled volume alarm, not a high-pressure alarm. Spontaneous breathing does not trigger alarms.

DIF: Cognitive Level: Analyze/Analysis

REF: Table 9-4

OBJ: Formulate a plan of care for the mechanically ventilated patient.

TOP: Nursing Process Step: Evaluation

MSC: NCLEX Client Needs Category: Physiological Integrity

2. Select all of the factors that may predispose the patient to respiratory acidosis.

(*Select all that apply.*)

a.	Anxiety and fear
b.	Central nervous system depression
c.	Diabetic ketoacidosis
d.	Nasogastric suctioning
e.	Overdose of sedatives

ANS: B, E

Central nervous system depression and drug overdose may result in hypoventilation and cause respiratory acidosis. Anxiety is a cause of hyperventilation and respiratory alkalosis. Diabetic ketoacidosis is a cause of metabolic acidosis. Nasogastric suctioning is a cause of metabolic alkalosis.

DIF: Cognitive Level: Remember/Knowledge

REF: Box 9-2

OBJ: Review the anatomy and physiology of the respiratory system.

TOP: Nursing Process Step: Assessment

MSC: NCLEX Client Needs Category: Physiological Integrity

3. The nurse is assisting with endotracheal intubation and understands that correct placement of the endotracheal tube in the trachea would be identified by which of the following? (*Select all that apply.*)

a.	Auscultation of air over the epigastrium
b.	Equal bilateral breath sounds upon auscultation
c.	Position above the carina verified by chest x-ray
d.	Positive detection of carbon dioxide (CO ₂) through CO ₂ detector devices
e.	Fogging of the endotracheal tube

ANS: B, C, D

The position of the tube is assessed after intubation through auscultation of breath sounds, carbon dioxide testing, and chest x-ray. Auscultation of air over the epigastrium indicates

placement in the esophagus rather than the trachea. Fogging of the ET tube does not indicate correct placement.

DIF: Cognitive Level: Remember/Knowledge

REF: p. 177

OBJ: Formulate a plan of care for the mechanically ventilated patient.

TOP: Nursing Process Step: Evaluation

MSC: NCLEX Client Needs Category: Safe and Effective Care Environment

ORDERING

1. The nurse is caring for a mechanically ventilated patient and is charting outside the patient's room when the ventilator alarm sounds. What is the priority order for the nurse to complete these actions: _____, _____, _____, _____?

- a. check quickly for possible causes of the alarm that can be fixed
- b. after troubleshooting, connect back to mechanical ventilator and reassess patient
- c. go to patient's bedside
- d. manually ventilate the patient while getting a respiratory therapist

ANS:

C, A, D, B

The nurse must quickly assess the patient and determine possible causes of the alarm. If the cause is not assessed within seconds, the nurse must manually ventilate the patient and secure assistance in troubleshooting the problem. Once the problem has been corrected, the patient must be reassessed.

DIF: Cognitive Level: Apply/Application

REF: pp. 190-191

OBJ: Formulate a plan of care for the mechanically ventilated patient.

TOP: Nursing Process Step: Implementation

MSC: NCLEX Client Needs Category: Safe and Effective Care Environment

2. The nurse is assisting with endotracheal intubation of the patient and recognizes that the procedure will be done in what order: _____, _____, _____, _____, _____?

- a. assess balloon on endotracheal tube for symmetry and leaks
- b. assess lung fields for bilateral expansion
- c. inflate balloon of endotracheal tube
- d. insert endotracheal tube with laryngoscope and blade
- e. suction oropharynx

ANS:

A, E, D, C, B

Intubation is done systematically by the physician, therapist, or anesthetist. Equipment is gathered and assessed (e.g., balloon/cuff on endotracheal tube). The patient is hyperoxygenated and secretions are suctioned from the oropharynx to visualize the vocal cords. The tube is

inserted, and the balloon is inflated once the tube is in place. The position of the tube is assessed after intubation through auscultation of breath sounds, carbon dioxide testing, and chest x-ray.

DIF: Cognitive Level: Analyze/Analysis

REF: p. 175 | p. 177

OBJ: Formulate a plan of care for the mechanically ventilated patient.

TOP: Nursing Process Step: Implementation

MSC: NCLEX Client Needs Category: Safe and Effective Care Environment