

# Medical Tests

## NBRC-CRT-RRT

**National Board for Respiratory Care: Certified/Registered Respiratory Therapist**

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# Latest Version: 6.0

## Question: 1

Which of the following is the BEST way to improve alveolar ventilation and decrease PaO<sub>2</sub> for a ventilated patient who has a VT of 8 mL/kg and is in A/C mode, but is not triggering above the set rate?

- A. Increase FiO<sub>2</sub>
- B. Increase PEEP
- C. Increase VT
- D. Increase RR

**Answer: D**

Explanation:

Correct answer: Increase RR

Increasing tidal volume (VT) is typically the best way to improve alveolar ventilation and decrease PaO<sub>2</sub> for a ventilated patient. When the VT is already at 8 mL/kg, however, increasing the respiratory rate (RR) is preferred, providing the patient is in A/C mode and not triggering above the set rate or is in SIMV mode.

## Question: 2

The respiratory therapist is preparing to administer a dry powder inhaler (DPI). Which of the following inspiratory flow rates is the minimum inspiratory flow rate that a patient should be able to generate to use this medication?

- A. 40 L/min
- B. 30 L/min
- C. 50 L/min
- D. 20 L/min

**Answer: A**

Explanation:

Correct answer: 40 L/min

A patient must have an inspiratory flow rate of at least 40 L/min to produce a respirable powder aerosol. Higher flow rates are preferred; however, a flow rate lower than this is not likely to fully aerosolize the medication, decreasing its effectiveness.

## Question: 3

The respiratory therapist is treating a patient who is being mechanically ventilated with an FiO<sub>2</sub> of 55% using PCV. The patient has the following ABG values:

pH 7.38

PaCO<sub>2</sub> 40 mm Hg

PaO<sub>2</sub> 53 mm Hg

HCO<sub>3</sub><sup>-</sup> 23 mEq/l

BE -1.7

Which of the following interventions is BEST for this patient?

- A. Change the ventilator of VCV mode
- B. No change is needed for this patient
- C. Increase the patient's PEEP
- D. Increase the patient's RR

**Answer: C**

Explanation:

Correct answer: Increase the patient's PEEP

The patient has a normal acid-base status, normal ventilation, and a normal metabolic status. The patient does, however, have moderate hypoxemia. Providing positive pressure by increasing the patient's PEEP will be the most effective intervention for this patient.

Increasing the respiratory rate or changing the ventilator mode to VCV is not likely to be effective in increasing this patient's oxygenation.

### Question: 4

Use the following scenario to answer this question.5

Which of the following medications would the respiratory therapist anticipate that the patient may be discharged with as new prescriptions?

(SELECT AS MANY as you consider indicated.)

- A. Lasix
- B. PO antibiotics
- C. Bronchodilators
- D. Home oxygen
- E. Steroids

**Answer: BCE**

Explanation:

Depending on the patient's condition at discharge, steroids, bronchodilators, and PO antibiotics may all be potential new prescriptions. Steroids could be used to decrease tracheal inflammation, bronchodilators may be prescribed as a rescue medication for tracheal stenosis exacerbation, and PO antibiotics may be used to continue treatment for pneumonia.

Home oxygen is very unlikely to be prescribed, as treated pneumonia or tracheal stenosis are both unlikely to result in the ongoing need for oxygen therapy at home. Lasix may be an existing prescription

given the patient's history of heart failure, but should not be a new prescription based on the patient's course of hospitalization.

### Question: 5

When measuring a patient's alveolar partial pressure of oxygen, which of the following parts of an ABG reading will affect this value?

pH 7.40  
PaCO<sub>2</sub>  
PaO<sub>2</sub>  
HCO<sub>3</sub><sup>-</sup>  
BE

- A. 1, 2, & 3 only
- B. 1, 2, 3, & 4 only
- C. 1 & 3 only
- D. 2 & 3 only

**Answer: D**

Explanation:

Correct answer: 2 & 3 only

The equation for determining PAO<sub>2</sub> is:  $PAO_2 = (700 \times O_2\%) - (PaCO_2 \times 1.25)$ . The only two factors that are found in an ABG reading that affect the value created by this equation are the PaCO<sub>2</sub> and the PaO<sub>2</sub>.

### Question: 6

The respiratory therapist is preparing to administer an inhaled antiinfective agent to a patient who has cystic fibrosis and has a *Pseudomonas aeruginosa* infection. Which of the following inhaled antiinfective agents should the respiratory therapist expect will NOT be a possible medication used to treat this patient?

- A. Zanamivir
- B. Tobramycin
- C. Ribavirin
- D. Aztreonam

**Answer: C**

Explanation:

Correct answer: Ribavirin

Ribavirin is an antiviral medication and would not be used to treat a bacterial infection.

Tobramycin, aztreonam, and zanamivir are all inhaled antiinfective agents that are used to treat *Pseudomonas aeruginosa* infections in patients with cystic fibrosis.

### Question: 7

The respiratory therapist is performing an EKG on a patient who has a history of an above-knee amputation (AKA) of the right leg. What implication does this history have on the placement of the lead on the right leg?

- A. The right leg lead should be placed over soft tissue as far down the stump as possible
- B. The lead for the right leg should be placed on the very tip of the stump
- C. The lead for the right leg should be placed on the right lower abdomen
- D. A normal EKG cannot be performed on this patient

**Answer: A**

Explanation:

Correct answer: The right leg lead should be placed over soft tissue as far down the stump as possible. The limb leads should be placed as distally as possible for the best results. Leads should be applied over fatty tissues or muscle for the best conductivity.

Placing the lead on the abdomen is not best if the lead can be placed more distally. Placing the lead on the tip of the stump will position it over bone and a scar, which will not provide ideal conduction. A normal EKG can still be performed on this patient, but the right leg lead placement will be modified.

### Question: 8

The respiratory therapist is planning for the post-surgical care of a 59-year-old female who is having a left total knee arthroplasty (TKA) and has a history of asthma. Which of the following factors is NOT an important consideration for post-surgical complications related to the patient's asthma?

- A. Recent use of oral corticosteroids
- B. The severity of the patient's airway hyperreactivity
- C. The presence of exercise-induced asthma
- D. The degree of airflow obstruction

**Answer: C**

Explanation:

Correct answer: The presence of exercise-induced asthma

The presence of exercise-induced asthma specifically is not an important consideration for post-surgical complications related to the patient's asthma.

The degree of airflow obstruction and the severity of the patient's airway hyperreactivity both influence the possibility of post-surgical complications. Planning for and reducing the likelihood of post-surgical complications does include administering perioperative corticosteroids, so understanding whether corticosteroids have been used recently is important.

### Question: 9

The respiratory therapist is evaluating the ABG of a preterm infant who is being oxygenated using a nasal cannula at 3 L/min and who is one hour old. The patient's ABG is as follows:

pH 7.33

PaCO<sub>2</sub> 47 mm Hg

PaO<sub>2</sub> 81 mm Hg

HCO<sub>3</sub><sup>-</sup> 19 mEq/l

BE -4

Which of the following interventions is necessary for this patient?

- A. Decrease or turn of the nasal cannula
- B. Begin providing oxygen using an oxygen hood instead of a nasal cannula
- C. No intervention is needed
- D. Intubate the patient and begin mechanical ventilation

**Answer: A**

Explanation:

Correct answer: Decrease or turn off the nasal cannula

Retinopathy of Prematurity (ROP) is caused by hyperoxygenation of a newborn. The goal PaO<sub>2</sub> to avoid ROP should be less than 80 mm Hg. A preterm infant who is one hour old should have PaO<sub>2</sub> of 52 to 69 mm Hg typically, making the nasal cannula likely to be unnecessary for this patient.

All the other ABG values are normal for a preterm infant who is one hour old.

Use the following scenario to answer this question

### Question: 10

How long would treatment for this patient be anticipated to take?

(CHOOSE ONLY ONE.)

- A. 6-9 months
- B. 6-12 weeks
- C. 1-3 weeks
- D. 12-18 months

**Answer: A**

Explanation:

Correct answer: 6-9 months

Treatment of drug-susceptible tuberculosis will typically take about six to nine months. If tuberculosis is drug-resistant, treatment can take much longer.

### Question: 11

Pulmonary function testing should be postponed for all of the following patients except:

- A. 71-year-old male, status/post cerebrovascular accident (CVA) one week
- B. 17-year-old female, recent CXR showing right-sided pneumothorax
- C. 33-year-old female, two broken ribs from a fall three days ago
- D. 15-year-old male, recent respiratory infection

**Answer: D**

Explanation:

A recent respiratory infection in an otherwise healthy young person is not a contraindication for pulmonary function testing.

### Question: 12

During the analysis of the flow-volume curve of a patient's pulmonary function testing, we suspect that the patient may have coughed during the first second of exhale during one of the trials. What indicator would we see in the graph to lead to this conclusion?

- A. a jagged interruption or dip in the curve during exhale
- B. a steep slope of the line during the expiratory phase of the maneuver
- C. an unusually high value for FVC
- D. a diminished value for FVC

**Answer: A**

Explanation:

Choices (B) and (C) indicate good curves and good results. A diminished value for FVC could indicate COPD, chronic bronchitis, emphysema, or bronchiectasis.

### Question: 13

The physician has asked us to evaluate the respiratory status of a patient with muscular dystrophy. Of all the tests that we may use in this assessment, which one should be performed first?

- A. maximum inspiratory pressure (MIP)
- B. maximal voluntary ventilation (MVV)
- C. arterial blood gas (ABG)
- D. CXR

**Answer: A**

Explanation:

This is the critical measurement for the respiratory status of a patient with this disease. The

other answers may or may not be indicated at other times, but they do not apply here.

### Question: 14

When examining the flow-time graph of Mr. LaGuardia's pulmonary function test, we see that the line noticeably declines toward the baseline after reaching a plateau. What does this indicate?

- A. poor patient effort
- B. blockage in the mouthpiece
- C. a likely leak in the circuit
- D. obstructive lung disorder

**Answer: C**

Explanation:

None of the other answers indicate a problem that would give such a result.

### Question: 15

The interpretation of the sleep study shows definitive evidence of obstructive sleep apnea. The diagnosis will be made for moderate sleep apnea if the apnea hypopnea index (AHI) is

- a.  $> 5$
- b.  $> 10$  and  $< 15$
- c.  $> 15$  and  $< 30$
- d.  $> 20$  and  $< 45$

**Answer: C**

Explanation:

This is the defined parameters of apnea hypopnea index for moderate sleep apnea, an average of 15 to 30 episodes per hour. These are the standards of the American Thoracic Society and the Academy of Sleep Medicine.



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