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# Nursing

*BCEN-CFRN-CTRN*

*Preparation for Emergency Nursing: Certified Flight Registered Nurse & Certified Transport Registered Nurse*



**[Questions and Answers \(PDF\)](#)**

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# Latest Version: 6.0

## Question: 1

A patient with hyperglycemic hyperosmolar non-ketosis (HHNK) is being transported by a medical air transport program. Which of the following patients is most likely to experience HHNK?

- A. An 11-year-old undiagnosed type I diabetic who uses a rescue inhaler for management of exercise-induced asthma
- B. A 35-year-old type I diabetic who uses an insulin pump for blood glucose management
- C. A 57-year-old type II diabetic who takes an oral hypoglycemic agent and, as well, uses regular insulin
- D. A 68-year-old type II diabetic who takes an oral hypoglycemic agent and a diuretic for blood pressure management

**Answer: D**

Explanation:

Correct answer: A 68-year-old type II diabetic who takes an oral hypoglycemic agent and a diuretic for blood pressure management

Hyperglycemic hyperosmolar non-ketosis (HHNK), which is also known as hyperosmolar hyperglycemic state (HHS), is a condition of extremely elevated blood glucose (greater than 600 mg/dL, and often as high as 1,000 mg/dL), and occurs as a complication of type II diabetes. It is often precipitated by an infection or illness, or even a stroke or myocardial infarction. In contrast to patients who experience diabetic ketoacidosis (DKA), patients who experience HHNK do not have elevated ketones or metabolic acidosis as a result of the significantly elevated blood glucose levels (and hence no fruity odor to the breath or presence of Kussmaul's respirations), but may present with symptoms similar to those of DKA: abdominal pain, decreased appetite, polydipsia, polyuria, headaches, blurred vision, and confusion. Like DKA, as HHNK progresses, patients experience dehydration as a result of osmotic diuresis, and hypotension, tachycardia, and cardiac dysrhythmias may result. If left untreated, patients may experience seizures, coma, or even death.

HHNK most commonly occurs in type II diabetic patients who are over the age of 50, are using oral agents to control their blood glucose, and who are taking other medications, often a diuretic, worsening the HHNK.

Reference:

ASTNA. Patient Transport: Principles and Practice, 5th Edition. Pg 377.

Smetana, Chris; Mauldin, Lindsay. Flight Medical Provider Study Guide: Current Concepts in Critical Care Transport. Pg 78.

## Question: 2

You are monitoring the airway and ventilator status of a patient who has been sedated and paralyzed during rapid sequence intubation (RSI) and is being maintained in this sedated, paralyzed state. Based

on the information provided in this scenario, which of the following ventilator modes is most appropriate for this patient?

- A. Synchronized intermittent mandatory ventilation (SIMV)
- B. Pressure support ventilation (PSV)
- C. Continuous mandatory ventilation (CMV)
- D. Assist-control (AC) ventilation

**Answer: C**

Explanation:

Correct answer: Continuous mandatory ventilation (CMV)

Continuous mandatory ventilation (CMV) is a ventilation mode during which the patient either is unable to take any spontaneous breaths or his ability to initiate spontaneous breathing is ignored, and the ventilator "breathes over" the patient. This method of ventilation is not used as frequently as it used to be, as it can be uncomfortable, or even painful, for patients who possess any ability to breathe spontaneously. If CMV is used, it is most appropriate for patients who are sedated, paralyzed, or apneic, and the patient should be medicated continuously for pain which can result from this ventilation method.

Reference:

ASTNA. Patient Transport: Principles and Practice, 5th Edition. Pg 189.

Smetana, Chris; Mauldin, Lindsay. Flight Medical Provider Study Guide: Current Concepts in Critical Care Transport. Pg 41.

### Question: 3

A patient who is complaining of constant, severe upper left quadrant pain which worsens when the patient rolls to left lateral recumbent position, and who has a history of chronic alcohol abuse is noted to have a positive Cullen's sign. Which of the following pathologic conditions is the most likely cause of the positive Cullen's sign?

- A. Extravasation due to nephrolithiasis
- B. Intestinal obstruction
- C. Acute pancreatitis
- D. Acute cholecystitis

**Answer: C**

Explanation:

Correct answer: Acute pancreatitis

Cullen's sign, or an acute development of ecchymosis in the subcutaneous tissue of the periumbilical region, may result from a ruptured ectopic pregnancy, abdominal aorta rupture, or acute pancreatitis due to hemorrhaging of the pancreas.

Patients with acute pancreatitis often complain of severe upper left quadrant pain which is exacerbated when the patient moves into a recumbent position, or severe pain to the epigastric region. Vasodilation

of the pancreatic vasculature or leaking of the pancreatic capillary bed may contribute to a sequestration of up to 6 liters of fluid in the retroperitoneal area. Medical transport teams will need to ensure aggressive fluid resuscitation to these patients to overcome the hypovolemia that results from the fluid sequestration. In addition, oxygenation, hemodynamic stability, and pain management, are all critical components of transporting these patients.

Reference:

ASTNA. Patient Transport: Principles and Practice, 5th Edition. Pg 371.

Smetana, Chris; Mauldin, Lindsay. Flight Medical Provider Study Guide: Current Concepts in Critical Care Transport. Pg 91.

## Question: 4

You are caring for a patient who has an arterial line placed. Where should the transducer be leveled?

- A. The transducer is leveled with the monitor it is connected to
- B. Phlebostatic axis at the 4th intercostal space midaxillary
- C. 2nd intercostal space midclavicular
- D. At the level of the naval

**Answer: B**

Explanation:

Correct answer: Phlebostatic axis at the 4th intercostal space midaxillary

Leveling the transducer at the 4th intercostal space midaxillary is at the level of the atria and, therefore, will give the most accurate measurements.

Reference:

ASTNA. Patient Transport: Principles and Practice, 5th Edition. Pg 314.

Smetana, Chris; Mauldin, Lindsay. Flight Medical Provider Study Guide: Current Concepts in Critical Care Transport. Pg 166.

## Question: 5

Overdose with medications from which of the following drug classes contributes to one of the most deadly types of poisonings?

- A. The benzodiazepines
- B. The tricyclic antidepressants
- C. The selective serotonin reuptake inhibitors
- D. The cardiac glycosides

**Answer: B**

Explanation:

Correct answer: The tricyclic antidepressants

The tricyclic antidepressants (TCAs) continue to be used in the treatment of major depressive disorder (primarily in treatment of cases that are refractory to other, more commonly used treatment), as well as in the treatment of chronic pain disorders and insomnia. Overdose with TCAs results in one of the deadliest types of poisoning, with most deaths occurring as a result of refractory hypotension. The TCA drugs are sodium-channel blockers; electrocardiogram (ECG) changes associated with TCA poisoning include sinus tachycardia as a result of anticholinergic effects, widening of the QRS complex, prolongation of the PR or QT interval, and a right bundle branch block (among others).

Reference:

ASTNA. Patient Transport: Principles and Practice, 5th Edition. Pg 421-422.

Smetana, Chris; Mauldin, Lindsay. Flight Medical Provider Study Guide: Current Concepts in Critical Care Transport. Pg 242.

## Question: 6

You are called for an inter-facility transfer of a patient. Upon arrival the patient's nurse gives you the following ABG:

pH-7.48

CO<sub>2</sub>- 50

HCO<sub>3</sub>- 28

PaO<sub>2</sub>-85

SaO<sub>2</sub>- 96%

BE- -2.

Which condition is the patient most likely in, and give the correct compensation status.

- A. Metabolic alkalosis, partially compensated
- B. Respiratory acidosis, fully compensated
- C. Metabolic acidosis, uncompensated
- D. Respiratory alkalosis, partially compensated

**Answer: A**

Explanation:

Correct answer: Metabolic alkalosis, partially compensated

The pH on the ABG is 7.48, which means the patient is in alkalosis. Therefore, we can immediately eliminate any answer that states the patient is in acidosis. Now, we must determine if the cause is respiratory or metabolic in nature. The bicarbonate is high at 28 and therefore, we know that it is metabolic in nature. To determine compensation status we must now see if the CO<sub>2</sub> is high, normal, or low. In this case, the CO<sub>2</sub> is high and we know that the status is partially compensated.

Reference:

Smetana, Chris; Mauldin, Lindsay. Flight Medical Provider Study Guide: Current Concepts in Critical Care Transport. Pg 6, 7.

## Question: 7

You are providing care for a patient in cardiogenic shock and are preparing to administer intravenous (IV) fluids. Which of the following statements regarding the delivery of IV fluids to patients in cardiogenic shock is most accurate?

- A. IV fluid should be administered at a rate of 10 to 15 mL/kg over 15 to 30 minutes in patients in cardiogenic shock
- B. The administration of IV fluids to a patient in cardiogenic is based on strict adherence to fluid administration formulas
- C. IV fluid administration to patients in cardiogenic shock should follow the same parameters as for treating patients distributive shock
- D. "Passive leg raise" may be used to identify patients in cardiogenic shock who would benefit from IV fluid administration

**Answer: D**

Explanation:

Correct answer: "Passive leg raise" may be used to identify patients in cardiogenic shock who would benefit from IV fluid administration

Regardless of the etiology of the shock state, initial treatment should be the same: the administration of fluids (IV fluids or other volume expanders) to improve or stabilize blood pressure, managing of ventilation (typically through endotracheal intubation), and the administration of vasopressor medications. All shock states, including cardiogenic shock, benefit from the administration of judiciously managed IV fluid administration. A good rule of thumb is to administer 5 to 10 mL/kg of IV fluid over a period of 15 to 30 minutes, and then assess for effects (positive and negative).

Another method for assessing for potential benefit from IV fluid administration is through the use of the "passive leg raise" (PLR) technique. The patient is positioned with the head elevated to 45 degrees, then the upper body is lowered flat and the clinician passively raises the patient's legs approximately 45 degrees. During this passive motion, approximately 300 mLs of blood are displaced from the lower extremities to the right side of the heart. The clinician should then evaluate end tidal CO<sub>2</sub>; an increase is indicative of a cardio-positive effect from IV fluid administration.

Reference:

ASTNA. Patient Transport: Principles and Practice, 5th Edition. Pg 204-205.

## Question: 8

You are the CFRN/CTRN caring for a patient that has Battle sign and "raccoon eyes." What type of skull fracture does this patient most likely have?

- A. Basilar skull fracture
- B. Open fracture
- C. Linear fracture
- D. Depressed skull fracture

**Answer: A**

Explanation:

Correct answer: Basilar skull fracture

Battle sign (Battle's sign) derives its name from Dr. William Henry Battle, an English surgeon, who initially described the ecchymosis in patients who had head injuries with fractures to the posterior aspect of the skull base, in the late 1800s. His description noted that to develop the sign, there was significant head trauma and may indicate significant internal injury to the brain and not just the posterior cranial vault or mastoid.

The pooling of blood around the eyes (raccoon eyes) is most commonly associated with fractures of the anterior cranial fossa. This finding is typically not present during the initial evaluation and delays by 1 to 3 days. If bilateral, this finding is highly predictive of a basilar skull fracture. Classically, the tarsal plate will be spared. Further extravasation of the blood beyond the periorbital region is limited, owing to the orbital septum inserting into the tarsal plate. When a skull base fracture is present, the raccoon sign is present in 50 to 60% of cases. This sign can be easily identified and is usually associated with anterior skull base fractures, especially of the frontal bone with an associated epidural hematoma.

Skull fractures are usually categorized by location (basilar vs. skull convexity), pattern (linear, depressed, or comminuted), and whether they are open or closed.

Ominous examination findings include an abnormal GCS, raccoon eyes, Battle's sign, hemotympanum, cerebrospinal fluid rhinorrhea, and/or an abnormal pupil exam. Patients with acute cerebrospinal fluid leaks are at risk for meningitis.

Reference:

Smetana, Chris; Mauldin, Lindsay. Flight Medical Provider Study Guide: Current Concepts in Critical Care Transport. Pg 187.

ASTNA. Patient Transport: Principles and Practice, 5th Edition. Pg 232.

## Question: 9

You are the CFRN/CTRN caring for a patient. You are briefing the patient about barotitis. Which of the following should be included in the briefing?

- A. Tell the air crew you are experiencing ear pain and we will land as soon as possible
- B. If ear pain begins upon ascent, perform Valsalva maneuver
- C. You should perform the Valsalva maneuver, yawn, or move your jaw during descent if you begin to experience ear pain
- D. You should chew gum to equalize pressure in your ears

**Answer: C**

Explanation:

Correct answer: You should perform the Valsalva maneuver, yawn, or move your jaw during descent if you begin to experience ear pain

Barotitis is caused by negative pressure forming a vacuum in the middle ear during descent due to blockage of the eustachian tubes. A proper method to clear this is by the Valsalva maneuver or by moving the jaw or yawning.

It is not recommended to chew gum as this causes the patient to swallow air. Pain rarely occurs upon ascending, but if it does, do not perform Valsalva as this will make the problem worse. Finally, the

correct action to take is to reascend if possible and try to equalize pressure in the ears, not land as soon as possible.

Reference:

ASTNA. Patient Transport: Principles and Practice, 5th Edition. Pg 33.

Smetana, Chris; Mauldin, Lindsay. Flight Medical Provider Study Guide: Current Concepts in Critical Care Transport. Pg 104.

## Question: 10

The medical transport provider who has been called to the scene of a motor vehicle accident is using the Revised Trauma Score tool to aid her in determining the severity of the patient's injuries. All of the following assessment components are included in the Revised Trauma Score tool, except:

- A. Glasgow Coma Scale (GCS) score
- B. Respiratory rate
- C. Capillary refill
- D. Systolic blood pressure

**Answer: C**

Explanation:

Correct answer: Capillary refill

The Revised Trauma Score tool, as its name suggests, is a trauma scoring tool that was developed through revision of the original Trauma Score physiologic index used to help determine the severity of traumatic injury. The original Trauma Score index includes assessment of five patient parameters, including systolic blood pressure, capillary refill, respiratory rate, respiratory expansion (any use of accessory muscles or presence of intercostal retractions), and the Glasgow Coma Score (GCS). The Revised Trauma Score excludes scoring of the subjective components of the assessment, the capillary refill and respiratory expansion, as these two parameters can be scored differently simply due to difference in the person assessing the patient.

Regardless of which of these tools is used to determine severity of traumatic injury, what needs to be kept in mind is that both of these tools measure the patient's physiologic response; patients who are compensating for the injury and patients being supported by mechanical ventilation will demonstrate more positive scores (indicating less severe injury), without the actual severity of their condition being accurately reflected.

Reference:

ASTNA. Patient Transport: Principles and Practice, 5th Edition. Pg 225-226.

## Question: 11

A 38-weeks gestation pregnant patient was retrieved from the field for transport due to umbilical cord prolapse (UCP). The medical transport team places the fetal heart rate (FHR) monitor and notes recurrent moderate decelerations in the FHR. All of the following position change interventions are appropriate in this scenario, except:



- A. Position the patient supine and displace the uterus manually to the left
- B. Position the maternal patient in exaggerated Sims position with head down
- C. Position the patient in knee-chest position
- D. Position the maternal patient in Trendelenburg position

**Answer: A**

Explanation:

Correct answer: Position the patient supine and displace the uterus manually to the left

The presence of a prolapsed umbilical cord is a medical emergency requiring immediate intervention to preserve the life of the fetus. A prolapsed cord may occur for a number of reasons, including non-cephalic fetal presentation, premature rupture of membranes (PROM), polyhydramnios, longer than normal cord, multiparity, multiple gestation pregnancy, maternal age  $\geq 35$ , history of recent amniotomy, no engagement of fetal part, preterm PROM, male sex of the fetus, or any of several obstetric procedures including attempts to change the fetal position or strategies to produce cervical ripening and dilation.

Umbilical cord prolapse (UCP) may appear as a frank presentation of the cord, visible on the perineum or protruding from the vagina, or it may be occult, presenting alongside the fetal presenting part and obscured. And, while in some instances, the fetus does not show any evidence of distress with UCP, in the vast majority of instances of UCP (nearly 70%), the fetus experiences some degree of asphyxia which is evidenced by changes to the FHR tracings. Transport providers should reposition the maternal patient in an attempt to relieve pressure from the presenting part on the umbilical cord. The pregnant female may be positioned in steep Trendelenburg, in an exaggerated Sims position with the maternal head down, or in knee-chest position. If necessary, a member of the medical transport crew may be required to place two (sterile) gloved fingers into the cervical opening in an attempt to further buffer the prolapsed UC from uterine contraction pressure.

Manually displacing the uterus to the left with the pregnant patient lying supine is used when the patient is showing signs of inferior vena cava syndrome.

Reference:

ASTNA. Patient Transport: Principles and Practice, 5th Edition. Pg 449.

Smetana, Chris; Mauldin, Lindsay. Flight Medical Provider Study Guide: Current Concepts in Critical Care Transport. Pg 254.

## Question: 12

When is a baby full term?

- A. Between 38-41 weeks
- B. After 42 weeks
- C. Between 24-28 weeks
- D. Between 36-37 weeks

**Answer: A**

Explanation:

Correct answer: Between 38-41 weeks

Babies are considered full term between 38-41 weeks. They are pre-term any time before 37 weeks and post-term after 42 weeks.

Reference:

Smetana, Chris; Mauldin, Lindsay. Flight Medical Provider Study Guide: Current Concepts in Critical Care Transport. Pg 248.

## Question: 13

Which disease process is characterized by pleural effusions, lobar consolidation, and patchy infiltrates seen on chest X-ray?

- A. Pneumonia
- B. COPD
- C. Asthma
- D. ARDS

**Answer: A**

Explanation:

Correct answer: Pneumonia

The key words in this question are lobar consolidation. Pneumonia typically is lobar, meaning it is restricted to one lobe of the lung, most often the right middle lobe.

ARDS presents as ground glass and bilateral and diffuse infiltrates. COPD and asthma have wide, clear lung fields with flattened diaphragms.

Reference:

Smetana, Chris; Mauldin, Lindsay. Flight Medical Provider Study Guide: Current Concepts in Critical Care Transport. Pg 54.

## Question: 14

The pilot of the rotary-wing aircraft and the clinical crew members sit down to discuss the mission plan after receiving notification that they are required to transport a 10-year-old male who was severely burned in a house fire. Which of the following terms most accurately describes the practice that the pilot and clinical crew members are participating in within this scenario?

- A. Air Medical Resource Management (AMRM)
- B. Crew Resource Management (CRM)
- C. Mission Planning Initiative (MPI)
- D. Operational Risk Assessment (ORA)

**Answer: A**

Explanation:

Correct answer: Air Medical Resource Management (AMRM)

Within both commercial aviation and military aviation (specifically U.S. Air Force), a process referred to as Crew Resource Management (CRM) exists to reduce the risk of aviation error and stress by involving all members of the flight crew in mission planning and safety, and decision making regarding the proposed flight. Within medical air transport, an identical process has been adopted and is referred to as Air Medical Resource Management (AMRM). All members of the air transport crew, including the pilot and the clinical team members, meet to discuss all potential assignments, and all members have an equal say in accepting or declining an assignment based on the available information. This process was adopted after several severe accidents occurred during which solely the pilot was allowed to decide on whether or not to proceed with the assignment. The AMRM requires the entire crew to use good communication and problem solving skills, as well as teamwork, when evaluating all the components of potential assignments.

Reference:

ASTNA. Patient Transport: Principles and Practice, 5th Edition. Pg 96, 99.

Smetana, Chris; Mauldin, Lindsay. Flight Medical Provider Study Guide: Current Concepts in Critical Care Transport. Pg 114.

## Question: 15

The motion of objects relative to the patient during rotor-wing transport may contribute to:

- A. Improved visual acuity
- B. Decreased pain
- C. Reduced muscular contraction
- D. Elevated respiration rate

**Answer: D**

Explanation:

Correct answer: Elevated respiration rate

Both air and land vehicle transportation result in vibration (motion of object relative to the patient) during transport and contribute to that patient experiencing increased pain, muscular contraction and respiratory rate, as well as decreased visual acuity.

Reference:

ASTNA. Patient Transport: Principles and Practice, 5th Edition. Pg 37.

## Question: 16

In response to nail bed pressure, the 38-year-old unrestrained driver of an MVC, withdraws his hand and opens his eyes; he can form individual words, but is unable to form sentences.

What is his GCS score?

- A. 9 - M4, V3, E2

- B. 8 - M3, V3, E2
- C. 9 - M3, V4, E2
- D. 8 - M4, V2, E2

**Answer: A**

Explanation:

Correct answer: 9 - M4, V3, E2

The purpose of the GCS (Glasgow Coma Scale/Score) is to describe and communicate the condition of an individual patient by separate, multidimensional ratings of their eye, verbal, and motor responses. After 40 years, it remains the appropriate method for this purpose. It is calculated by addition of the total points selected under each component (eye, verbal, motor) for a total of 15 possible points.

ADULT GCS

Eye Opening Response

If unable to assess due to injury, mark "Not testable (NT)" Verbal Response

If unable to assess due to intubation, mark "Not testable (NT)" Motor Response

If unable to assess due to paralysis or sedation, mark "Not testable (NT)"

Spontaneously (4) Oriented (5) Obeys commands (6)

To verbal command (3) Confused (4) Localizes pain (5)

To pain (2) Inappropriate words (3) Withdrawal from pain (4)

No eye opening (1) Incomprehensible sounds (2) Flexion to pain (3)

Not testable (NT) No verbal response (1) Extension to pain (2)

Not testable/intubated (NT) No motor response (1)

Not testable (NT)

Severity of injury, based on GCS score:

- 14-15: Mild
- 9-13: Moderate
- 3-8: Severe

Reference:

ASTNA. Patient Transport: Principles and Practice, 5th Edition. Pg 238.

## Question: 17

Infant/newborn seizures are most likely to result from all of the following, except:

- A. Fever
- B. Infection
- C. Hypoglycemia
- D. Opioid withdrawal

**Answer: A**

Explanation:

Correct answer: Fever

Seizure activity in a newborn or very young infant almost always is indicative of a state of illness or injury and often presents as the first sign of central nervous system disorders. Most frequently, seizure activity in the newborn results from the presence of metabolic dysregulation (such as hypoglycemia), with opioid or other drug withdrawal, with intraventricular hemorrhage (preterm infants), infection, neonatal encephalopathy (often related to liver failure), and congenital brain abnormalities.

Reference:

ASTNA. Patient Transport: Principles and Practice, 5th Edition. Pg 486-487.

Smetana, Chris; Mauldin, Lindsay. Flight Medical Provider Study Guide: Current Concepts in Critical Care Transport. Pg 272.

## Question: 18

Which of the following statements regarding the use of vecuronium during rapid sequence intubation (RSI) is most accurate?

- A. The use of vecuronium during RSI contributes to an increase in the number of RSI attempts
- B. Vecuronium causes fasciculations with onset of paralysis during RSI
- C. Vecuronium can be used interchangeably with rocuronium during RSI
- D. Tripling the dose of vecuronium is necessary to provide an onset speed similar to that of rocuronium

**Answer: A**

Explanation:

Correct answer: The use of vecuronium during RSI contributes to an increase in the number of RSI attempts

The nondepolarizing agent, vecuronium, may on occasion be used during RSI. It should not be the first choice drug when choosing a paralytic agent for several reasons. First, the onset of action of vecuronium is significantly longer than that of succinylcholine and rocuronium, even when the dose is tripled. This delay then cuts into the safe apnea waiting time, increasing the number of necessary intubation attempts, decreasing the time available to safely perform intubation, and increasing the need to administer mask ventilations. Second, vecuronium has a longer duration of action, with effects lasting from 60 to 75 minutes, as compared to rocuronium which has a duration of 30 to 60 minutes, and succinylcholine, with a duration of only 4 to 6 minutes. Vecuronium should only be used for RSI if a nondepolarizing agent is necessary and rocuronium is not available for use in the situation.

Vecuronium does not cause fasciculations.

Reference:

ASTNA. Patient Transport: Principles and Practice, 5th Edition. Pg 176.

Smetana, Chris; Mauldin, Lindsay. Flight Medical Provider Study Guide: Current Concepts in Critical Care Transport. Pg 27.

## Question: 19

You are transporting a patient with hyponatremia of uncertain origin, and review of the patient's transport chart reveals the following laboratory results: serum sodium of 125 mEq/liter; potassium of

5.5 mEq/liter; chloride of 110 mEq/liter; bicarbonate of 33 mEq/liter; glucose of 75 mg/dL; BUN of 24 mg/dL; and creatinine of 1.0 mg/dL. Using the supplied laboratory values, please calculate the patient's serum osmolality using the standard formula for calculating this number, and determine if the osmolality is within normal range.

- A. 262.74 mEq/L, not in normal range
- B. 304.62 mOsm/L, not in normal range
- C. 262.74 mEq/L, within normal range
- D. 304.62 mOsm/L, within normal range

**Answer: A**

Explanation:

Correct answer: 262.74 mEq/liter, not in normal range

Serum osmolality is typically calculated to aid in determining the possible etiology of hyponatremia when the cause is unclear. It is calculated through use of a simplified, standard formula using some of the patient's chemistry results—the serum sodium level (Na), the BUN, and the serum glucose level. As these laboratory values are expressed using different units of measure, a formula has been devised to translate each of these serum values into a common value, mOsm/liter, which is typically considered to be the same as mEq/liter.

The basic formula is as follows:  $(2 \times \text{Na}) + \text{BUN}/2.8 + \text{glucose}/18 = \text{serum osmolality}$ .

Using the patient's laboratory values that were provided in the scenario, the formula reads as follows:

$(2 \times 125) + 24/2.8 + 75/18 = \text{serum osmolality}$

Now we can proceed with solving of the formula.

$250 + 8.57 + 4.17 = \text{serum osmolality}$

262.74 mEq/L (or mOsm/L) = serum osmolality

Normal adult range for serum osmolality is 275 to 295 mOsm/L (or mEq/L), so the patient's osmolality is below normal range.

Hyponatremia associated with a low serum osmolality, referred to as hypotonic hyponatremia, is most often seen in syndrome of inappropriate antidiuretic hormone (SIADH), hypothyroidism, psychogenic polydipsia, or in situations when the patient is volume overloaded, such as in congestive heart failure.

Hyponatremia associated with a high serum osmolality, referred to as hypertonic hyponatremia, is most often seen in extreme hyperglycemia or from the administration of medications such as mannitol.

Hyponatremia associated with normal serum osmolality is referred to as pseudohyponatremia, and may be encountered in patients with severely elevated lipid levels.

Reference:

ASTNA. Patient Transport: Principles and Practice, 5th Edition. Pg 383.

## Question: 20

You are a medical air transport crew members participating in a mission involving a ground incident and are required to ride in a a ground transport vehicle. Which of the following statements regarding traveling as a crew member in a ground transport vehicle is most accurate?

- A. All crew members are required to wear a seat belt at all times
- B. Only the patient is required to remain seat belted at all times in ground transport vehicles

- C. Training for response to ground vehicle accidents is not required for medical air transport crew  
D. All crew members are required to be trained in response to ground vehicle accidents

**Answer: D**

**Explanation:**

Correct answer: All crew members are required to be trained in response to ground vehicle accidents  
All medical air transport crew members should be trained in response to ground vehicle accidents in the event that they are required to participate in a ground vehicle mission.

Both the patient and all crew members riding in the front of the ground transport vehicle are required to remain buckled in their seat belts at all times while the vehicle is in motion. If possible, crew members in the patient compartment should also remain buckled in their seat belts, but may need to remove their seat belts and move around the compartment in the provision of patient care.

**Reference:**

ASTNA. Patient Transport: Principles and Practice, 5th Edition. Pg 111-112.