Nursing

CCRN-Pediatric
American Association of Critical Care Nurses: Critical Care Registered Nurse (Pediatric)

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Question: 1

A patient's family informs the care team that their religious beliefs dictate that they pray for several minutes at specific times of day and request that, when possible, evaluations of their child be arranged around the prayer times. A consulting physician arrives at the patient's room to perform a nonurgent evaluation and informs the nurse that he "will not wait around for some religious ceremony." The nurse's best action in this case is to

A. tell the physician firmly that he is being unreasonable and disrespectful.
B. interrupt the family's prayers to tell them the consulting physician needs to do an evaluation.
C. try to find a time that the consultant can return, which would not interfere with the family's prayers.
D. ask the family to pray elsewhere from now on so the child's care is not interrupted.

Answer: C

Explanation:
Each family in the critical care unit arrives with their own unique collection of values, religion, culture, assumptions, education, and communication style. Often, serious acute medical illness or injury places a great strain on the patient and family's coping skills. In this setting, respect for those religious or cultural traditions that do not interfere with essential medical care can help a family get through the stress of a child's critical illness. In this case. where there is no emergent medical need, the nurse's best action is to advocate for the family's religious preferences while expressing respect for the consulting physician' s time and effort.

Question: 2

The critical care nurse is taking care of a 10-year-old patient who sustained an accidental crush injury and has developed renal failure secondary to severe rhabdomyolysis. As his condition worsens, the medical team prepares to institute continuous renal replacement therapy (CRRT). All of the following statements about CRRT are true EXCEPT

A. CRRT allows for less dramatic fluid shifts in the hemodynamically unstable patient.
B. there is less need for anticoagulation therapy with CRRT than with other dialysis methods.
C. young, small-sized patients are at high risk for hypothermia with the CRRT circuit than with other dialysis methods.
D. CRRT allows for improved nutritional support in the critically ill patient since by-products of a protein-containing diet can be cleared continuously.

Answer: B

Explanation:
The healthy kidney performs multiple body functions: excretion of waste products, maintenance of electrolyte and acid—base balance, and control of total body water. Dialysis ("renal replacement therapy") is

indicated in the patient who is failing other therapeutic interventions for fluid overload, hyperkalemia, metabolic acidosis, overdose/ingestion, and uremia. Intermittent hemodialysis is very effective and works rapidly but is associated with large fluid shifts and hypovolemia that is usually not well-tolerated in the critically ill patient. Continuous renal replacement therapy (CRRT) allows for more controlled removal of fluid with effective solute clearance. With CRRT, there can be more precise control of fluid status (less hypotension) and improved nutritional support since the protein load of an optimal diet can be cleared continuously. Continuous hemofiltration requires anticoagulation, which may be complicated by excessive bleeding in the critically ill patient. The risk of hypothermia associated with the extracorporeal blood flow required for CRRT is exaggerated in the young, small-sized pediatric patient.

Question: 3

A 2-year-old child is admitted to the critical care unit after an accidental submersion injury (near drowning). Eight hours after the submersion, chest x-ray reveals diffuse bilateral patchy pulmonary infiltrates, and the child's ventilator settings reveal markedly impaired pulmonary compliance with a significant oxygen requirement. Given this clinical information, the most likely explanation for this child's pulmonary status is

A. acute respiratory distress syndrome.
B. congestive heart failure with secondary pulmonary edema.
C. bacterial pneumonia.
D. dislodged endotracheal tube.

Answer: A

Explanation:

Acute respiratory distress syndrome (ARDS) is defined as bilateral lung infiltrates on chest x-ray with a PaO_2/FiO_2 ratio of less than 200 and no clinical evidence of elevated left atrial pressure. Clinically, ARDS is characterized by severe hypoxemia, markedly impaired pulmonary compliance, and capillary leak leading to interstitial and alveolar edema. The cascade of injury with ARDS begins with a pulmonary or systemic insult—in this case, a submersion injury. Acute respiratory distress syndrome is also frequently seen in the setting of septic shock, even in the absence of focal pulmonary infection. An increase in alveolar capillary permeability leads to protein-rich pulmonary edema, which triggers a series of inflammatory reactions, further impairing pulmonary compliance. Although bacterial pneumonia after a submersion injury can cause bilateral infiltrates with impaired oxygenation and pulmonary compliance, this degree of pulmonary impairment 8 hours after the submersion from only bacterial pneumonia is unusual. Pulmonary edema secondary to congestive heart failure results in decreased pulmonary compliance and hypoxemia but is less likely after a near-drowning event than with ARDS.

Question: 4

A 16-year-old patient is admitted to the ICU after a 16-foot fall from a tree. The patient had a computed tomography (CT) scan en route to the ICU, and a cervical collar has been placed. The CT scan was negative for bleeding, but the patient has no sensation or movement below his waist. The patient is ventilated with 35% Fi02 via venturi mask. The patient's data are as follows:
Mental status: No loss of consciousness: patient alert and oriented x4
Heart rate: 44
Blood pressure: 79/32 mmHg

Respiratory rate: 26
Temperature: 94.7°F
Which one of following is the most likely cause of the patient's symptoms?

A. Neurogenic shock
B. Hypovolemic shock
C. Subdural hematoma
D. Anterior cord syndrome

Answer: A

Explanation:
Neurogenic shock leads to the loss of sympathetic tone as a result of a disruption or injury to the sympathetic nervous system, Patients with neurogenic shock experience altered thermoregulation and vasodilation resulting in bradycardia. hypotension. and/or poikilothermia. Hypovolemic shock results in volume loss, which usually leads to tachycardia as a compensatory mechanism for decreased blood pressure. A subdural hematoma would be the result of a head injury. The patient does not have signs or symptoms of a head injury, such as physical marks, physical impairments, or altered mental status. Patients with anterior cord syndrome will retain sensation to the affected area.

Question: 5

In the symptomatic hyperkalemic patient, the critical care nurse expects the initial treatment to include all of the following EXCEPT

A. nebulized albuterol administration.
B. intravenous Administration of insulin and glucose.
C. intravenous calcium gluconate administration.
D. hemodialysis.

Answer: D

Explanation:
Hyperkalemia is a medical emergency, requiring rapid recognition and treatment to avoid progression to fatal cardiac arrhythmia. Acute treatment is aimed at protecting the heart from the effects of hyperkalemia while facilitating renal and gastrointestinal potassium excretion and shifting potassium ions from the extracellular to intracellular space. Intravenous calcium (chloride or gluconate) does not have any effect on serum potassium levels but has a protective effect on myocardial cells by lowering their threshold potential. Calcium works rapidly but transiently; repeated doses may be required until the serum potassium has been decreased. Facilitating potassium shift into the intracellular space is accomplished with the administration of beta-2 agonists (e.g.. albuterol) and intravenous insulin (given with glucose to avoid hypoglycemia). If metabolic acidosis is present, intravenous sodium bicarbonate may also be given. Agents that enhance renal (e.g., loop diuretics) and gastrointestinal (e.g., Kayexalate) potassium excretion may also be given. Hemodialysis is an effective means of managing hyperkalemia but would not typically be available for initial treatment.

Question: 6

A 7-year-old previously healthy patient presents with a 1 -day history of fever, cough, poor oral intake, and shortness of breath. Examination reveals a fatigued child in respiratory distress with a distal capillary refill time of 3 seconds. The results of an arterial blood gas are:

pH: 7.21
PCO_2: 63 mmHg
PO_2: 74 mmHg
HCO_3: 23 mEq/L

This patient's clinical condition is best characterized as

A. respiratory acidosis with metabolic compensation.
B. acute respiratory acidosis without metabolic compensation.
C. mixed respiratory and metabolic acidosis.
D. acute metabolic acidosis without respiratory compensation.

Answer: B

Explanation:

Interpreting arterial blood gases (ABGs) should be done in a systematic manner to determine the nature of a patient's acid–base abnormality. The arterial pH reveals whether the patient has an acidosis (pH < 7.35), alkalosis (pH > 7.45), or neither (pH 7.35–7.45). The PCO_2 and HCO_3 reveal whether there is an isolated respiratory or metabolic abnormality or some combination of the two. They also demonstrate whether there is any compensation for the primary abnormality. With primary metabolic derangements, the arterial pH, serum bicarbonate and PCO_2 all change in the same direction (e.g., metabolic acidosis [decreased pH] as a result of low serum bicarbonate [decreased HCO_3], leading to compensatory hyperventilation [decreased PCO_2]). With primary respiratory derangements, the arterial pH changes in the opposite direction of serum bicarbonate and PCO_2 (e.g., respiratory alkalosis [increased pH] from hyperventilation [decreased PCO_2], leading to a compensatory decrease in renal bicarbonate reabsorption [decreased HCO_3]). This patient's ABGs demonstrates a respiratory acidosis (pH < 7.35, PCO_2 > 45) without metabolic compensation (normal HCO_3). Over time, the kidney will retain bicarbonate (increased HCO_3) to buffer the acidosis and return the overall arterial pH to normal.

Question: 7

The family of a young patient with complex medical problems voices frustration that the instructions from one subspecialty service seem to be contradicted by the instructions from another subspecialty service. In this case, the nurse's best action is to

A. advise the family to ask the subspecialists to clarify their instructions the next time they come to evaluate the patient.
B. tell the family that they should just follow the set of instructions with which they feel most comfortable.
C. have the patient's regular outpatient care provider try to coordinate care between the subspecialty services after discharge.
D. arrange for a care conference involving all of the major care providers and the family to clarify the treatment plan as a group.

Answer: D

Explanation:
Patients and families often feel powerless in the critical care unit because of the unfamiliar environment, challenges of attempting to understand the complexities of their child's medical care, and the stress of a serious illness or injury, all of which contribute to A feeling of confusion and helplessness. Best nursing practice emphasizes interventions that empower patients and families to learn about and participate in their child's medical care whenever possible. It is common in the patient with complicated medical issues for the recommendations and priorities of various subspecialty providers to appear contradictory and confusing, particularly for the family who is unfamiliar with critical care medicine. In this circumstance. the critical care nurse has an important role to play in assisting families to receive clear and consistent information about their child's care. A multidisciplinary care conference with family members (and nursing staff) is often the most effective way to accomplish this.

Question: 8

A 7-year-old child is accidentally struck in the head with a baseball bat swung by her older sibling. The family reports that she cried for a few seconds after being struck and then lost consciousness for several minutes. Evaluation demonstrates a lethargic, irritable girl who vomits forcefully several times during assessment. Scalp examination reveals a swelling of the left temporal area with a barely reactive dilated left pupil. Noncontract computed tomography of the head demonstrates a left temporal skull fracture with a large, biconvex (lens-shaped) left temporal extra-axial hematoma underlying the fracture with an associated midline shift. Given this information, the most likely diagnosis is

A. subarachnoid hemorrhage.
B. subdural hematoma.
C. epidural hematoma.
D. diffuse axonal injury.

Answer: C

Explanation:
Epidural hematomas are usually caused by a focal injury to the head and often occur in association with a skull fracture. Epidural hematomas are usually caused by arterial bleeding and typically develop within minutes of injury but may continue to expand over several hours. Patients with an epidural hematoma generally experience a severe headache. vomiting, and a decreased level of consciousness. Signs of increased intracranial pressure include hypertension, altered respirations, bradycardia, and pupillary findings. This patient's dilated pupil on the side of her head injury is due to compression of the third cranial nerve by the shifted temporal lobe. Computed tomography (CT) demonstrates a lens-shaped (biconvex), extra-axial hematoma. Subarachnoid hemorrhage may be associated with trauma, but the CT scan will demonstrate blood along the falx cerebri and outer cortex. Patients with a subarachnoid hemorrhage may also have neck stiffness and fever. Subdural hematomas occur with acceleration—deceleration injuries and causes bleeding between the dura and the cortex. Head CT scan will demonstrate a crescent-shaped, extra-axial hematoma. Diffuse axonal injury is caused by acceleration—deceleration injury and is remarkable for the contrast between a normal CT scan and a severely neurologically impaired patient.

Question: 9

A 14-year-old patient is evaluated after a 20-foot fall. Assessment reveals a spontaneously breathing patient whose right chest moves inward on inhalation and outward on exhalation. The left chest rises on inhalation and falls on exhalation. This patient's chest examination reveals a

A. right pneumothorax.
B. bag-mask ventilation.
C. left flail chest.
D. right flail chest.

Answer: D

Explanation:
Chest wall injury is common in cases of serious blunt trauma, such as occurs with falls. assault, and motor vehicle accidents. Flail chest is characterized by paradoxical movement of a segment of the chest wall with respiration from multiple fractures within the rib, involving at least two or three ribs. The flail segment is effectively separated from the rest of the chest wall by the fractures. Clinically, the flail segment moves inward during spontaneous inhalation and outward during passive exhalation. in contrast to chest wall movement with normal respiration. The flail segment itself may cause significant respiratory difficulty. Although generally internal injuries associated with the blunt trauma (e.g„ pulmonary and cardiac contusions) are responsible for more significant respiratory insufficiency. This patient demonstrates right-sided flail chest, with paradoxical movement of the right chest wall during spontaneous respirations.

Question: 10

A patient has recently undergone open-heart surgery for complex congenital heart disease; he is being treated with topical antibiotics for a superficial sternal wound infection when he develops fever, tachycardia, worsening sternal pain, and purulent discharge from the wound. On the basis of this information, the critical care nurse suspects that the patient has developed which of the following complications?

A. Mediastinitis
B. Pulmonary embolus
C. Bacterial endocarditis
D. Aortic dissection

Answer: A

Explanation:
Mediastinitis describes a bacterial infection of the mediastinum, a potentially life-threatening infection that is most commonly seen after cardiac surgery. Mediastinitis may also complicate chest trauma, esophageal perforation, or adjacent infection. which spreads to the mediastinal space. Sternal wound dehiscence is a known risk factor for the development of mediastinitis. Patients may present with fever, tachycardia, sternal wound drainage, cellulitis, and signs of hemodynamic instability. There may also be sternal instability or a

sternal "click" Hamman sign is a crunching sound heard during systole with auscultation of the chest wall, which may or may not be present with mediastinitis, Purulent discharge from this patient's sternal wound with increased sternal wound pain make pulmonary embolus, aortic dissection, and bacterial endocarditis less likely than mediastinitis in this patient.

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