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| **Maryland Next Gen NCLEX Test Bank Project**  **September 1, 2022; Revised April 17, 2023** | | | |
| **Case Study Topic**:  (Stand-alone Bow-Tie) | Stroke | **Author:** | DeNiece Bennett, DNP, MSN-Ed, RN  University of Maryland, School of Nursing |

**Case Summary**

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| A 26-year-old female of Latin descent with no prior medical history presents in the emergency department with a sudden onset of generalized weakness of the left side, lightheadedness, and headache. The nurse initiates a code stroke; administers alteplase, makes a care plan and evaluates the outcomes of administering the drug. |

**Objectives**

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| 1. Assess and identify the clinical manifestations associated with an acute neurologic deficit. 2. Manage the client and the client’s response to the emergency therapeutics. 3. Evaluate and document client responses to emergency interventions. |

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| **Case Study Link** | **Case Study QR Code** |
| <https://umaryland.az1.qualtrics.com/jfe/form/SV_20rzGeirj3MjONU> |  |
| **Bow-tie QR Code** | **Bow-tie Link** |
|  | <https://umaryland.az1.qualtrics.com/jfe/form/SV_4I05QuyCgWcX7qm> |

**Case References**

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| 1. Urden, L.D., Stacy, K.M., Lough, M.E. (2022). *Critical Care Nursing: Diagnosing and Management.* Elsevier 2. Workman, M.L., Ignatavicius, D. (2021) *Medical-Surgical Nursing: Concepts for Interprofessional Collaborative Care*. 10th Ed. Elsevier Health Sciences 3. Cheever, JLHK H. ([2018]). Lippincott CoursePoint Enhanced for Brunner & Suddarth's Textbook of Medical-Surgical Nursing (14th Edition). Wolters Kluwer Health. https://pageburstls.elsevier.com/books/9781975123383 |

**Case Study Question 1 of 6**

A 26-year-old woman presents in the emergency department with a sudden onset of lightheadedness and generalized weakness of the left lower and upper extremities.

* Click to highlight the findings that require immediate follow-up.

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| **Nurses' Notes** |
| **1100:** A 26-year-old female of Latin descent presents to the emergency department with lightheadedness, generalized weakness of the left lower and upper extremities, and a sudden headache after completing a 2.5-mile sprint. Reports some nausea but no vomiting. Thinking she was dehydrated from her exercise, she drank about a liter of water and self-administered 500 mg of acetaminophen for pain with no improvement. She reports the symptoms began at approximately 0900. No significant previous medical or surgical history. Takes an oral combined hormonal contraceptive. Occasionally drinks 3-4 glasses of wine a week and vapes with e-cigarettes daily.  Continuous cardiac monitoring initiated, per protocol. Heart rate is 99 bpm, blood pressure is 160/100. She is awake and alert and can make her needs known. Voiding clear-yellow urine; abdomen is soft with bowels sounds in all quadrants. Reports increasing numbness to the left side and upper and lower extremities. | |

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| **Nurses' Notes** |
| **1100:** A 26-year-old female of Latin descent presents to the emergency department with lightheadedness, generalized weakness of the left lower and upper extremities, and a sudden headache after completing a 2.5-mile sprint. Reports some nausea but no vomiting. Thinking she was dehydrated from her exercise, she drank about a liter of water and self-administered 500 mg of acetaminophen for pain with no improvement. She reports the symptoms began at approximately 0900. No significant previous medical or surgical history. Takes an oral combined hormonal contraceptive. Occasionally drinks 3-4 glasses of wine a week and vapes with e-cigarettes daily.  Continuous cardiac monitoring initiated, per protocol. Heart rate is 99 bpm, blood pressure is 160/100. She is awake and alert and can make her needs known. Voiding clear-yellow urine; abdomen is soft with bowels sounds in all quadrants. Reports increasing numbness to the left side and upper and lower extremities. | |

**Scoring Rule: +/-**

**Rationale:** A disruption of the blood supply to brain areas leads to a sudden loss of motor function. Like a myocardial infarction or heart attack, a disruption of blood flow to the brain is a medical emergency that requires immediate and intentional interventions. Lightheadedness, weakness of the left lower and upper extremity, sudden headache, elevated heart rate, elevated blood pressure, denotes poor cerebral perfusion and requires immediate follow up.

**Case Study Question 2 of 6**

A 26-year-old woman presents in the emergency department with a sudden onset of lightheadedness and generalized weakness of the left lower and upper extremities.

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| **Nurses' Notes** |
| **1100:** A 26-year-old female of Latin descent presents to the emergency department with lightheadedness, generalized weakness of the left lower and upper extremities, and a sudden headache after completing a 2.5-mile sprint. Reports some nausea but no vomiting. Thinking she was dehydrated from her exercise, she drank about a liter of water and self-administered 500 mg of acetaminophen for pain with no improvement. She reports the symptoms began at approximately 0900. No significant previous medical or surgical history. Takes an oral combined hormonal contraceptive. Occasionally drinks 3-4 glasses of wine a week and vapes with e-cigarettes daily.  Continuous cardiac monitoring initiated, per protocol. Heart rate is 99 bpm, blood pressure is 160/100. She is awake and alert and can make her needs known. Voiding clear-yellow urine; abdomen is soft with bowels sounds in all quadrants. Reports increasing numbness to the left side and upper and lower extremities. | |

* For each finding, click to specify if the finding is a risk factor or not a risk factor for ischemic stroke.

|  |  |  |
| --- | --- | --- |
| Assessment/Finding | Risk factor | Not risk factor |
| Combined hormonal contraceptive | * X |  |
| Drinks 3 – 4 glasses of alcohol a week |  | * X |
| Vapes e-cigarettes daily | * X |  |
| Completed a 2.5-mile sprint on the treadmill |  | * X |
| Latin descent | * X |  |

**Scoring Rule: 0/1**

**Rationale:** Efforts to reduce the onset of stroke remain a focal point for healthcare providers. A healthy lifestyle that addresses modifiable risk factors such as physical activity (40 minutes per day, 3 – 4 days/week), alcohol consumption in moderation, and healthy eating practices can reduce the onset of a stroke. Age, race, and gender are nonmodifiable risk factors for a stroke. African Americans and some Hispanic/Latino Americans have a higher stroke and mortality when compared to Caucasian Americans. Combined hormonal contraceptive is a birth control that contains estrogen to prevent ovulation by altering the cervical mucus and uterine lining. Exogenous estrogens impact the skeletal, metabolic, and coagulation systems, thereby increasing the risk of blood clots, stroke, or heart attack. Vape contains nicotine as an active ingredient and increases the risk of developing a blood clot, stroke, or heart attack while using estrogen.

**Case Study Question 3 of 6**

A 26-year-old woman presents in the emergency department with a sudden onset of lightheadedness and generalized weakness of the left lower and upper extremities.

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| **Nurses' Notes** |
| **1100:** A 26-year-old female of Latin descent presents to the emergency department with lightheadedness, generalized weakness of the left lower and upper extremities, and a sudden headache after completing a 2.5-mile sprint. Reports some nausea but no vomiting. Thinking she was dehydrated from her exercise, she drank about a liter of water and self-administered 500 mg of acetaminophen for pain with no improvement. She reports the symptoms began at approximately 0900. No significant previous medical or surgical history. Takes an oral combined hormonal contraceptive. Occasionally drinks 3-4 glasses of wine a week and vapes with e-cigarettes daily.  Continuous cardiac monitoring initiated, per protocol. Heart rate is 99 bpm, blood pressure is 160/100. She is awake and alert and can make her needs known. Voiding clear-yellow urine; abdomen is soft with bowels sounds in all quadrants. Reports increasing numbness to the left side and upper and lower extremities. | | |
| **Diagnostic Report** |
| Head CT shows with ischemic stroke | |

The client is diagnosed with an ischemic stroke.

* Drag the most appropriate word from the choices to fill in the blank of the following sentence.

The top priority for this client is

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| Word choices |
| Improving fluid and electrolytes |
| Restoring cerebral perfusion \* |
| Supporting proper body alignment |
| Promoting nutrition and dietary needs |

**Scoring Rule: 0/1**

**Rationale:** An interruption of blood flow to the brain because of a thrombotic or embolic event can lead to the onset of an ischemic stroke. The main nursing priority with a client experiencing an ischemic stroke is to restore cerebral perfusion to prevent further neurological deficits, altered level of consciousness, or death of the cells.

**Case Study Question 4 of 6**

A 26-year-old woman presents in the emergency department with a sudden onset of lightheadedness and generalized weakness of the left lower and upper extremities.

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| **Nurses' Notes** | |
| **1100:** A 26-year-old female of Latin descent presents to the emergency department with lightheadedness, generalized weakness of the left lower and upper extremities, and a sudden headache after completing a 2.5-mile sprint. Reports some nausea but no vomiting. Thinking she was dehydrated from her exercise, she drank about a liter of water and self-administered 500 mg of acetaminophen for pain with no improvement. She reports the symptoms began at approximately 0900. No significant previous medical or surgical history. Takes an oral combined hormonal contraceptive. Occasionally drinks 3-4 glasses of wine a week and vapes with e-cigarettes daily.  Continuous cardiac monitoring initiated, per protocol. Heart rate is 99 bpm, blood pressure is 160/100. She is awake and alert and can make her needs known. Voiding clear-yellow urine; abdomen is soft with bowels sounds in all quadrants. Reports increasing numbness to the left side and upper and lower extremities.  **1130:** A 20-gauge IV was placed in the right and left antecubital per protocol. Blood work drawn and results returned. | | | | | |
| **Diagnostic Report** | |
| Head CT shows with ischemic stroke | | | | |
| **Laboratory Report** | | |
| Lab | Results | | | Reference range |
| Glucose (fasting) | 186 mg/dL | | | Normal < 99 mg/dL |
| Hematocrit | 55% | | | Males: 42-52%; Females: 35-47% |
| Hemoglobin | 13 g/dL | | | Males: 13-18 g/dL; Females:12-16 g/dL |
| Platelets | 500,000/mm3 | | | 140,000 to 450,000/ mm3 |
| PT | 13.5 sec | | | 9.5-12 seconds |
| **Orders** | | |
| * Alteplase 0.9 mg/kg, with a maximum dose of 90 mg, over 60 minutes, IV, STAT; bolus 10% of dose * Bolus labetalol 20 mg, IV, over 2 minutes, then 10 mg IV to maintain SPB >140 mmHg but <185 mmHg and DBP > 80 but <110 mmHg | | | | |

The nurse reviews the healthcare provider’s orders and plans to administer alteplase.

* What additional assessment data should the nurse obtain before administering alteplase? Select all that apply.
* **No current pregnancy \***
* **Blood glucose is greater than 50 mg/dL\***
* **No major surgical procedures within 14 days \***
* Recent international travel
* **Serum pH is greater than 7.35**
* **Confirm onset and timeframe of symptoms\***
* Serum potassium greater than 3.5 mEq/L
* Can safely ambulate to the bathroom
* **Client weight\***

**Scoring Rule: +/-**

**Rationale:** Thrombolytic therapy, alteplase or recombinant t-Pa, dissolves the clot and is used once an ischemic stroke is determined. Dose is weight dependent. A thorough assessment to diagnose stroke and initiating thrombolytic therapy within 3 hours lessens the stroke's magnitude and improves the brain's overall function and outcomes three months after the stroke. Contraindications to thrombolytic treatment include but are not limited to if symptoms started longer ago than 3-hours, having a major surgical procedure within the last 14 days, current pregnancy, blood glucose less than 50 mg/dL, and receiving heparin in the past 48 hours.

**Case Study Question 5 of 6**

A 26-year-old woman presents in the emergency department with a sudden onset of lightheadedness and generalized weakness of the left lower and upper extremities.

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| **Nurses' Notes** | |
| **1100:** A 26-year-old female of Latin descent presents to the emergency department with lightheadedness, generalized weakness of the left lower and upper extremities, and a sudden headache after completing a 2.5-mile sprint. Reports some nausea but no vomiting. Thinking she was dehydrated from her exercise, she drank about a liter of water and self-administered 500 mg of acetaminophen for pain with no improvement. She reports the symptoms began at approximately 0900. No significant previous medical or surgical history. Takes an oral combined hormonal contraceptive. Occasionally drinks 3-4 glasses of wine a week and vapes with e-cigarettes daily.  Continuous cardiac monitoring initiated, per protocol. Heart rate is 99 bpm, blood pressure is 160/100. She is awake and alert and can make her needs known. Voiding clear-yellow urine; abdomen is soft with bowels sounds in all quadrants. Reports increasing numbness to the left side and upper and lower extremities.  **1130:** A 20-gauge IV was placed in the right and left antecubital per protocol. Blood work drawn and results returned.  **1200:** Weight 75 kg. Alteplase 67.5 mg infused over 60 minutes. 7mg of total dose given as bolus per protocol. | | | | | |
| **Diagnostic Report** | |
| Head CT shows with ischemic stroke | | | | |
| **Laboratory Report** | | |
| Lab | Results | | | Reference range |
| Glucose (fasting) | 186 mg/dL | | | Normal < 99 mg/dL |
| Hematocrit | 55% | | | Males: 42-52%; Females: 35-47% |
| Hemoglobin | 13 g/dL | | | Males: 13-18 g/dL; Females:12-16 g/dL |
| Platelets | 500,000/mm3 | | | 140,000 to 450,000/ mm3 |
| PT | 13.5 sec | | | 9.5-12 seconds |
| **Orders** | | |
| * Alteplase 0.9 mg/kg, with a maximum dose of 90 mg, over 60 minutes, IV, STAT; bolus 10% of dose * Bolus labetalol 20 mg, IV, over 2 minutes, then 10 mg IV to maintain SPB >140 mmHg but <185 mmHg and DBP > 80 but <110 mmHg | | | | |

* For each possible action, click to specify if it is indicated or not indicated after administering alteplase.

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| Action | Indicated | Not Indicated |
| Ensure oral anticoagulants are withheld for the next 24 hours | \* |  |
| Arrange for an inpatient admission to the medical-surgical unit |  | \* |
| Assess and monitor vital signs for intracerebral hemorrhage | \* |  |
| Insert an indwelling catheter to record urine output accurately |  | \* |
| Consult with a Hematologist to increase the client’s PT and INR levels |  | \* |
| Keep the client NPO until a speech and swallow evaluation is completed | \* |  |
| Monitor serum glucose level to prevent complications of a stroke | \* |  |

**Scoring Rule: 0/1**

**Rationale:** Clients who receive thrombolytic therapy are admitted to an intensive care unit for continuous cardiac monitoring and close observation for bleeding; therefore, oral anticoagulants are withheld for the next 24 hours. Insertion of nasogastric tubes, urinary catheters, and intra-arterial pressure catheters is delayed for 24 hours. Vital signs are recorded and documented every 15 minutes for the first two hours, then every 30 minutes for the next six hours, and then every hour until 24 hours after treatment to monitor for intracerebral hemorrhage and other signs of bleeding. Serum glucose blood levels should be assessed and maintained within 140 to 180 mg/dL. Efforts to reduce hypoglycemia are also significant. Poor neurological outcomes in acute stroke have been associated with hyperglycemia.

**Case Study Question 6 of 6**

A 26-year-old woman presents in the emergency department with a sudden onset of lightheadedness and generalized weakness of the left lower and upper extremity.

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| **Nurses' Notes** | | |
| **1100:** A 26-year-old female of Latin descent presents to the emergency department with lightheadedness, generalized weakness of the left lower and upper extremity, and a sudden headache after completing a 2.5-mile sprint. Reports some nausea but no vomiting. Thinking she was dehydrated from her exercise, she drank about a liter of water and self-administered 500 mg of acetaminophen for pain with no improvement. She reports the symptoms began at approximately 0900. No significant previous medical or surgical history. Takes an oral combined hormonal contraceptive. Occasionally drinks 3-4 glasses of wine a week and vapes with e-cigarettes daily.  Continuous cardiac monitoring initiated, per protocol. Heart rate is 99 bpm, blood pressure is 160/100. She is awake and alert and can make her needs known. Voiding clear-yellow urine; abdomen is soft with bowels sounds in all quadrants. Reports increasing numbness to the left side and upper and lower extremities.  **1130:** A 20-gauge IV was placed in the right and left antecubital per protocol. Blood work drawn and results returned.  **1200:** Weight 75kg. Alteplase, 67.5 mg infused over 60 minutes. 7mg of total dose given as bolus per protocol.  **1230.** Transferred to the critical care unit. | | | | | | |
| **Diagnostic Report** | | |
| Head CT shows with ischemic stroke | | | | | |
| **Laboratory Report** | | | |
| Lab | | Results | | | Reference range |
| Glucose (fasting) | | 186 mg/dL | | | Normal < 99 mg/dL |
| Hematocrit | | 55% | | | Males: 42-52%; Females: 35-47% |
| Hemoglobin | | 13 g/dL | | | Males: 13-18 g/dL; Females:12-16 g/dL |
| Platelets | | 500,000/mm3 | | | 140,000 to 450,000/ mm3 |
| PT | | 13.5 sec | | | 9.5-12 seconds |
| **Orders** | | | |
| * Alteplase 0.9 mg/kg, with a maximum dose of 90 mg, over 60 minutes, IV, STAT; bolus 10% of dose * Bolus labetalol 20 mg, IV, over 2 minutes, then 10 mg IV to maintain SPB >140 mmHg but <185 mmHg and DBP > 80 but <110 mmHg | | | | | |
| **Progress Note** |
| **Day 2, 800:** Client is awake, alert, and oriented to person, place, and time. Heart rate of 98 bpm, sinus rhythm, blood pressure 128/86, and afebrile. Bleeding and fall precautions continued. Instructed to use the call bell for assistance for ambulation. Provided stroke education and expected outcomes after a stroke reviewed. Health risk factors, signs and symptoms, early interventions, follow-up care, and apixaban at discharge discussed. Advised of a speech and swallow test to evaluate the motor function of the oropharyngeal. Educated on the adverse effects of alteplase and increased risk for bleeding. | | | | | | | |

The client’s condition has improved the next day and the nurse evaluates the client’s understanding of the instructions provided.

* Click to specify whether the statement indicates an understanding, or no understanding of the teaching provided.

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| Statement | Understanding | No understanding |
| “I will use the call bell and wait for someone to help me get out of bed.” | \* |  |
| “A speech and swallow test will determine if I can drink normal again.” | \* |  |
| “I will switch to an electric razor instead of straight razor to shave.” | \* |  |
| “The physical therapist will determine my functional ability.” |  | \* |
| “At discharge, I should plan to self-administer insulin for hyperglycemia.” |  | \* |
| “I will follow up with my gynecologist to determine a better contraceptive plan.” | \* |  |

**Scoring Rule: 0/1**

**Rationale:** Thrombolytic agents are designed to dissolve the thrombi to help reestablish blood flow to reduce injury and death of the neural cells. Like other anticoagulant agents, the risk of bleeding is a significant adverse effect. To prevent a fall, the nurse should instruct the client to call someone to help her get out of bed. An ischemic stroke can cause dysphagia (difficulty swallowing) due to impairment of the mouth, tongue, palate, larynx, pharynx, and upper esophagus, therefore, a swallow evaluation should be completed within 4 to 24 hours. The speech and swallow evaluation will determine if the client should have thin or thicken liquids or pureed foods to prevent aspiration. The client should take the necessary precaution to reduce bleeding by switching to an electric razor or brushing their teeth with a soft bristle toothbrush to reduce bleeding at the gumline. Combined hormonal contraception contains the estrogen hormone that influences fibrinogen in the plasma, specifically factor VII and X, thereby increasing the risk of stroke, bleeding, and heart attack. The client should inquire about other alternatives to prevent pregnancy. A baseline assessment of the client’s functional ability is important to determine the motor, social, and cognitive function. This assessment is completed by the nurse. The client should plan to take apixaban, an oral anticoagulant used to treat and prevent blood clots to prevent a stroke. Clients with type II diabetes should plan to monitor their blood glucose and if indicated self-administer insulin as prescribed.

**Bowtie**

A 26-year-old woman presents in the emergency department with a sudden onset of lightheadedness and generalized weakness of the left lower and upper extremities.

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| **Nurses' Notes** | |
| **1100:** A 26-year-old female of Latin descent presents to the emergency department with lightheadedness, generalized weakness of the left lower and upper extremities, and a sudden headache after completing a 2.5-mile sprint. Reports some nausea but no vomiting. Thinking she was dehydrated from her exercise, she drank about a liter of water and self-administered 500 mg of acetaminophen for pain with no improvement. She reports the symptoms began at approximately 0900. No significant previous medical or surgical history. Takes an oral combined hormonal contraceptive. Occasionally drinks 3-4 glasses of wine a week and vapes with e-cigarettes daily.  Continuous cardiac monitoring initiated, per protocol. Heart rate is 99 bpm, blood pressure is 160/100. She is awake and alert and can make her needs known. Voiding clear-yellow urine; abdomen is soft with bowels sounds in all quadrants. Reports increasing numbness to the left side and upper and lower extremities.  **1130:** A 20-gauge IV was placed in the right and left antecubital per protocol. Blood work drawn and results returned**.** | | | | |
| **Laboratory Report** | | |
| Lab | Results | | | Reference range |
| Glucose (fasting) | 186 mg/dL | | | Normal < 99 mg/dL |
| Hematocrit | 55% | | | Males: 42-52%; Females: 35-47% |
| Hemoglobin | 13 g/dL | | | Males: 13-18 g/dL; Females:12-16 g/dL |
| Platelets | 500,000/mm3 | | | 140,000 to 450,000/ mm3 |
| PT | 13.5 sec | | | 9.5-12 seconds |

The nurse reviews the assessment data to determine the appropriate care plan.

* Complete the diagram by dragging from the choices below to specify what condition the client is most likely experiencing, 2 actions the nurse should take to address that condition, and 2 parameters the nurse should monitor to assess the client's progress.

|  |  |  |
| --- | --- | --- |
| * Action to take |  | Parameter to monitor |
|  | Condition most likely experiencing |  |
| Action to take |  | Parameter to monitor |

|  |  |  |
| --- | --- | --- |
| **Actions to take** | **Potential conditions** | **Parameters to monitor** |
| Administer morphine | Hypoperfusion syndrome | Blood pressure |
| Bolus intravenous fluids | Hypovolemic shock | Level of consciousness \* |
| Give supplemental oxygen \* | Ischemic stroke\* | Patency of airway \* |
| Initiate code stroke \* | Meningitis | Serum glucose |
| Initiate seizure precautions |  | Range of motion |

**Scoring Rule: 0/1**

**Rationale:** The client is showing symptoms of an ischemic stroke. Use of combined hormonal contraceptive is birth control that contains estrogen is a major risk factor for stroke in young adults. Once the determination is made that the client is experiencing a neurological deficit as seen with an ischemic stroke, the nurse should initiate a code stroke which activates and coordinates a rapid team response with the radiologist who will interpret the CT scan results immediately to determine the type of stroke, analyze of blood work within a specified timeframe, and obtain a consultation by a Neurologist. The overarching goal with initiating a code stroke is achieving, sustaining, and improving client outcomes by minimizing any neurological deficits. The lack of blood flow to the cells can cause cell injury and cell death with delayed care. To reduce the effects of an ischemic stroke, administering supplemental oxygen is critical in preventing cell death. Management of the airway is a nursing priority for the client experiencing an acute stroke as these clients are at risk of developing dysphagia. The nurse should monitor and assess the patency of the airway and functioning. The nurse should continue to reassess the client’s neurological status. A decrease in the level of consciousness is indicative of intracranial pressure (ICP) or poor cerebral perfusion.