

## Assessment and Emergency Care of Neurologic Emergencies

### Scene Size-up

#### Scene Safety

Ensure scene safety and safe access to the patient. Take appropriate standard precautions. Review dispatch information; emergency calls dispatched as a medical condition may have an associated mechanism of injury. Establish early in the call whether the patient's condition is medical or trauma. Determine the number of patients and the need for additional resources. A neurologic emergency may be the result of exposure to hazardous materials or from another type of incident. Advanced life support (ALS) is often required at neurologic emergencies. Call for ALS early. Their support can be canceled if it is determined they are not needed. Consider cervical spine stabilization if the mechanism of injury is unknown.

#### Mechanism of Injury (MOI)/ Nature of Illness (NOI)

Determine the MOI/NOI. Observe the scene, and look for clues that will assist you in determining the MOI/NOI. The nature of the problem may not be apparent until more information is gathered. Ask family members or bystanders about the event. Assess the patient for signs of trauma; evaluate the patient's environment. Look for signs of medical conditions that may be indicated by the patient's medications, medical supplies, and medical alert bracelet or tag.

### Primary Assessment

#### Form a General Impression

Note the position of the patient, and identify any immediate life threats. Determine priority of care based on the MOI/NOI. If the patient has a poor general impression, call for ALS assistance. A rapid scan of the patient will help you identify and manage life threats. Assess the patient's level of consciousness using the AVPU scale. Obtain the chief complaint from the patient if possible.

#### Airway and Breathing

Ensure the airway is open, clear, and self-maintained. The airway of an unresponsive patient needs to be opened and maintained using a modified jaw-thrust if spinal injury is suspected. A patient with an altered level of consciousness may need emergency airway management; consider inserting a properly sized oropharyngeal or nasopharyngeal airway. Suction the airway as required. Place the patient in the recovery position to prevent aspiration. Observe for the possibility of a foreign body airway obstruction. Evaluate the patient's ventilatory status for rate and depth of breathing, respiratory effort, and tidal volume. Patient respirations of less than 12 breaths/min or more than 20 breaths/min are considered inadequate, and the patient may require assistance breathing. Continuously monitor oxygen saturation, and look for additional signs of hypoxia. Administer high-flow oxygen at 15 L/min, providing ventilatory support as needed. Do not place anything in the patient's mouth.

#### Circulation

Check the patient's pulse; if no pulse is present, begin cardiopulmonary resuscitation immediately. Evaluate distal pulse for rate, quality (strength), and rhythm. Observe skin color, temperature, and condition. Assess capillary refill time; if greater than 2 seconds, treat the patient aggressively for shock. Look for evidence of life-threatening bleeding, and treat the patient accordingly.

#### Transport Decision

If the patient has an airway or breathing problem, signs and symptoms of bleeding, or other life threats, manage them immediately and consider rapid transport, performing the secondary assessment en route to the hospital. If the patient has a paralyzed extremity, ensure it is placed in a safe, secure position.

**NOTE:** The order of the steps in this section differs depending on whether the patient is conscious or unconscious. The following order is for a conscious patient. For an unconscious patient, perform a primary assessment, perform a rapid full-body scan, obtain vital signs, and obtain the past medical history from a family member, bystander, or an emergency medical identification device.

## Assessment and Emergency Care of Neurologic Emergencies, continued

### History Taking

#### Investigate Chief Complaint

Investigate the chief complaint and gather a history once you have identified and treated life threats. Look for signs and symptoms that may indicate a cause for the patient's condition. Evaluate the patient's facial expressions and speech. Identify associated symptoms and pertinent negatives. Ask OPQRST and SAMPLE questions, focusing on the events surrounding the incident. Use the TIPS-AEIOU mnemonic to help you identify possible causes of altered mental status. Determine when the patient last appeared healthy. Collect or list all medications the patient is taking or has stopped taking. Inquire about the use of drugs or alcohol. Information can also be obtained from family members, bystanders, and medical alert tags if the patient is not able to provide the information.

### Secondary Assessment

#### Physical Examinations

Perform a systematic prehospital head-to-toe examination beginning with the head, looking for DCAP-BTLS. Assessment should be rapid if the patient has a poor general impression. Patients suspected of having a stroke should have a focused neurologic examination performed, such as the full-body scan or Cincinnati Stroke Scale.

#### Vital Signs

On completion of the primary assessment and treatment of immediate life threats, obtain the patient's baseline vital signs. Vital signs should include blood pressure by auscultation, pulse rate and quality, respiration rate and quality, pupil evaluation, and skin assessment for perfusion. Note the patient's level of consciousness. Determine the patient's Glasgow Coma Scale score. Use pulse oximetry, if available, to assess the patient's perfusion status. Tachycardia or hypotension may indicate hypoperfusion. Bradycardia and/or erratic breathing may indicate increasing intracranial pressure, as do unequal pupils. Bradypnea may indicate cerebral hypoxia and impending cardiopulmonary arrest. Check the patient's blood glucose level if local protocol allows. Reassess the patient's vital signs every 5 minutes to observe trends. A widening pulse pressure (the difference between the systolic and diastolic pressures) is a sign of increasing intracranial pressure.

### Reassessment

#### Interventions

If a spine or head injury is suspected, immobilize the spine. To ensure an open airway, position an oropharyngeal or nasopharyngeal airway if necessary. Provide oxygen via nonrebreathing mask or bag-mask device as required. Control any external bleeding and treat for shock. Reassess the chief complaint, primary assessment, vital signs, and any interventions already performed. Is the oxygen delivery sufficient and is the patient breathing adequately? Is the pulse oximetry value improving? If hypoglycemia is suspected to be the cause of an altered mental status and the patient is awake and able to swallow, administer oral glucose. If stroke is suspected, time is crucial. Administer high-flow oxygen and provide rapid transport to the appropriate facility. Vital signs should be repeated every 5 minutes and the results compared with those obtained earlier. If the patient is awake and alert, place him or her in a position of comfort. Unresponsive patients should be placed in the recovery position, unless spinal injury is suspected, to prevent aspiration and facilitate drainage of secretions. Stroke patients should be positioned with the head slightly elevated. Continuously observe and reassess the patient's condition during transport to enable management of worsening conditions. Document changes noted during your assessment and reassessment of the patient.

## Assessment and Emergency Care of Neurologic Emergencies, continued

### Communication and Documentation

Contact medical control and the receiving hospital with a radio report that includes notification of a neurologic emergency. Some hospitals require a “stroke alert.” Include a thorough description of the MOI/NOI and position in which the patient was found. Include treatments performed and patient response. Be sure to document the patient’s chief complaint, physical findings, history, time of initial onset, and any changes in patient status and the time they occurred. Document the scene observations on arrival. Follow local treatment protocols.

Communicating with a patient experiencing a neurologic emergency is sometimes difficult. Patients may appear unresponsive or have difficulty speaking, but might still be able to hear and understand you. Avoid unnecessary or inappropriate comments. If possible, establish an effective form of communication. Calm and reassure the patient.

**NOTE:** Although the steps below are widely accepted, be sure to consult and follow your local protocols. Follow standard precautions when treating all patients.

## Neurologic Emergencies

### General Management of Neurologic Emergencies

Managing life threats to the patient’s ABCs is the primary concern during any neurologic emergency. The general impression of the patient is very important. Note the patient’s overall appearance, work and pattern of breathing, and the position in which the patient was found. The management of specific neurologic emergencies begins with the following steps:

1. Ensure scene safety, taking the appropriate standard precautions.
2. Determine whether the call indicates a medical or trauma event.
3. Open, clear, and maintain the patient’s airway.
4. Inspect, palpate, and auscultate the chest.
5. Administer high-concentration oxygen via a nonrebreathing mask or bag-mask device as appropriate.
6. Determine appropriate interventions based on the chief complaint and findings of the physical examination.
7. Transport to the appropriate treatment facility.

### Headache

Headache may be a sign of a potentially life-threatening situation. Look for signs of stroke, meningitis, and possible carbon monoxide poisoning. Perform a complete patient assessment that includes obtaining vital signs. Administer high-flow oxygen. Place the patient in a position of comfort, usually in a darkened, quiet environment. Transport the patient to the hospital.

### Stroke (Cerebrovascular Accident)/Transient Ischemic Attack

Determine the time of symptom onset. Observe the patient’s position and protect any affected extremities. Administer high-flow oxygen via a nonrebreathing mask or bag-mask device if the patient’s breathing is inadequate. Obtain a history of illness using OPQRST. Obtain a SAMPLE history. A transient ischemic attack has occurred if stroke symptoms end on their own within 24 hours of onset. Perform a field stroke test such as the Cincinnati Prehospital Stroke Scale or Los Angeles Prehospital Stroke Screen. Monitor vital signs every 5 minutes; watch for trends in blood pressure measurements. Be alert for conditions that may mimic stroke. Transport the patient to a stroke specialty center. Do not delay transport.

## Assessment and Emergency Care of Neurologic Emergencies, continued

### Neurologic Emergencies

#### Seizures

Seizures may be the result of epilepsy, fever, metabolic disorders, or blood chemical problems or may be idiopathic. Recognize that a seizure is occurring and determine whether the seizure is new onset or similar to previous seizures. If possible, determine the part of the body where the seizure activity was first noticed. Ensure an open airway but do not place anything into the patient's mouth; a nasopharyngeal airway can be inserted. Administer high-flow oxygen via a nonrebreathing mask. If local protocol allows, obtain and record the patient's blood glucose level. Do not restrain a patient having a seizure. Provide emotional support, and transport to a hospital. Patients refusing transport after a seizure should be encouraged to seek medical follow-up.

#### Altered Mental Status

There are many causes of altered mental status. The TIPS-AEIOU mnemonic will assist you in determining the cause. Hypoglycemia can cause an altered mental status and may mimic stroke or seizure. Hypoglycemia should be ruled out in patients with altered mental status or a decreased level of consciousness. Seizures may occur in patients whose blood glucose level drops and becomes very low. Head injury may also be the cause of an altered mental status. Assess the patient for a possible MOI, and perform a full-body scan. Changes in the patient's mental status may also be the result of drug use or alcohol intoxication. The patient's history may provide information about psychological disorders that may be causing the altered mental status. Any patient with an altered mental status requires immediate attention. Support the ABCs, provide spinal immobilization if indicated, and transport the patient to the appropriate hospital.