MODULE 4: DIAGNOSTICS AND ASSESSMENTS

Learning Objectives

Upon completion of this module, nurses will be able to:

- Describe the acute stroke nursing assessment
- Understand why neurological assessments and functional assessments are important
- State the standardized neurological assessments and understand the training requirements
- Explain the relevant stroke investigations and why they are being done

For the most up to date information please refer to the following Canadian Stroke Best Practice Guideline when completing this module:

NEW Acute Stroke Management | Canadian Stroke Best Practices

SWO Stroke Network, 2023.
Adapted from NEO Stroke Network (2010).

4.1 Acute Care Nursing Assessment

Acute stroke patients require skilled and knowledgeable professionals attending to their care. Organized stroke units create the opportunity to develop a critical mass that facilitates the development of expertise of clinicians. Expertise in stroke assessment by clinicians ensures that stroke patients are offered appropriate investigations and receive appropriate and timely care. "The nurse is often the first to see changes and early warning signs that may predict a neurological crisis. Familiarity with a stroke nurse assessment promotes the nurse's ability to gather accurate patient information, identify stroke emergencies and promote timely referrals to appropriate specialists and time-dependent investigations" (HSFO, Faaast FAQs, 2007, page 9).

A stroke assessment includes:
(HSFO, Faaast FAQs, 2007, p. 10)

1. ABC

Begin a general assessment of the moment you first encounter the person. Take note any signs of acute distress that are present and assess ABC (airway-breathing-circulation).

2. Health History

The purpose of the health history is to collect subjective data and combine it with objective data from the physical examination. The combined database is then used to make a judgment or diagnosis about the health status of the individual (Jarvis, 2000).

3. Vital Signs

Temperature, heart rate, blood pressure, respiration rate, pain assessment and oxygen saturation are all measured and monitored according to Standards of Care for the unit.

4. Pupils

Record the size of the pupils in mm using the pupil scale prior to the application of the light stimulus. Indicate the reaction of pupils as either:

+ = Brisk Reaction S = Sluggish – = No Reaction

It is critical to report a change in either pupil.

5. Standardized Neurological Assessment

A neurological (neuro) assessment provides a standardized method to rapidly identify emerging stroke complications, and will provide a better patient prognosis.

Early identification of emerging stroke complications may:

- Lead to early intervention
- Limit the extension of neurological damage
- Impact patient outcomes

4.2 Standardized Neurological Assessments (CNS, NIHSS, GCS)

The use of standardized and validated stroke assessment tools in both the acute and rehabilitation settings enables **sound decision making and care planning.**

What are you looking for?

Symptoms of change in neurological status

- Restlessness
- Combativeness
- Confusion
- Severe headache
- Lethargy
- Decline in motor strength
- Decrease in coordination
- Change in balance
- Change in speech/language

(HSFO, Faaast FAQS, 2007)

There are three neurological assessment tools available for nurses: Canadian Neurological Scale (CNS), the National Institutes of Health Stroke Scale (NIHSS) and the Glasgow Coma Scale (GCS) (HSFO, 2003; RNAO, 2005). The CNS and the NIHSS are assessments specific to stroke. You can find the training for these two assessments within this module.

Canadian Neurological Scale* (CNS):

The Canadian Neurological Scale is an assessment tool for evaluating and monitoring the neurological status of acute stroke patients. It has been found to be brief, valid and reliable, and can be administered in approximately 5 minutes - 10 minutes.

The CNS assesses:

- Level of consciousness (LOC)
- Orientation
- Speech
- Motor function of the face, arms and legs

A limitation of the scale may be that some useful measures are omitted. For example, it does not include assessment of cerebellar or brainstem function (HSFO, 2003; RNAO, 2005).

National Institute of Health Stroke Scale* (NIHSS):

The NIHSS was developed by the National Institute of Health and is a multi-item scale intended to evaluate neurological impairment. The NIHSS has demonstrated reliability and validity for patients with stroke. It takes approximately 5-10 minutes to administer. Training is required. Training options will be determined by your organization. For a summary of training options you can follow this link NIHSS_Stroke_Scale_Training_Options_FinalCopy_Jan26th2023.pdf (corhealthontario.ca)

The NIH Stroke Scale (NIHSS) assesses:

- LOC
- Visual fields
- Motor response
- Sensation
- Language
- Neglect

It is an **11-item** scale that measures various physiological deficits associated with stroke:

- LOC
- Best gaze
- Visual field testing
- Facial paresis
- Arm motor function
- Leg motor function
- Limb ataxia
- Sensory
- Best language
- Dysarthria
- Extinction and inattention

The NIHSS allows us to:

- Objectively quantify our clinical exam (give it a score)
- Determine if the patient's neurological status is improving or deteriorating
- Provide standardization in assessment (from one nurse to the next – the same exam is performed)
- Communicate patient status to staff
- Aid in decision making

A limitation of the scale is that it has a low sensitivity to small changes.

(HSFO, 2003; RNAO, 2005)

Glasgow Coma Scale (GCS):

The Glasgow Coma Scale is a standardized and valid neurological assessment tool for assessing level of consciousness or coma.

It is a neurological assessment that is widely used by the neurological and neurosurgery community and is found in the curriculum of most undergraduate nursing programs.

It lacks specificity and applicability when applied to stroke patients, as most do not have impaired LOC.

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* Where do I document these neurological assessments in my organization?
Follow your organization's charting guidelines.

4.3 Other Assessments

There are many more assessments relevant to stroke inpatients. Some of these assessments are administered by other members of the team. Consult with your Nurse Clinician or Stroke Nurse to learn more about any one of the assessments listed below.

- **Function:** AlphaFIM®(an abbreviated version of the FIM® Instrument to assess function and disability in the acute care setting)
- **Pain:** Visual Analog Scale, Wong-Baker Faces Rating Scale, Numeric Rating Scale
- **Skin Breakdown:** Braden Risk Assessment
- **Balance:** Berg Balance Scale
- **Cognition:** Montreal Cognitive Assessment (MoCA), Mini Mental
- **Depression**: Geriatric Depression Scale, Patient Health Questionnaire -9 (PHQ9), Hospital and Anxiety Depression Scale (HADS)
- **Deep Vein Thrombosis:** Follow organization's DVT prophylaxis guidelines
- **Swallowing:** Toronto Bedside Swallowing Screening Test (TOR BSST), Jewish Barnes, Acute Stroke Dysphagia Screening Tool etc.
- **Continence**
- **Nutrition/Hydration**
- **Oral Care:** Oral Health Assessment Tool (OHAT)
- **Sleep Apnea**: Stop Bang
- **Driving**

4.4 Investigations

All patients with suspected acute stroke should undergo **CT or MRI** to determine eligibility for acute treatment. The CT and CTA should be done at the same time.

Patients arriving at the hospital within the **6-hour** time window should undergo immediate non-contrast CT combined with CT angiography of the head and neck.

Patients arriving in the **6-24-hour** time window should undergo immediate imaging with a non-contrast CT and CT perfusion or MRI.

Advanced CT imaging, such as CT perfusion or multiphase CTA is strongly encouraged to aid in patient selection for EVT.

Refer to your organizations pre-printed orders for specific details regarding investigations.

CT – HEAD is ordered STAT in the emergency department to rule out brain hemorrhage or identify other etiologies. The CT scan may appear normal for several hours after the onset of stroke. In ischemic stroke, a larger infarct may appear as a hypodense area (core) surrounded by area of intermediate density (penumbra). Hypodense area is most commonly seen in 24-48 hrs. **It is necessary to repeat in 2 days.** CT does not show posterior circulation strokes well.

CT – Angiogram (CTA) (Head and Neck) examines blood flow through the arteries in the neck and brain – dye is injected into a vein and a series of rapid-image x-rays are taken as the dye travels through.
Metformin is usually held 48hrs post CT with contrast.

Multiphase CTA in Acute Stroke

Multi-phase CTA provides cerebral angiograms in three phases (peak arterial, peak venous and late venous) after the injection of contrast.

Multiphase CTA in Acute Stroke provides a better indication of collateral flow and is essential to help guide patient selection for EVT.

Good collateral flow is associated with:

- Better clinical outcomes
- Less chance of hemorrhagic transformation
- A greater possibility of successful recanalization

Delaney, F., et al. (n.d.)

Imaging criteria influencing EVT selection:

- Presence of a proximal occluded artery, which is a target lesion amenable to EVT
- Presence of good collaterals on multiphase CTA
- Small to moderate ischemic core as defined by an ASPECTS score of >6 on noncontrast CT.

Stotts, G. & Krings, T. (2016).

Magnetic Resonance Imaging (MRI)/Magnetic Resonance Angiography (MRA) may be ordered if CT is normal, may detect ischemic changes, smaller infarcts and TIAs presenting acutely.

Carotid Doppler is an ultrasound of carotid arteries to detect blockages.

Blood tests confirm (or refute) suspicions of specific clinical conditions:

- **Complete Blood Count (CBC)** is used to evaluate overall health and detect a wide range of disorders including anemia, infection, etc.
- **Levels of cardiac enzymes** (including **troponin** and **creatine kinase**) can confirm heart muscle damage and extent of damage.
- **Creatinine** findings can show reduced renal blood flow, atherosclerosis.
- **Glucose Random Testing** indicates blood glucose levels in the blood.
- **PTT/INR** Partial Thromboplastin Time indicates the function of all coagulation factors. International Normalized Ratio (INR) is a ratio used to monitor the effectiveness of blood thinning drugs such as warfarin (Coumadin).
- **Lipid Profile** is a complete fasting lipoprotein profile that will show total blood cholesterol level, HDL, LDL and triglyceride levels.
- **HbA1c** is a test that measures the amount of glycated hemoglobin in your blood. Glycated hemoglobin is a substance in red blood cells that is formed when glucose attaches to hemoglobin. It indicates how well blood sugar has been controlled over the previous 2-3 months. HbA1c results can contribute to a diagnosis of diabetes.

Chest X-RAY will determine whether the heart is enlarged or if fluid is accumulating in the lungs.

Echocardiogram (ECHO) uses ultrasound to show the shape, texture and movement of heart valves, as well as the size of heart chambers and how well they are working. An ECHO may be done to diagnose heart valve problems or identify a cardiac cause of stroke.

Electrocardiogram (ECG) is a test to examine a graphic record of the heart's electrical impulses, determining timing and duration of each electrical phase in the heart beat. The result will determine if a heart attack has occurred and monitors for changes in heart rhythm.

Holter Hook up/Telemetry Monitoring (24 and 48 hr) is a portable and remote, respectively, monitor of the patient's cardiac rhythm. They may be used to detect heart rhythm abnormalities during daily activities, ruling out atrial fibrillation as a cause of stroke.

O_2 saturation monitoring picks up presence of hypoxia which may exacerbate and worsen ischemic damage. If hypoxic, possible causes of respiratory compromise (pneumonia, partial airway obstruction, hypoventilation, and atelectasis) must be considered and managed.

Optional:

Transesophageal echocardiogram (TEE) is an invasive procedure to obtain a more detailed view of the heart structures from the esophagus.

Electroencephalogram (EEG) uses electrodes on the patient's scalp to investigate electrical activity in the brain to rule out seizure.

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