



Clinical Practice Guidelines: Neurological/Stroke and Transient ischaemic attack

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Stroke and Transient ischaemic attack

November, 2021

A stroke occurs when blood flow to a portion of the brain is interrupted causing ischaemia. If blood flow is not restored, it will eventually lead to permanent brain injury. There are two broad classifications of stroke, ischaemic and haemorrhagic.^[1]

Haemorrhagic stroke is caused by a break in the wall of a weakened blood vessel. Haemorrhagic strokes are commonly associated with hypertensive arterial disease, cerebral aneurysms or arteriovenous malformations (AVMs).^[1] Hypertension increases the risk in this cohort of patients. Haemorrhagic stroke occurs in approximately 15% of all stroke cases but accounts for approximately 40% of all stroke deaths.^[2]

Ischaemic stroke is caused by either embolic (blood clot) or thrombotic (plaque) occlusion of a blood vessel. Ischaemic strokes account for approximately 85% of strokes and are potentially amenable to reperfusion therapies aimed at restoring blood flow to the affected part of the brain.^[1]

A transient ischaemic attack (TIA) is a brief episode of neurological dysfunction (lasting from a few minutes to several hours) that results from focal temporary cerebral ischaemia. These events may be caused by a temporary blood vessel occlusion that self resolves. TIA and stroke should be considered a continuum of the same disease process. Approximately 5% of TIA patients will progress to stroke or further TIAs within a few weeks.^[3]

While more common in older adults, stroke may also occur in neonates, infants and young adults resulting in significant morbidity and mortality. It is estimated that 600 Australian children will have a stroke each year.^[4]

There is overwhelming evidence that managing patients in dedicated stroke units significantly reduces death and disability.^[5]

Reperfusion therapies

Intravenous (IV) thrombolysis is available in selected emergency departments with CT imaging capabilities and is considered an effective treatment for specific patient groups if administered within nine hours from onset of symptoms. When indicated, it has been clearly demonstrated to improve patient outcomes, however, may not completely dissolve large vessel occlusions (LVO).

Endovascular clot retrieval (ECR) or thrombectomy is the removal of an embolus or thrombus by a retractable mechanical device. Until recently, endovascular clot retrieval within the first six hours of symptom onset was considered the standard of care for eligible patients with acute stroke secondary to a large vessel occlusion. Recent studies^[6] have shown that some patients with LVO may benefit from ECR up to 24 hours after onset, even if there has been no improvement after thrombolysis. This, combined with improvements in clot retrieval techniques^[7] has meant that there are now many more ECR eligible patients. Up to 20% of all Ischaemic stroke patients may be eligible for ECR.^[8]

Clinical features



Common clinical features include:

- Sudden loss of movement or weakness in part of the body, especially on one side (hemiparesis/hemiplegia)
- Difficulty speaking (dysphasia)
- Difficulty swallowing (dysphagia)
- Visual disturbances
- Sudden onset of headache with neurological symptoms
- ALOC (most common with haemorrhagic stroke due to increases in ICP and brainstem involvement)

Stroke can occur at any age and an estimated 600 Australian children have a stroke each year.^[8]

Stroke in children typically has a sudden and rapid onset. In infants the most common signs of stroke are seizures and extreme sleepiness. In toddlers to teenagers the clinical features are similar to adults.

Additionally, the following features are commonly found in paediatric stroke patients:

- Dizziness, loss of balance, poor coordination
- Difficulty swallowing/drooling
- Seizures/weakness
- Difficulty concentrating
- Sudden collapse

The NIHSS-8 is suitable for patients ≥ 8 years of age.

Clinicians should always consider stroke in paediatric patients presenting with any of the clinical features listed above.

Risk assessment



Other conditions that mimic stroke must be considered:

- Hypoglycaemia
- Intracerebral lesions (e.g. tumour, abscess)
- Seizures and post-ictal states (Todd's paralysis)
- Hemiplegic migraine
- Electrolyte abnormalities (e.g. hyponatraemia)
- Conversion disorder

It is not possible to definitively differentiate between an ischaemic and haemorrhagic stroke without a CT scan.

Therefore, clinicians should always assume an ischaemic stroke in all patients so that the possibility for reperfusion therapies are not prematurely discounted.

STROKE ASSESSMENT TOOLS

The **National Institute of Health Stroke Scale (NIHSS)-8** is a validated stroke assessment tool used to objectively quantify the impairment caused by stroke. It is suitable for use in all patients greater than 8 years of age.

The NIHSS-8 is composed of 8 items, each of which has a score that correlates with a description of the impairment level. The maximum score possible is 24, with the minimum score being zero. The NIHSS-8 has an 82% diagnostic accuracy for large vessel occlusion (LVO) stroke and therefore will assist with triaging patients for potential endovascular treatment.^[9]

The NIHSS-8 is calculated by determining the accumulative score associated with each criterion. The NIHSS-8 score must be recorded on the eARF.

ITEM	DESCRIPTION	SCORING DEFINITION	SCORE	RESULT
1	Level of consciousness	Alert	0	
		Rousable to minor stimulation	1	
		Rousable to only painful stimulation	2	
		Unarousable	3	
2	Level of consciousness questions — ask the patient's age and current month (must be exact)	Both answers correct	0	
		One answer correct or dysarthria, foreign language	1	
		Neither answer correct	2	
3	Commands — opens/close eyes, grip and release non paretic hand then other hand (1 step commands or mimics OK)	Both correct (OK if impaired by weakness)	0	
		One correct	1	
		Neither correct	2	
4	Best Gaze — test horizontal eye movements tracking object-face	Normal	0	
		Partial gaze, abnormal gaze in 1 or both eyes	1	
		Forced eye deviation or total paresis which cannot be overcome	2	
5	Facial Palsy — show teeth, close eyes tight, raise eyebrows. If stuporous check symmetry of the grimace to pain	Normal	0	
		Minor paralysis, flat nasolabial fold, asymmetrical smile.	1	
		Partial paralysis (lower face)	2	
		Complete paralysis (upper and lower face)	3	
6	Motor Arm — arm outstretched 90° sitting or 45° supine for 10 seconds Encourage best effort Score for left and then right arm (Highest possible total score = 8)	No drift for 10 seconds	0	ADD LEFT AND RIGHT
		Drift but does not hit bed	1	
		Some effort against gravity but can't sustain	2	
		No effort against gravity	3	
		No movement at all	4	
		Unable to assess due to amputation, fusion	x	
7	Dysarthria — ask the patient to slowly count to five (5)	Normal	0	
		Mild to moderate slurred speech but intelligible	1	
		Unintelligible or mute	2	
		Intubated or mechanical barrier	x	
8	Extinction/Neglect — simultaneously touch patient on both hands or legs with their eyes closed. Show fingers in both visual fields	Normal none detected	0	
		Neglect or extinction of double simultaneous stimulation in any modality	1	
		Profound neglect in both visual and sensory modalities	2	
			TOTAL SCORE	/ 24

The **Modified Rankin Scale (mRS)** is a measure of **premorbid** function to assess patient suitability for hyper-acute stroke treatment.^[10] The mRS score must be recorded on the eARF.

Score	Modified Rankin Scale Description
0	No symptoms at all.
1	No significant disability despite symptoms: able to carry out all usual duties and activities.
2	Slight disability: unable to carry out all previous activities, but able to walk without assistance.
3	Moderate disability: requiring some help, but able to walk without assistance.
4	Moderate severe disability: unable to walk without assistance and unable to attend to own bodily needs without assistance.
5	Severe disability: bedridden, incontinent and requiring constant nursing care and attention.

+ Additional information

- The timing of the onset of symptoms needs to be clearly defined so that suitability for either IV thrombolysis (within 9 hours) or ECR (within 24 hours) can be determined by the receiving medical facility. For patients who wake up with stroke symptoms, the timing of onset must be assumed to be when they were last well, that is, the time they went to sleep.
- Whenever possible, patients should be positioned at 45 degrees head-up (semi-reclined) to maximise the balance between cerebral perfusion, and minimising cerebral oedema.
- Stroke patients have a swallow risk and clinicians should manage this accordingly to prevent passive aspiration.
- Ensure the patient's next of kin contact phone number is recorded on the eARF.

