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Emergency Department **Stroke** and **Transient Ischaemic** **Attack** Care Bundle

Summary for clinicians

Improving the management of **stroke** and **TIA**
in the emergency department



strokefoundation



National Institute of Clinical Studies Emergency Care Community of Practice
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This summary document was developed from the *Implementation and information package* by Dr Jay Weeraratne, emergency physician and member of the NICS Stroke Reference Group.

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All adults presenting with stroke-like symptoms to the emergency department should receive:

- ✓ Rapid initial stroke screen
- ✓ ABCD² assessment for suspected TIA
 - A Age: ≥ 60 years (1 point)
 - B Blood pressure: ≥ 140/90mmHg (1 point)
 - C Clinical features: unilateral weakness (2 points), speech impairment without weakness (1 point)
 - D Duration: > 60 mins (2 points), 10-59 mins (1 point)
 - D Diabetes (1 point)

Tool interpretation¹

>4 = HIGH risk; ≤4 = LOW risk

Maximum score = 7

- ✓ Urgent* CT or MRI
- ✓ Nil by mouth until bedside swallow screen (within 24 hours) for stroke
- ✓ Aspirin as soon as possible**, if haemorrhage excluded

150-300mg one-time loading unless contraindicated



✓ Physiological monitoring and management:

- **Neurological status**
Regular monitoring to establish baseline and identify change
- **Blood glucose**
Cautious treatment of markedly elevated blood glucose levels; early, intensive maintenance of euglycaemia is not recommended. Avoid hypoglycaemia
- **Blood pressure**
Cautious lowering by no more than 10-20% if extremely high $\geq 220/120$; monitor for neurological deterioration. Avoid hypotension
- **Hydration status**
Maintain euolemia

* 'Urgent' is considered as soon as possible, but certainly less than 24 hrs¹

** 'As soon as possible' is considered within 48 hrs¹

Please note: This care bundle represents key components of stroke and TIA care that are essential to evidence-based stroke care. This is not a complete list of all care components that will be required. Other interventions will be necessary within the continuum of care.

Why focus on stroke?

Acute stroke is a medical emergency. Appropriate initial management can reduce disability and mortality resulting from stroke.²

Stroke is Australia's second single greatest killer after coronary heart disease and is a leading cause of disability.³

Management of acute stroke was identified by the NICS Emergency Care Community of Practice (EC CoP) as an area of clinical concern. For more information about NICS EC CoP, go to www.nhmrc.gov.au/nics.

What is a care bundle?

A care bundle is a group of evidence-based practice points that, when combined, define best care and significantly improve patient outcomes.

Developers of the care bundle concept, the Institute for Healthcare Improvement⁴, suggest that to be effective each component must meet the following criteria:

1. each component must be **based on sound evidence**
2. the delivery of each component must be **in need of improvement**
3. the delivery of each component must be **achievable in terms of resources**
4. no component should be a **major source of controversy**
5. the delivery of each component must be **measurable**.

A key strength of the care bundle concept is that it provides a memory tool as well as a simple mechanism for timely measurement of compliance and, with it, the ability to influence clinical practice accordingly.



What about stroke units and thrombolysis?

Stroke unit care is the highest priority for clinicians and administrators to consider in acute stroke management.¹

Stroke unit care is defined as dedicated, co-ordinated care for stroke patients in hospital under a multidisciplinary team who specialise in stroke management.⁵

Stroke unit care significantly reduces death and disability after stroke compared with conventional care in general wards for all people with stroke.¹

Ideally, all patients suspected of having a stroke should be admitted as quickly as possible to an acute stroke unit.^{1,6} The 'Rapid initial stroke screen' bundle component supports early referral to a stroke unit where available. Currently only about a third of hospitals across Australia offer stroke unit care.²

Thrombolysis is also an important aspect of acute stroke management. Systematic reviews demonstrate a net benefit for patients treated within three hours of stroke with intravenous recombinant tissue plasminogen activator (rt-PA, the only thrombolytic agent approved for use in Australia) in reducing the odds of death or dependency.¹

Thrombolysis has not been included in the bundle as it is currently not recommended for widespread routine use in hospitals without dedicated and organised stroke care or stroke units.^{1,6,7} Early referral to the best available stroke expertise (i.e. a stroke unit, where available) should be a result of the first bundle component, 'Rapid initial stroke screen'. This should result in eligible patients being thrombolysed where the treatment is available.

Scope of the care bundle

The NICS stroke care bundle has been developed for use in the emergency department, by emergency department staff. It is valid for use in adult acute ischaemic stroke and TIA patients.

Unless otherwise described, principles and management of TIA should follow that outlined for ischaemic stroke.¹



Recommendations, grading and levels of evidence

Recommendations, and the grades and evidence levels listed in this document under each component have been quoted directly from the NSF Clinical Guidelines for Acute Stroke Management.¹ The grading and level of evidence listed for each recommendation were assigned by the NSF, according to the NHMRC interim levels of evidence pilot.⁸ Please refer to the *Information and implementation package* for the levels of evidence table.

Grading of recommendations⁸

Grade	Description
A	Body of evidence can be trusted to guide practice
B	Body of evidence can be trusted to guide practice in most situations
C	Body of evidence provides some support for recommendation(s) but care should be taken in its application
D	Body of evidence is weak and recommendation must be applied with caution
✓	Recommended best practice based on clinical experience and expert opinion



✓ Rapid initial stroke screen

ED staff should use a validated stroke screen tool to assist in rapid accurate assessment for all people with stroke [Grade C; Level II]¹

Rationale: The diagnostic accuracy of ED staff is increased by the use of a validated stroke recognition tool, and training in that tool.^{6,9} Rapid and accurate diagnosis leads to earlier and more appropriate referrals to available stroke expertise⁹, i.e. a stroke unit or a physician experienced in stroke care. This in turn should lead to timely treatment and better outcomes.¹⁰

Results from the 2009 NSF *National stroke audit acute services organisational survey report*² also found that half of hospitals surveyed did not have emergency department triage protocols for stroke.

This audit also found that even in hospitals surveyed with stroke units, a third of stroke patients were receiving care on other wards.

There are a number of validated stroke screening tools currently in use in Australia and internationally, including the Cincinnati Prehospital Stroke Scale (CPSS), Face Arm Speech Test (FAST), Los Angeles Prehospital Stroke Screen (LAPSS), Melbourne Ambulance Stroke Screen (MASS), National Institutes of Health Stroke Scale (NIHSS) and Recognition of Stroke in the Emergency Room (ROSIER). The ROSIER scale is the only tool that has been validated specifically for use in the ED following triage.⁹ CPSS, FAST, LAPSS and MASS have been developed and validated for pre-hospital use.

✓ ABCD² assessment when TIA suspected

All patients with suspected TIA should have a full assessment that includes assessment of stroke risk using the ABCD² tool at initial point of health care contact [Grade B; Level II]¹

Rationale: TIA patients are at high risk of subsequent stroke (2.5-5% at 2 days; 5-10% at 30 days; 10-20% at 90 days).¹¹ Efficiency and accuracy of TIA diagnosis and management in the ED is important in preventing subsequent stroke.^{7,12}

The 2009 NSF *National stroke audit acute services organisational survey report*² found that less than half of hospitals surveyed had a defined pathway for assessing TIA patients and only 39% were using a risk stratification tool.

The ABCD² score provides a reliable, validated stratification tool that can be used to determine the treatment of TIA patients.

TIA patients with an ABCD² score of 5 or greater should be designated high risk, be admitted (or, where available, referred to a TIA clinic for urgent assessment) to facilitate rapid assessment, including urgent head imaging (as soon as possible, but certainly within 24 hours), and be treated as for acute stroke.¹

All TIA patients with an ABCD² score of 4 or less should be designated as low risk and should have a CT brain and carotid ultrasound (where indicated) as soon as possible, that is, within 48 to 72 hours. Low risk TIA patients should be referred to a general practitioner, private specialist or TIA clinic for ongoing management.¹



ABCD² Tool¹³

- A Age: ≥ 60 years (1 point)
- B Blood pressure: $\geq 140/90$ mmHg (1 point)
- C Clinical features: unilateral weakness (2 points), speech impairment without weakness (1 point)
- D Duration: > 60 mins (2 points), 10-59 mins (1 point)
- D Diabetes (1 point)

Tool interpretation¹

>4 = HIGH risk; ≤ 4 = LOW risk
Maximum score = 7

Urgent CT or MRI

All patients with suspected stroke should have an urgent* brain CT or MRI [Grade A; Level I]¹

TIA patients classified as high risk (ABCD² > 4) should have an urgent CT brain. Patients classified as low risk (ABCD² < 5) should have a CT brain and carotid ultrasound (where indicated) as soon as possible** [Grade B; Level I & III-3]¹

* 'urgent' is considered as soon as possible, but certainly within 24 hours.

** 'as soon as possible' is considered within 48 - 72 hours.

Rationale: Clinicians disagree on the clinical diagnosis of stroke (versus stroke mimic) in about 20% of patients. Brain imaging is required to distinguish ischaemic stroke from intracranial haemorrhage and stroke mimics and should be performed immediately so that treatment can start promptly.^{11,14}

The 2009 NSF *National stroke audit acute services organisational survey report*² found that one third of rural hospitals surveyed that managed acute stroke patients had no access to CT.

In most instances CT is the most practical initial brain imaging test and will provide enough information to make decisions about emergency management.¹⁵ CT is therefore the modality of choice for the initial brain scan in most patients.^{7,11,14-16}

✓ Nil by mouth until bedside swallow screen (within 24hrs) for stroke

Patients should be screened for swallowing deficits before being given food, drink or oral medications. Screening should be undertaken by personnel specifically trained in swallow screening [Grade C, Level I]¹

Patients should be screened within 24 hours of admission [Grade ✓]¹

Patients who fail the swallowing screen should be referred to a speech pathologist for a comprehensive assessment [Grade ✓]¹

Rationale: Dysphagia occurs in 27-55% of people with new onset strokes.⁷ Dysphagia is associated with an increased risk of complications, such as aspiration, aspiration pneumonia, dehydration and malnutrition.^{14,17}

Early bedside screening is required to prevent dysphagia complications.¹⁴ A failed bedside screen should always be followed by a complete assessment from a speech pathologist prior to ingestion of food, drink or medications.⁷

In the 2007 NSF National stroke audit clinical report acute services, only half of the stroke patients included had a documented swallow screen before being given food or drink.¹⁸

Studies have found that implementation and adherence to a formal dysphagia screening, referral and assessment protocol reduces the incidence of pneumonia, improves process of care and patient outcomes.^{1,17}

TIA patients are not specifically mentioned in the guidelines in relation to bedside swallow screening, although standard practice does not usually require screening for TIA patients.



Screening tools

A simple bedside swallow screen, using a validated tool, should be conducted on admission, or as soon as possible following admission (within 24 hours), to identify possible dysphagic patients who should then be referred for a complete examination by a specialist.^{1,7,11,17,19,20}

A number of screening tools are available, although currently available data, including three systematic reviews, are not able to conclusively recommend one tool over another.^{1,7}

An assessment of gag reflex is not a valid screen for dysphagia and should only be used as part of a more detailed assessment.^{1,15,17,19,20}

Aspirin as soon as possible if haemorrhage excluded

Aspirin (150-300mg) should be given as soon as possible after the onset of stroke symptoms (i.e. within 48 hours) if CT/MRI scan excludes haemorrhage [Grade A; Level I]¹

Rationale: Acute phase aspirin therapy improves outcomes and reduces the risk of early recurrent ischaemic stroke.¹⁴

There is no data from randomised controlled trials to support the use of other antiplatelet regimes in acute stroke patients.⁷

As for stroke, antiplatelet therapy should be commenced in TIA patients as soon as haemorrhage has been excluded.¹

✓ Physiological monitoring and management

- neurological status
- blood glucose
- blood pressure
- hydration status

Patients should have their neurological status (including Glasgow Coma Scale) and vital signs including pulse, blood pressure, temperature, oxygen saturation, glucose, and respiratory pattern monitored and documented regularly during the acute phase, the frequency of such observations being determined by the patient's status [Grade C; Level II & III-2]¹

Patients with hyperglycaemia should have their blood glucose level monitored and appropriate glycaemic therapy instituted to ensure euglycaemia, especially if the patient is diabetic. Hypoglycaemia should be avoided [Grade ✓]¹

Intensive, early maintenance of euglycaemia is currently not recommended [Grade B; Level II]¹

If extremely high blood pressure (BP > 220/120) exists, instituting or increasing antihypertensive therapy may be started, but blood pressure should be cautiously reduced (by no more than 10-20%) and the patient observed for neurological deterioration [Grade ✓]¹

Close monitoring of hydration status and appropriate fluid supplementation should be used to treat or prevent dehydration [Grade B; Level I]¹



Rationale: Monitoring and management of vital signs is routinely conducted for all ED patients. These particular four elements have been included because they require special attention in acute stroke patients. These elements should be included in the initial assessment, with the frequency of subsequent observations determined by the patient's status.

Neurological status: The severity of the initial neurological defect has been found to be the single most important variable in determining the rate and degree of recovery.¹⁹

Monitoring of neurological status using regular neurological observations during the acute phase helps to identify deterioration which can lead to earlier intervention.¹⁹ Possible assessment tools include the Glasgow Coma Scale, Canadian Neurological Scale and National Institutes of Health Stroke Scale.

Blood glucose: Hyperglycaemia at the time of acute stroke is associated with poorer clinical outcomes¹, infarct progression, greater mortality and reduced functional recovery.^{6,7,11,14-16,19} Hypoglycaemia may cause focal neurological deficits¹⁵ that can be reversed by treatment.^{7,11,15}

There is little evidence to support early, aggressive control of blood glucose in patients with mild to moderately elevated glucose levels, however general consensus suggests that cautious treatment of patients with markedly elevated blood glucose is reasonable.^{1,7,15,16}

Blood pressure: Both hyper and hypotension have been found to negatively affect outcomes in acute stroke, although evidence regarding specific therapies is lacking.¹⁴ General consensus is for markedly elevated blood pressure (BP > 220/120) to be cautiously reduced^{1,11,15,16} (by no more than 10-20%) and patient observed for neurological deterioration.¹

Hydration status: Suboptimal fluid intake leads to negative outcomes.¹⁴ This is particularly problematic in patients with dysphagia. Dehydration is linked to cerebral hypoperfusion²¹ and increased ischaemic penumbra* size.²²

* Ischaemic penumbra is the cerebral area peripheral to the area of ischaemia where metabolism is active but blood flow is diminished.

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