



*National Institute for
Health and Clinical Excellence*

Quick reference guide

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Stroke

Diagnosis and initial management of acute stroke and transient ischaemic attack (TIA)

About this booklet

This is a quick reference guide that summarises the recommendations NICE has made to the NHS in 'Stroke: diagnosis and initial management of acute stroke and transient ischaemic attack (TIA)' (NICE clinical guideline 68).

Who should read this booklet?

This quick reference guide is for all healthcare professionals who care for people with acute stroke or TIA.

Who wrote the guideline?

The guideline was developed by the National Collaborating Centre for Chronic Conditions, which is based at the Royal College of Physicians. The Collaborating Centre worked with a group of healthcare professionals (including consultants, GPs and nurses), patients and carers, and technical staff, who reviewed the evidence and drafted the recommendations. The recommendations were finalised after public consultation.

For more information on how NICE clinical guidelines are developed, go to www.nice.org.uk

Where can I get more information about the guideline?

The NICE website has the recommendations in full, reviews of the evidence they are based on, a summary of the guideline for patients and carers, and tools to support implementation (see inside back cover for more details).

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NICE clinical guidelines are recommendations about the treatment and care of people with specific diseases and conditions in the NHS in England and Wales.

This guidance represents the view of the Institute, which was arrived at after careful consideration of the evidence available. Healthcare professionals are expected to take it fully into account when exercising their clinical judgement. However, the guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer, and informed by the summary of product characteristics of any drugs they are considering.

Implementation of this guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the guidance, in their local context, in light of their duties to avoid unlawful discrimination and to have regard to promoting equality of opportunity. Nothing in this guidance should be interpreted in a way that would be inconsistent with compliance with those duties.

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Key to terms

ABCD²: prognostic score to identify people at high risk of stroke after a TIA

FAST: Face Arm Speech Test (used to screen for a diagnosis of stroke or TIA)

MUST: Malnutrition Universal Screening Tool

ROSIER: Recognition of Stroke in the Emergency Room (used to confirm a diagnosis of stroke or TIA)

Further details about these tools can be found in Appendix D of the NICE guideline.

Introduction

Stroke is a major health problem in the UK. It accounts for around 11% of deaths, results in significant morbidity in people who survive, and represents a substantial health and resource burden. Symptoms of stroke include numbness, weakness or paralysis, slurred speech, blurred vision, confusion and severe headache. A transient ischaemic attack (TIA) is defined as stroke symptoms and signs that resolve within 24 hours.

This guideline covers interventions in the acute stage of a stroke ('acute stroke') or TIA. Most of the recommendations relate to interventions in the first 48 hours after onset of symptoms, although some interventions up to 2 weeks are covered. There is evidence that rapid diagnosis, admission to a specialist stroke unit, and immediate brain imaging and use of thrombolysis where indicated can all contribute to a better outcome for patients. For people who have had a TIA, rapid assessment for risk of subsequent stroke allows appropriate treatment to be initiated to reduce the likelihood of stroke occurring.

Patient-centred care

Stroke has a sudden and sometimes dramatic impact on the person and their family. Treatment and care should take into account peoples' individual needs and preferences where possible. Good communication is essential, supported by evidence-based information, to allow people to reach informed decisions about their care when they are able to do so. If the person agrees, families and carers should have the opportunity to be involved in decisions about treatment and care. However, the person's consent may be difficult to obtain at the time of an acute episode, or where the stroke or TIA results in communication problems. If the person does not have the capacity to make decisions, follow the Department of Health guidelines – 'Reference guide to consent for examination or treatment' (2001) (available from www.dh.gov.uk/consent). Also follow the code of practice accompanying the Mental Capacity Act: a summary is available from www.publicguardian.gov.uk, which also gives details about lasting power of attorney and advance decisions about treatment.

All aspects of care must be patient-centred, and where possible based on full discussion with the person and/or their families and carers. It should be borne in mind that some recommendations in the guideline may not be appropriate for people who are dying or who have severe comorbidities.

Key priorities for implementation

Rapid recognition of symptoms and diagnosis

- In people with sudden onset of neurological symptoms a validated tool, such as FAST (Face Arm Speech Test), should be used outside hospital to screen for a diagnosis of stroke or TIA.
- People who have had a suspected TIA who are at high risk of stroke (that is, with an ABCD² score of 4 or above) should have:
 - aspirin (300 mg daily) started immediately
 - specialist assessment^a and investigation within 24 hours of onset of symptoms
 - measures for secondary prevention introduced as soon as the diagnosis is confirmed, including discussion of individual risk factors.
- People with crescendo TIA (two or more TIAs in a week) should be treated as being at high risk of stroke, even though they may have an ABCD² score of 3 or below.

Specialist care for people with acute stroke

- All people with suspected stroke should be admitted directly to a specialist acute stroke unit^b following initial assessment, either from the community or from the A&E department.
- Brain imaging should be performed immediately^c for people with acute stroke if any of the following apply:
 - indications for thrombolysis or early anticoagulation treatment
 - on anticoagulant treatment
 - a known bleeding tendency
 - a depressed level of consciousness (Glasgow Coma Score below 13)
 - unexplained progressive or fluctuating symptoms
 - papilloedema, neck stiffness or fever
 - severe headache at onset of stroke symptoms.

Nutrition and hydration

- On admission, people with acute stroke should have their swallowing screened by an appropriately trained healthcare professional before being given any oral food, fluid or medication.

^a Specialist assessment includes exclusion of stroke mimics, identification of vascular treatment, identification of likely causes, and appropriate investigation and treatment.

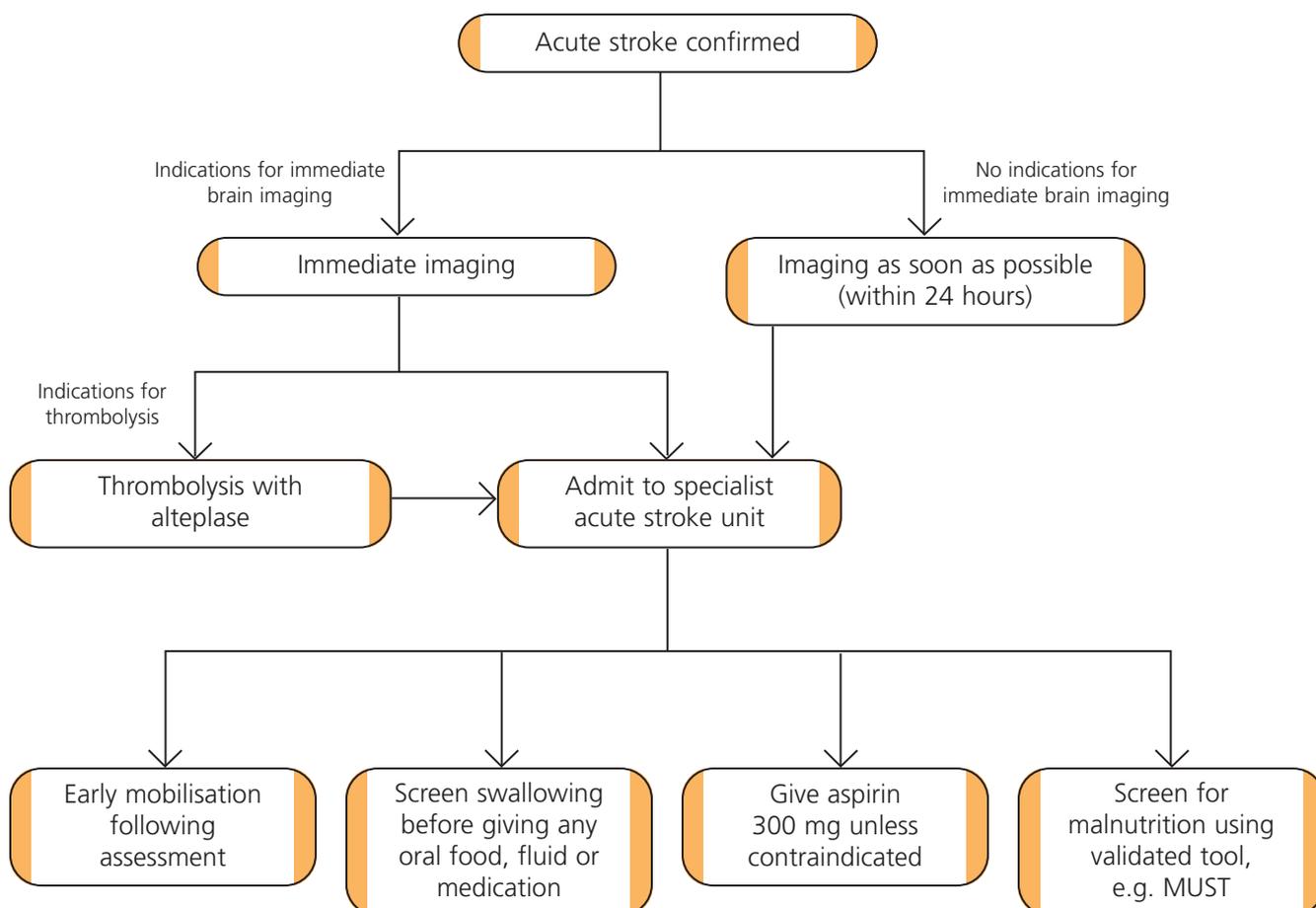
^b An acute stroke unit is a discrete area in the hospital that is staffed by a specialist stroke multidisciplinary team. It has access to equipment for monitoring and rehabilitating patients. Regular multidisciplinary team meetings occur for goal setting.

^c The Guideline Development Group felt that 'immediately' is defined as 'ideally the next slot and definitely within 1 hour, whichever is sooner', in line with the National Stroke Strategy.

Rapid recognition of symptoms and diagnosis

- Outside hospital, use a validated tool such as FAST (Face Arm Speech Test) to screen for a diagnosis of stroke or TIA in people with sudden onset of neurological symptoms.
- Exclude hypoglycaemia as the cause of sudden-onset neurological symptoms.
- In A&E, establish the diagnosis rapidly using a validated tool such as ROSIER (Recognition of Stroke in the Emergency Room).

Emergency treatment for people with acute stroke



Specialist stroke units

- Admit anyone with a suspected stroke directly to a specialist acute stroke unit^a after assessment, from either the community or A&E.

^a An acute stroke unit is a discrete area in the hospital that is staffed by a specialist stroke multidisciplinary team. It has access to equipment for monitoring and rehabilitating patients. Regular multidisciplinary team meetings occur for goal setting.

Brain imaging

- Perform brain imaging immediately^a if any of these apply:
 - indications for thrombolysis or early anticoagulation treatment
 - on anticoagulant treatment
 - a known bleeding tendency
 - a depressed level of consciousness (Glasgow Coma Score [GCS] <13)
 - unexplained progressive or fluctuating symptoms
 - papilloedema, neck stiffness or fever
 - severe headache at onset of stroke symptoms.
- Otherwise perform brain imaging as soon as possible^b.

Thrombolysis with alteplase

- Consider giving alteplase for treatment of acute ischaemic stroke if indicated by exclusion of intracranial haemorrhage.
 - Alteplase must be used in full accordance with its marketing authorisation, which states:
 - ◆ use within 3 hours of symptom onset
 - ◆ treatment must be performed by a physician specialised in neurological care.
- Alteplase should be administered only within in a well-organised stroke service with:
 - staff trained in delivering thrombolysis and in monitoring for any associated complications
 - level 1 and level 2 nursing care staff trained in acute stroke and thrombolysis
 - immediate access to imaging and re-imaging, and staff trained to interpret the images.
- Staff in A&E who are trained and supported can administer thrombolysis (in accordance with its marketing authorisation) if patients are managed within a specialist acute stroke service.
- Consider blood pressure reduction to 185/110 mmHg or lower in people who are candidates for thrombolysis.

Swallowing and nutrition

- Screen the person's swallowing before giving any oral food, fluid or medication.
- Screen for malnutrition on admission using a validated tool such as MUST (Malnutrition Universal Screening Tool).

Early mobilisation

- Help the person to sit up as soon as possible (when their clinical condition permits).
- Mobilise the person as soon as possible (when their clinical condition permits), as part of an active management programme in a specialist stroke unit.

^a 'Immediately' is defined as 'ideally the next slot and definitely within 1 hour, whichever is sooner', in line with the National Stroke Strategy.

^b 'As soon as possible' is defined as 'within a maximum of 24 hours after onset of symptoms', in line with the National Stroke Strategy.

Pharmacological treatment for people with acute stroke

Aspirin and anticoagulation treatment for stroke and comorbidities

Type of stroke (and comorbidities)	Treatment
Aspirin and anticoagulant treatment	
Acute ischaemic stroke without primary intracerebral haemorrhage	<ul style="list-style-type: none"> • Give aspirin 300 mg as soon as possible, and certainly within 24 hours: <ul style="list-style-type: none"> – orally if the person is not dysphagic – rectally or by enteral tube if they have dysphagia. • Continue aspirin for 2 weeks after symptom onset (or until discharge if sooner) and then initiate long-term antithrombotic treatment. • Give a proton pump inhibitor in addition to aspirin if previous dyspepsia with aspirin is reported. • Give an alternative antiplatelet agent if the person is allergic to or genuinely intolerant of aspirin*. • Do not give anticoagulants routinely for treatment of acute stroke[†].
Acute venous stroke (cerebral venous sinus thrombosis, including secondary cerebral haemorrhage)	<ul style="list-style-type: none"> • Give full-dose anticoagulation treatment (initially full-dose heparin and then warfarin [INR 2–3]) unless there are comorbidities that preclude its use.
Stroke secondary to acute arterial dissection	<ul style="list-style-type: none"> • Treat with either anticoagulants or antiplatelet agents, preferably as part of a randomised controlled trial.
Acute ischaemic stroke associated with antiphospholipid syndrome	<ul style="list-style-type: none"> • Treat in the same way as people with acute ischaemic stroke without antiphospholipid syndrome.
Haemorrhagic stroke (primary intracerebral haemorrhage) – reversal of anticoagulation	<ul style="list-style-type: none"> • Return clotting levels to normal as soon as possible in people who were receiving anticoagulants before their stroke (and have elevated INR), using a combination of prothrombin complex concentrate and intravenous vitamin K.
Anticoagulation for comorbidities	
Disabling ischaemic stroke and atrial fibrillation	<ul style="list-style-type: none"> • Give aspirin 300 mg for the first 2 weeks before considering anticoagulants.
Disabling cerebral infarction and prosthetic valves, with significant risk of haemorrhagic transformation	<ul style="list-style-type: none"> • Stop anticoagulants and substitute aspirin 300 mg for 1 week.
Ischaemic stroke and symptomatic proximal DVT or PE	<ul style="list-style-type: none"> • Give anticoagulants rather than aspirin unless there are contraindications.
Haemorrhagic stroke and symptomatic DVT or PE	<ul style="list-style-type: none"> • Treat with either anticoagulants or a caval filter.
<p>* Aspirin intolerance is defined as either a proven hypersensitivity to aspirin-containing medicines or a history of severe dyspepsia induced by low-dose aspirin.</p> <p>[†] If prophylactic anticoagulation is given because the risk of venous thromboembolism outweighs the risk of haemorrhagic transformation, review the patient regularly. Further details will be included in the forthcoming NICE clinical guideline 'The prevention of venous thromboembolism in all hospital patients' (publication expected September 2009).</p> <p>Abbreviations: DVT, deep vein thrombosis; INR, international normalised ratio; PE, pulmonary embolism.</p>	

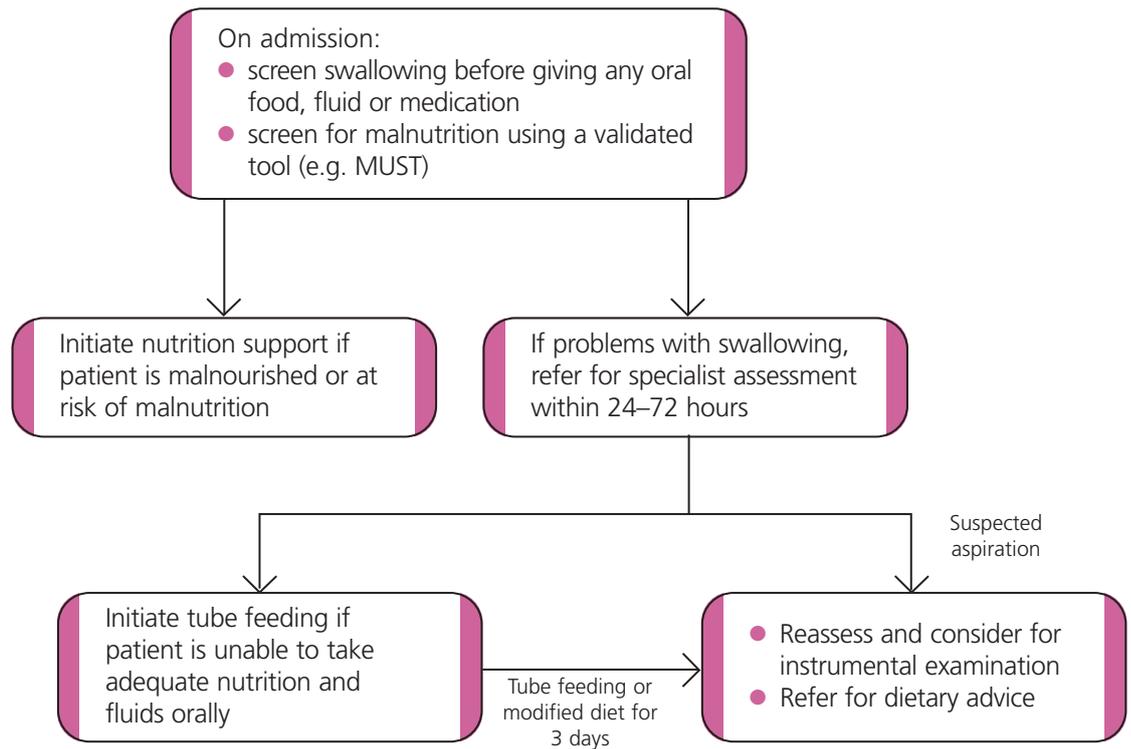
Statins

- Do not start statin treatment immediately after an acute stroke^a.
- Continue statin treatment for people with acute stroke who are already taking statins.

^a The consensus of the Guideline Development Group is that it would be safe to start statins after 48 hours.

Specialist care for people with acute stroke

Swallowing and nutrition



Assessment of swallowing function

- For people with acute stroke who are unable to take adequate nutrition and fluids orally:
 - initiate feeding with a nasogastric tube within 24 hours of admission
 - consider using a nasal bridle tube or gastrostomy if the person is unable to tolerate a nasogastric tube
 - refer for detailed nutritional assessment, individualised advice and monitoring.
- In people with dysphagia, give food and fluids in a form that can be swallowed without aspiration, following the specialist assessment of swallowing.

Oral nutritional supplementation

- Screen for malnutrition on admission and then weekly using a validated tool such as MUST.
- Screening for malnutrition and the risk of malnutrition should be carried out by healthcare professionals with appropriate skills and training.
- Be aware that dysphagia, poor oral health and reduced ability to self-feed will affect nutrition in people with stroke.

- Do not give routine nutritional supplementation if the person is adequately nourished on admission.
- Initiate nutritional support for people with stroke who are at risk of malnutrition. This may include oral nutritional supplements, specialist dietary advice and/or tube feeding.
- Assess the person's hydration on admission; review regularly and manage so that normal hydration is maintained.

Maintenance or restoration of homeostasis

Supplemental oxygen therapy

- Give supplemental oxygen only if oxygen saturation drops below 95%.

Blood sugar control

- Maintain blood glucose concentration between 4 and 11 mmol/litre.
- Provide optimal insulin therapy with intravenous insulin and glucose for people with diabetes.

Blood pressure control

- Give anti-hypertensive treatment only if there is a hypertensive emergency with one or more of the following:
 - hypertensive encephalopathy
 - hypertensive nephropathy
 - hypertensive cardiac failure/myocardial infarction
 - aortic dissection
 - pre-eclampsia/eclampsia
 - intracerebral haemorrhage with systolic blood pressure >200 mmHg.
- Consider blood pressure reduction to 185/110 mmHg or lower in people who are candidates for thrombolysis.

Surgery for people with acute stroke

Surgical referral for acute intracerebral haemorrhage

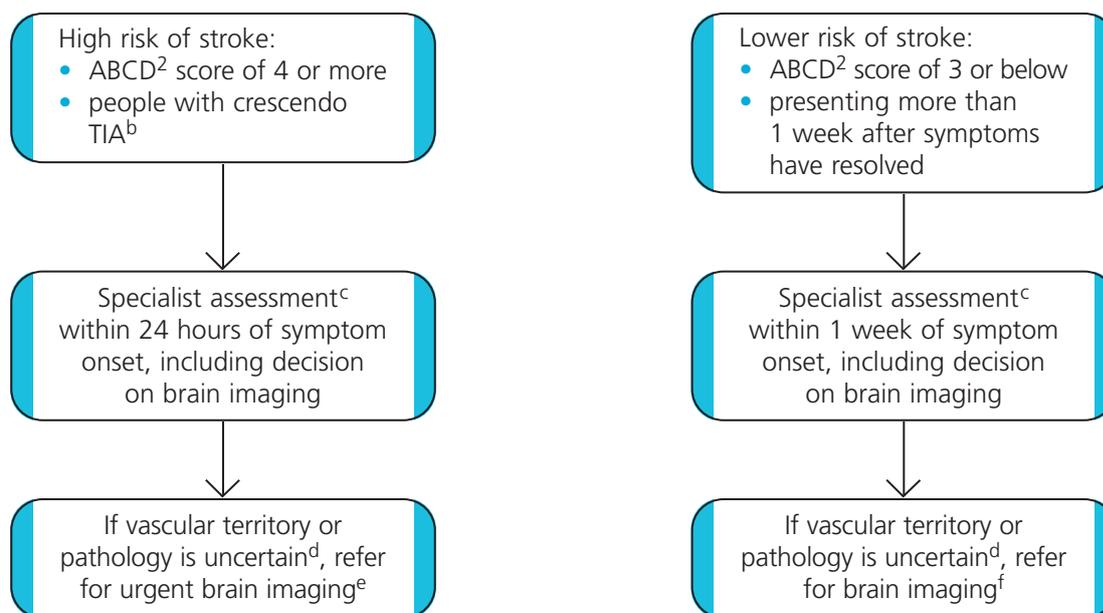
- Stroke services should agree protocols for monitoring, referral and transfer of people to regional neurosurgical centres for the management of symptomatic hydrocephalus.
- People with intracranial haemorrhage should be monitored by specialists in neurosurgical or stroke care for deterioration in function and referred immediately for brain imaging when necessary.
- Consider surgery following a primary intracranial haemorrhage if the person has hydrocephalus and was previously fit.
- Give medical treatment initially, rather than referring them for surgery, to people with any of:
 - small deep haemorrhages
 - lobar haemorrhage without either hydrocephalus or rapid neurological deterioration
 - a large haemorrhage and significant comorbidities before the stroke
 - a GCS score below 8 (unless because of hydrocephalus)
 - posterior fossa haemorrhage.

Surgical referral for decompressive hemicraniectomy

- Consider referring for decompressive hemicraniectomy if middle cerebral artery (MCA) infarction is present and all criteria below are met.
 - Aged 60 years or under.
 - Clinical deficits suggestive of infarction in the territory of the MCA with a National Institutes of Health Stroke Scale (NIHSS) score above 15.
 - Decrease in the level of consciousness to give a score of 1 or more on item 1a of the NIHSS.
 - Signs on CT scan of an infarct of at least 50% of MCA territory, with or without additional infarction in the territory of the anterior or posterior cerebral artery on the same side, or infarct volume greater than 145 cm³ as shown on diffusion-weighted MRI.
- Refer within 24 hours of symptom onset.
- Perform surgery within 48 hours of symptom onset.
- People who are referred for decompressive hemicraniectomy should be monitored by appropriately trained professionals skilled in neurological assessment.

People with TIA – assessment, early management and imaging

- Start daily aspirin (300 mg) immediately.
 - Introduce measures for secondary prevention as soon as the diagnosis is confirmed, including discussion of individual risk factors.
- Assess risk of subsequent stroke as soon as possible using a validated scoring system^a such as ABCD².



- Use diffusion-weighted MRI for brain imaging, except where contraindicated. For these people use CT scanning.

^a These scoring systems exclude certain populations that may be at particularly high risk of stroke, such as those with recurrent TIAs and those on anticoagulation treatment, who also need urgent evaluation. They also may not be relevant to patients who present late.

^b Two or more TIAs in a week.

^c Specialist assessment includes exclusion of stroke mimics, identification of vascular treatment, identification of likely causes, and appropriate investigation and treatment.

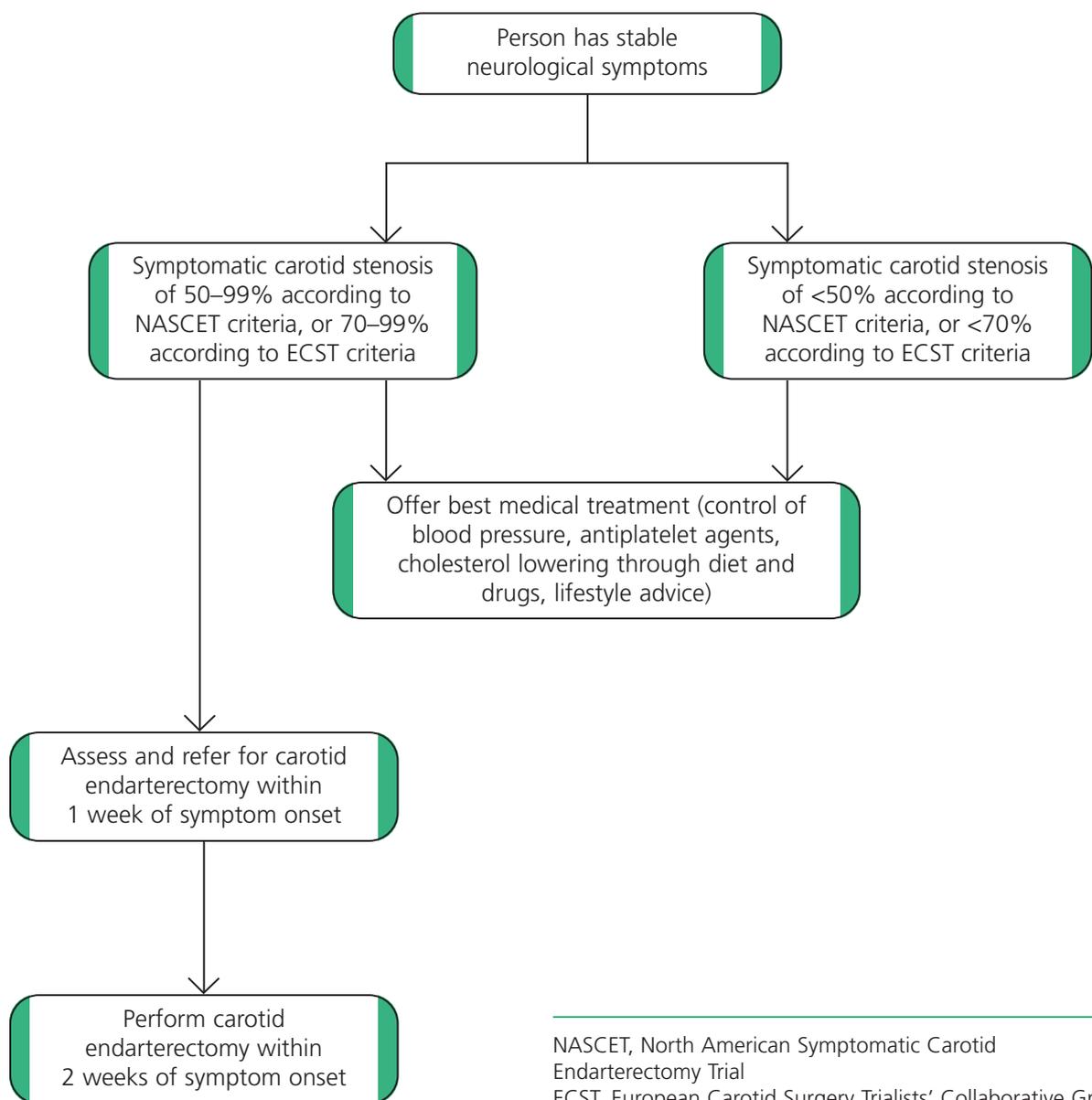
^d Examples of where brain imaging is helpful in the management of TIA are listed in the NICE guideline (section 1.2.1).

^e Within 24 hours of symptom onset, in line with the National Stroke Strategy.

^f Within 1 week of symptom onset, in line with the National Stroke Strategy.

Carotid imaging and carotid endarterectomy for people with TIA or non-disabling stroke

- If the person is identified as a candidate for carotid endarterectomy on specialist assessment, perform carotid imaging within 1 week of symptom onset.



- Make sure that carotid imaging reports state clearly which criteria (ECST or NASCET) were used when measuring the extent of carotid stenosis.

Implementation tools

NICE has developed tools to help organisations implement this guidance (listed below).

These are available on our website (www.nice.org.uk/CG068).

- Slides highlighting key messages for local discussion.

- Costing report to estimate the national savings and costs associated with implementation.
- Audit support for monitoring local practice.

Further information

Ordering information

You can download the following documents from www.nice.org.uk/CG068

- A quick reference guide (this document) – a summary of the recommendations for healthcare professionals.
- The NICE guideline – all the recommendations.
- ‘Understanding NICE guidance’ – information for patients and carers.
- The full guideline – all the recommendations, details of how they were developed, and reviews of the evidence they were based on.

For printed copies of the quick reference guide or ‘Understanding NICE guidance’, phone NICE publications on 0845 003 7783 or email publications@nice.org.uk and quote:

- N1621 (quick reference guide)
- N1622 (‘Understanding NICE guidance’).

Related NICE guidance

For information about NICE guidance that has been issued or is in development, see the website (www.nice.org.uk).

Published

- Lipid modification: cardiovascular risk assessment and the modification of blood lipids for the primary and secondary prevention of cardiovascular disease. NICE clinical guideline 67 (2008). Available from: www.nice.org.uk/CG067
- Alteplase for the treatment of acute ischaemic stroke. NICE technology appraisal 122 (2007). Available from: www.nice.org.uk/TA122
- Hypertension: management of hypertension in adults in primary care. NICE clinical guideline 34 (2006). Available from: www.nice.org.uk/CG034

- Nutrition support in adults: oral nutrition support, enteral tube feeding and parenteral nutrition. NICE clinical guideline 32 (2006). Available from: www.nice.org.uk/CG032
- Clopidogrel and modified-release dipyridamole in the prevention of occlusive vascular events. NICE technology appraisal 90 (2005). Available from: www.nice.org.uk/TA090
- Type 1 diabetes: diagnosis and management of type 1 diabetes in children, young people and adults. NICE clinical guideline 15 (2004). Available from: www.nice.org.uk/CG015

Under development

- The prevention of venous thromboembolism in all hospital patients. NICE clinical guideline (publication expected September 2009).

Updating the guideline

This guideline will be updated as needed, and information about the progress of any update will be posted on the NICE website (www.nice.org.uk/CG068).

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