Secondary prevention of ischaemic stroke

Consider all of the following

Brain imaging
Perform Doppler ultrasound of carotid arteries
Consider carotid endarterectomy

Assess heart rhythm

Glycaemic control in diabetic patients

Control blood pressure (BP) and cholesterol

Provide lifestyle advice

Short term follow-up

Refer back to GP for long term follow-up

Prevent future events

Assess heart rhythm

Consider carotid endarterectomy

Sinus rhythm - consider antiplatelet medication

Atrial fibrillation (AF)

Atrial fibrillation (AF) including paroxysmal AF - consider anticoagulation

Glycaemic control in diabetic patients

Provide lifestyle advice

Control blood pressure (BP) and cholesterol

Short term follow-up

Refer back to GP for long term follow-up

Information resources for patients and carers

Secondary prevention of ischaemic stroke

Provide information for patients

Consider all of the following

Brain imaging
Perform Doppler ultrasound of carotid arteries
Consider carotid endarterectomy

Assess heart rhythm

Glycaemic control in diabetic patients

Control blood pressure (BP) and cholesterol

Provide lifestyle advice

Short term follow-up

Refer back to GP for long term follow-up

Prevent future events

Assess heart rhythm

Consider carotid endarterectomy

Sinus rhythm - consider antiplatelet medication

Atrial fibrillation (AF)

Atrial fibrillation (AF) including paroxysmal AF - consider anticoagulation

Glycaemic control in diabetic patients

Provide lifestyle advice

Control blood pressure (BP) and cholesterol

Short term follow-up

Refer back to GP for long term follow-up

Prevent future events

Assess heart rhythm

Consider carotid endarterectomy

Sinus rhythm - consider antiplatelet medication

Atrial fibrillation (AF)

Atrial fibrillation (AF) including paroxysmal AF - consider anticoagulation

Glycaemic control in diabetic patients

Provide lifestyle advice

Control blood pressure (BP) and cholesterol

Short term follow-up

Refer back to GP for long term follow-up
1 Background information

Quick info:
Scope:
- management of transient ischaemic attack (TIA) and acute stroke, including:
  - acute diagnosis and treatments, including hyperacute stroke units (HASU) and thrombolysis
  - aspects of rehabilitation
  - long-term care and support
  - secondary prevention
  - prevention of complications
  - management of carotid artery disease
Out of scope:
- primary prevention of stroke
- detailed recommendations on (neuro)surgical techniques, but the role of surgery is considered
- diagnosis and management of children with stroke
- management of subarachnoid haemorrhage

Definition:
- TIA:
  - rapid onset of global or focal impairment of brain function
  - due to vascular pathology
  - lasts less than 24 hours
- stroke:
  - a medical emergency requiring immediate response
  - clinical syndrome of rapid onset of global or focal impairment of brain function
  - due to vascular pathology
  - lasts more than 24 hours or results in death
- ischaemic stroke:
  - in situ disease of small vessels due to hypertension and diabetes; or
  - atherosclerotic plaque rupture and local vessel occlusion (usually in the carotid artery); or
  - thromboembolism usually from an atrial thrombus secondary to atrial fibrillation (AF)
- haemorrhagic stroke:
  - in situ disease of small vessels due to hypertension; or
  - atherosclerotic disease in the cerebral vessels (which weakens the vessel walls); or
  - cerebral amyloid angiopathy which is increasingly recognised in the elderly; or
  - congenital aneurysms or arteriovenous malformation in the cerebral vessels

Incidence and prevalence:
- stroke [1]:
  - affects between 174 and 216 people per 100,000 population in the UK each year
  - accounts for 11% of all deaths in England and Wales
  - 69% of strokes are due to cerebral infarction
  - 13% of strokes are due to primary haemorrhage
  - 6% of strokes are due to subarachnoid haemorrhage
  - 12% of strokes are of an uncertain type
  - the risk of recurrent stroke within 5 years of a first stroke is between 30% and 43%
- TIA:
  - affects 35 people per 100.000 of the population per year [1]
  - there is a 20% risk of a full stroke within the first 4 weeks after a TIA [2]

Risk factors:
Stroke - secondary prevention

- increasing age
- male gender
- African-Carribean or Asian background
- hypertension
- diabetes mellitus (DM)
- atrial fibrillation (AF)
- previous history of stroke or ischaemic heart disease
- high cholesterol
- smoking
- carotid stenosis
- excessive alcohol consumption
- obesity
- lack of exercise
- a diet that is:
  - high in saturated fats
  - high in salt
  - low in fresh fruit and vegetables
- congenital heart disease

NB: This information appears on each page of this care map.

References:

2 Information resources for patients and carers

Quick info:
The following resource has been recommended by the Department of Health's National Stroke Strategy:

The following resources have been produced by organisations certified by The Information Standard:
- 'Diet and Hypertension' (PDF) from British Dietetic Association at http://www.bda.uk.com
- 'Haemorrhagic stroke' (URL) from Bupa at http://www.bupa.co.uk
- 'Stroke' (PDF) from Brain & Spine Foundation at http://www.brainandspine.org.uk
- 'Stroke' (URL) from Bupa at http://www.bupa.co.uk
- 'Stroke' (URL) from Datapharm at http://www.medguides.medicines.org.uk
- 'Stroke' (PDF) from Patient UK at http://www.patient.co.uk
- 'Stroke and high blood pressure' (URL) from Blood Pressure Association at http://www.bpassoc.org.uk
- Sue Ryder Care at http://www.suerydercare.org
- 'Transient Ischaemic Attack (TIA)' (URL) from Bupa at http://www.bupa.co.uk
- 'Transient Ischaemic Attack (TIA)' (URL) from Datapharm at http://www.medguides.medicines.org.uk
- 'Transient Ischaemic Attack (TIA)' (URL) from Patient UK at http://www.patient.co.uk
- The Carers Resource at http://www.carersresource.org
- The Disabled Living Foundation at http://www.dlf.org.uk
- The Stroke Association at http://www.stroke.org.uk
Stroke - secondary prevention

Derbyshire local pathways > Neurology > Stroke

• ‘Understanding NICE guidance: Early assessment and treatment of people who have had a stroke or transient ischaemic attack (TIA)’ (PDF) from National Institute for Health and Clinical Excellence (NICE) at http://www.nice.org.uk

Information for carers and people with disabilities is available at:

• ’Caring for someone’ (URL) from Directgov at http://www.direct.gov.uk

• ’Disabled people’ (URL) from Directgov at http://www.direct.gov.uk

Patient stories describing their care journeys are available at ‘Healthtalkonline’ (URL) from DIPEx at http://www.healthtalkonline.org.

Explanations of clinical laboratory tests used in diagnosis and treatment are available at ‘Understanding Your Tests’ (URL) from Lab Tests Online-UK at http://www.labtestsonline.org.uk.

NB: This information appears on each page of this care map.

3 Updates to this care map

Quick info:

Date of publication: 20-May-2011

This care map was created in line with the following references:


Stroke - secondary prevention

4 Note: this care map is currently under local review within Derbyshire

Quick info:
For further information, please contact Anne Hayes, NHS Derbyshire County Public Health Specialist

5 Secondary prevention of ischaemic stroke

Quick info:
It is essential that the 'Stroke - suspected' page is consulted prior to this section.
All patients who have had non-disabling stroke or transient ischemic attack (TIA), and in whom preventative treatment is appropriate, should receive best medical treatment, including all of the following:
• started on aspirin 300mg daily without delay unless there are contraindications, when alternative antiplatelet drugs such as clopidogrel should be started [1]
• carotid imaging should be carried out on all individuals who have symptoms of a non-disabling stroke or TIA in the carotid territory [6]:
  • for those with high risk of stroke (ABCD2 score of 4 or more) carotid imaging should be carried out as soon as possible, preferably within 24 hours of presentation
  • those with a lower risk of stroke (ABCD2 score 3 or below) should be imaged within 1 week of presentation
• treat patients with crescendo TIA (two or more TIAs in a week) as being at high risk of stroke, even though they may have an ABCD2 score of 3 or below [1,6]
• people who present more than one week after their last symptom of TIA has resolved should be managed using the lower risk pathway
• glycaemic control in diabetic patients [1]
• reduction of blood pressure (BP) [6]
• consideration of heart rhythm [1]
• control of cholesterol [6]
• provision lifestyle advice [1]

For every patient, an individualised and comprehensive strategy for stroke prevention should [1]:
• be implemented as soon as possible following a TIA or stroke (within 1 week)
• continue long term
• include potential interventions available to reduce risk of further stroke/vascular events:
  • in any patient where no common cause is identified, fuller investigation for other rare causes should be considered [6]

References:
6 Provide information for patients

Quick info:
Information about stroke and risk factors should be:
- given to patients first in the hospital setting [1]
- reinforced at every opportunity by all health professionals involved in the care of the patient [1,5]
- provided in an appropriate format for the patient, taking into account both their stroke-specific impairments and their personal situation [1,5]

All patients receiving medication for secondary prevention should [1]:
- be given information about the reason for the medication, how and when to take it, and any possible common side effects
- receive verbal and written information about their medication in a format appropriate to their needs and abilities
- have compliance aids (eg large-print labels and non-childproof tops) provided according to their level of manual dexterity, cognitive impairment, and personal preference, and compatible with safety in the home environment
- be aware of how to obtain further supplies of medication

References:

8 Brain imaging

Quick info:
People who have had a suspected transient ischaemic attack (TIA) – ie whose symptoms and signs have completely resolved within 24 hours – should be assessed by a specialist [1]:
- within 24 hours for those with high risk TIAs (ABCD2 greater than 3) [6]
- within one week of onset of symptoms for those with ABCD2 score less than 4 [6]
- before a decision on brain imaging is made [1]

People who have had a suspected TIA who need brain imaging, ie those in whom vascular territory or pathology is uncertain, should undergo diffusion-weighted MRI, except where contraindicated, in which case CT scanning should be used [1].

Contraindications to MRI include patients who have any of the following [4]:
- a pacemaker
- shrapnel
- some brain aneurysm clips and heart valves
- metal fragments in eyes
- severe claustrophobia

Brain imaging is helpful in the management of TIA for certain cases, eg for patients [4]:
- with TIA where haemorrhage needs to be excluded, eg long duration of symptoms or people on anticoagulants
- being considered for carotid endarterectomy where it is uncertain whether the stroke is in the anterior or posterior circulation
- where an alternative diagnosis is being considered, eg migraine, epilepsy, or tumour

References:

9 Perform Doppler ultrasound of carotid arteries

Quick info:
All people with suspected non-disabling stroke or transient ischemic attack (TIA), who after specialist assessment are considered as candidates for carotid endarterectomy, should have carotid imaging [1,6]:


This care map was published by . A printed version of this document is not controlled so may not be up-to-date with the latest clinical information.
10 Assess heart rhythm

Quick info:
Assessing heart rhythm:
- use ECG with prolonged recording if paroxysmal arrhythmia is suspected [7]
- patients with atrial fibrillation (AF) and transient ischaemic attack (TIA) or stroke should be anticoagulated unless there are contraindications [1,6]

References:

11 Glycaemic control in diabetic patients

Quick info:
Ensure good glycaemic control in diabetic patients [7]:
- check glycated haemoglobin (HbA1c)
- consider altering hypoglycaemic medication and/or insulin
- provide education and support
- see the ‘Diabetes’ care map for further details

Reference:

12 Control blood pressure (BP) and cholesterol

Quick info:
Blood pressure (BP):
- the optimal target for BP for those with established cardiovascular disease (CVD) is consistently below 130/80mmHg [1,3]
- in patients with bilateral severe internal carotid artery stenosis a higher target, e.g. systolic BP of 150mmHg, may be more appropriate [1,3]
**Stroke - secondary prevention**

**Derbyshire local pathways > Neurology > Stroke**

- BP reduction should be undertaken using one or more of the following agents [1]:
  - in hypertensive patients age 55 years or older, or patients of African or Caribbean origin of any age, the first choice for initial therapy should be either a calcium-channel blocker or a thiazide-type diuretic
  - in hypertensive patients younger than age 55 years, the first choice for initial therapy should be an angiotensin-converting enzyme (ACE) inhibitor (or an angiotensin-II receptor antagonist if an ACE inhibitor is not tolerated)
  - an ACE inhibitor, calcium-channel blocker, or a thiazide-type diuretic should be added if target BP is not achieved with the initial choice
  - beta-blockers should not usually be initiated as first- or second-line for the prevention of recurrent stroke (unless there are other specific clinical indications) [1]

**Lipid modification:**

- evidence shows statins significantly reduce subsequent major coronary events in patients with a history of stroke or transient ischemic attacks (TIA) [29,30]
- immediate statin treatment is not recommended in patients with acute stroke – consider use after 48 hours [4]
- patients with acute stroke already receiving statins should continue with treatment [4]
- all patients with ischaemic stroke or TIA with a total cholesterol of more than 3.5 mmol/L should be treated with a statin medication unless contraindicated [1,6]
- treatment goals should be the following (whichever achieves the lowest absolute value) [1,6]:
  - total cholesterol less than 4.0 mmol/L and LDL cholesterol less than 2.0 mmol/L, or
  - a 25% reduction in total cholesterol and a 30% reduction in LDL cholesterol
- avoid statin therapy or use with caution (if required for other indications) in individuals with a history of haemorrhagic stroke, particularly those with inadequately controlled hypertension [4]

NB: Before prescribing any medication, product information and drug reference guides should be consulted to check indications, contraindications, cautions, and interactions [4].

**References:**


### 13 Provide lifestyle advice

**Quick info:**

*Provide education and support to the patient on the following:*

- cessation of smoking [1,3,5]:
  - prompt smoking cessation at every opportunity using individualised strategies which may include pharmacological agents and/or psychological support [1]
  - see 'Smoking cessation' care map
- maintaining alcohol consumption within limit (3 units/day for men and 2 units/day for women) [1,3,5]
- reducing body weight for overweight or obese patients – aim for body mass index (BMI) of 25kg/m² or less [1,3]:
  - give advice and support to aid weight loss, which may include diet, behavioural therapy, and physical activity [1]
  - give advice on medication to aid weight loss only after dietary advice and exercise has been started and evaluated [1]
- appropriate exercise – 20-30minutes of moderate exercise a day, eg brisk walking sufficient to induce breathlessness [1,3]:
  - encourage lifelong participation in programmes of exercise after stroke [5]
- minimising saturated fat intake and eating a balanced diet, including [1]:
  - using low-fat dairy products
• low salt intake if hypertensive
• reducing meat intake
• eating 5 or more portions of fruit and vegetables a day

References:

14 Atrial fibrillation (AF) including paroxysmal AF - consider anticoagulation

Quick info:
Atrial fibrillation (AF) is [4]:
• a supraventricular tachycardia
• a common arrhythmia, whose incidence increases with age, from 0.5% at age 50-59 years to 9% at age 80-89 years
• the commonest cause of embolic stroke

Patients with AF who present with a transient ischaemic attack (TIA) or ischaemic stroke have an overall risk of recurrent stroke of 12% in the first year and 5% per year thereafter [4]:
• the incidence is substantially higher in those with cardiovascular disease (CVD) or valvular heart disease

Consider anticoagulation in these patients [34]

References:
[34] Derbyshire stroke rehabilitation group; 2011.

15 Sinus rhythm - consider antiplatelet medication

Quick info:
Antiplatelet medication:
• offer antiplatelets after ischaemic stroke or transient ischaemic attack (TIA) to patients who are not otherwise eligible for anticoagulation [1,3,4,5]
• options include [3,4,5,18,23]:
  • a combination of low dose aspirin (75mg once a day) and dipyridamole (200mg twice a day) modified release (MR) (the preferred option); if headaches develop on dipyridamole try starting at a lower dose [6]
  • clopidogrel if patient is unable to tolerate combination antiplatelet therapy [6,24]
• antiplatelet agents are not recommended when a patient is on anticoagulant medication for other reasons [3,4]
• consider proton pump inhibitor (PPI) if dyspepsia or significant risk of a gastro-intestinal (GI) haemorrhage are present [3,4]
• clopidogrel alone can be considered where patients are intolerant of aspirin [1,3,4,18]

NB: Before prescribing any medication, consult product information and drug reference guides to check indications, contraindications, cautions, and interactions [4].

References:
16 Consider carotid endarterectomy

Quick info:

Carotid endarterectomy (CEA):

- significantly benefits patients with recent symptoms of severe carotid stenosis [25,26]
- is indicated when symptomatic carotid stenosis is measured at greater than [1,4]:
  - 50% as measured using the North America Symptomatic Carotid Endarterectomy Trial (NASCET) methods
  - 70% as measured using the European Carotid Surgery Trial (ECST) methods
- surgery should:
  - be undertaken in patients fit for surgery as soon as possible and within two weeks of symptoms [1,4,5] – studies indicate surgery within the first week is not associated with a higher operative risk than delayed surgery [27]
  - only be undertaken by a specialist surgeon in centres where outcomes of carotid surgery are routinely audited [1,4,5]
- carotid endarterectomy appears to be superior in efficacy to carotid stenting [28]
- carotid angioplasty/stenting should only be carried out in specialist centres where outcomes of these techniques are routinely audited, and as part of a randomised clinical trial [1]

NB: Carotid imaging reports should clearly state which criteria (ECST or NASCET) were used when measuring the extent of carotid stenosis [1,4].

References:


17 Short term follow-up

Quick info:

Information about stroke and risk factors should be:

- given to patients first in the hospital setting [1]
- reinforced at every opportunity by all health professionals involved in the care of the patient [1,5]
- provided in an appropriate format for the patient, taking into account both their stroke-specific impairments and their personal situation [1,5]

All patients receiving medication for secondary prevention should [1]:

- be given information about the reason for the medication, how and when to take it, and any possible common side effects
- receive verbal and written information about their medication in a format appropriate to their needs and abilities
- have compliance aids, eg large-print labels and non-childproof tops, provided according to their level of manual dexterity, cognitive impairment, and personal preference, and compatible with safety in the home environment
- be aware of how to obtain further supplies of medication
A follow-up one month after the event, either in primary or secondary care, means [2]:

- answer questions of patients and carers
- provide information as above
- medication and other risk factor modification can be assessed
- screening for cognitive or other subtle neurological impairments should be performed
- any neurological deterioration or recurrence observed should trigger further investigation
- patient will usually be referred to primary care for long term follow-up

To ensure the patient's discharge record has been adequately updated, to ensure proper documentation and appropriate continuity of care, use your local discharge form based on the HIU Discharge Summary developed by the Health Informatics Unit of the Royal College of Physicians (RCP), London, UK [10,11].

References:

18 Refer back to GP for long term follow-up

Quick info:

Long-term planned follow-up:

- local arrangements should make it clear how this is decided and where the person will be followed up [3]
- review patient’s risk factors and monitor regularly in primary care, at least on a yearly basis [1]
- check and optimise lifestyle measures and medication treatments for secondary prevention [3]
- check and record blood pressure (BP) and lipid profile annually [3]
- arrange for annual pre-winter influenza immunisations [3]

Long-term monitoring for secondary prevention [6]:

- pulse
- blood pressure (BP)
- cholesterol
- diabetes mellitus (DM)
- lifestyle advice

Consider appropriate ongoing care to manage the physical and psychological complications identified [1,9]:

- swallowing – persistent dysphagia will require alternative longer term feeding methods
- nutrition and hydration
- continence
- cognitive ability
- memory
- attention
- communication
- self-care
- pressure sore risk
- mobility
- spasticity
- risk of falls
• psychological state, including mood, anxiety, and emotional state
• sleep disturbance

Consider the following:

• offer any patient whose situation changes (eg new problems or changed environment) further assessment by the specialist stroke rehabilitation service [1]
• offer any patient with residual impairment after the end of initial rehabilitation a formal review 6 months following discharge [1], and annually thereafter to consider whether further interventions are needed [2]
• refer for specialist assessment if [1]:
  • new problems, not present when last seen by the specialist service, are present
  • the patient’s physical or social environment has changed

Give patients and carers specific health advice on discharge about [1,9]:

• how to prevent future strokes
• how to recognise further strokes and the appropriate emergency response
• contact details for relevant rehabilitation services
• information on how to access benefits
• detailed information on prescription medication advice
• a named point of contact for stroke information for carers [6,33]
• written information about the patient's diagnosis and management plan to carers [6,33]
• carers to receive sufficient practical training to enable them to provide care [6,33]

References:

Overview

This document describes the provenance of Derbyshire Health Community’s Stroke care map.

This care map has been localised by Derbyshire Health Community, under the lead of Anne Hayes, NHS Derbyshire County Public Health Specialist. The care map has been reviewed by Derbyshire stakeholders and has been approved by relevant members of the Health Community-wide Clinical Effectiveness and Guideline Group (CEGG).

Published: 20th May 2011
Next scheduled update: 20th November 2011

Editorial methodology

The Map of Medicine Editorial Team have undertaken the localisation editing of the care map. The text is based on the Map of Medicine international care map, which was created in line with the Map of Medicine editorial methodology.