

The Recognition and Emergency Management of Suspected Stroke and TIA Guidelines Supplement

Prepared by the National Pre-hospital
Guidelines Group

June 2006



Royal College
of Physicians

ROYAL COLLEGE OF PHYSICIANS



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Acknowledgements

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Conflicts of interest

Following the protocol used by the Intercollegiate Working Party for Stroke when developing the National Clinical Guidelines for Stroke, all working party members were asked to declare any potential conflicts of interest. Nearly all professionals worked for an organisation whose work is related in some way to the guidelines. Details of appointments and affiliations are therefore listed below. The following were declared as potential conflicts of interest with the guidelines.

Commercial companies: consultancy, lecturing and research work for companies including: Aventis, AstraZeneca, Boehringer Ingelheim, GlaxoSmithKline, Ipsen, Merck Sharp & Dohme, Novartis, Sanofi-Synthelabo & Bristol-Myers Squibb, Servier and Takeda.

Charities: posts within patients' charities including the Stroke Association, Connect, Speakability, Different Strokes, the College of Health, the MS Society, Disability, and the Neurological Alliance.

Committees, Organisations and Universities: Ambulance Service Association, Association of British Neurologists, British Paramedic Association, College of Emergency Medicine, University of Newcastle Upon Tyne, London Ambulance Patients' Public Involvement Forum, National Stroke Nurses Forum, NHS Direct, Royal College of General Practitioners, Royal College of Physicians, Society of Vascular Nurses, Stroke Association and University of Central Lancashire.

Members had conducted research for and/or held posts connected to government agencies, including the NHS National Research and Development Programme, the Health Technology Assessment programme, the Medical Research Council and the National Institute for Health and Clinical Excellence.

Introduction

Scope

These guidelines cover the recognition and emergency management of suspected stroke and transient ischaemic attack (TIA). This does not include the management of subarachnoid haemorrhage, and there are a separate set of guidelines for the management of stroke in childhood. Thrombolysis and longer term management issues are covered in the National Clinical Guidelines for Stroke 2004.

Aims of the Guidelines

The aims of the guidelines are:

1. To provide explicit recommendations for practising clinicians, managers, patients and carers about the recognition and emergency management of suspected stroke and TIA, from the onset of symptoms to acute intervention in Accident and Emergency Departments.
2. To provide recommendations based on best available evidence.
3. To give consensus statements from the working party where evidence is lacking.

Context and Use

As stated in the National Clinical Guidelines for Stroke (2004) guidelines should be taken as statements to inform the clinician. Guidelines cannot cover every eventuality because new evidence is published every day. Feedback is welcomed as these guidelines will be updated and incorporated into the third edition of the National Clinical Guidelines for stroke in 2008.

Methodology of Guideline Development

The Guidelines were developed by the National Pre-hospital Guidelines Group following the protocol used in the National Clinical Guidelines for Stroke. Members of the working party, listed in the front of this supplement, were nominated by professional organisations and societies to give wide representation from all disciplines, including the views of patients and their families. The guidelines were developed through consensus meetings of the National Pre-hospital Guidelines Group and feedback from the Intercollegiate Working Party for Stroke.

Searching the scientific literature

A Research Fellow and Research Assistant conducted formal searches of the literature around stroke and TIA in relation to public awareness, delays, diagnosis, positioning, oxygen therapy, blood pressure, body temperature and blood glucose. The searches included the period from 1966 to 2005. The electronic databases Medline, AMED, CINAHL, EMBASE, Zetoc and the Cochrane Collaboration were systematically searched. Other national guidelines were also reviewed, including the National Clinical Guidelines for Stroke, and the National Institute for Health and Clinical Excellence (NICE).

The search strategies are available at the Royal College of Physicians website at:

www.rcplondon.ac.uk

Assessing the quality of research and writing the guidelines

A simplified version of the Scottish Intercollegiate Guidelines Network (SIGN) appraisal checklists were used by members of the RESPONSE (Rapid Emergency Stroke Pathways: Organised Systems and Education) Working Group to assess the quality of published articles. Details of the membership of the RESPONSE Project are listed in Appendix 2. All articles were double-marked to check for consistency. We would like to thank members of the RESPONSE Working Group who took the time to review the evidence.

Where evidence existed from meta-analyses or randomised controlled trials (RCTs) this was used. Where there was limited or no evidence from RCTs, then evidence from observational group studies or small-group studies was used. Evidence from single case studies was not used. The quality and strength of evidence supporting each guideline uses the same format that is used in the National Clinical Guidelines for Stroke. The letters (A, B, C, D) that support each guideline indicate the quality of evidence and the level of evidence is represented by the numbers I to IV. Table 1 shows the meaning of each. This format has been used because this was the preferred method used National Clinical Guidelines for Stroke (2004).

Table 1 Guideline strength: level of evidence and grade of recommendation

Level of evidence	Type of evidence	Grade of recommendation
Ia	Meta-analysis of randomised controlled trials (RCTs)	A
Ib	At least one RCT	A
II	At least one well designed, controlled study but without randomisation or at least one well designed, quasi-experimental study	B
III	At least one well designed, non-experimental descriptive study (eg comparative studies, correlation studies, case studies)	B
IV	Expert committee reports, opinions and/or experience of respected authorities. This grading indicates that directly applicable clinical studies of good quality are absent	C
Consensus of working party	Recommended good practice based on the clinical experience of the Guideline Development Group	D

Evidence and lack of evidence

Where there was no available evidence to construct guidelines, consensus statements (graded D) were developed. There is currently a lack of empirical evidence regarding the recognition and emergency management of stroke in the pre-hospital setting. Due to the lack of research in some areas of the recognition and management of stroke, guidelines have been developed based on consensus opinion. This does not mean that the area of recognition and management is any less important than those areas where the guidelines are based on empirical research.

Peer review

When the guidelines were agreed by the National Pre-hospital Guidelines Group members of the Intercollegiate Working Party for Stroke (listed in Appendix 1), were asked as a prerequisite to review the guidelines prior to endorsement. Following feedback from the Intercollegiate Working Party for Stroke appropriate changes were made to the guidelines. We would like to thank the reviewers for the contribution that they have made in developing the guidelines and for sharing their knowledge and expertise.

The final guidelines were piloted in North West region before being made available nationally.

Format

The format is consistent with that of the National Clinical Guidelines for Stroke (2004).

Patient and carer views and preferences

Relevant quotations from interviews conducted with patients, carers and the general public provided views and experiences about stroke services that were used to inform the guidelines. A report from the Intercollegiate Working Party for Stroke, the Picker Survey, the Involvement of Local communities in the Design of Stroke Services with Cultural and Religious Sensitivity Project, and the Involvement of Users and Carers in Determining the Organisation and Delivery of Stroke Services Project, as well as representation from the London Ambulance Patient and Public Involvement Forum provided additional patient and carer views.

Cost of stroke care

It is beyond the scope of this supplement to undertake a cost benefit analysis.

Updating the guidelines

The Intercollegiate Working Party for Stroke, co-ordinated by the Clinical Effectiveness and Evaluation Unit at the Royal College of Physicians, London, will review future evidence. It is envisaged that the Recognition and Emergency Management of Suspected Stroke and TIA Guidelines will be updated and incorporated in the third edition of the National Clinical Guidelines for Stroke in 2008.

Funding and conflicts of interest

Funding for the programme was provided by Cumbria and Lancashire Strategic Health Authority. Competing interests of the working party members were fully declared and are listed after their names at the front of this supplement.

The Recognition and Emergency Management of Suspected Stroke and TIA Guidelines Supplement

Treating stroke and TIA as a medical emergency will save lives and prevent long-term disability. Whilst much of the responsibility for initial pre-hospital care falls to the Ambulance Service and Primary Care, these guidelines are also relevant to NHS Direct, A&E staff and Acute Medical Service. These guidelines apply to the care of all patients with suspected stroke or TIA, irrespective of whether it is a first or recurrent event. These guidelines contain recommendations from the Pre-Hospital Stroke Guidelines Group and the Intercollegiate Working Party for Stroke. Longer term management issues are covered by the National Clinical Guidelines for Stroke (2004).

1.1 Recognition of stroke/TIA symptoms

Public awareness of stroke symptoms is poor. Less than half of the general public are able to name even one stroke symptom. Public awareness of stroke and TIA is a necessary aspect of ensuring timely access to emergency care.

- a. Every opportunity should be taken to raise awareness of stroke symptoms, particularly in high risk groups e.g. people with: hypertension, atrial fibrillation, previous vascular events and diabetes (B)
- b. For suspected stroke call an emergency ambulance (B)
- c. Stroke classically presents with the **SUDDEN** onset of neurological loss e.g. one or more of: limb weakness, difficulty speaking or understanding speech, loss of vision, clumsiness or numbness of arms or legs. For suspected stroke, use the **Face Arm Speech Test** (B)

- F** Facial Movements: Ask the patient to smile or show teeth. Look for **NEW** lack of symmetry.
- A** Arm Movements: Ask the patient to lift their arms together and hold. Does one arm drift or fall down?
- S** Speech: If the patient attempts a conversation. Look for **NEW** disturbance of speech.
- T** Test all three. If one or more abnormal, suspect stroke.

Evidence (Table 2)

- a. Pancioli AM, Broderick J, Kothari R, Brott T, Tuchfarber A, Miller R, Khoury J, Jauch E (1998) Public Perception of Stroke Warning Signs and Knowledge of Potential Risk Factors. *Journal of the American Medical Association* **279**: 1288-1292 (III)
- b. Harraf F, Sharma AK, Brown MM, Lees KR, Vass RF, Kalra L (2002) A multi-centre observational and early assessment of acute stroke. *British Medical Journal* **325**: 17-20 (III)
- c. Harbison J, Hossain O, Jenkinson D, Davis J, Stephen J, Louw S, Ford G (2003) Diagnostic accuracy of stroke referrals from primary care, emergency room physicians and ambulance staff using the face arm speech test. *Stroke* **34**: 71-76 (III)

Patient's view: *The response by the ambulance and the care at hospital on arrival were excellent and could not have been better.*

1.2 Pre-hospital management of stroke

Patients should be transferred to hospital as an emergency response from the Ambulance Service. The patient should be transferred to a centre with provision for specialist stroke care.

Recommendations

- a. Assess Airway, Breathing, Circulation and Disability (D)
- b. If conscious sit up (D)
- c. Patients should be nil by mouth (D)
- d. An informant should be encouraged to accompany the patient (D)
- e. All medication should be brought with the patient (D)
- f. Give oxygen to maintain saturation over 95% (D)
- g. Blood glucose should be measured, and if $<3\text{mmols/litre}$, 100ml 10% glucose (Dextrose) should be administered via IV cannula (D)
- h. Repeat FAST (D)
- i. Actively manage hypotension by either giving saline and/or raising the foot of the trolley (D)
- j. Perform 12-lead ECG (D)
- k. History of event, including time of onset, signs and symptoms and previous medical, drug, and social history, should be taken from patient and/or informant (D)
- l. If the patient is suitable for thrombolysis, pre-alert the nearest specialist centre (D)

Evidence

- a. to i. Consensus of working party (IV)

1.3 Arrival at hospital

With active management in the initial hours after stroke onset ischaemic brain may be saved from infarction.

Recommendations

- a. Immediate assessment and differential diagnosis, should be made (D)
- b. Patients suitable for thrombolysis should be identified and treatment pathways instigated (D)
- c. Repeated assessments of blood glucose, oxygen saturation level, hydration, and temperature should be performed, and parameters maintained within normal limits. Infection should be actively managed unless the patient is receiving palliative care (B)
- d. Repeated assessments of blood pressure should be performed. Blood pressure should only be lowered in the acute phase where there are likely to be complications from hypertension, e.g. hypertensive encephalopathy, aortic aneurysm with renal involvement (B)
- e. A 12 lead ECG should be performed, and arrhythmias managed (D)
- f. Neurological assessments should be performed frequently by trained staff using a standardised scale, for example the ROSIER. The recognition of neurological deterioration should elicit medical review (D)
- g. The patient should be assessed on admission for their risk of aspiration, using a validated swallow screening tool, administered by an appropriately trained professional (B)
- h. All patients should be transferred to an Acute Stroke Unit (A)

Evidence taken from tables 3.2.2 in the National Clinical Guidelines for Stroke (2004).

- a. Consensus of working party (IV)
- b. Consensus of working party (IV)
- c. Extrapolation from Stroke Unit Trialists' Collaboration (2004) Organised Inpatient (Stroke Unit) Care for Stroke (Cochrane Review). In: *The Cochrane Library*, Issue 1, 2004. Chichester, UK: John Wiley and Sons (Ib)

Indredavik B, Bakke F, Slordahl S, Rosketh R, Haheim L (1999) Treatment in a combined acute stroke and rehabilitation stroke unit: which aspects are most important? *Stroke* **30**: 917-923 (Ib)

Langhorne P, Pollock A (2002) What are the components of effective stroke unit care? *Age and Ageing* **31**: 365-371 (III)

Bhalla A, Tilling K, Kolominsky-Rabas P, Heuschmann P, Megherbi SE, Czlonkowska A, Kobayashi A, Mendel T, Giroud M, Rudd A, Wolfe C (2003) Variation in the management of acute physiological parameters after ischaemic stroke: A European perspective. *European Journal of Neurology* **10**: 25-33 (III)

- d. Blood Pressure in Acute Stroke Collaboration (BASC) (2004) Interventions for deliberately altering blood pressure in acute stroke (Cochrane Review). In: *The Cochrane Library*, Issue 1, 2004. Chichester, UK: John Wiley and Sons (Ia)

Ahmed N, Wahlgren N (2003) Effects of blood pressure lowering in the acute phase of total anterior circulation infarcts and other stroke subtypes. *Cerebrovascular Diseases* **15**: 235-43 (Ib)

e. Consensus of working party (IV)

f. Consensus of working party (IV)

Nor AM, Davis J, Sen B, Shipsey D, Louw SJ, Dyker AG, Davis M, Ford GA (2005) The Recognition of Stroke in the Emergency Room (ROSIER) scale: development and validation of a stroke recognition instrument. *Lancet Neurology* **4**: 727-734 (III)

g. Martino R, Pron G, Diamant N (2000) Screening for oropharyngeal dysphagia in stroke: insufficient evidence for guidelines. *Dysphagia* **15**: 19-30 (Ia)

Perry L, Love C (2001) Screening for dysphagia and aspiration in acute stroke: a systematic review. *Dysphagia* **16**: 7-18 (Ia)

h. Stroke Unit Trialists' Collaboration (2004) Organised Inpatient (stroke unit) Care for Stroke (Cochrane Review). In: *The Cochrane Library*, Issue 1, 2004. Chichester, UK: John Wiley and Sons (Ia)

1.4 Brain imaging

If patients present with a clinical syndrome that might be due to stroke, the first stage of management is to make the correct diagnosis through careful history-taking, examination and investigation.

Recommendations

- a. Brain imaging should be undertaken immediately if the patient has: (B)
- indications for thrombolysis or early anticoagulation
 - been taking anticoagulant treatment
 - a known bleeding tendency
 - a depressed level of consciousness
 - unexplained progressive or fluctuating symptoms
 - papilloedema, neck stiffness or fever
 - severe headache at onset
- b. Brain imaging should be undertaken as soon as possible in all other patients, within 24 hours at most of onset unless there are good clinical reasons for not doing so (B)

Evidence taken from table 3.1.2 in the National Clinical Guidelines for Stroke (2004).

- a. Sandercock P, Allen C, Corston R (1985) Clinical diagnosis of intracranial haemorrhage using Guy's hospital score. *British Medical Journal* **291**: 1675-1677 (III)

Wardlaw JM, Keir SL, Seymour J, Lewis S *et al* (2004) What is the best imaging strategy for acute stroke? NHS Health Technology Assessment **8**: (1) 2004 (Ia)

- b. Extrapolation from the Chinese Acute Stroke Trial Collaborative Group (CAST) (1997) Randomised, placebo-controlled trial of early aspirin use in 20,000 patients with acute ischaemic stroke. *Lancet* **349**: 1641-1649 (Ib)

International Stroke Trial Collaborative Group (1997) The International Stroke Trial (IST): A randomised trial of aspirin, subcutaneous heparin, both or neither among 19,435 patients with acute ischemic stroke. *Lancet* **349**: 1569-1581 (Ib)

Royal College of Physicians of Edinburgh (1998) Royal College of Physicians of Edinburgh Consensus Conference on Medical Management of Stroke, 26-27 May 1998. *Age and Ageing* **27**: 665-666 (IV)

Royal College of Physicians of Edinburgh (2000) *Consensus Conference on Stroke Treatment and Service Delivery*. Edinburgh: RCPE (IV)

Royal College of Radiologists (2003) *Making the best use of a department of clinical radiology*. London: RCR (IV)

Department of Health (2001) *National Service Framework for Older People*. London: Department of Health (IV)

Patient's view: *She should have had the scan on Monday. Monday arrived nothing. Tuesday arrived nothing. She actually had the scan on Wednesday.*

1.5 Information and support needs

Information for patients and their families following stroke can be offered in a variety of formats. Patients' organisations have a variety of leaflets and web-based materials on stroke. However, research demonstrates how difficult it is to give information effectively and failure to provide sufficient information is one of the commonest causes of patients' complaints.

Recommendations

- a. Patients' and carers' information and support needs should be considered from the outset (A)
- b. Health and social services professionals should ensure that patients and their families have information about the likely diagnosis and expected care pathways (D)
- c. Information provision should take into account the needs of each individual (D)
- d. Information should be freely available to patients and their families in a variety of languages and formats specific to patient impairments (A)

Evidence (Table 3)

- a. Forster A, Smith J, Young J, Knapp P, House A, Wright J (2004) Information provision for stroke patients and their caregivers (Cochrane Review). In: *The Cochrane Library*, Issue 1, 2004. Chichester, UK: John Wiley and Sons (Ia)
- b. Consensus of working party (IV)
- c. Consensus of working party (IV)
- d. Forster A, Smith J, Young J, Knapp, P House A, Wright J (2004) Information provision for stroke patients and their caregivers (Cochrane Review). In: *The Cochrane Library*, Issue 1, 2004. Chichester, UK: John Wiley and Sons (Ia)

Carer's view: *I think more information beforehand about what treatment and care to expect and what he's going to be like.*

1.6 Investigation and management of patients with suspected TIA (no symptoms at time of assessment)

The risk of developing a stroke after a hemispheric TIA can be as high as 30% within the first month, with the greatest risk being within the first 72 hours. Patients with TIA also have an increased risk of myocardial infarction and other vascular events. The risk of further stroke is highest early after stroke or TIA.

Recommendations

- a. Patients first seen in the community with TIA, or with a stroke but having made a good recovery when seen, should be assessed and investigated in a specialist service (e.g. neurovascular clinic), as soon as possible and certainly within seven days of the incident (B)
- b. Patients likely to have a diagnosis of TIA should be prescribed an anti-platelet regime immediately (B)
- c. Patients likely to have a diagnosis of TIA should be advised not to drive until assessed by a specialist (D)
- d. Patients should be advised to return to hospital immediately if the symptoms return (D)
- e. Immediate admission to a specialist stroke service is vital for those with a greater than 20% risk of completed stroke. These are patients with more than one TIA in seven days or who have three or more of the following characteristics: blood pressure greater than 140/90 mmHg; unilateral weakness or speech disturbance; symptoms lasting sixty minutes or more; or who have diabetes (B)

Evidence (Table 4)

- a. Lovett JK, Dennis MS, Sandercock PA, Bamford J, Warlow CP, Rothwell PM (2003) Very early risk of stroke after a first transient ischemic attack. *Stroke* **34**: 138-140. Epub 2003 July 10 (II)

Coull AJ, Lovett JK, Rothwell PM on behalf of the Oxford Vascular Study (2004) Population based study of early risk of stroke after transient ischaemic attack or minor stroke: Implications for public education and organisation of services. *BMJ* **328**: 326-328 (II)
- b. International Stroke Trial Collaborative Group (1997) The International Stroke Trial (IST): A randomised trial of aspirin, subcutaneous heparin, both or neither among 19,435 patients with acute ischemic stroke. *Lancet* **349**: 1569-1581 (II)

Chinese Acute Stroke Trial Collaborative Group (CAST) (1997) Randomised, placebo-controlled trial of early aspirin use in 20,000 patients with acute ischaemic stroke. *Lancet* **349**: 1641-1649 (II)
- c. Consensus of working party (IV)
- d. Consensus of working party (IV)
- e. Rothwell PM, Giles MF, Flossmann E, Lovelock CE, Redgrave J N, Warlow CP, Mehta Z (2005) A simple score (ABCD) to identify individuals at high early risk of stroke after transient ischaemic attack. *Lancet* **366**: 29-36 (II)

Appendix 1

RESPONSE Members

Rapid Emergency Stroke Pathways: Organised Systems and Education

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Appendix 2

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Table 2			
Author	Design and sample	Findings	Conclusions
Pancioli et al, 1998	Obs; 1880 members of the general public	The elderly population are at greatest risk and yet are least knowledgeable	Considerable education is needed to increase the public's awareness of stroke warning signs and risk factors
Harraf et al, 2002	Multicentre obs; 739 patients with signs or symptoms suggestive of stroke	Not all patients are evaluated by a senior doctor within 3 hours of arrival at hospital and most do not undergo computed tomography	Delays in patients arriving at hospital can be reduced by the use of the Emergency Services
Harbison et al, 2003	Obs; 487 patients with suspected stroke and TIA	Ambulance paramedics diagnosis of stroke was correct in 144 of 183 patients (79%). Compared with primary care doctors, paramedics referred more total anterior circulation strokes, fewer lacunar strokes and admitted more patients within 3 hours of symptom onset	Paramedics using FAST achieved high levels of detection and diagnostic accuracy of stroke

Table 3				
Author	Design and sample	Intervention	Outcome measures	Conclusions
Forster et al 2004	M/A (n = 9 RCTs and CCTs); stroke patients and their primary carers	Leaflets, booklets, manuals and lectures	Knowledge about stroke and services; impact on health	Some evidence that information combined with education is more effective than information alone

Table 4

Author	Design and sample	Findings	Outcome measures	Conclusions
Lovett et al, 2003	Obs; 209 clinical TIAs from population based stroke register	8.6% stroke risk within 7 days from first TIA and 12% by 30 days	Completed stroke	Much higher early risk of stroke after TIA than previously thought
Coull et al, 2004	Obs; n = 174 patients after TIA (n = 87) or minor stroke (n = 87)	Prospective cohort study of 9 general practices	Risk of recurrent stroke at 7 days, 1 month, and 3 months	The risks of recurrent stroke were much higher than commonly quoted, ie 11.5% at 7 days; 15% at 1 month; 18.5% at 3 months
Rothwell et al, 2005	Obs; n = 987 patients (n = 209 derivation; n = 778 validation)	Six point score was highly predictive of 7 day risk of stroke in patients with probable or definite TIA	Risk of stroke within 7 days	Risk of stroke during the 7 days after TIA seems to be highly predictable using the ABCD score

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