SIGN PUBLICATION NUMBER 13

Management of Patients with Stroke

I: Assessment, Investigation, Immediate Management and Secondary Prevention

A National Clinical Guideline
recommended for use
in
Scotland
by the
Scottish Intercollegiate Guidelines Network

Pilot Edition
May 1997

S I G N

Getting validated guidelines into local practice

This guideline was issued in May 1997 and will be reviewed in 1999. Comments are invited to assist the review process. All correspondence and requests for further background information regarding the guideline should be sent to:

Mrs Christina Pottinger, SIGN Secretariat
Royal College of Physicians, 9 Queen Street, Edinburgh, EH2 1JQ

The definitions of the types of evidence and the grading of recommendations used in this guideline originate from the US Agency for Health Care Policy and Research[1] and are set out in the following tables.

Level	Type of Evidence
Ia	Evidence obtained from meta-analysis of randomised controlled trials.
Ib	Evidence obtained from at least one randomised controlled trial.
IIa	Evidence obtained from at least one well-designed controlled study without randomisation.
IIb	Evidence obtained from at least one other type of well-designed quasi-experimental study.
III	Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies.
IV	Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities.

Grade	Recommendation
A (Evidence Levels Ia, Ib)	Required - at least one randomised controlled trial as part of the body of literature of overall good quality and consistency addressing specific recommendation.
B (Evidence Levels IIa, IIb, III)	Required - availability of well conducted clinical studies but no randomised clinical trials on the topic of recommendation.
C (Evidence level IV)	Required - evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities. Indicates absence of directly applicable clinical studies of good quality.

Contents

Summary of Recommendations

Grade

Service delivery

- Acute in-patient care for patients admitted to hospital with a major stroke should be organised as a **multidisciplinary stroke service** based in designated units — **A**
- A local **admissions policy** should be agreed between hospitals and general practitioners and a local protocol for referral to a **fast-track assessment clinic** for those with minor strokes or TIAs not requiring hospital admission — **C**

Assessment and Investigation

- **Written local protocols** should be available for both routine and more specialised investigations which the clinical situation may merit — **C**
- All patients with acute stroke should undergo **CT brain scanning** as soon as possible—preferably within 48 hours—and no later than 7 days. A local protocol for more urgent scans should be available — **C**
- A **swallowing assessment** should be undertaken at home or hospital as part of the clinical assessment of stroke — **B**

Immediate Management

- **High blood pressure** should not normally be lowered in the acute phase of stroke — **C**
- Urgent **neurosurgical assessment** should be available for patients with large cerebellar infarcts or hydrocephalus, and for selected cases of cerebral haemorrhage — **C**
- Routine use of **drugs** to limit neural damage, including corticosteroids, nimodipine, plasma volume expanders, barbiturates, and streptokinase, is of no proven benefit and should be discouraged — **A**

Secondary Prevention

- **Antiplatelet therapy**—normally aspirin—should be prescribed as early as possible for secondary prevention of stroke and other vascular events in patients who have sustained an ischaemic stroke — **A**
- **Warfarin** should be considered for use in patients with non-valvular atrial fibrillation and also after cardioembolic stroke from valvular heart disease and recent myocardial infarction — **A** **C**
- **Control of risk factors** such as hypertension, hyperlipidaemia and cessation of cigarette smoking should be initiated — **C**

1 Introduction

1.1 Stroke is the third most common cause of death in the developed world.[2] This holds true for Scotland, where a quarter of stroke deaths occur under the age of 65 years.[3]

1.2 The incidence of stroke in Scotland is probably higher than defined in population studies from elsewhere in the UK. Hospital-based record linkage studies in Scotland suggest that the annual incidence is approximately 3 per 1,000 of the population and that the prevalence is 10 per 1,000 of the population.[3] This is possibly an underestimation.

1.3 Stroke is not a homogeneous condition. There are clear pathological sub-types: cerebral infarction, primary intra-cerebral haemorrhage and sub-arachnoid haemorrhage, with over 100 potential underlying causes. In the UK, over 80% of first strokes are due to cerebral infarction, about 10% result from primary intracerebral haemorrhage and approximately 5% are due to subarachnoid haemorrhage.[4]

1.4 Stroke can affect any age group. It can range from a minor episode, (a transient ischaemic attack, or TIA)[5] lasting a few minutes or hours, to a major life threatening or disabling event.

1.5 The survivors of first and subsequent strokes will either make a complete recovery or will have varying degrees of disability. About 50% of stroke survivors will have some level of functional disability at six months.[6]

1.6 The goal of health care for strokes should be to:

- reduce the incidence of strokes by the use of valid primary preventive methods
- reduce case fatality once a stroke has occurred
- reduce the level of disability due to stroke
- assist those who remain disabled to achieve their maximum functional potential
- define the needs of those who remain permanently disabled as part of care planning
- contribute to health care needs of those with permanent disabilities

- implement secondary prevention strategies to reduce the risk of a further vascular event.

1.7 Working groups sponsored by SIGN have developed a series of clinical guidelines to assist in the delivery of good quality clinical care following an acute stroke. They are presented in four parts, of which this guideline is the first:

I Assessment, investigation, immediate management, and strategies for secondary prevention

II Management of carotid stenosis and carotid endarterectomy

III Identification and management of dysphagia

IV Prevention and management of complications, rehabilitation and discharge planning.

1.8 Areas not addressed by this stroke guideline are:

- **Primary prevention** —— this important issue is common to all vascular disease
- **Subarachnoid haemorrhage** —— investigation and initial management is different from other types of stroke
- **Stroke in young people** —— specialist investigations beyond those discussed in these guidelines.

2 Aims of the Guideline

2.1 The major aim of this national guideline is to assist individual clinicians, hospital departments and hospitals to produce local protocols for:

(a) assessment, investigation and immediate management of individuals with a TIA or acute stroke event (other than a subarachnoid haemorrhage)

(b) secondary prevention and risk factor management post- TIA or acute stroke event.

2.2 The management of an individual patient will be influenced by the cause, type and severity of the stroke, the presence of co-existing disease and the patient's social environment.

Stroke management occurs in a variety of settings: in the home, hospital out-patient clinics, and inpatient care. The guideline is presented in a format which should allow the principles of care to be applied in primary care, hospital-based and shared-care settings.

2.3 The guideline makes recommendations which involve the clinical practice of medical, nursing and paramedical staff. The principles identified should form the basis for local discussion and facilitate the development of local protocols. Some aspects require the involvement of primary and secondary care professionals to develop a common protocol regarding the interface between the two services. In addition, the guideline is of relevance to purchasing teams and managers of provider units in terms of the resources required to support the provision of care.

2.4 The secondary aim of this guideline is to suggest methods for implementation and for clinical audit.

3 Assessment and Investigation of Acute Stroke and Transient Ischaemic Attack (TIA)

3.1 The result of assessment and investigation should answer the following series of questions:

(1) Is this event vascular, i.e. a stroke or transient ischaemic attack?

(2) Which part of the brain is affected?

(3) Is the vascular event ischaemic or haemorrhagic?

(4) What is the cause of the vascular event?

(5) What problems does this cause the patient?
(a) functional
(b) social

(6) What other medical problems co-exist and affect the management of the stroke?

(7) What facilities are required to manage this event?

This process should involve one or more members of the multidisciplinary team, and requires the support of investigative facilities, together with appropriate referral to specialist stroke services.

3.2 Clinical Assessment

3.2.1 Medical Assessment

An acute stroke or TIA can only be diagnosed reliably after a doctor has taken a good history and performed a physical examination. The clinical assessment will guide further management regarding necessity for hospital referral, admission and intervention. Such an approach should result in answering questions (1), (2), (6) and (7) in the above list. *(See also 3.3.1)*

3.2.2 Multidisciplinary Assessment

Multidisciplinary assessment involving nursing and professions allied to medicine should begin as soon as possible after a disabling stroke. This will contribute to answering question (5) above.

A full medical assessment should be undertaken and multidisciplinary assessment considered for all acute stroke patients to define the nature of the event, the need for investigation, further management, and the need for rehabilitation *Grade C, level IV*

3.2.3 **Swallowing Assessment**

Dysphagia is a potentially serious consequence of stroke which may be unrecognised unless patients are systematically screened. The mortality rate in patients with dysphagia is high: 46% of patients admitted with acute stroke and dysphagia die within six weeks. Aspiration pneumonia may contribute, although dysphagia may in some cases reflect severity of stroke. Approximately a third of patients with hemispheric stroke, and about two thirds of those with brainstem stroke, have dysphagia.[7, 8]

Assessment of swallowing by trained staff should be undertaken either at home or in hospital before any oral intake is permitted. Nurses working within specialist units may be trained to undertake an initial dysphagia screening test. Patients with swallowing defects should be referred to a speech and language therapist. *(See SIGN Guideline on the Management of Patients with Stroke Part III: Identification and management of dysphagia.)*

A swallowing assessment should be undertaken at home or hospital as part of the clinical assessment of stroke *Grade B, level III*

3.3 **Investigations**

Investigations are undertaken:

- to confirm the nature of the vascular event (question (1) above) and to indicate the underlying cause (questions (3) and (4))
- to determine the appropriate strategy for secondary prevention
- to identify prognostic factors.

Written local protocols should be available setting out indications for both routine and more specialised investigations which the clinical situation may merit *Grade C, level IV*

3.3.1 **CT Brain Scanning**

Randomised trials of the use of CT brain scanning have not been performed, but a clinical consensus exists that the assessment of most patients with acute cerebrovascular events should include CT brain scanning because:

- Specific treatment of intracranial haemorrhage (e.g. neurosurgery, cessation/ reversal of antithrombotic therapies) may be indicated if rapidly diagnosed

- There is conclusive evidence for the efficacy of antiplatelet and anticoagulant agents in the secondary prevention of ischaemic stroke, but they should be avoided in cases of haemorrhagic stroke[9-11]
- Clinical scoring systems have been found to be unreliable in distinguishing ischaemic and haemorrhagic stroke.[12]

The timing of CT brain scanning is important. Identification of intracranial haemorrhage or non-stroke pathology is important for their specific management. Small intracranial haemorrhages can resolve rapidly, so within a few days may be indistinguishable on CT from a small infarct. If CT cannot be performed early, later magnetic resonance imaging (MRI) may be required. Since MRI is more expensive and less widely available, early CT brain scanning should be part of routine management.[13]

All patients with acute stroke should undergo CT brain scanning as soon as possible – preferably within 48 hours – and no later than seven days. A local protocol for more urgent scans should be available

Grade C, level III & IV

3.3.2 **Other Routine Investigations**

- **Haematological and biochemical investigations** should be performed to establish a baseline for management and evidence of concomitant disease.[14]
- **Chest *x*-ray and ECG examinations** in patients with acute stroke may provide evidence of cardiac disease, and therefore of possible embolic source.[13]

All patients with acute stroke or TIA should have ECG, chest x-ray, full blood count, ESR, serum urea and electrolytes, blood glucose and lipids

Grade C, level IV

3.3.3 **Additional Investigations**

The necessity for additional investigations will be determined by the clinical situation, e.g. young patients, those with clinical evidence of cardiac disease, recent trauma.

- **MRI investigation** may enable early identification of ischaemic lesions, although within the first few hours, the distinction between haemorrhage and infarction may be difficult. MRI allows distinction between haemorrhagic and ischaemic lesions several weeks after the acute stroke. MRI scanning has advantages over CT scanning in the identification of both posterior fossa haematoma and brainstem infarcts.[13]

- **Carotid Doppler ultrasonography** is considered in the SIGN Guideline on the Management of Patients with Stroke Part II: Management of Carotid Stenosis and Carotid Endarterectomy.[15] In summary, this should be used in those patients who have sustained a *carotid territory* TIA or who have recovered from a completed *carotid territory* ischaemic stroke, and who are considered suitable for surgery.[13] It helps select suitable candidates for carotid endarterectomy and inform decisions regarding antihypertensive, anticoagulant and antiplatelet therapy.
- **Echocardiography** may be indicated in the investigation of patients with evidence of cardiac disease or in whom other risk factors are absent, especially if multiple cerebrovascular events have occurred.[13]
- **Other haematological investigations** may also be appropriate in certain situations e.g. hypercoagulable states, bleeding diatheses and in young patients with strokes.

4 Immediate Management Following Acute Stroke

The management of a newly diagnosed stroke is determined by two relevant questions:

(1) Is there active treatment which can be directed at the cerebrovascular event?

(2) What facilities or support are required to provide immediate care for the stroke patient? (see section 6)

4.1 **Drug therapy** (*see also section 5*)

4.1.1 **Cerebral Infarct**

No therapy has yet been confirmed to limit the *neuronal damage* associated with acute cerebral infarction.

- Management of patients with acute ischaemic stroke using **thrombolytic therapy** carries the risk of catastrophic intracerebral haemorrhage.[16]
- A randomised study of intravenous **rt-PA** in cerebral infarction demonstrated significant improvement in functional outcome in carefully selected patients treated in specialist units within 3 hours of stroke onset.[17] This should not yet be regarded as a routine therapy, particularly outwith specialist centres.
- No benefit has been demonstrated for **heparin** in reducing mortality in patients with acute ischaemic stroke.[18]
- **Corticosteroids** have been used in an attempt to reduce the level of cerebral oedema associated with acute stroke. There is no evidence that steroids improve outcome.[19, 20]
- **Haemodilution techniques** have been used in an attempt to increase cerebral perfusion in patients with acute stroke. No beneficial effects have been found in a series of unselected patients.[21]
- The rationale of therapy with **nimodipine** and other **calcium antagonists** in patients with acute ischaemic stroke is that neuronal damage may be prevented by inhibiting cellular calcium influx. No benefit has been found to be associated with this type of therapy.[22]
- **Reduction in blood pressure** should not normally be undertaken in the acute phase of stroke. In a number of randomised controlled trials reduction of blood pressure which occurred as a side effect of treatment was associated with worsening of outcome.[23-25]

Routine use of drugs to limit neural damage, including cortico-steroids, nimodipine, plasma volume expanders, barbiturates, and streptokinase, is of no proven benefit and should be discouraged *Grade A, level Ia & Ib*

High blood pressure should not normally be lowered in the acute phase of stroke as this may worsen outcome *Grade C, level IV*

4.1.2 **Intracranial haemorrhage**
(excluding subarachnoid haemorrhage)

Patients receiving anticoagulants or recent thrombolytic therapy, or those with bleeding disorders, require urgent correction of coagulation defects

Aspirin should be discontinued *Grade C, level IV*

4.2 **Neurosurgical Intervention**

Surgical evacuation of medium-sized intracerebral haematomas should be considered, especially if there are clinical signs of raised intracranial pressure or clinical deterioration occurs. Further research is needed to clarify this type of intervention[26, 27] (*see also section 8.9*).

Patients with acute hydrocephalus associated with cerebellar stroke due to compression of the aqueduct by blood or oedema should be considered for ventricular shunting and decompression surgery.[28]

Urgent neurosurgical assessment should be available for selected patients, such as those with large cerebellar infarcts or hydrocephalus, and for selected cases of cerebral haemorrhage *Grade C, level III & IV*

5 Secondary Prevention following Acute Ischaemic Stroke and TIA

5.1 Appropriate strategies for secondary prevention can only be determined once the nature of the vascular event is defined by investigation, including brain scanning.

When intracerebral haemorrhage has been excluded the following should be considered for patients diagnosed as having ischaemic stroke or TIA.

5.2 **Antiplatelet therapy**

Longterm antiplatelet therapy reduces the risk of serious vascular events following a stroke by about a quarter: about 36 serious vascular event will be avoided over 36 months among 1,000 patients.[9] Aspirin appears to be safe in the acute phase of stroke. [11]

No significant difference has been found between the protective effects of high aspirin dosage (500-1,500mg per day) and of medium aspirin dosage (75-325 mg per day). Medium dose aspirin therapy is the most widely tested antiplatelet regimen and no other regimen appears to have a greater protective effect. Higher doses are associated with increased adverse events.[9]

Other antiplatelet drugs, either alone or in combination with aspirin have not been shown to be more effective than aspirin alone,[9] although data from one randomised controlled trial shows that dipyridamole has an independent effect equal to low dose aspirin and some additive effect is achieved in combination.[29]

Antiplatelet therapy, normally aspirin, should be prescribed immediately for the secondary prevention of recurrent stroke and other vascular events in patients who have sustained an ischaemic cerebrovascular event

Grade A, level Ia & Ib

5.3 **Anticoagulation therapy**

Warfarin reduces the relative risk of a further ischaemic stroke in patients with atrial fibrillation to the same relative extent as its primary preventive action in atrial fibrillation. However, the reduction in *absolute* risk is higher. The risk of recurrent stroke following a transient ischaemic attack or minor non-disabling stroke is reduced by approximately two-thirds.[10] *(See forthcoming SIGN Guideline on Anti-Thrombotic Therapy.)*

Warfarin should be considered for use in patients with non-valvular atrial fibrillation *(Target INR = 2-3)* *Grade A, level Ia*

The optimum timing of introduction of anticoagulant after the stroke event has not been clearly defined and consideration should be given to risk of haemorrhagic transformation.[30]

Warfarin should also be considered after cardioembolic stroke from valvular heart disease and recent myocardial infarction *Grade C, level IV*

5.4 Carotid endarterectomy

Recommendations for selection of patients suitable for carotid endarterectomy are discussed in the SIGN Guideline on the Management of Patients with Stroke Part II: Management of Carotid Stenosis and Carotid Endarterectomy.[15]

5.5 Other risk factors

There are few randomised clinical trials of the effects of risk factor modification in the secondary prevention of ischaemic or haemorrhagic stroke. Inferences can be drawn from the findings of primary prevention trials, and control of hypertension, hyperlipidaemia and cessation of cigarette smoking should be advocated.[31]

One randomised control trial in a Chinese population has shown a reduction in fatal and non-fatal stroke when blood pressure is lowered.[32] Further studies, e.g. PROGRESS, are awaited to confirm this.

Control of hypertension, hyperlipidaemia and cessation of cigarette smoking should be advocated once the initial event has stabilised *Grade C, level IV*

6 Implications for Service Delivery

6.1 **Adequate assessment** of patients with clinically suspected recent stroke or transient ischaemic attack requires access to a multidisciplinary team to provide both the initial assessment and, if necessary, on-going support and rehabilitation.

6.2 **Adequate investigation** of patients with recent stroke or transient cerebrovascular symptoms requires rapid access to hospital-based facilities via either hospital admission or a fast track clinic.

6.3 **Admission policies**

A controlled trial did not demonstrate any difference in outcome between care at home and hospital inpatient care for patients with acute stroke.[33]

Patients who have suffered an acute stroke should usually be admitted to hospital if any of the following clinical features are present: depressed level of consciousness, fluctuating symptoms or signs, dysphagia, doubtful diagnosis, atypical stroke suggestive of serious underlying disease, immobility, confusion, incontinence, suspicion of intracranial haemorrhage, or anticoagulation therapy.[34] Admission might also be indicated by poor support or circumstances at home.

A local admissions policy should be agreed between hospitals and general practitioners, setting out the categories of patients who will usually be referred or admitted to hospital *Grade C, level IV*

6.4 **Fast-track assessment clinics**

Following a transient ischaemic attack, the risk of stroke is approximately seven times the risk in the general population of the same age: 12% in the first year and 7% per annum thereafter.[35]

Patients who have sustained minor strokes or transient ischaemic attacks and who are not admitted to hospital require urgent assessment. The risk of a further more serious stroke is highest in the few weeks immediately following a transient ischaemic attack. The aim should be for all such patients to be assessed at fast-track outpatient clinics as soon as possible after recognition of the transient ischaemic attack, and within two weeks.[36]

Patients with suspected transient ischaemic attack or minor stroke who are not admitted to hospital should have rapid access for urgent assessment and investigation (CT brain scanning, carotid Doppler examination and echocardiography)

A written local protocol should be available detailing the processes of assessment and treatment, whether these are delivered on a day-case or out-patient basis

Initial assessment should usually be completed within 1-2 weeks of referral
Grade C, level III & IV

6.5 Organisation of care for patients admitted to hospital with a major stroke

A meta-analysis of trials comparing management of patients with acute stroke in specialised units and in general medical units has shown that management of patients with stroke in a stroke unit is associated with a reduction in mortality of 23% over the first 12 months. More patients managed in stroke units are discharged home and remain at home.[37, 38] In the majority of these trials, stroke care was provided in a designated area or ward, as opposed to a roving stroke care team.

Acute inpatient care for patients with major stroke should be organised as a multidisciplinary stroke service based in designated units *Grade A, level Ia*

At an international level, the 1996 Declaration of Helsingborg has called for organisation of stroke care by a multidisciplinary service.[39] It is the view of the guideline development group that an identified clinician with a special interest in stroke should have overall responsibility for this service, which should include rapid investigation and diagnosis, optimal nursing care and planning of secondary prevention. In addition, prompt assessment of neurological impairment and disability and involvement of a multidisciplinary team is beneficial.[40, 41]

7 Implementation of the Guideline through Local Protocols

7.1 It is expected that the guideline will be adopted after local discussion involving clinical staff and provider and purchaser management. The Area Clinical Audit Committee should be fully involved. Local arrangements will then be made for the derivation of specific local protocols to implement the national guideline in individual hospitals, units and practices.

7.2 Following the development of local protocols, providers should consider how best to implement and audit their use.[42]

- The staff groups who require to be involved in development of, and to be familiar with, protocols derived from this national guideline are set out in Annex 1.
- Local protocols should be discussed with and circulated to all relevant staff, and displayed in all areas where acute strokes and TIAs are managed.
- Appropriate assessment, investigation and secondary prevention may be promoted in the following ways:

7.3 **Patient-specific reminders at time of consultation or admission**
These may include proformas in case records; display of tables or flow diagrams in staff rooms, nursing stations, outpatient clinics, A&E departments, and surgeries where patients may present with initial symptoms. Annex 2 provides examples of patient-specific reminders.

7.4 **Continuing Education**
Continuing education of relevant staff (medical, nursing, paramedical, pharmacy) at hospital, unit and general medical practice levels by lectures, tutorials and policy reviews.

Hospitals and units may wish to appoint a staff member to co-ordinate this activity, which may be most appropriately delivered by the multidisciplinary stroke team.

7.5 **Audit**
Hospital managers and professional directors should consider this guideline in audit planning, especially in units where a large number of such patients are admitted acutely (e.g. general medical and geriatric assessment units). Practitioners

in primary care also should consider the implications of this guideline for clinical audit and the potential for audit at the interface between primary and secondary care.

7.5.1 **Audit of key outcome indicators**

Key outcome indicators are noted at Annex 3. The outcome of clinical assessment, investigation and immediate management is to ensure accuracy of diagnosis, identify care needs if a disabling stroke event has occurred and provide supportive care. Audit of individual episodes of care will ascertain if these goals have been met.

Particular attention should be paid to accuracy of diagnosis. Appropriate secondary prevention is dependent upon an accurate diagnosis. It can best be judged in audit of individual episodes of care and retrospective review of cases when new stroke or TIA events occur. The key outcome indicator is in fact reduction of stroke events and deaths, which can only be judged at a population level, i.e. on epidemiological data.

7.5.2 **Audit of process**

Audit of process at ward level is strongly recommended. The minimum provisions and clinical core dataset required for audit of process are listed in Annex 4. It will be advantageous to establish current baseline practice against which change may be measured.

7.6 **Quality assurance and continuous quality improvements**

Hospital managers and clinical directors, involving their hospital audit committees as appropriate, should ensure that performance in providing appropriate care for the stroke patient in terms of clinical assessment, investigation and introduction of secondary prevention in appropriate patients is satisfactory.

7.7 **Funding**

Adequate funding should be included in purchaser-provider contracts, to ensure that effective and appropriate care is given to all stroke patients.

7.8 **Statement of Intent**

This report is not intended to be construed or to serve as a standard of medical care. Standards of medical care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge and technology advance and patterns evolve.

- These parameters of practice should be considered recommendations only. Adherence to them will not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results.
- The ultimate judgement regarding a particular clinical procedure or treatment plan must be made by the doctor in light of the clinical data presented by the patient and the diagnostic and treatment options available.
- Significant departures from the national guideline as expressed in the local protocol should be fully documented and the reasons for the differences explained.
- Significant departures from the local protocol should be fully documented in the patient's case notes at the time the relevant decision is taken.
- A background paper on the legal implications of guidelines prepared by Dr Pamela Abernethy of Simpson & Marwick, W.S. is available from the SIGN secretariat.

7.9 **Dissemination**

The guideline will be sent to:

- Named practitioners in each of the relevant staff groups throughout Scotland.
- Chief Executives and Clinical Directors in Trust and other hospitals in Scotland.
- Board General Managers and Directors of Public Health and other chief professional officers in each Health Board.
- Chairmen of Area Clinical Audit Committees and of Area Medical and other professional Advisory Committees.
- Local Medical Committees
- Relevant education and training bodies
- Selected others

8 Development of the Guideline

8.1 Responsible bodies

The series of SIGN stroke guidelines has been developed under the chairmanship of Dr Margaret Roberts through the Royal College of Physicians and Surgeons of Glasgow acting on behalf of the Scottish Intercollegiate Guidelines Network (SIGN) and these have been accepted by SIGN as the Scottish National Guidelines from which local protocols should be derived.

8.2 Guideline Development Group

Name	Discipline	Health Board
Ms G D Baer	Physiotherapy	Edinburgh
Dr C Bucknall	Area Audit Co-ordinator	Glasgow
Dr I Bone	Neurology	Glasgow
* Dr M S Dennis	Stroke Medicine	Lothian
Mrs M T Gordon	Speech & Language Therapy	Glasgow
Dr S J C Hamilton	Geriatric Medicine	Grampian
Mrs L Holdsworth	Physiotherapy	Tayside
* Dr K R Lees	Acute Stroke Medicine	Glasgow
* Prof G D O Lowe	Vascular Medicine	Glasow
Dr A MacLeod	Medicine & Therapeutics	Grampian
Dr R MacWalter	Geriatric Medicine	Tayside
Dr P Mattison	Rehabilitation Medicine	Ayrshire & Arran
Mrs C Ritchie	Occupational Therapy	Glasgow
* Dr M A Roberts *(Chairman)*	Geriatric Medicine	Glasgow
Dr A Short	General Practice	RCGP
Dr P d'A Semple	Member of SIGN	RCPSG
Dr J Webb	Public Health Medicine	Lothian

Declarations of personal interests are held bythe SIGN Secretariat.

8.3 Development team

This guideline was prepared by a group whose membership was derived from the Guideline Development Group as indicated (*).

8.4 **Development process**

The Development Group met on 10 occasions between November 1993 and May 1996. Successive drafts were developed by synthesis of the literature, correspondence and full discussion on four occasions. The draft recommendations were discussed at two consensus conferences held in Glasgow and Edinburgh, attended by 350 health care professionals, patients and representatives of Chest, Heart & Stroke Scotland.

8.5 **External review**

The guideline was submitted in draft form to the following external referees: Dr J.M. Bamford, Neurologist and Cerebrovascular Physician, St James's Hospital, Leeds; Dr R. Dykhuisen, Physician, Aberdeen Royal Infirmary; Dr P.R.D. Humphrey, Neurologist, Walton Centre, Liverpool; Dr O.J. Robb, Neuroradiologist, Aberdeen Royal Infirmary; Dr P.A. Sandercock, Physician, Western General Hospital, Edinburgh; Dr G.S. Venables, Neurologist, Royal Hallamshire Hospital, Sheffield; Professor C.P. Warlow, Neurologist, Western General Hospital, Edinburgh; Professor J. Weir, Radiologist, Aberdeen Royal Infirmary.

8.6 **SIGN Editorial Board**

The guideline was reviewed before publication by the SIGN Editorial Board.

Professor James Petrie	Royal College of Physicians of Edinburgh *Chairman of SIGN*
Dr Doreen Campbell	CRAG secretariat, Scottish Office
Dr Patricia Donald	Royal College of General Practitioners
Dr Jeremy Grimshaw	Health Services Research Unit, University of Aberdeen
Mr Douglas Harper	Royal College of Surgeons of Edinburgh
Dr Grahame Howard	Royal College of Radiologists *Vice Chairman of SIGN*

8.7 **Systematic literature review**

The SIGN Editorial Board recognises that the systematic review undertaken for this pilot edition does not fully meet the requirements of the methodology presently prescribed by SIGN and this will be addressed in the first review of the guideline (*see section 8.8*). However, The Guideline Development Group made full use of the systematic reviews in the field undertaken to date by the Cochrane Collaboration[18, 21, 38] and detailed arguments and references are provided in recent reviews.[43-46] Copies of references cited and full documentation on the development of the guideline may be consulted at the offices of the SIGN secretariat.

8.8 Review of the guideline

The Royal College of Physicians and Surgeons of Glasgow on behalf of SIGN will have continuing responsibility for the review and updating of the guideline. The guideline will be formally reviewed in 1999; amendments will be disseminated as required at that time or, exceptionally, at any other time when significant amendment becomes necessary.

The Guideline Development Group is aware of ongoing trials, e.g. STICH, SPIRIT, PROGRESS, which are due to report in the next year and the results of these will be considered in the first review of the guideline. The group will also consider imaging strategies, such as echocardiography, in more detail in this review.

8.9 Recommendations for further research

Relevant staff should be encouraged to identify topics for research directed towards:

- therapeutic and surgical interventions in acute stroke care
- secondary prevention
- appropriate audit tools and outcome indicators for assessment of early stroke care.

In addition, the resource implications and costs and benefits of different aspects of the care of patients with stroke require further assessment.

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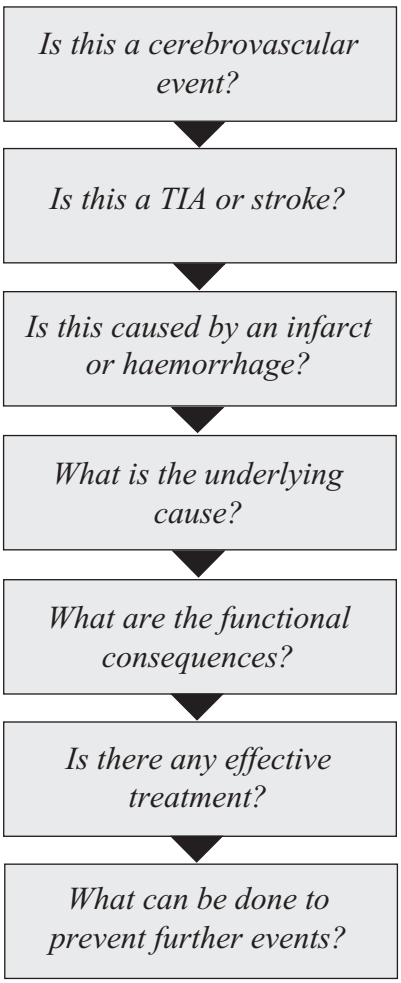
Annex 1

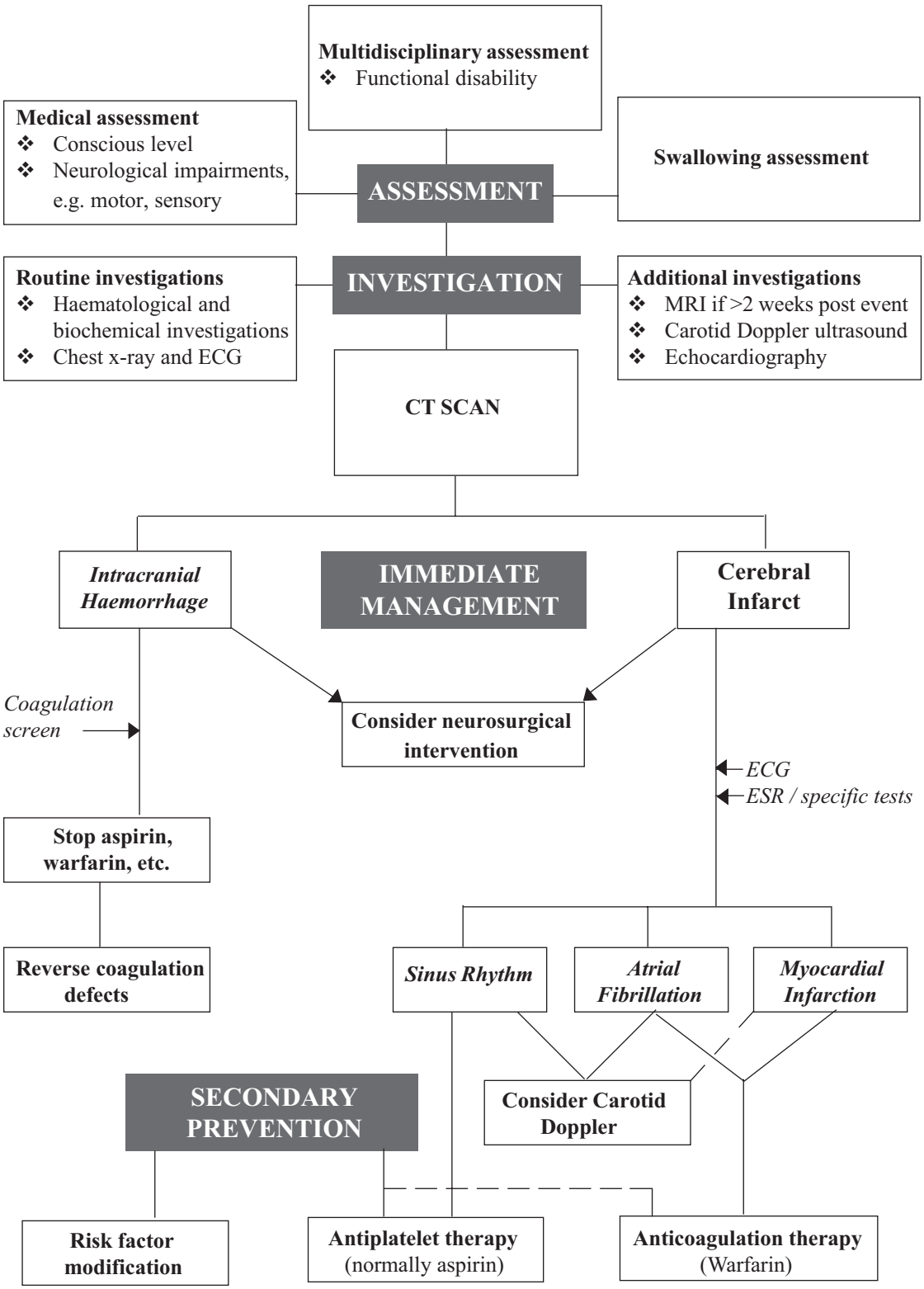
Staff groups who require to be involved in development and implementation of local protocols derived from this national guideline

- Hospital and primary care medical staff
- Nursing staff in hospital and community
- Radiologists and radiographers
- Pharmacy staff
- Occupational therapy staff
- Physiotherapy staff
- Speech and language therapy staff
- Dietetics staff
- Area audit committees
- Deans and postgraduate deans of university faculties of medicine in Scotland and other relevant professional educational bodies

Annex 2

Examples of patient specific reminders in general hospital or primary care




Multidisciplinary assessment
❖ Functional disability
Medical assessment
❖ Conscious level
❖ Neurological impairments, e.g. motor, sensory
ASSESSMENT
Swallowing assessment
Routine investigations
❖ Haematological and biochemical investigations
❖ Chest x-ray and ECG
INVESTIGATION
Additional investigations
❖ MRI if >2 weeks post event
❖ Carotid Doppler ultrasound
❖ Echocardiography
CT SCAN
Intracranial Haemorrhage
IMMEDIATE MANAGEMENT
Cerebral Infarct
Coagulation screen
Consider neurosurgical intervention
ECG
ESR / specific tests
Stop aspirin, warfarin, etc.
Reverse coagulation defects
Sinus Rhythm
Atrial Fibrillation
Myocardial Infarction
SECONDARY PREVENTION
Consider Carotid Doppler
Risk factor modification
Antiplatelet therapy (normally aspirin)
Anticoagulation therapy (Warfarin)

Annex 3

Key outcome indicators

(i) For the component of stroke care covered by this guideline, the quality of care given can be defined if:

- ❖ The nature of stroke and its aetiology has been accurately defined in the case record
- ❖ In either a primary or secondary stroke event, appropriate secondary prevention is introduced, considering both aetiology and risks and benefits to the individual patient
- ❖ A reduction in stroke events is achieved.

(ii) The first two of these outcome indicators are amenable to audit in either primary or secondary care centres; the third requires a population-based audit or epidemiological study. The quality of the audit will in part be dictated by the way in which clinical information is recorded and, in the hospital setting, how effectively episodes of care are coded.

(iii) Routine collection of data for these outcome indicators may be problematic such that audit of *process* is preferable, because:

- ❖ The reduction in stroke events and deaths is a long-term outcome, i.e. over months and years
- ❖ The choice of secondary prevention is determined by individual patient needs.

Annex 4

Minimum provisions and core dataset required for audit of process by hospital units

Provisions

- Access to unit case records, prescription forms and patients.
- Access to unit protocols, care plans and procedures.
- Lists of admissions (stroke register)
- Time for audit

Core dataset for audit

Clinical assessment

- Initial diagnosis on admission
- Identification of neurological impairment
- Identification of functional and social impairment

Investigations

- CT results
- ECG
- Baseline investigations
- ESR
- Other specific investigations

Secondary prevention

- Use of aspirin
- Use of anti-coagulation

Surgical intervention

SIGN

SIGN PUBLICATION NUMBER 13

Management of Patients with Stroke

Assessment, Investigation, Immediate Management and Secondary Prevention

A Quick Reference Guide

Derived from the National Clinical Guideline recommended for use in Scotland by the Scottish Intercollegiate Guidelines Network (SIGN)

A B C refers to **grade of recommendation**

Service delivery

- Acute in-patient care for patients admitted to hospital with a major stroke should be organised as a **multidisciplinary stroke service** based in designated units — A
- A local **admissions policy** should be agreed between hospitals and general practitioners and a local protocol for referral to a **fast-track assessment clinic** for those with minor strokes or TIAs not requiring hospital admission — C

Assessment and Investigation

- **Written local protocols** should be available for both routine and more specialised investigations which the clinical situation may merit — C
- All patients with acute stroke should undergo **CT brain scanning** as soon as possible—preferably within 48 hours—and no later than 7 days. A local protocol for more urgent scans should be available — C
- A **swallowing assessment** should be undertaken at home or hospital as part of the clinical assessment of stroke — B

Immediate Management

- **High blood pressure** should not normally be lowered in the acute phase of stroke — C
- Urgent **neurosurgical assessment** should be available for patients with large cerebellar infarcts or hydrocephalus, and for selected cases of cerebral haemorrhage — C
- Routine use of **drugs** to limit neural damage, including corticosteroids, nimodipine, plasma volume expanders, barbiturates, and streptokinase, is of no proven benefit and should be discouraged — A

Secondary Prevention

- **Antiplatelet therapy**—normally aspirin—should be prescribed as early as possible for secondary prevention of stroke and other vascular events in patients who have sustained an ischaemic stroke — A
- **Warfarin** should be considered for use in patients with non-valvular atrial fibrillation and also after cardioembolic stroke from valvular heart disease and recent myocardial infarction — A C
- **Control of risk factors** such as hypertension, hyperlipidaemia and cessation of cigarette smoking should be initiated — C

Additional copies of this Quick Reference Guide and the full guideline are available from

SIGN Secretariat, 9 Queen Street, Edinburgh, EH2 1JQ

This Quick Reference Guide was issued in May 1997 and will be reviewed in 1999