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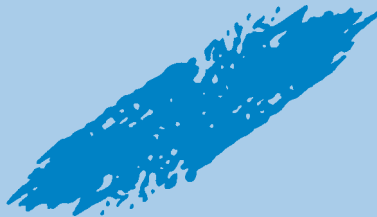
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A Guide for General Practitioners

Prevention of Stroke

December 1996



National Health and Medical Research Council

NHMRC

NHMRC CLINICAL GUIDELINES

STROKE PREVENTION

***A Guide for
General
Practitioners***

National Health and Medical Research Council
NHMRC

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INTRODUCTION

This guide will help you to:

- **screen for stroke risk in both symptomatic and asymptomatic patients;**
- **take urgent action to reduce stroke risk, particularly in those with**
 - **atrial fibrillation**
 - **TIA/suspected stroke;**
- **help patients to make informed decisions about treatment for stroke risk reduction, and to understand specialist advice, particularly where this is conflicting.**

Stroke causes about 10% of all deaths and about 25% of all chronic disability in Australia, making it the third most common cause of death and one of the largest single causes of long-term disability.

Stroke prevention measures have the potential to reduce this burden significantly.

General practitioners, with the help of this guide, are the key to better stroke prevention. What is needed is proactive opportunistic screening and risk management, and prompt action for two groups of patients: those with stroke/TIA symptoms, and those with atrial fibrillation.

In areas where specialist consultation and/or management is indicated (eg. anticoagulation with warfarin, carotid endarterectomy), specialist opinions on management may differ. This is often because new technology and methods are being used ahead of randomised trials to prove their effectiveness. The guide contains information on such areas to assist general practitioners in helping patients to make sense of differing specialist opinions and make informed decisions about management.

The guide is based on the National Health and Medical Research Council's evidence-based *Clinical Practice Guidelines: Prevention of Stroke - The Role of Anticoagulants, Antiplatelet Agents and Carotid Endarterectomy*. This document and the accompanying *Stroke Prevention: A Consumer's Guide* are available from:

Australian Government Publishing Service
GPO Box 84, Canberra ACT 2601

Freecall: 132 447 or 008 020 049

STROKE PREVENTION CHECKLIST

SCREENING FOR STROKE RISK

All patients over the age of 45 years and all with risk factors (see below) should be screened for:

History of risk factors:

- Hypertension
- Smoking
- Palpitations (suggesting atrial fibrillation)
- Diabetes
- Hyperlipidaemia
- Cardiac failure
- Peripheral vascular disease
- TIA/stroke

Symptoms of stroke/TIA:

Sudden onset of

- Weakness/numbness of arm and/or leg
- Speech disturbance (aphasia, dysarthria)
- Double vision
- Vertigo
- Ataxia
- Peripheral vascular disease
- Amaurosis fugax

Examination:

- Irregular pulse (atrial fibrillation)
- Blood pressure (compare arms for extracranial arterial disease; use appropriate cuff size)
- Neck bruit
- Cardiac bruit

Tests:

- If pulse is irregular: Resting ECG
- If indicated by patient concern or family history: Blood sugar, blood lipids
- If neurological symptoms, or neck bruit (particularly under 60 years): Carotid Ultrasound

ACTION

Symptoms of stroke/TIA

- **Stroke risk is highest within hours or days of onset of symptoms.**
- **Refer urgently to neurologist or stroke UNIT for:**
CT to exclude haemorrhage
Carotid ultrasound
ECG to check for atrial fibrillation
Urgent preventive and acute management. (Page 4)
- Risk of stroke declines slowly over time, but still remains high and requires prompt assessment (as above) and management.
- If there is no AF or haemorrhagic stroke, immediate long-term antiplatelet therapy is indicated. (Page 5)

For carotid territory symptoms

- Immediate long-term antiplatelet therapy (page 5) plus
- Specialist referral for carotid ultrasound and possible further imaging to confirm presence/degree of carotid stenosis, then:
If 70-99% stenosis: consider endarterectomy.
If <70% stenosis: later re-imaging. (Page 8)

Atrial fibrillation (Page 6)

- Thyroid function tests on all patients. Treat thyrotoxicosis if present.
- **If symptoms or other risk factors are present, always consider long-term anticoagulation with warfarin.**
- **Consider specialist referral for assessment for anticoagulation.**
- If there are no other symptoms or risk factors (as shown by ECG, echo, & clinical examination; ie. "lone AF"), then give no therapy or antiplatelet therapy.

Vascular risk factors
(as above, see "History")

Usual risk factor management - antihypertensives, Quit advice, lifestyle advice etc. Antiplatelet therapy if indicated. (Page 5)

STROKE/TIA SYMPTOMS — A MEDICAL EMERGENCY

RED ALERT

Stroke is a medical emergency

- Stroke or TIA should be treated as a medical emergency, and management instigated urgently. Stroke risk after TIA/stroke is extremely high, and/or TIA may be start of a stuttering progression. Early intervention may prevent further progression, and in established stroke, may minimise neurological deficit.
- Inform patients about warning signs of stroke and TIA, the need to call an ambulance promptly.

PATIENT INFORMATION AND SUPPORT

Patient understanding and knowledge is crucial in effective stroke prevention.

- Inform patients and carers about
 - the warning signs of stroke/TIA
 - the need to seek urgent medical attention or call an ambulance promptly, whether the onset of symptoms is sudden or gradual
 - the reason for this need.
- Inform patients and carers about the role of and reasons for preventive treatments.
- Provide support for those on long-term medication.

Consumer research suggest that most people are poorly informed about what a stroke is (many confuse it with heart attack), the causes and types of stroke, and stroke risk factors and prevention.

ANTIPLATELET AGENTS IN STROKE PREVENTION

Aspirin (75 – 325 mg/day)

Should be given to:

- People with non-haemorrhagic stroke or TIA (Level I evidence)
Unless:
 - aspirin is contraindicated (intolerance, high risk of bleeding)
 - warfarin may be more appropriate, ie.
 - where the stroke has a cardiac cause (AF, valvular heart disease) (pages 6,7); or
 - where there is surgically inaccessible cerebrovascular atherosclerosis, and cerebral ischaemic symptoms occur despite antiplatelet therapy (Level IV evidence — no definitive data exist).
- People with:
 - previous MI
 - other cardiac disease (unstable angina, post coronary artery bypass graft, post coronary angioplasty, stable angina/coronary artery disease),
 - peripheral vascular disease (intermittent claudication, peripheral grafts, peripheral angioplasty)
 - other high stroke risk(Level I evidence)

The dose range reflects different trials. No definitive data exist on optimum dose. No particular preparation is preferred.

There is insufficient evidence to support regular use of aspirin for stroke prevention in people at low risk. (Level I evidence)

Dipyrimadole or ticlopidine

These antiplatelet agents should be considered for people who are intolerant of aspirin or in selected aspirin failures (Level I evidence). Their effectiveness is similar to aspirin.

Risk reduction with antiplatelet agents

Antiplatelet agents reduce the relative risk of stroke or death by about 25%.

Contraindications

- History of intolerance of aspirin
- High risk of bleeding (e.g. peptic ulceration, recent major injury, bleeding disorder).

ATRIAL FIBRILLATION (AF)

RED ALERT

Atrial fibrillation (including intermittent AF) significantly increases stroke risk. Anticoagulation with warfarin should be routinely considered in all patients with AF.

There is particular urgency following symptoms of TIA/stroke, in order to prevent further stroke.

Screening/case-finding for atrial fibrillation

- Opportunistic screening: Examine pulse rhythm routinely when measuring blood pressure, particularly in elderly people. If pulse rhythm is in doubt, resting ECG should be done.
- Case-finding in high risk people: If pulse rhythm and ECG are normal but the patient at very high risk of embolic stroke (e.g. prior TIA/stroke), 24-hour Holter monitoring will detect about 50% of cases of intermittent AF.
- People with intermittent palpitations and no clear diagnosis should have cardiac event monitoring.
- Echocardiography may be of use in stratification of stroke risk in people with cardiac abnormalities but no clinical risk factors.

Anticoagulation - Warfarin

Specialist consultation: In considering the risks and benefits of warfarin, specialist medical input should be strongly considered.

Risk reduction: Warfarin therapy reduces relative risk of stroke or death by about 70%.

Contraindications:

- Dementia
- Frequent falls
- Alcohol abuse
- Previous cerebral haemorrhage, bleeding problems
- Peptic ulceration
- Liver or renal impairment
- Poor control of INR.

Primary stroke prevention in AF without valvular heart disease

Warfarin is both more effective and more hazardous than aspirin, though trial evidence shows very low rates of bleeding for both.

- Warfarin should be considered in all patients with AF except for those with no other risk factors (ie. those with “lone AF”) (Level I evidence). At particularly high risk of stroke are those in AF with prior thromboembolism, hypertension, diabetes, and/or history of CCF.
Treatment with warfarin should be lifelong (Level IV evidence).
Anticoagulant control should be closely monitored, aiming at an INR of 2.0-3.0. (Level I evidence)
- Over age 75, risk of serious haemorrhage with warfarin is high; but this may be outweighed by higher risk of cardioembolic stroke. Anticoagulation should therefore be considered (Level IV evidence).
- Aspirin is effective, but less so than warfarin, and should be used where warfarin is contraindicated (Level I evidence).
- In lone AF (ie. no other stroke risk factors), the vascular event rate is extremely low, warfarin is not indicated, and there is insufficient evidence to recommend routine use of prophylactic aspirin (Level III evidence).

Secondary stroke prevention after cardioembolic stroke/TIA

Assuming CT scan shows no haemorrhage:

- Early anticoagulation with warfarin reduces the high risk of subsequent stroke. Potential benefit must be balanced against the risk of haemorrhagic transformation in acute stroke (Level IV evidence). With large infarcts, this risk is probably increased.
- Aspirin is effective, but less so than warfarin, and should be used where warfarin is contraindicated (Level I evidence).
- Where the neurological deficit is very severe, consider quality of life issues, in consultation with patient and/or family, in deciding about anticoagulation.

Stroke prevention in AF with valvular heart disease

- In most valvular heart disease, particularly rheumatic heart disease, and disease associated with AF or prior thromboembolism, anticoagulation with warfarin (INR 2-3) is of benefit (Level III evidence).
- For people with mechanical heart valves and AF or prior thromboembolism, warfarin (INR 2.5-3.5) should be combined with aspirin 100 mg daily (Level II evidence).

CAROTID ARTERY STENOSIS AND CAROTID ENDARTERECTOMY (CEA)

Involving Patients in Decision Making

General practitioners can help patients to:

- Be involved in and informed about decisions regarding both imaging and surgery
- Understand differences of opinion among specialists.
- Understand potential implications of imaging results - anxiety caused by the results of imaging should not outweigh the benefit gained.
- Access quality assurance data/complication rates for both angiography and surgery.

Imaging

Who should be imaged?

- Most people with TIA/minor stroke.
- Most people with a neck bruit, particularly those under 60 years.
NB: About 50% with a bruit have severe (70-99%) stenosis, but about 25% of those with severe stenosis have no bruit.
Population screening cannot be justified. Most people with asymptomatic carotid stenosis are at low risk of stroke.
Ultrasound for individuals at high risk (eg. lower limb ischaemia, symptomatic coronary disease, diabetes) may be justified in some instances, to stratify risk.

What imaging techniques should be used?

Initial investigation — duplex ultrasonography.

Further investigation — technique/s used will depend critically on quality assurance issues (page 10), and on availability, patient preference, and cost. There is disagreement as to the best strategy, and considerable variation in practice; eg. some regard catheter angiography as essential, some operate on ultrasound alone.

Advantages and disadvantages of the available techniques are:

- **Duplex ultrasound:** safe, inexpensive, but may undercall 70% stenosis as 50%, or fail to distinguish >90% stenosis from occlusion. Does not image cerebral vessels.
- **Magnetic resonance angiography (MRA):** safe, images cerebral vessels, although not with the clarity of catheter angiography. It may overcall severe stenosis as occlusion, and may miss ulceration.

- **Catheter angiography:** the “gold standard” on which the trial evidence is based. It provides excellent imaging of carotid and cerebral vessels, but carries a 1% risk of stroke plus a further 3% risk of minor neurological event. Risk varies among angiographers and depending on the complexity of the patient’s condition.

Carotid Endarterectomy

Balancing risks for CEA

The risk of ischaemic stroke ipsilateral to carotid stenosis (i.e. same side of the brain) increases with increasing stenosis, particularly >80% vessel diameter. Perioperative stroke risk is largely independent of stenosis. Therefore, the benefits of CEA increase as the degree of stenosis increases, but the exact breakeven point must depend on other factors that predict stroke without surgery, including: symptoms of carotid territory ischaemia, symptoms of ischaemia in the brain (rather than in the eye), being male, and evidence of lower limb ischaemia (Level III evidence).

Decisions regarding surgery are best made collaboratively, with the patient, surgeon, neurologist, and general practitioner.

For symptomatic carotid stenosis

Surgery for people with retinal ischaemia (amaurosis fugax), cerebral hemispheric TIA, or non-disabling stroke is:

- **Recommended** where the symptoms are caused by 70-99% carotid stenosis ipsilateral to the ischaemia, the patient is in good general health, and the surgical centre has a combined angiographic/surgical stroke-or-death risk of 5% or less. (Level I evidence)
- **Uncertain** for people with ipsilateral 30-69% carotid stenosis:
30-50% stenosis — Level II evidence against
50-69% stenosis — Level IV evidence in favour;
- **Not recommended** for people with ipsilateral <30% carotid stenosis (Level II evidence).

Post-surgical management: Antiplatelet therapy is standard practice (Level IV evidence).

Where CEA is contraindicated:

All patients should have antiplatelet therapy and risk factor control;

Those with <70% stenosis and no other contraindication for surgery should be re-imaged at a later date (Level IV evidence).

For asymptomatic carotid stenosis

Asymptomatic other side - i.e. the side in question is asymptomatic but there is a history of contralateral CEA &/or symptoms (amaurosis fugax, TIA/stroke) - CEA should be considered where:

- The patient has asymptomatic 70-99% stenosis, good health, and life expectancy of 2 years (males) or 5 years (females) **and**
- The surgical centre has a combined angiographic/surgical stroke-or-death risk of 3% or less.

(Level IV evidence)

Truly asymptomatic - i.e. both sides are asymptomatic - CEA should be considered where:

- The patient has asymptomatic 80-99% carotid stenosis, good health, and life expectancy of 5 years (males) or 10 years (females) **and**
- The surgical centre has a combined angiographic/surgical stroke-or-death risk of 3% or less.

(Level II evidence. There are, however, a number of problems in applying the results of the trials to clinical practice.)

Post-surgical management: Antiplatelet therapy is standard practice (Level IV evidence).

Where CEA is contraindicated: Management should be risk factor control and antiplatelet therapy.

Before major elective surgery

Before major elective surgery, and subject to the guidelines above, endarterectomy:

- **Is indicated** for symptomatic 70-99% carotid stenosis (Level III evidence).
- **May be considered** for asymptomatic 80-99% stenosis (Level IV evidence).

Quality Assurance

Audited results of ultrasound, MRA, catheter angiography, and surgeons' perioperative complication rates should be readily available to patients and referring doctors. Angiography should have a permanent disability rate of no higher than 1%. General practitioners should help patients obtain this information.

INDIVIDUAL STROKE RISK

Risks are at least additive. There is some controversy regarding interaction.

General risk factors

- Age: Risk roughly doubles with each decade of life.
- Hypertension: Risk doubles with every 7.5 mmHg rise in diastolic BP from 70 to 110 mmHg. A similar risk increase applies for systolic pressure in those with raised systolic pressure.
- Smoking: Increases stroke risk 3-5 times. Risk is directly related to numbers of cigarettes smoked. Effects of smoking on risk are reversed in 3-5 years.

Atrial fibrillation (without anticoagulation)

NB: Intermittent AF poses the same stroke risk as sustained AF

- No other risk factors: (no thromboembolism, hypertension, CCF; normal echocardiogram; ie. "lone AF") Risk is low (similar to no AF).
- Other risk factors: **Risk increases by 5-6 times**, and is substantially greater than this
 - (a) in older people, and
 - (b) with risk factors for structural heart disease, e.g. hypertension, CCF, prior thromboembolism, diabetes.
- Plus valvular heart disease: **Risk increases by about 17 times.**
- Following cardiogenic stroke/TIA: **12-20% will experience a second stroke within 2 weeks, with a risk of about 1% per day. Within 12 months, 20% will have a second stroke.**

Carotid artery stenosis (without treatment):

- No symptoms of TIA/stroke &
 - 30-60% stenosis: Annual risk about 1%, similar to average population of same age & sex
 - 60-99% stenosis: Annual risk 3%, but only 1% for disabling stroke.
- Following TIA/stroke plus 70-99% stenosis: Annual risk 7%-18%.
- Neck bruit but no cerebral symptoms: Annual risk of ipsilateral ischaemic stroke is <1%. 50% have operable (70-99%) stenosis, but 24% of people with 70-99% stenosis have no bruit.

STROKE ADVICE AND RESOURCES

**For Stroke prevention pamphlets
Stroke support group locations and contacts:**

State Stroke Associations

ACT

Stroke Association ACT
12 Clarkson Street
Pearce ACT 2607
Phone: (062) 863 333 (Peter McMahon)

New South Wales

Stroke Recovery Association Inc.
2nd Floor, 1 West Street, Lewisham NSW
PO Box 673, Petersham NSW 2049
Phone: (02) 550 0594
Fax: (02) 560 2306

Queensland

Support, Self-help and Social Activities for Stroke People
PO Box 426
Morningside Qld 4170
Phone: (07) 3999 9461

South Australia

Stroke SA
Neurological Resource Centre
23A King William Road
Unley SA 5061
Phone: (08) 357 8909

Tasmania

Stroke Club of Tasmania
10 Maritana Place
Claremont Tas 7011
Phone: (002) 492 033 (Val Manson)

Victoria

Stroke Association of Victoria
PO Box 226
Geelong Vic 3220
Phone: (052) 787 980 (Clare Gray)

Western Australia

Contact: Manning Stroke Club
138 Planet Street
Carlyle WA 6101
Phone: (09) 361 3839

National Stroke Foundation

394-400 Little Bourke Street
Melbourne Victoria 3000
Phone: (03) 9670 1000
Fax: (03) 9670 9300

Australian Brain Foundation State Offices

New South Wales

PO Box N27, Grosvenor Place
Sydney NSW 2000
Phone: (02) 9259 1219
Fax: (02) 9247 2430

Queensland

“Ladhope”, 131 Wickham Terrace
Brisbane Queensland 4000
Phone: (07) 3831 1704
Fax: (07) 3832 6674

South Australia

1st Floor, 28 Greenhill Road, Wayville SA 5034
Mail to: PO Box 125, Unley Business Centre, SA 5061
Phone: (08) 8357 8911
Fax: (08) 8373 1496

Tasmania

169 Campbell Street
Hobart Tasmania 7000
Phone: (03) 6231 4424
Fax: (03) 6234 3442

Victoria

746 Burke Road
Camberwell Victoria 3124
Phone: (03) 9882 2203
Fax: (03) 9882 5737

Western Australia
320 Rokeby Road
Subiaco WA 6008
Phone: (09) 382 2320
Fax: (09) 382 1149

National Office Brain Foundation

PO Box 20
Hawthorn Victoria 3122
Phone: (03) 9818 7844
Fax: (03) 9818 1566

Smoking: For Quit booklets and resources
Phone National QUITLINE: 13 18 48

NHMRC evidence rating

The evidence base for these guidelines is rated using the four-point rating system recommended by the NHMRC Quality of Care and Health Outcomes Committee:

Level I: All relevant randomised controlled trials

Level II: One randomised controlled trial

Level III: Other controlled trials or well designed cohort or case-control analytic studies

Level IV: Clinical experience, descriptive studies, expert committees

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- Hypertension
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- Palpitations (suggesting atrial fibrillation)
- Diabetes
- Hyperlipidaemia
- Cardiac failure
- Peripheral vascular disease
- TIA/stroke

Symptoms of stroke/TIA:

Sudden onset of

- Weakness/numbness of arm and/or leg
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- Peripheral vascular disease
- Amaurosis fugax

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- Irregular pulse (atrial fibrillation)
- Blood pressure (compare arms for extracranial arterial disease; use appropriate cuff size)
- Neck bruit
- Cardiac bruit

Tests:

- If pulse is irregular: Resting ECG
- If indicated by patient concern or family history: Blood sugar, blood lipids
- If neurological symptoms, or neck bruit (particularly under 60 years): Carotid Ultrasound

ACTION

Symptoms of stroke/TIA

- **Stroke risk is highest within hours or days of onset of symptoms.**
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For carotid territory symptoms

Atrial fibrillation (Page 6)

- Thyroid function tests on all patients. Treat thyrotoxicosis if present.
- **If symptoms or other risk factors are present, always consider long-term anticoagulation with warfarin.**
- **Consider specialist referral for assessment for anticoagulation.**
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Vascular risk factors (as above, see "History")

Usual risk factor management - antihypertensives, Quit advice, lifestyle advice etc. Antiplatelet therapy if indicated. (Page 5)