

TIA and stroke

a management guide for GPs

The incidence of stroke in Australia is about 46,000 per year. It is the third most common cause of death in this country (about 15,000 per year) and a major cause of disability. All GPs need to be aware of rapid changes occurring in management.

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For stroke, perhaps above all other medical conditions, there is a need for a seamless continuum of care from the acute presentation, through management in hospital or other healthcare facility, to integration back into the community. With the availability of level I evidence to show that the burden of stroke may be reduced by specific strategies for the acute phase as well as effective forms of secondary prevention, management is changing rapidly. This article discusses current approaches to management, and highlights the specific roles that GPs play – these are summarised in the box on page 16. The evidence underlying changes in management approaches is also explained (see the box on page 19).¹⁻⁹

There are now three specific strategies in acute stroke management that have been proven to improve outcomes (that is, are supported by level I evidence). Specifically:

- administration of intravenous tissue plasminogen activator (tPA; alteplase [Actilyse]) within three hours of stroke onset may increase the number of patients improving to

virtually no clinical deficit by about 30%^{1,2}

- administration of aspirin within 48 hours of ischaemic stroke onset may reduce death and nonfatal stroke in about nine patients per 1000 treated^{3,4}
- management in a stroke care unit may reduce mortality and the need for institutionalised care by about 20%.^{5,10}

Pre-hospital management

For the stroke patient, time is brain. The GP's initial tasks are to recognise the symptoms and signs of an acute transient ischaemic attack (TIA) or stroke (Table 1), and to facilitate rapid transfer to a healthcare facility where the strategies listed above can be put into place with minimal delay. If there is any doubt about the diagnosis, the patient should be transferred to hospital for further investigation. Differential diagnoses are listed in Table 2.

A number of factors have been identified that may prolong hospital arrival times. These include the following:

- lack of recognition of cause of symptoms

IN SUMMARY

- Stroke is one of the major causes of death and disability in Australia.
- All patients with acute stroke should be referred directly to a hospital with imaging facilities (CT and/or MRI), and preferably a stroke unit that provides thrombolytic therapy.
- Management in a stroke unit can reduce long term outcomes of death and dependency.
- Risk factor identification and management are important.
- Early rehabilitation of patients in a multidisciplinary team environment is ideal.
- Rural GPs are in a unique position to take on multiple roles in stroke management (physician, service co-ordinator, staff and family educator, and support service).

Table 1. Symptoms and signs of TIA and stroke

- Motor symptoms: weakness or clumsiness (unilateral or bilateral)
- Sensory symptoms: altered feeling on one side of the body
- Difficulty swallowing
- Speech or language disturbance: slurred speech, difficulty with reading or understanding
- Vestibular dysfunction
- Unsteady gait/cerebellar features
- Visual symptoms: loss of vision in one eye, loss of visual field, diplopia
- Nonfocal symptoms: generalised weakness, incontinence, imbalance, altered state of consciousness, dizziness

Table 2. Differential diagnoses

- Migraine
- Syncope
- Epilepsy (Todd's palsy)
- Intracranial structural lesions
- Encephalopathy
- Encephalitis
- Multiple sclerosis
- Transient global amnesia
- Peripheral neuropathy or myopathy
- Metabolic derangement – e.g. hypoglycaemia
- Peripheral causes of vertigo, such as benign postural vertigo

- nonambulance transport
- GP contact
- less severe stroke
- ischaemic stroke
- living alone
- being asleep at stroke onset.

The fact that 'GP contact' delays transfer to hospital may seem paradoxical, but it is understandable given that GPs cannot always immediately attend the home to establish the diagnosis.¹¹ Hence, it is crucial that they, having been contacted by a patient or carer by telephone, act to facilitate rapid ambulance (ideally) or other mode

TIA and stroke



Stroke is a common cause of death and permanent disability in adults. With the results of key trials and meta-analyses that have recently become available, management is undergoing rapid change. Increasing emphasis is being placed on the value of specific treatment strategies in the acute phase and effective forms of secondary prevention.

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of transport to hospital if there is reasonable suspicion that stroke has occurred.

Hospital care

After transfer to hospital has been effected, time is still the most important factor. The GP has an important role in a number of the steps involved.

Clinical confirmation of diagnosis

Rapid triage by a nurse trained to recognise the symptoms and signs of stroke is helpful, and expeditious clinical evaluation should establish the diagnosis more clearly. The presentation of the stroke syndromes can often be divided according to the vascular territories using, for example, the Oxford classification of cerebral infarction, which may assist in management. It is also important to identify risk factors such as hypertension, atrial fibrillation, diabetes, cigarette smoking, hyperlipidaemia, a past history of stroke and previous ischaemic heart disease.

Brain imaging

Computed tomography (CT) remains the workhorse of acute stroke management, and has the important advantage over magnetic resonance imaging (MRI) of immediately distinguishing between haemorrhage (increased signal) and infarction (usually little change within the first few hours). Examples are shown in Figures 1a and b.

MRI is becoming more readily available – diffusion-weighted MRI (DWI) has the great advantage of detecting acute ischaemia almost immediately after stroke onset when a CT scan would still be negative. In fact, about one-third

of clinically proven TIAs have MRI ischaemic changes, particularly in DWI, that correspond with the clinical presentation. This subset of patients may have a different clinical course compared with patients with TIAs but without MRI (DWI) changes.^{12,13}

MRI also provides better resolution than CT for imaging the posterior fossa and brainstem.

Acute management with tPA and/or aspirin

Therapy with intravenous tPA may be considered:

- if the length of time from symptom onset is less than three hours
- CT scans are essentially normal
- blood pressure is less than 185/110 mmHg
- the coagulation profile is normal, and
- there are no other contraindications to thrombolysis.

For every 100 patients treated within three hours, 12 patients will have little or no residual clinical deficit (i.e. the number

needed to treat to benefit one individual is about eight).¹ tPA was licensed for use in managing stroke in appropriate centres in August 2003.

Oral aspirin (150 to 300 mg) should be administered as early as possible, preferably within 48 hours of stroke onset. Note, however, that tPA and aspirin are never given before brain imaging.

Ultrasound of carotid or vertebrasilar arteries

Carotid and transcranial Doppler ultrasound may show focal narrowing in the internal carotid artery and the posterior circulation, respectively. Each patient's suitability for surgical intervention (carotid endarterectomy) should be considered before he or she is subjected to the test. Significant symptomatic stenosis in the internal carotid artery is defined as 70% or more.

Management in a stroke care unit

Level I evidence is now available to show that managing acute stroke patients in a

The GP's role in managing patients with stroke

Pre-hospital management

- Recognising the symptoms and signs of acute transient ischaemic attack (TIA) or stroke
- Facilitating rapid transfer to a healthcare facility where acute stroke management strategies can be put into place with minimal delay

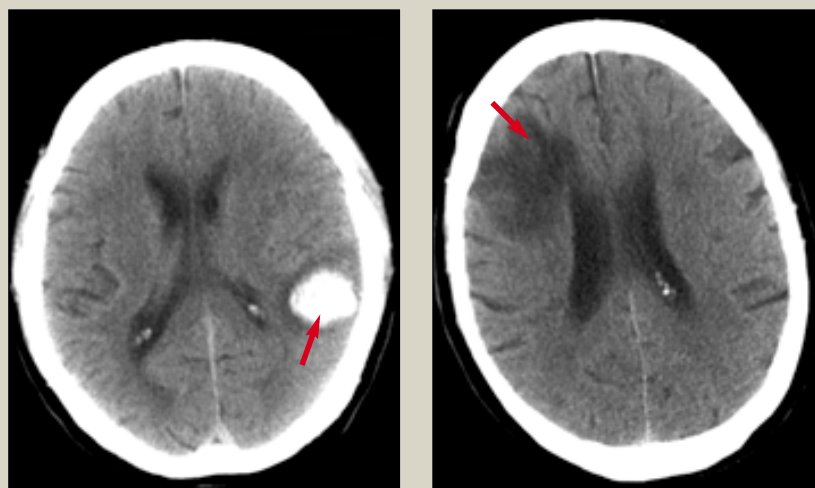
Hospital care

- Assisting with medical management (in some hospitals)
- Providing additional medical and historical information about patients to hospital doctors
- Preparing family and carers for the patient's discharge
- Liaising with 'hospital in the home' or 'rehabilitation in the home' programs
- Care-planning with hospital team for discharge

Community care

- Implementing secondary prevention strategies
- Re-integrating stroke patients into the community

CT imaging in acute stroke management



Figures 1a and b. CT scans are mandatory for all stroke patients and crucial in making decisions about therapy. a (left). An area of haemorrhage appears white (arrow). b (right). Cerebral infarcts (arrow) appear darker than normal brain.

stroke care unit reduces the risk of death and dependency at one year by about 20% compared with management in a general ward,⁵ and, therefore, the former approach should now be mandatory. There has been a general recommendation that stroke care units be established Australia-wide,¹⁴ and the initiative is being taken up by a num-

ber of States and Territories. At present, however, only 23% of Australians have access to stroke care unit facilities.

Minimum investigation set

To define the type of stroke and associated comorbidities, a minimum set of investigations is recommended. This

comprises the following:

- brain CT
- chest x-ray
- full blood examination
- erythrocyte sedimentation rate
- random blood sugar
- urea, creatinine and electrolytes
- ECG.

Newer strategies for reducing the burden of stroke: a look at the evidence

Acute management

There is now level I evidence for three acute management strategies in reducing the burden of stroke: tissue plasminogen activator (tPA), aspirin and care in a stroke care unit. This is summarised in Table A.

Table A. Benefits (avoidance of death or disability) of acute interventions

Strategy	Absolute risk reduction	Number needed to treat*	Potential benefit per 1000 cases of stroke in Australia†
Tissue plasminogen activator (tPA) 0-3 hours ^{1,2}	11.0	9	11†
Aspirin ^{3,4}	1.2	83	6†
Stroke care unit ^{5,6}	5.6	18	46†

* The number of patients needed to be treated in one year to avoid one death or disability per year.

† Case reduction of death and dependency from an estimated number of stroke cases in Australia in 1998 sourced from several Australian studies.⁶

The evidence relies on a number of pivotal trials and meta-analyses that have been conducted over the last 10 years. Of these strategies, the number of patients needed to treat to obtain benefit for one individual is most favourable for tPA. It should be noted that although tPA does increase the risk of symptomatic intracranial haemorrhage (about 7% of patients), it does not appear to increase mortality.^{1,2} tPA is now licensed in Australia for management of stroke in appropriate centres.

Aspirin is less effective than tPA, but it is cheaper and safer. There is no evidence that intravenous or subcutaneous heparin is of benefit.³

Management of patients in a stroke care unit is effective and safe, and should not be particularly expensive. Even in smaller hospitals, a stroke care unit can be established and operated by reorganising existing resources.

Secondary prevention

Level I evidence now exists for at least four early strategies for secondary prevention in improving long term outcomes after TIA or stroke: use of antiplatelet agents, blood pressure lowering, warfarin and carotid endarterectomy. This is summarised in Table B.

Table B. Benefits of secondary prevention strategies

Strategy	Relative risk reduction	Absolute risk reduction	Number needed to treat*
Antiplatelet agent ⁴	23	1.0	100
Blood pressure lowering ⁷	28	2.2	45
Warfarin ⁸	67	8.0	12
Carotid endarterectomy ⁹	44	3.8	26

* The number of patients needed to be treated in one year to avoid one recurrent stroke per year.

Special issues for rural GPs

- Access to CT and duplex ultrasound. Can this be arranged urgently? If not, the patient should be transferred.
- More complete medical management. In many instances the GP may be the sole medical manager, hence a knowledge of level I evidence for acute care (tPA, aspirin, stroke unit management) as well as secondary prevention strategies (antiplatelet agents, warfarin, blood pressure lowering, referral for carotid endarterectomy or lipid lowering) is essential. If not, the patient should be referred or transferred.
- Facilitating the continuum of care from acute presentation through to rehabilitation and community adjustment. Rural GPs are probably even more involved in this than urban GPs.
- Family and emotional support, which are crucial in the recovery process. Depression is not uncommon among stroke patients.

Transoesophageal echocardiography is an additional investigation that may be used to detect aortic arch atheroma as an embolic source if no obvious cardiac or large artery sources have been identified. In patients with atrial fibrillation or recent acute myocardial infarction, this investigation is not usually indicated unless more information about cardiac function is required.

Management of medical complications

Each complication should be managed on its merits. These include:

- infections (e.g. pneumonia, urinary tract infections)
- deep venous thrombosis (DVT) or pulmonary embolism
- cardiac failure, fluid imbalance
- hypertension
- hyperglycaemia
- cardiac arrhythmias/cardiac infarction
- pressure sores
- urinary and bowel problems
- seizures
- falls.

Significant hypertension is not an uncommon finding in the acute stroke setting, and generally there is no need for intervention in ischaemic stroke unless the systolic pressure is above 220 mmHg or the diastolic pressure is above 120 mmHg. Fortunately, elevated blood pressure at admission usually settles within hours, or within a few days at most.

Pressure stockings are essential for preventing DVT; subcutaneous heparin is often used in patients who cannot be mobilised or with a history of DVT or pulmonary embolus.¹⁵

Speech assessment is important for patients with speech impairment, and appropriate dietary advice is essential for those with swallowing difficulties.

Early rehabilitation

Although there is rapidly accumulating evidence that rehabilitation improves clinical outcomes, it is uncertain how early this should occur. Nevertheless, it is generally considered that rehabilitation should usually be commenced as soon as practicable, and this is the practice in most stroke care units.

Early secondary prevention

Based on their risk factor profile, people who have experienced a TIA may have a risk of stroke of up to 31% within the next seven days.¹⁶ Conversely, in patients who have experienced an ischaemic stroke preceded by a TIA, 43% of these TIAs will have taken place within seven days before the ischaemic stroke.¹⁷ Thus it is crucial to instigate appropriate investigations and secondary prevention as early as possible.

There is now level I evidence that at least four early strategies for secondary prevention may improve long term outcomes after TIA or stroke. Some of these may be initiated in hospital, but most often they are commenced by the GP when the patient has returned to the community. These strategies are discussed in the section 'Secondary prevention' below.

Discharge planning

Of the patients with stroke who enter hospital, about 20% will die during their stay and the remainder will be discharged:

- directly home (33%)
- to rehabilitation centres (33%)
- to nursing homes (only about 10%).

For the two-thirds who go either home or to rehabilitation, early planning is essential. Increasingly, patients are being discharged early with the support of 'hospital in the home' programs, in which ongoing medical management of stroke comorbidities is undertaken. The use of 'rehabilitation in the home' programs is an increasingly common trend.

Community care

The GP, who may have been involved during the early phases of stroke onset and hospital care, assumes an even more important role in caring for a patient after discharge from hospital. The main management issues for GPs include use of secondary prevention strategies, and it is helpful to have a checklist to ensure that all appropriate steps are taken. GPs are also involved in reintegrating the patient into the community.

Secondary prevention

There are at least four secondary stroke prevention strategies that need to be implemented where appropriate (see the box on page 19). These are:

- antiplatelet agents
 - aspirin⁴
 - clopidogrel (Iscover, Plavix)¹⁸
 - aspirin with dipyridamole (Asasantin SR)¹⁹

- blood pressure lowering agents
 - using perindopril (Coversyl) alone or with indapamide²⁰ (a combined preparation [Coversyl Plus] is available)
 - for patients with a previous history of stroke there is some evidence that ramipril (Ramace, Tritace) may be effective²¹
- warfarin (Coumadin, Marevan), in patients in atrial fibrillation⁸
- carotid endarterectomy, in symptomatic patients with carotid stenosis of 70% or more.⁹

Compared with the use of aspirin alone, clopidogrel has been shown to further reduce the relative risk of vascular events, including ischaemic stroke, by about 8.7%. Compared with the use of aspirin alone, the combination of aspirin and dipyridamole also shows a relative reduction of risk of stroke or death by a further 13%. The major use of clopidogrel and aspirin/dipyridamole is in the setting of further cerebrovascular events despite the use of aspirin or, for the former, in the patient who cannot tolerate aspirin due to its side effects. For patients with nonvalvular atrial fibrillation one should aim for an INR of 2.5 (range, 2.0 to 3.0). Heparin is still occasionally used as a prelude to warfarin, but evidence for this is lacking.³

Lipid lowering using simvastatin (Lipex, Zocor) is a possible fifth strategy to consider. There is some evidence that simvastatin may be of benefit, although this needs to be confirmed in trials specifically designed for patients with TIA or stroke.²²

Risk factor modification measures are also important. These include cessation of cigarette smoking and avoidance of heavy alcohol consumption. In addition, blood glucose in patients with diabetes should be strictly controlled (although there is no level I evidence to support this recommendation).

Re-integration

Adjustments to the patient's environment may be required because he or she may need to be re-introduced to work or home activities gradually. Increased stress on carers is likely, sometimes with attendant illnesses. In some instances, respite care may need to be arranged.

Role of the rural GP

Rural GPs are faced with additional challenges for managing patients with stroke or TIA – these are described in the box on page 20. Therefore, awareness of the evidence base for management strategies is most important – particularly if they undertake more complete medical management. Since access

to specialist services is more limited in rural areas, GPs usually assume greater responsibility, thus making it even more important that they are aware of the need to refer to rural based specialists when appropriate (for example, for carotid endarterectomy).

Resources

The National Stroke Foundation (NSF) produced a set of clinical guidelines for acute stroke management in 2003.

Final comments

The management of stroke is changing quite rapidly with the introduction of the evidence based strategies discussed in this article. The role of the GP remains central. MT

A list of references is available on request to the editorial office.

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