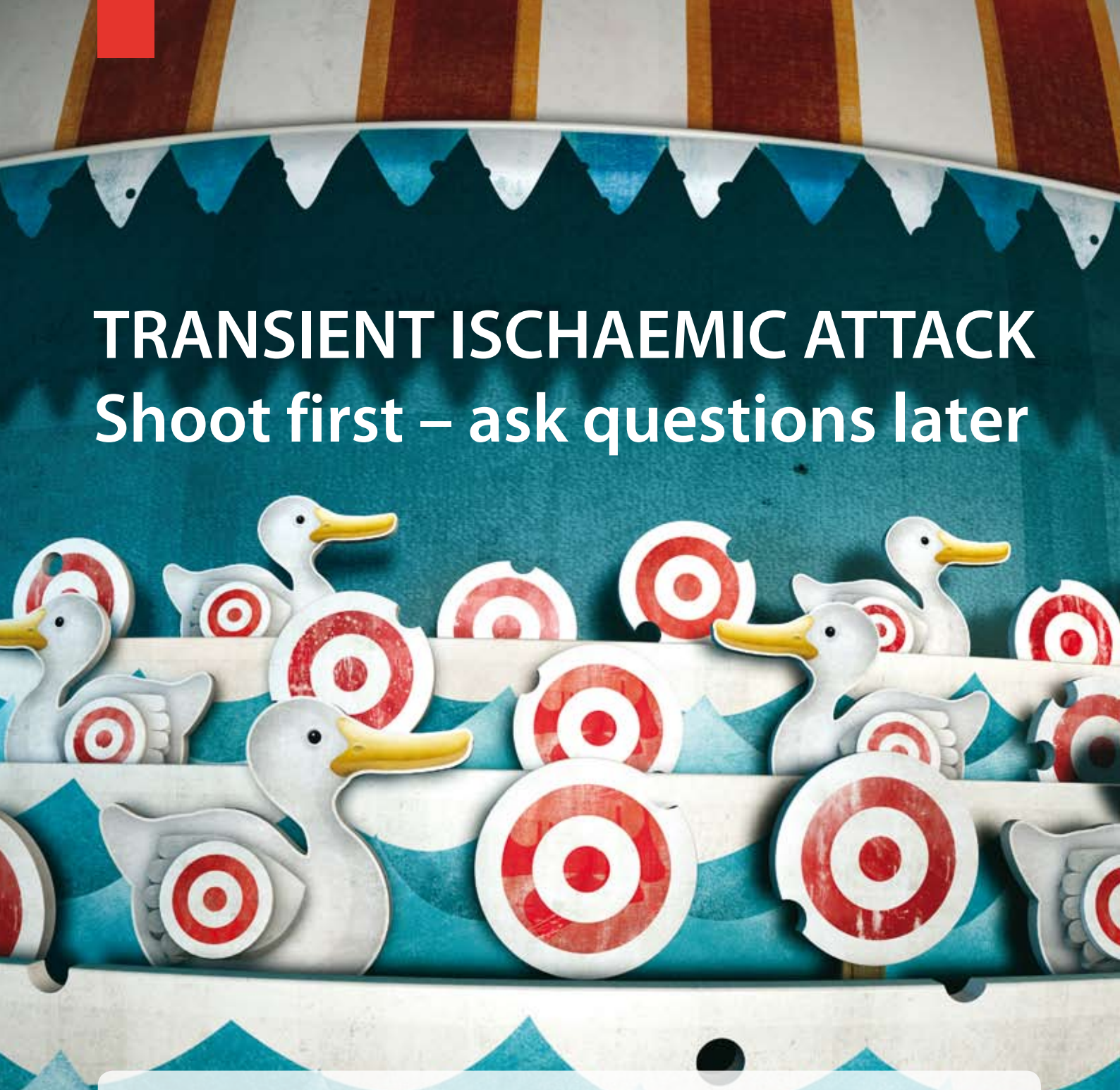
TRANSIENT ISCHAEMIC ATTACK
Shoot first – ask questions later



Key concepts

- A transient ischaemic attack (TIA) is a medical emergency due to the high risk that stroke will occur within the next 48 hours
- Aspirin, a statin and an antihypertensive medicine should be given to all patients immediately following a suspected TIA - if they are fully recovered and without contraindications
- All patients with a suspected TIA should have their risk of stroke assessed using the ABCD^2 tool, and then be referred to secondary care for urgent investigation and treatment (according to local protocols)
- As soon as a diagnosis of TIA is confirmed, risk factors should be assessed and a long-term, individualised secondary prevention plan implemented

Transient ischemic attack is a stroke warning

A transient ischaemic attack (TIA) is traditionally defined as a group of stroke symptoms which resolve within a 24 hour period. However, in practice, symptoms that last longer than one hour are likely to indicate a stroke. In New Zealand, approximately 8000 people per year experience a stroke and approximately one quarter of these people have a preceding (warning) TIA.[1] The risk of stroke is greatest in the first 48 hours following a TIA and some studies report the risk to be as high as 10% in the week following.[1, 2] A TIA is therefore a medical emergency.

Early diagnosis and intervention is important

If a TIA is rapidly diagnosed and appropriate interventions initiated, the risk of subsequent stroke can be significantly reduced. Prompt access to specialised stroke services can greatly enhance patient outcomes,[2, 3] although availability of these services is variable throughout New Zealand. Therefore it is important that primary care clinicians respond effectively and rapidly to manage a patient with a suspected TIA.

When to suspect TIA

Due to the high risk of stroke following a TIA, it is important that all people with a suspected TIA receive urgent treatment and referral for secondary care assessment. However, other conditions can mimic the symptoms of TIA and over diagnosis is frequent. It has been estimated that 50% to 80% of suspected TIA cases are subsequently confirmed.[1] A desire not to miss any cases must be balanced against the risk of an incorrect diagnosis, which can cause the patient anxiety and affect their ability to work, to drive, to travel in general or, in some cases, to qualify for medical insurance.

The best method of diagnosing TIA is an accurate description of the event provided by the patient, as soon as possible after it has occurred. If an observer was present then corroboration of detail is also useful. Brain imaging cannot be relied upon solely for diagnosis – although a positive finding may be confirmatory, negative imaging does not exclude TIA.

The difference between ischaemic stroke and TIA

The etiological difference between an ischaemic stroke and a TIA is that stroke causes brain damage, whereas a TIA does not – this is why the symptoms of a TIA resolve quickly. As brain imaging technology improves, neurologists are increasingly finding that TIAs lasting for longer than one hour are often associated with brain damage and are in fact strokes. This has led to the working definition of a TIA being changed to; stroke-like symptoms which resolve in less than one hour.

Both TIA and stroke are medical emergencies and the management of the two is largely the same. The crucial difference is that patients with stroke need to be referred to hospital immediately, in order to eliminate the possibility of intracranial haemorrhage (ICH), before antithrombotic treatment can begin. However, patients with TIA should be given aspirin, statin and antihypertensive treatment immediately after symptoms have resolved,[1, 2, 4] without waiting for secondary care assessment. This is because following resolution of symptoms, the chance of ICH is very small.

A diagnosis of TIA is more likely if the history includes:[1]

- Sudden and discernible onset of symptoms
- Neurological deficits maximal at onset
- Loss of function
- Rapid recovery (usually 30 – 60 minutes)

N.B. Progressive onset of symptoms, or a succession of muscular symptoms from one part of the body to another, is more likely to be due to epilepsy if it occurs over seconds to minutes, or a migraine if it occurs over a number of minutes.

TIA diagnosis

Typically, symptoms of TIA are "negative" and involve loss of localised neurological function (e.g. loss of sensation, vision or power). TIAs rarely cause "positive" symptoms such as pins and needles, limb movement or scintillating (bright, flashing, shimmering) visual disturbances. Symptoms of ataxia, vertigo, dysphagia (difficulty swallowing), dysarthia (difficulty articulating speech) and focal sensory symptoms may be consistent with TIA when combined with other typical symptoms. Hypoglycaemia should be excluded in all patients with sudden onset of neurological symptoms. Patients with a blood glucose < 3.5 mmol/L should be treated and then reassessed.[1] Table 1 outlines symptoms which are typical and atypical of TIA.

What do you do when you suspect TIA?

Step 1: Immediate empiric treatment to reduce stroke risk

Administer **aspirin**, **statin** and **antihypertensive** treatment immediately after symptoms have resolved – unless contraindicated (e.g. history of intracranial haemorrhage, anticoagulant treatment or hypotensive). Do not defer treatment until after secondary care assessment or brain imaging.[1]

Table 1: Diagnosis of TIA (adapted from Stroke Foundation of New Zealand, 2008)[1]

Symptoms typical of TIA	Symptoms atypical of TIA
Unilateral weakness of: Face Arm Leg	Generalised weakness or generalised sensory disturbances
Unilateral sensory disturbance	Reduced consciousness or reduced muscle tone resulting in falls
Dysphasia (speech deficit)	Light headedness
Hemianopia (blindness in one half of the visual field in one or both eyes)	Confusion – having excluded dysphasia
Transient monocular blindness (blindness in one eye)	Bilateral visual disturbances
	Incontinence
	Hypotension
	Amnesia
	Hypoglycaemia
	Focal epileptic seizures
	Anxiety or hyperventilation
	Isolated vertigo, nausea and ataxia
	Migraine aura without headache

The Early Use of Existing Preventive Strategies for Stroke (EXPRESS) trial of immediate, multiple pharmacotherapy after TIA demonstrated an 80% reduction in early recurrent stroke and improved patient outcomes, compared to less aggressive treatment.[2]

The first dose of aspirin should be between 150 and 300 mg (depending on whether the patient is already taking aspirin). This should then be reduced to 100 mg per day, prior to commencing long-term antithrombotic treatment.[5]

Aspirin is the only antiplatelet medicine with strong evidence for its effectiveness in the acute treatment of TIA. Two studies have shown that combination treatment of clopidogrel and aspirin, or dipyridamole and aspirin may also be effective in acute treatment following a TIA. However, more complete studies are required before medicines other than aspirin can be recommended.[5–7]

Antihypertensive treatment should be given unless the patient is hypotensive. An ACE inhibitor such as cilazapril (0.5 – 2.5 mg) is an appropriate choice. This treatment can be refined in response to blood pressure over the following weeks.

Unless the patient is already taking a statin (in which case their usual dose would be given), atorvastatin 80 mg can be given initially. Follow up testing of lipid levels may prompt a change in dose or statin.

A definitive plan for long-term secondary prevention can be made following a comprehensive evaluation of the patient.

Best Practice tip: Most practices will have aspirin available to give immediately. A prescription for an antihypertensive and a statin can be written and filled urgently at the closest pharmacy. General practitioners, especially rural or duty doctors, may consider carrying a TIA kit including aspirin, statin and an ACE inhibitor.

Haemorrhage risk

People using anticoagulant treatment, or with a documented history of intracranial haemorrhage or thunderclap occipital headache should not be given aspirin, and should be referred to hospital as soon as possible. Individual decisions on treatment will then be made once brain imaging procedures have been completed. In situations such as these, primary care has an important role to play in the recording and clarification of medical histories prior to admission.

Step 2: Assess stroke risk

Following TIA the risk of stroke is dangerously elevated. Assessment tools exist to help stratify this risk.

Use your ABCD^2 risk tool

All patients presenting to primary care with suspected TIA should have an assessment of stroke risk using the ABCD^2 tool (Table 2).[1]

Table 2: ABCD^2 tool for stroke prediction following TIA[8]

	Risk factor	Points
A	Age: ≥ 60 years	1
B	Blood pressure: ≥ 140/90mm Hg	1
C	Clinical features:	
	unilateral weakness or	2
	speech impairment without weakness	1
D	Duration of symptoms:	
	≥ 60 minutes or	2
	10–59 minutes	1
D	Diabetes: Medication	1

The ABCD^2 tool is an aid only and it should not replace clinical decision making. Other factors which may place a patient in the high-risk category, but are not included in the ABCD^2 tool, are listed as follows.

High risk of stroke is indicated by:[5]

All people with an ABCD^2 score of **≥ 4**, or any of the following regardless of ABCD^2 score:

- Active TIA at presentation
- Crescendo TIAs
- Suspected TIA with atrial fibrillation
- Suspected TIA while taking anticoagulation treatment

Low risk of stroke is indicted by:[5]

All people with an ABCD^2 score of **≤ 3** or:

- People who present more than seven days after a suspected TIA

Step 3: Referral for assessment in secondary care

Referral for assessment is usually required in order to eliminate possible TIA mimics (e.g. subdural haematoma or brain tumour), to gain timely access to investigations and to assist in the development of a long-term treatment plan for secondary stroke prevention. The urgency of referral to secondary care is determined by the estimated risk of subsequent stroke occurring.[1] Patients with a TIA, who are already taking anticoagulants, should be referred to secondary care for immediate brain imaging. Some DHBs have protocols that allow for direct access of primary care to specialised investigations such as CT and carotid ultrasound for patients with high diagnostic certainty.

High risk

Patients judged to be at high risk for stroke require immediate referral for assessment including brain and possibly carotid imaging within 24 hours.[5] Referral processes from primary care are determined by the availability of specialist stroke services, which varies between regions.

 Contact your local DHB to find out how urgent TIA referrals are made in your area.

Low risk

Patients classified as low risk for stroke require brain and possibly carotid imaging within seven days. The need for referral is considered to be urgent, although, the risk of a stroke occurring within the next 48 hours is less than for people in the high-risk category.[1]

Secondary prevention and follow-up

All patients with a confirmed TIA require primary care follow-up (often in conjunction with secondary care) to establish an individual treatment plan for long-term stroke risk reduction. Results from secondary care assessment should be incorporated into this plan once they are known.

Routine investigations for patients without established risk factors would generally include; CBC, sodium and potassium, creatinine, eGFR, fasting lipids, CRP (to rule out vascular inflammation), glucose, ECG and INR if on warfarin.[1]

Modifiable risk factors

People who have had a TIA require individual strategies to modify identified risk factors. Where appropriate, interventions may include:[1]

- Smoking cessation advice and treatment
- A diet low in fat (especially saturated fat) and sodium, and high in fruit and vegetables
- A weight reduction programme
- Increasing the amount of regular exercise and activity
- Avoidance of excessive alcohol

Involving whānau in lifestyle changes can improve the success of any interventions. Māori or Pacific health providers can also provide support for achieving treatment goals.

Pharmacotherapy for secondary prevention

Long-term preventative treatment includes:[1]

- Antiplatelet treatment
- Anticoagulation (for people with atrial fibrillation)
- Blood pressure lowering treatment
- Cholesterol lowering treatment
- Nicotine replacement treatment or other smoking cessation aids

Antiplatelet treatment: Following a TIA, and provided the patient does not have atrial fibrillation (AF), commence antiplatelet treatment (if not taking an anticoagulant). Aspirin was previously considered the gold standard for secondary prevention of stroke, however, current recommendations, based on expert consensus are now:

1. Clopidogrel as first-line treatment – 300 mg loading dose, followed by 75 mg, per day
2. Aspirin (100 mg, per day) in combination with modified release dipyridamole (150 mg, twice daily) provides similar benefits to clopidogrel but has a higher incidence of adverse effects, therefore can be considered second-line treatment if intolerant to clopidogrel.[10]
3. Aspirin (100 mg, per day) alone is effective in the secondary prevention of stroke, however, it is marginally less effective than first or second-line treatments and is generally reserved for patients who are not able to tolerate clopidogrel or dipyridamole.[5]

Clopidogrel and aspirin in combination is not recommended for long-term secondary prevention after TIA or stroke, as any benefit in reduction of ischaemic events is outweighed by an increase in the risk of adverse effects, including bleeding.[5]

Anticoagulation treatment: For patients with a recent TIA and AF (i.e. high risk), anticoagulation treatment (warfarin or dabigatran) is substantially more effective than antiplatelet treatment and any risks are usually far

Carotid versus vertebrobasilar TIA

Carotid imaging is used in secondary care to diagnose carotid stenosis in patients with symptoms of carotid TIA (Table 3). Patients with severe stenosis of the carotid artery (if surgically fit and with a life-expectancy of at least two years) require urgent endarterectomy. In these cases the benefits outweigh the immediate risks of surgery.

Table 3: Symptoms of carotid and vertebrobasilar TIA[9]

Carotid TIA	Vertebrobasilar TIA
▪ Unilateral sensory and/or motor symptoms affecting the limbs and face ▪ Monocular transient blindness ▪ Dysphasia	▪ Bilateral sensory and/or motor symptoms affecting the limbs and face ▪ Cortical blindness ▪ Double vision ▪ Isolated hemianopia or quadrantanopia

outweighed by the benefits. Anticoagulation treatment should begin for all patients with TIA and AF as soon as brain imaging has excluded haemorrhage or another cause for the symptoms.[5] Aspirin should only be used in the acute period following the TIA before the establishment of effective anticoagulation. Anticoagulation treatment should not be given to patients with non-cardioembolic stroke (e.g. carotid stenosis) or TIA without AF.[4]

For further information see: "Consensus statement" (Page 10)

Blood pressure lowering treatment: Increased blood pressure is the major risk factor for all strokes. Lowering blood pressure decreases the likelihood of stroke following TIA. Following TIA all patients, unless hypotensive, and including those with AF, should receive blood pressure lowering treatment with a target of < 130/80 mm Hg. Currently, the strongest evidence of benefit is for the use of an ACE inhibitor, either alone, or in combination with a diuretic.[5]

Cholesterol lowering treatment: Statin treatment has been shown to marginally reduce the incidence of all stroke and to clearly reduce the incidence of ischaemic stroke in patients with a prior TIA.[5] Statin treatment should be considered for all patients following TIA, including those with AF. Randomised controlled trial evidence supports the use of atorvastatin 80 mg daily or simvastatin 40 mg daily.[11, 12] Atorvastatin 80 mg has been shown to reduce the risk of secondary stroke, as well as other cardiovascular events, compared with less intensive statin treatments. This option is recommended for patients with a fasting LDL >2.6 who are able to tolerate a high statin dose. Lower doses of artovastatin or simvastatin are appropriate for patients who have co-morbidities or are likely to experience adverse effects on high-dose statins. A life expectancy of at least two years is required for patients to gain significant stroke prevention benefit from statin treatment. Statins should not be used routinely for patients with intracerebral haemorrhage.[5]

Diabetes management

Glucose intolerance and diabetes are independent risk factors for stroke. Hyperglycaemia often occurs in the days immediately following TIA, therefore, once a patient has stabilised, an assessment of glucose tolerance should be made.[5]

Driving following TIA

People who have had a TIA should be restricted from driving for a period of:

- One month following a single TIA or;
- Three months following multiple TIAs that have been adequately investigated

Following a TIA, it is a requirement that vocational drivers have the cause of the event established and satisfactory treatment initiated. Vocational driving should be avoided for a period of at least six months. People who experience multiple TIAs should not return to vocational driving (although some exceptions may be granted).[13]

For further information on medicines used in TIA and stroke see: “Consensus statement” (Page 10)

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