New Zealand protocols for the management of stroke and transient ischemic attack

Stroke Unit Network of New Zealand

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This collection of protocols is the result of an amalgamation of those in use at Auckland City, Christchurch, Hawke's Bay Hospital and the Princess Margaret Hospital. The aim is to improve the care of people with stroke. It is intended that these protocols are shared freely and used as a basis for local protocols. It is acknowledged that not all aspects of stroke care are covered. We ask that any new protocols are sent in for review and addition to this collection.

This set of documents are based on and intended to be read in conjunction with *Life After Stroke: NZ guideline for the management of stroke*. December 2003. See www.nzgg.org.nz

The NZ guideline for the management of stroke recommendations are given and denoted by *. These recommendations are;

A the recommendation is supported by good evidence

B the recommendation is supported by fair evidence

C the recommendation is supported by expert opinion only and/or limited evidence

Alan Barber 28 June 2006

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Admission to hospital

All people with a definite or presumptive diagnosis of stroke should be admitted to hospital unless:

- their symptoms have fully resolved or are rapidly recovering so that there is minimal interference with activities of daily living AND urgent outpatient assessment by a specialist stroke service is available
  OR

- in the opinion of the treating doctor AND the person, or the person's family, there is unlikely to be any benefit from admission to hospital. This may apply to people who were already severely disabled or suffering a terminal illness prior to the stroke.

All people with a definite or presumptive diagnosis of stroke should be transferred to hospital urgently.

Where the local hospital offers acute thrombolytic treatment for ischemic stroke, and time of stroke onset is known, people with stroke should expect to be admitted to hospital and have initial assessments (including CT) completed within 3 hours of stroke onset.

Stroke unit admission and discharge guidelines

ACH stroke unit admission and discharge guidelines

All patients with stroke or TIA who

- did not require assistance with ADLs prior to stroke / TIA
- have no reduction in level of consciousness or forced eye deviation
- no severe co-morbidity

Admission process

0800 – 2200

General medicine team discusses with stroke/neurology registrar on call

Or stroke team arranges transfer to the stroke unit from ED

Then bed manager informs co-ordinator on ward 81

2200 – 0800 and weekends (after hours)

Patient remains in ED / APU (admitted and clerked under general medicine) until reviewed by stroke team/neurology registrar on rounds

Or
Transfer to a general medicine ward and subsequently reviewed by stroke team

Length of stay

Patient will remain in the stroke unit until

- acute investigation and treatment has been completed
- patients are medically stable

It is envisioned average length of stay will be 5 days

ACH acute stroke unit

Six beds - ward 81

All care will meet bi-cultural health care standards

Bed availability

The stroke registrar and/or nurse specialist will decide which patients are appropriate for admission to the stroke unit and will check bed availability with the ward 81 charge nurse/co-ordinator.
The ward 81 charge nurse will co ordinate all admissions and discharges to the stroke unit in conjunction with the bed manager.

Admitting teams

The majority of patients admitted to the stroke unit will be “general medical stroke patients”. A small number of patients will be admitted as “Neurology stroke patients”. The neurology stroke patients will usually have been referred to the neurology service directly by general practitioners or the emergency department, as is current practice.

General medical stroke patients

- These patients will be clerked by the general medicine team.
- Patients will be admitted directly to the stroke unit, where beds are available.
- If beds are not available in the stroke unit, the patient will be admitted to APU or directly to a general medicine ward
    - stroke unit bed availability will be discussed the following morning with the ward neurology registrar.
    - If a stroke unit bed is still not available, the patient will be transferred from APU to a general medicine ward as per current practice.
    - The mobile stroke team will see all patients not admitted to the stroke unit.

Neurology stroke patients

- The neurology team will decide which stroke patients will be admitted under the neurology service using current criteria.
- Patients will be clerked by the stroke registrar and be cared for by the neurology team.
- Patients will be admitted to the stroke unit.
- If there are no beds available on 81, the patients will be admitted to another ward and will be cared for by the neurology team and stroke nurse specialist as an “outlier”.

Patient Care

Neurology stroke patients

- The neurology team will provide routine medical care for the neurology stroke patients.
- The medical team on call the day that a neurology stroke patient was admitted will provide general medical support for that patient if requested.

General medicine stroke patients

- General medicine patients will be admitted to the stroke unit under the care of the neurology team.
- The ward neurologist will take primary responsibility for the care of a general medical patient while they are in the stroke unit.
- The neurology team will provide routine medical care to general medical stroke patients while they are in the stroke unit.
- The medical team will provide general medical support for that patient and take over primary responsibility once the patient has been discharged from the stroke unit.
- The neurology team will provide neurology support for patients after discharge from the stroke unit if requested.
- Clinical care pathways will be developed to direct the investigation and management of stroke unit patients.

Nursing care

- Will be provided by nurses in ward 81.
- The stroke nurse specialist will follow those patients not admitted to the stroke unit. However, he/she will see those patients in the stroke unit for education, attend all multidisciplinary meetings and will provide stroke unit staff education in conjunction with the clinical nurse educator.

Allied Health staff

- Will be provided by the ward 81 interdisciplinary team.
- The allied health mobile stroke team will follow all patients not admitted to the stroke unit and coordinate their therapy input.
- Allied health staff will hand over care to their colleagues on the Older Peoples Health (OPH) or Auckland RehabPlus wards once discharged from the stroke unit.
- Allied health staff will be available to the therapists in other areas for specialist input.
- Maori patients will be offered input from Kai Atawhai where appropriate.
- Maori patients will be offered input from the Maori Social Work service where appropriate.

Discharge planning

- Discharge planning will begin at the time of admission.
- The ward 81 charge nurse in consultation with the neurology team and bed manager will coordinate the discharge or transfer of patients from the stroke unit.
- Formal multidisciplinary team meetings will occur once per week where discharge planning will be discussed.

Discharge destination

- Patients will be discharged to their previous residence with or without support services if rapid recovery (< 5-7 days).
- Patients requiring on-going rehabilitation > 5-7 days will be transferred directly from the stroke unit to Older Persons Health (OPH) or Rehab Plus wards in consultation with these services.
- Where OPH/Rehab Plus beds are not immediately available, neurology stroke patients will be transferred to ward 81, and general medical stroke patients the home ward of the admitting general medical team.
- Rest home or hospital level nursing care if not a suitable candidate for rehabilitation e.g. unable to actively participate in rehabilitation or severe co-morbidities.

Christchurch Hospital acute stroke unit admission and discharge policy

ASU admission policy

The ASU will take any patient admitted to hospital with a diagnosis of acute stroke. This will include strokes of all severities, including those with a devastating stroke and who may be dying.

NB. TIAs (by definition are non-disabling) do not necessarily need inpatient admission. However they require URGENT investigations and secondary prevention instituted.

The establishment of the ASU was not intended to alter the previous admission policy regarding division of patients with stroke between general medicine (GM) and neurology. In general:

People with stroke should be admitted to the ASU under the care of the neurology service if specialised neurological assessment, monitoring or management may be indicated. For example:

- patients considered for thrombolysis
- patients with progressive or unstable stroke deficits
- younger patients with large strokes who may be at risk of deterioration due to progressive brain swelling
- patients where the diagnosis or aetiology of stroke is of uncertain or unusual kind, including younger
- patients without traditional vascular risk factors.

Patients who present with stroke as a manifestation of systemic cardiovascular disease without other acute neurological issues will be admitted to the ASU under the care of the general physician of the day responsible for stroke.

The GM teams responsible for stroke on their respective on call days are: 1, 4, 6, 8, 10 and 11.

Principles

- ASU beds should be kept full (i.e. as many stroke patients as possible should come to the stroke unit).

- If a patient with a stroke is admitted to a general medical ward (ASU beds full), then they should be reviewed on an individual basis as to whether to transfer them into ASU at later stage. It may be more appropriate to facilitate early transfer to BIRS or TPMH rather than into ASU. Multiple shifts may be counter-productive to both the patient and the treating team and may increase length of stay.

- Patients who develop a stroke whilst in hospital should also be reviewed on an individual basis. For some (eg stroke on a surgical ward) it may be most appropriate to shift into ASU, whereas a frail person with significant co-morbidities should remain in their general medical ward. Those patients who have a stroke in hospital and need tPA should be transferred to ASU urgently.

- The ASU should aim to take all types and severity of stroke. Evidence suggests that all patients irrespective of their age, gender, or stroke severity, have the potential to benefit from a stroke unit approach.

- Patients who are dying from their acute stroke should remain in the ASU for their palliative care (short term).

- Patients admitted because of a presumed stroke, in whom a subsequent alternative diagnosis is made, should be either transferred out to the most appropriate specialist ward, or discharged home, as soon as possible.

Discharge Planning - ASU

Discharge planning should commence as soon as possible after admission to the ASU.

In general, an estimation of the likely length of inpatient care required should be made within 48-72 hours of hospital admission.

- If inpatient care of less than another 4-5 days seems likely then a pathway for the patient to be discharged home directly from the ASU should be commenced.

- If inpatient care of a further 7-10 days or longer seems likely then early referral to the appropriate rehabilitation facility should be made (BIRS or TPMH).

- A decision regarding discharge procedure for patients who fall between these time estimates may be deferred for a further 48-72 hours then reviewed. However, it is recommended that a rehabilitation specialist is involved early in the decision-making process for these patients also.

- Regardless of the planned discharge process, all patients should continue active multidisciplinary rehabilitation during their stay in the ASU, unless a clear decision has been made that an individual patient is for comfort

cares, rather than active rehabilitation. Rehabilitation efforts on the ASU are **not** deferred because of a decision that transfer to another rehabilitation facility is likely.

- If a patient is not for active treatment and rehabilitation, a decision regarding possible hospital level care placement may be necessary. These decisions are complex and should be made on an individual patient basis with full involvement of the whole multidisciplinary team, and where possible the patient and the patient's family. Generally, a period of observation on the ASU will be required before such a decision can be made.

Diagnosis of stroke

Appropriate management of the person with a stroke depends on accurate diagnosis. People with stroke must be distinguished from patients with other causes of rapid neurological deterioration.

Stroke is primarily a clinical diagnosis. Caution in the diagnosis of stroke is required if there is a gradual onset of symptoms over several days or weeks, a poor history (because of impaired level of consciousness or dysphasia and a reliable eye-witness account is not available), absent focal neurological signs, fluctuating neurological signs, coma, unexplained fever, severe headache, or symptoms and signs of raised intracranial pressure.

Stroke is a clinical diagnosis but modify if necessary after CT scan and other investigations

Is it a vascular event?

- Is it a stroke or could there be other pathology?

Where is the lesion and what arterial territory is involved?

- See next page re vessel involved or OCSP classification

What type of stroke?

Stroke type: Oxford community stroke project (OCSP) classification

Ischemic Stroke (see subtypes below)

Ischemic Stroke with hemorrhagic transformation

Primary Intracerebral hemorrhage (PICH)

Subarachnoid hemorrhage (SAH)

What type of ischemic stroke?

Total Anterior Circulation Infarct - TACI

Seen with ICA and MCA occlusion

- Motor +/- sensory deficit of face, arm and leg (at least 2/3) and
- Visual field defect (hemianopia or quadrantanopia) and
- Higher cerebral dysfunction (dysphasia if dominant hemisphere or visuospatial dysfunction/dyspraxia/neglect if non dominant hemisphere)
- Can be associated with cerebral edema and impaired level of consciousness

Mortality at 1 month = 40%

Partial Anterior Circulation Infarct (PACI)

Seen with MCA branch occlusion

- Two of three TACI criteria above or
- Higher cerebral dysfunction alone or
- Restricted motor/sensory deficit e.g. hand alone

Mortality at 1 month = 5%

PACI also seen with ACA occlusion

- Flaccid paralysis and sensory loss of leg

Lacunar Infarct (LACI)

Seen with small penetrating vessel occlusion

- Pure motor stroke (at least 2/3 of face, arm, leg) or
- Mixed motor/sensory hemiplegic stroke or
- Dysarthria and clumsy hand or
- Pure sensory stroke (at least 2/3 of face, arm, leg) – uncommon

Mortality at 1 month = 2%

Posterior circulation Infarct (POCI)

Seen with PCA occlusion

- Isolated homonymous hemianopia

Also seen with brainstem & cerebellar infarction

- Ipsilateral cranial nerve palsy with contralateral motor &/or sensory loss or
- Bilateral motor and/or sensory loss or
- Cerebellar dysfunction

NB may also have dysconjugate eye movements, Horner's syndrome, dysarthria and/or dysphagia

Mortality at 1 month = 5%

What is the likely cause of the stroke?

TOAST Classification (see below)

- e.g. thromboembolic (large vessel atherosclerosis), small vessel disease, cardioembolic or hemorrhage

TOAST classification of acute ischemic stroke subtypes

Large Artery Atherosclerosis

Carotid artery stenosis > 70%
Other vessel stenosis

Cardioembolic

High Risk	Mechanical prosthetic valve
	Mitral stenosis with atrial fibrilation
	Atrial fibrillation (other than lone AF)
	Left atrial/atrial appendage thrombus
	Sick sinus syndrome
	Recent myocardial infarction (4 wks)
	Left ventricular thrombus
	Dilated cardiomyopathy
	Akinetic left ventricular segment
	Atrial myxoma
	Infective endocarditis
Medium risk	Mitral valve prolapse
	Mitral annulus calcification
	Mitral stenosis without AF
	Left atrial turbulence (smoke)
	Atrial septal aneurysm
	Patent foramen ovale
	Atrial flutter
	Lone atrial fibrillation
	Bioprosthetic cardiac valve
	Nonbacterial thrombotic endocarditis
	Congestive cardiac failure
	Hypokinetic left ventricular segment
	Myocardial infarction (> 4 wks < 6 mths)

Lacune (small-vessel occlusion)

Stroke of other cause

Vasculitis
Hypercoaguable state
Other hematological disorders

Stroke of more than 1 cause

Large artery
Cardioembolic
Lacune
Other

Unknown (describe)

Investigation of acute stroke

Brain imaging

Imaging of the brain is required to guide acute intervention (A)*

Imaging of the brain should be performed as soon as possible and not more than 48 hours after the onset of symptoms, unless there is a good clinical reason for not doing so (C)*

Brain imaging is required in all patients to detect intracerebral hemorrhage and to exclude non-vascular causes of a 'stroke-like' syndrome.

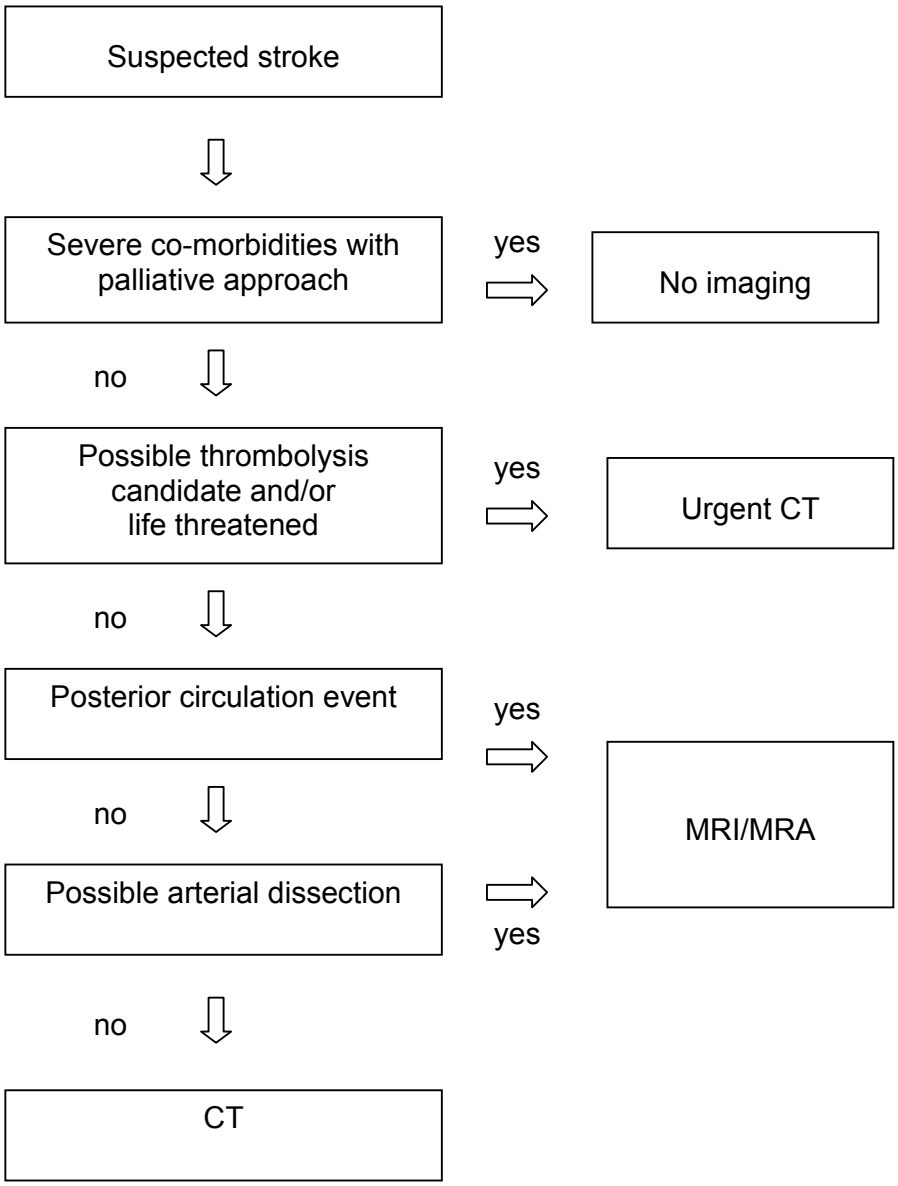
Brain imaging should be undertaken urgently if (B)*:

- there is a deterioration in the person's condition following the onset of symptoms
- subarachnoid hemorrhage is suspected
- hydrocephalus secondary to intracerebral hemorrhage is suspected
- trauma is suspected
- the person is on anticoagulant therapy or has a known bleeding tendency
- the diagnosis is in doubt
- thrombolytic therapy is being considered

Brain imaging should always be undertaken before anticoagulant therapy or thrombolytic therapy is started (C)*

* Recommendations from *Life After Stroke: NZ guideline for the management of stroke*. See www.nzgg.org.nz

Imaging pathway for stroke



Other investigations

All people with a definite or presumptive diagnosis of stroke should have the following investigations (C)*:

- full blood count (including platelet count)
- erythrocyte sedimentation rate / CRP
- serum urea, creatinine, electrolytes, blood glucose, albumin
- electrocardiogram

Chest x-rays should not be undertaken as a routine investigation unless specifically indicated by the patient's symptoms or signs (C)*

Additional investigations such as MRI may be required in people with acute ischemic stroke depending on the clinical situation.

Echocardiography

Consider transesophageal echocardiography for patients with an ischemic stroke where all of the following apply;

- Patient is <65 yrs of age
- No cause for the stroke is identified (e.g. not due to internal carotid artery stenosis)
- No cardiac history and normal ECG (or non-specific changes only)
- Where the identification of an abnormality (patent foramen ovale/cardiac embolic source) would change management

Consider transthoracic echocardiography for patients admitted to the stroke unit who need further cardiac investigation (and where a TOE is not indicated) in patients with a cardiac history where;

- where an echocardiogram hasn't been performed in the past
- where the results of the echocardiogram may lead to a change in management

* Recommendations from *Life After Stroke: NZ guideline for the management of stroke*. See www.nzgg.org.nz

Ischemic stroke: acute management

Anti-platelet and anti-coagulant therapy

Aspirin

Aspirin 160−300 mg should be given as soon a possible after the onset of a stroke in most patients if a diagnosis of intracerebral hemorrhage has been excluded with brain imaging (A)*

Only aspirin doses of 160−300 mg have been studied at the acute stage. As 160 mg tablets are not available in New Zealand it is reasonable to use doses of 150−300 mg

Do not administer aspirin within 24 hours of a thrombolytic agent (A)*

Heparin

Intravenous heparin, subcutaneous heparin, low-molecular-weight heparin and heparinoids are not routinely recommended for the treatment of people with acute ischemic stroke (A)*

In carefully selected patients (e.g. evolving basilar artery thrombosis, stroke or transient ischemic attack associated with carotid artery dissection), treatment with intravenous heparin can be considered, although there is only limited evidence to support its use.

Thrombolysis

Thrombolytic treatment should only be administered by physicians with expertise in the assessment and management of people with acute stroke and where protocols for the use of thrombolysis are in place (A)*

Thrombolysis given outside of specialist centres may be dangerous.

Intravenous thrombolysis (see t-PA protocol)

Patients should not receive intravenous tPA if they have any of the exclusion criteria used in the NINDS trial.

Thrombolytic treatment with intravenous tissue plasminogen activator (tPA) 0.9 mg/kg (maximum dose 90 mg) may be given to carefully selected people with acute ischemic stroke if (A)*:

- there is a clear history of the time of onset of symptoms
- treatment is given within 3 hours of the onset of symptoms
- intracerebral hemorrhage has been excluded by imaging

Intra-arterial thrombolysis

Carefully selected patients presenting within 0−6 hours after the onset of symptoms who have angiographic evidence of middle cerebral may be treated with intra-arterial thrombolysis. Immediate access to cerebral angiography and expertise with intra-arterial thrombolysis are required.

Carotid endarterectomy

Carotid endarterectomy is not recommended for people with acute ischemic stroke (C)*

Endovascular treatment

Because of the lack of evidence, the use of endovascular treatments, such as angioplasty or stenting, is not recommended for treatment of most people with acute ischemic stroke outside of a research setting (C)*

* Recommendations from *Life After Stroke: NZ guideline for the management of stroke*. See www.nzgg.org.nz

Tissue plasminogen activator in acute stroke

Indication

Tissue plasminogen activator (t-PA) is indicated for the management of acute ischemic stroke in adults. The aim is to reduce the degree of disability at outcome. Treatment should only be initiated within 3 hours after the onset of symptoms, after intracranial hemorrhage has been excluded by cranial computerised tomography (CT).

Potential benefits and risks

Patients treated with t-PA have a 13-20% absolute benefit (depending on the outcome score used) over those treated with placebo. This means that for every 5-7 patients treated, 1 patient benefits. Earlier commencement of tPA within the 3 hour time window may result in even greater benefit. This benefit of tPA is irrespective of age (although few patients > 80 years have been enrolled in studies), stroke subtype and stroke severity. The benefit of tPA is maintained at 1 year. tPA use is cost effective.

It is important to tell patients and their families that tPA may result in hemorrhage and 3% of patients (1 for every 33) treated with tPA can develop symptomatic hemorrhage, which may result in death. However, with strict adherence to tPA guidelines (see below), the potential benefits of tPA outweigh the risk.

Action & pharmacokinetics

t-PA is a naturally occurring tissue plasminogen activator which is synthetically produced by recombinant DNA technology. This allows manufacture of a “human product”. It is a glycoprotein enzyme of 527 amino acids.

t-PA binds to the fibrin in a thrombus and converts the entrapped plasminogen to plasmin. This initiates local fibrinolysis (clot breakdown). t-PA can induce hemorrhage in ischemic stroke patients, particularly if the protocol is not strictly adhered to.

t-PA is cleared rapidly from the plasma primarily by the liver. After the infusion has been terminated, more than 50% will be cleared in 5 minutes.

Instructions for registrar

- Record symptom onset time and time of phone-call
- Confirm that urgent FBC has been sent (& INR if on warfarin)
- Confirm immediate CT scan (and transfer to CT) arranged
    - You may need to help transport the patient to CT if necessary
    - CT must be interpreted by radiology registrar, radiologist or neurologist. Record time CT interpreted
- Proceed to CT scanning for clinical assessment/inclusion/exclusion criteria
- Obtain Blood count and glucose results (INR if warfarin)
- Notify on call neurologist through the hospital operator
- Notify charge nurse of *possible* stroke unit admission

Inclusion criteria

Age 18-85 years

Clinical diagnosis of ischemic stroke causing measurable neurological deficits (defined as impairment of language, motor function, cognition, and/or gaze, vision, or neglect).

Clearly defined onset of symptoms within 3 hours of treatment initiation. A patient must not have woken from sleep with symptoms.

Patient able to undergo CT before t-PA administration.

Exclusion criteria

- Coma or severe obtundation with fixed eye deviation and complete hemiplegia. The NIHSS should be ≤ 22
- Minor stroke symptoms that are rapidly improving
- Non-disabling stroke symptoms. The NIHSS should usually be greater than 4 (see attached sheet). Occasional patients with a lower NIHSS may still be considered for example patients with severe dysphasia.

- History of stroke in previous 12 weeks
- Any pre-existing neurological illness resulting in a modified Rankin Scale of 3 or higher (mRS of 3 = moderate disability requiring some help - see attached sheet)
- Seizure prior to administration of t-PA
- Previously known intracranial or subarachnoid hemorrhages, arteriovenous malformation, aneurysm, or previously known intracranial neoplasm that is terminal or would increase the risk of intracranial bleeding after tPA, or may confound neurological assessment
- Clinical presentation suggestive of subarachnoid hemorrhage, even if the initial CT is normal
- Hypertension: systolic blood pressure ≥ 185mmHg; or diastolic blood pressure >110mmHg on repeated measures prior to administration of t-PA. **NB.** tPA may be given if the BP is able to be cautiously lowered to these levels within 3 hours.
- Presumed septic embolus
- Myocardial infarction within past 30 days
- Biopsy of a parenchymal organ or surgery that would increase the risk of unmanageable (e.g uncontrolled by local pressure) bleeding after the administration of tPA in the past 30 days
- Recent trauma, with internal injuries/ulcerative wounds in the past 30 days
- Any active or recent hemorrhage that would increase the risk of unmanageable (e.g. uncontrolled by local pressure) bleeding after the administration of thrombolytic therapy
- Known hereditary or acquired hemorrhagic diathesis, e.g., APTT or PT greater than normal, or oral anticoagulant therapy with an INR of >1.3.
- Pregnancy, lactation, or parturition within the previous 30 days.
- Baseline glucose of <2.8 or >22.0 mmol/L, platelets <100 10^9/L, Hct <0.25.
- Other serious, advanced, or terminal illness, or any other condition that would impose a significant hazard to the patient if intravenous t-PA were initiated

CT exclusion criteria

- Likely etiology other than acute brain ischemia
- Evidence of intracerebral hemorrhage
- Caution should be exercised if early infarct signs greater than 1/3 of the middle cerebral artery territory are seen on CT

If eligible for treatment with tPA:

- Consent from patient or next of kin
- Administer tPA bolus using dosing chart [below] in ED Resuscitation and commence t-PA infusion
- Transfer patient to stroke unit

Drug administration

Dose: 0.9mg/kg (maximum 90mg) given as

- 10% of total dose, bolus over 1 minute
- remaining 90% as an infusion over 60 minutes

Reconstitution

Insert the transfer cannula provided vertically into the stop, through the mark at its centre, as per product instructions.

Direct the stream of sterile water for injection into the ACTILYSE t-PA cake. Slight foaming upon reconstitution is not unusual, if this occurs, leave to stand for a few minutes.

Do not use vial if vacuum not present.

Mixing should be accomplished by gentle swirling and slow inversion.

Use immediately after reconstitution, unused drug can be stored in a fridge for up to 24hrs.

A separate IV cannula should be used to administer the t-PA

Other important points

No other anticoagulant (warfarin or heparin) or antiplatelet agents (aspirin, dipyridamole or clopidogrel) are to be given within 24 hours of t-PA administration

A repeat CT should be performed at 24 hours post tPA administration

Neurological observation

All patients will be admitted to the stroke unit

Full observations

- vital signs (P, BP, T, R)
- neuro obs (GCS, pupillary reaction and size, limb power)

From start of infusion

every 15 minutes	2 hours then
½ hourly for	next 4 hours, then
1 hourly for	next 4 hours, then
2 hourly for	next 8 hours, then
4 hourly	until reviewed

Reportable observations and possible complications

- Allergic Reaction such as anaphylaxis (urticaria, bronchospasm, hypotension)
- Fever
- Hypertension ≥ 185/110 – cautiously lower blood pressure
- Hypotension systolic BP ≤ 110
- Hemorrhage

  observe / test all body waste for suggestion of occult bleeding

  check potential bleeding sites e.g. wounds, IV access, puncture sites

  NB. onset of abdominal pain may indicate retroperitoneal bleeding

  do not use razor blade for shaving

  minimise invasive procedures.

Leave IV leur in situ for blood taking, if possible. If venepuncture is required, apply direct pressure to puncture site for 20 minutes.

- Minimise physical handling of the patient to prevent bruising/bleeding
- Strict bed rest for the first 24hrs
- Safety precautions to prevent falls
- Neurological deterioration – consider urgent CT

		Vol 1mg/1ml				Vol 1mg/1ml	
Patient weight (kg)	Total dose@ 0.9mg/kg	10% Bolus (ml)	90% infusion (ml)	Patient Weight (kg)	Total dose@ 0.9mg/kg	10% Bolus (mL)	90% Infusion (mL)
40	36 mg	3.6	32.4	70	63 mg	6.3	56.7
41	36.9	3.7	33.2	71	63.9	6.4	57.5
42	37.8	3.8	34.0	72	64.8	6.5	58.3
43	38.7	3.9	34.8	73	65.7	6.6	59.1
44	39.6	4.0	35.6	74	66.6	6.7	59.9
45	40.5	4.1	36.4	75	67.5	6.8	60.7
46	41.4	4.1	37.3	76	68.4	6.8	61.6
47	42.3	4.2	38.1	77	69.3	6.9	62.4
48	43.2	4.3	38.9	78	70.2	7.0	63.2
49	44.1	4.4	39.7	79	71.1	7.1	64.0
50	45.0	4.5	40.5	80	72.0	7.2	64.8
51	45.9	4.6	41.3	81	72.9	7.3	65.6
52	46.8	4.7	42.1	82	73.8	7.4	66.4
53	47.7	4.8	42.9	83	74.7	7.5	67.2
54	48.6	4.9	43.7	84	75.6	7.6	68.0
55	49.5	5.0	44.5	85	76.5	7.7	68.8
56	50.4	5.0	45.4	86	77.4	7.7	69.7
57	51.3	5.1	46.2	87	78.3	7.8	70.5
58	52.2	5.2	47.0	88	79.2	7.9	71.3
59	53.1	5.3	47.8	89	80.1	8.0	72.1
60	54.0	5.4	48.6	90	81.0	8.1	72.9
61	54.9	5.5	49.4	91	81.9	8.2	73.7
62	55.8	5.6	50.2	92	82.8	8.3	74.5
63	56.7	5.7	51.0	93	83.7	8.4	75.2
64	57.6	5.8	51.8	94	84.6	8.5	76.1
65	58.5	5.9	52.6	95	85.5	8.6	76.9
66	59.4	5.9	53.5	96	86.4	8.6	77.8
67	60.3	6.0	54.3	97	87.3	8.7	78.6
68	61.2	6.1	55.1	98	88.2	8.8	79.4
69	62.1	6.2	56.0	99	89.1	8.9	80.2
				100kg	90.0	9.0	81.0

Management of bleeding complications

Bleeding should be considered as the likely cause of neurological worsening after use of tPA until brain imaging available.

Emergency CT brain scan required.

For any life-threatening hemorrhagic complication, including ICH

- Discontinue infusion tPA
- Obtain blood samples for coagulation tests (FBC, APTT/INR, fibrinogen) and cross-match if blood transfusion may be needed
- Obtain surgical consultation, as necessary (surgery is usually delayed until the fibrinolytic state is corrected)
- Consider other interventions that may be useful, such as transfusion, cryoprecipitate, and platelets (e.g. 6-8 U of cryoprecipitate or fresh frozen plasma, and 6-8 U of platelets).
- Mechanical compression should be applied to bleeding sites, when possible

Blood-pressure management

Monitor BP during first 24 hours after tPA treatment:

q15 min for 2 h, q30 min for 4 h, q1h for 4 h, q2h for 8 h, then q4h

Patients with elevated blood pressure who are otherwise eligible for treatment with intravenous tPA can have their blood pressure lowered cautiously so that their systolic blood pressure is ≤ 185 mm Hg and the diastolic blood pressure is ≤ 110 mm Hg

If systolic BP is 180-230mmHg or diastolic BP 105-120mmHg (≥2 recordings; 5-10min apart):

- Give IV labetalol 10mg over 1-2 minutes with cardiac monitoring
- The dose may be repeated or doubled every 10-20 minutes up to a total dose of 200 mg
- Monitor BP every 15 minutes during labetolol treatment and observe for development of hypotension

If systolic BP >230 or diastolic BP 121-140mmHg (≥2 recordings; 5-10min apart):

- Treat with repeated doses of IV labetalol, as above, every 10 minutes up to a total dose of 200 mg

- If no satisfactory response, infuse sodium nitroprusside (0.5-10ug/kg per minute)* or glyceryl trinitrate (GTN)**

If DBP >140 (≥2 recordings; 5-10min apart):

- Infuse sodium nitroprusside (0.5-10ug/kg per minute).*

* Continuous arterial monitoring of BP is advised if nitroprusside is used. The risk of bleeding from arterial puncture should be weighed against the possibility of missing dramatic changes in pressure during infusion.

** GTN infusion: as per cardiology guidelines – 50mg in 250ml 0.9% Saline. Start at 3ml/hour and titrate in 3ml/h steps every 5 minutes. Do not use for more than 24 hours.

Attach sticky label

Case Details

Date of stroke onset ___ / ___ / ___ Time of onset _____

Time of arrival to ED _____ Time of CT _____

Estimated/known weight _____kg NIHSS_____

Highest pre t-PA BP recording _____/_____ Antihypertensives required? yes / no

Laboratory test results

Date:___ / ___ / ___

Time:_____

APTT	
INR	
Glucose	
Pregnancy test	

Time informed consent obtained for t-PA treatment_____

Time of t-PA administration (24hr clock) _____

Treating Neurologists initials_____

Additional CT head to be booked 24hrs post tPA

t-PA Dose = 0.9 mg/kg with max dose 90mg (see weight/dose table in guideline)

	Date/time	**Vol (1 mg/ml)**
10% of total dose IV bolus dose over I minute		
Remaining 90% infused over 60 minutes		

Thrombolysis checklist

STROKE ONSET TIME ____:____ Reliable Onset unknown/on waking

ARRIVAL TIME ____:____ **E.D. ASSESSMENT TIME** ____:____ **CT HEAD TIME** ____:____

BLOOD PRESSURE on arrival: _____/_____

INCLUSION CRITERIA - must meet all or not eligible for thrombolysis

Age >18 and previously independent (not requiring "hands on" physical assistance with ADLs)

Diagnosis of acute stroke (rapid-onset FOCAL neurological deficit, likely due to stroke)

Reliable stroke onset time. If unknown or wakes with stroke, onset is when last awake and normal

<3 hours from stroke onset. Needs CT scan and to start t-PA within 3 hours (180 mins) of onset

Measurable neurological deficit e.g. significant hemiparesis and/or dysphasia (NIHSS > 4)

EXCLUSION CRITERIA (INITIAL) – must not have any

Yes	No	Comatose/severely obtunded with fixed eye deviation and complete hemiplegia
Yes	No	Known bleeding diathesis, LMW heparin within 48 hours, warfarin with INR >1.3,
Yes	No	SBP ≥185 or DBP ≥110 (note - may give 2 doses of labetalol 10-20mg IV)
Yes	No	Baseline glucose of <2.8 or >22.0 mmol/L, platelets <100 10^9/L, Hct <0.25
Yes	No	Recent stroke/head trauma [3months], major surgery [30d], GI/GU bleed [21d]
Yes	No	Past history of intracranial hemorrhage, aneurysm, AVM

PROCEED TO EMERGENCY DEPARTMENT IF PATIENT MEETS ALL INCLUSION CRITERIA AND NONE OF THE EXCLUSION CRITERIA.

Consultant notified: Time ____:____

Urgent blood tests: FBC, INR (& APTT if recent heparin), Glucose, Urea & Electrolytes

Insert 18G cannula x 2 ECG

Blood Pressure: _____/_____ (<185/110) Temperature: _____ ^oC

ON CALL NEUROLOGIST (name) _____**ASSESSMENT TIME** ____:____

Confirm full inclusion criteria above

Confirm full exclusion criteria (next page)

Document neurological examination including modified NIHSS (next page)

CT Result:	Hemorrhage	No	Yes	Hypodensity*	No	Yes
	Mass effect	No	Yes	(*> 1/3 mca territory)		

CONFIRM EXCLUSION CRITERIA

Fails any inclusion criteria	No	Yes	Presumed septic embolus	No	Yes
CT exclusion	No	Yes	Stroke/head trauma < 3 months	No	Yes
SBP>185, DBP>110	No	Yes	Major surgery <30 days	No	Yes
(or aggressive antiHT Rx required)			Organ biopsy / MI <21-30 days	No	Yes
Trivial deficits. NIHSS <5	No	Yes	GI or GU hemorrhage <21 days	No	Yes
Coma, dense hemiplegia NIH>22	No	Yes	Non-compressible puncture <21d	No	Yes
Seizure at onset	No	Yes	Pregnancy, parturition <30 d	No	Yes
Presentation suggestive of SAH	No	Yes	PHx ICH, aneurysm, AVM	No	Yes
On warfarin & INR > 1.3	No	Yes	PHx other serious neurol disease	No	Yes
On heparin & raised APTT	No	Yes	PHx bleeding diathesis	No	Yes
LMWH < 48 hrs	No	Yes	Other serious/terminal illness	No	Yes
Platelets <100	No	Yes	Glucose <2.8 or >22.0 (_____)	No	Yes

NEUROLOGICAL EXAMINATION AT ACUTE ASSESSMENT

NIHSS (Modified) scores =	**0**	**1**	**2**	**3**
Level of consciousness:	Alert	Arousable	Hard to arouse	Coma
Orientation:	Full	Partial	Disoriented	
Obeys simple commands/gesture:	Yes	Partial	No	
Dysphasia:	No	Mild/Mod	Severe	Total
Dysarthria:	No	Mild/Mod	Severe	
Gaze palsy:	No	Partial	Total forced deviation	
Hemianopia:	No	Partial	Complete	Bilateral/blind
Facial weakness:	No	Minor	Marked lower	Complete upper & lower
Power [proximal] (NIHSS score each limb)		**R arm**: __/5 (NIH___)		**R leg**: __/5 (NIH___)
(5/5=0, 4/5=1, 3/5=2, 1-2/5 =3, 0/5=4)		**L arm**: __/5 (NIH___)		**L leg**: __/5 (NIH___)
Incoordination (≠weak)	No	One limb	Two limbs	
Hemisensory deficit:	No	Mild/Mod	Severe	
Extinction / inattention:	No	Inattention	Profound inattention/neglect	

NIHSS

TREATMENT WITH THROMBOLYSIS

Confirm meets all criteria and clinically OK to proceed with thrombolysis.

Risks & Benefits discussed.

Consent obtained and documented in records.

Patient Weight: _____kg Actual Estimated

t-PA DOSE - total (0.9 mg/kg, max90mg): ____mg **Bolus** 10% ___mg **Infusion** 90%___mg

IV tPA bolus given (time) ____:____ Time from stroke onset = _____ Minutes

IV tPA infusion commenced (time) ____:____ Transfer to ICU (time) ____:____

Any preventable delays? Details:_____

Any protocol violation? Details: _____

ChCh tPA protocols – medical

IV tPA for Acute Ischemic Stroke: Instructions for Neurology Registrar

TIME IS BRAIN!

Call received from ED or Neurologist: "ACUTE STROKE", possible tPA candidate
- **Record symptom onset time and time of phone-call**
- Confirm that immediate CT scan has been arranged, including immediate transportation to scanner
- You may assist transport if necessary
- Confirm that tPA 'stroke pack' will accompany patient from ED (ED drug cupboard)
- Confirm that urgent FBC has been sent (and INR if on warfarin)

Notify Ward 31 Nurse-in-Charge of ***possible*** acute stroke patient who may need SCU admission. 89310/88315

Proceed to CT scanning for clinical assessment.
- Obtain **Acute Stroke Register** :
    - In basket on left before door to CT control room.

History:
- DIAGNOSIS of stroke
- ONSET TIME
- check-list of inclusion & exclusion criteria for tPA

Examination: confirm findings are those of a STROKE
- quantify deficits - ***use Stroke Register form***:
- consciousness, commands (gesture if aphasic), speech
- gaze palsy, hemianopia
- power face, arms and legs bilaterally
- incoordination (esp if suspect post. circulation lesion)
- hemisensory abnormality
- neglect / inattention

CT scan review [see CT exclusion criteria – below]
- CT must be interpreted by radiology registrar, radiologist or neurologist.
- Record time CT interpreted

Obtain Blood count and glucose results (INR if warfarin)

PAGE NEUROLOGIST ON CALL THROUGH HOSPITAL OPERATOR

Treat with tPA:
- Consent from patient or next of kin
- Administer tPA bolus using dosing chart [below]
- Transfer patient to Ward 31 Stroke Unit SCU for tPA infusion

If patient is **NOT** treated with tPA:
- Admit under Neurology to any available bed.
- Contact the duty manager.
- DO **NOT** send the patient back to ED unless essential for patient safety

Intracerebral hemorrhage: acute management

Investigations

Coagulation studies

A full blood count, bleeding time, prothrombin time and activated partial thromboplastin time should be performed (C)*

Anti-coagulation should be reversed in those patients taking anti-coagulant therapy (e.g. vitamin K, fresh frozen plasma, prothrombinex etc)

Angiography

Angiography should be considered for patients with an intracerebral hemorrhage if:

- there is no clear cause for the hemorrhage
- the patient is a surgical candidate, especially a young, normotensive patient who is clinically stable

Angiography is not required for older, hypertensive patients who have a hemorrhage in the basal ganglia, thalamus, cerebellum, or brainstem and in whom the CT or magnetic resonance imaging does not suggest that the hemorrhage was caused by an underlying vascular lesion (C)*

Magnetic resonance angiography or CT angiography may obviate the need for cerebral angiography in selected patients (C)*

Surgical removal of intracerebral hematomas

There is insufficient evidence to make firm recommendations about whether or when to operate on patients with an intracerebral hemorrhage.

Surgical removal of a hematoma may be considered for:

- patients with a cerebellar hemorrhage > 3 cm in diameter who are deteriorating secondary to brainstem compression or hydrocephalus

* Recommendations from *Life After Stroke: NZ guideline for the management of stroke*. See www.nzgg.org.nz

- patients with an intracerebral hemorrhage associated with a structural lesion such as an aneurysm, arteriovenous malformation, or cavernous angioma, if the patient has a chance of a good outcome and the structural vascular lesion is surgically accessible

- young patients with a moderate or large lobar hemorrhage who are clinically deteriorating may be candidates for surgical removal of a hematoma (C)*

Surgical removal of a hematoma should not be considered for:

- patients with a small supratentorial hemorrhage (<10 cm^3) or a minimal neurological deficit

- patients with Glasgow Coma Scale scores of ≤ 4, unless coma is secondary to cerebellar hemorrhage compressing the brainstem

Management of raised blood pressure

In patients who have an intracerebral hemorrhage, if there is a history of raised blood pressure, mean arterial pressure (MAP) should be maintained below 130 mm Hg (C)*, where:

MAP = diastolic blood pressure + ⅓ (systolic BP − diastolic BP)

In general, this means aiming for BP limits of:

- systolic blood pressure < 180 mm Hg or

- diastolic blood pressure < 105 mm Hg

Where blood pressure lowering is required, use **oral** antihypertensive medications if possible, unless BP elevation is **extreme** (eg >240/130 ischemic, >200/120 ICH)

- Give IV labetalol 10mg over 1-2 minutes

- The dose may be repeated or doubled every 10-20 minutes up to a total dose of 150mg

- Monitor BP every 15 minutes during labetolol treatment and observe for development of hypotension

- If no satisfactory response, infuse sodium nitroprusside (0.5-10ug/kg per minute)* or glyceryl trinitrate (GTN)**

* Continuous arterial monitoring of BP is advised if nitroprusside is used. The risk of bleeding from arterial puncture should be weighed against the possibility of missing dramatic changes in pressure during infusion.

** GTN infusion: as per cardiology guidelines – 50mg in 250ml 0.9% Saline. Start at 3ml/hour and titrate in 3ml/h steps every 5 minutes. Do not use for more than 24 hours.

Management of neurological complications

Brain edema and increased intracranial pressure

Patients (particularly young patients) with large MCA stroke who are alert at admission are at risk of deterioration in the next 24-72 hours. A reduction in GCS by 2 points that is sustained for more than 2-3 hours is an indication for urgent specialist opinion

Medical therapy

Corticosteroids are not recommended for the management of cerebral edema and increased intracranial pressure following an ischemic stroke (A)*

Osmotherapy (e.g. intravenous frusemide and intravenous mannitol) and hyperventilation are recommended for selected patients who are deteriorating secondary to increased intracranial pressure (B)*

Mannitol

- 1g/kg/day (generally for no more than 24 hours)
- bolus 0.5g/kg over 20 minutes
- repeat doses usually 0.25g/kg
- serum osmolality should be tested at 24 hours and maintained <315mosmol/l

If medical treatment for brain swelling is required for >24 hours, other options could be considered, including

- Glycerol (NG)
- Frusemide 40-80mg IV
- Hypertonic saline.

* Recommendations from *Life After Stroke: NZ guideline for the management of stroke*. See www.nzgg.org.nz

Surgical therapy

Drainage of cerebrospinal fluid via a ventricular drain or shunt may be used to treat raised intracranial pressure secondary to hydrocephalus (C)*

Surgical decompression and evacuation of large cerebellar infarcts that are leading to compression of the brainstem and hydrocephalus is recommended (C)*

Patients at high risk of malignant infarction with brain edema

A. Age =<50 years

B. Premorbid functioning fully independent, no major medical co-morbidities

C. Clinical features of a large anterior circulation ischemic stroke.

- Usually will have complete hemiplegia, hemisensory deficit, neglect and/or dysphasia, and may have gaze deviation and/or visual field deficits.
- Any reduction in level of consciousness due to anterior circulation ischemic stroke

D. Imaging Criteria

- Imaging evidence of >50% of MCA territory infarction plus signs of significant mass effect

Note: if patient meets clinical criteria a), b) and c) at admission, but not imaging crtieria, then repeat CT scan is indicated if any clinical deterioration occurs, or at 24 hours.

Management of medical complications

Venous thromboembolism

Deep venous thrombosis (DVT) and pulmonary thromboembolism (PTE) are recognised complications following a stroke.

In rehabilitation settings, symptomatic DVT's occur in 10-15% of patients and deaths from pulmonary emboli occur in approximately 2%.The risk of developing venous thromboembolism is higher in patients who are immobile with paralysis of the leg. Those who are very immobile such as those confined to bed or a wheelchair are at greatest risk.

A variety of agents have been shown to be effective in the prevention of DVT and PTE in other (non-stroke) high risk patients including post-operative patients. These include aspirin, unfractionated (standard) Heparin, low molecular weight Heparin, low dose Warfarin and compression stockings.

However in stroke patients, prevention of DVT/PTE is complicated by the risk of hemorrhagic transformation of the new cerebral infarct. Such hemorrhagic transformation can increase both morbidity and/or mortality. Therefore, the risks and potential benefits need to be carefully weighed up.

Mobilisation

- Mobilisation should be encouraged as early as possible after the onset of the stroke (B)*

Compression stockings

- Compression stockings should be considered in people with stroke who have weak or paralysed legs once the person's peripheral circulation, sensation and the state of the skin have been assessed (C)*

- The American Stroke Association recommends intermittent external compression stockings, but only for patients who cannot receive antithrombotic drugs (grade B recommendation)

Aspirin

- Aspirin 150−300 mg/day should be given for the prevention of venous thromboembolism in the absence of any contraindication (A)*

* Recommendations from *Life After Stroke: NZ guideline for the management of stroke*. See www.nzgg.org.nz

Prophylactic anticoagulants

- Prophylactic anticoagulation against deep vein thrombosis is not to be routinely administered after stroke. (C)* Although subcutaneous heparin and low-molecular-weight heparin prevent venous thromboembolism, this beneficial effect may be counterbalanced by an increased risk of intracranial hemorrhage

- Prophylactic anticoagulation may be considered in immobilised people with stroke who are intolerant of aspirin, are unable to wear compression stockings, or have had a previous venous thrombosis (C)*

N.B. These guidelines apply to prevention of DVT/PTE only. Treatment of established venous thromboembolism requires careful analysis of the benefit to risk ratio in each patient.

Hypoxia

Supplemental oxygen should be given to hypoxic patients, aiming to maintain oxygen saturation at ≥ 95% (C)*

Patients who are not hypoxic should not be given supplemental oxygen (C)*

Pyrexia

Fever should be controlled with the use of antipyretics such as paracetamol and treatment of the underlying cause (B)*

Pressure Areas

Due to immobility, impaired sensation and poor nutrition

Prevention

Assess pressure area risk (Waterlow Score) and monitor frequently

Ensure appropriate mattress is used e.g. pressure relief mattress if high risk

Early mobilization following physiotherapy assessment

- regular re-positioning

- good nutrition/hydration
- management of continence

Spasticity and contractures

Refer to Physiotherapy section of these guidelines

Hemiplegic shoulder pain

Refer to Physiotherapy section of these guidelines

Management of blood pressure

Refer to the tPA guideline for patients receiving tPA

There is no evidence from randomised controlled trials to guide management of blood pressure in the first week after a stroke. A cautious approach should be taken toward the treatment of arterial hypertension in the acute stage

Acute BP management first 7 days after stroke

- Existing antihypertensive drugs should be continued unless the person has symptomatic postural hypotension
- There is consensus that blood pressure should be lowered where there is a dissection of the thoracic aorta or acute myocardial infarction

Antihypertensive agents should be avoided unless;

Ischemic Stroke

- systolic blood pressure > 220 mm Hg or
- diastolic blood pressure > 120 mm Hg

Intracerebral hemorrhage

- systolic blood pressure > 180 mm Hg or
- diastolic blood pressure > 100 mm Hg

Where blood pressure lowering is required, use **oral** antihypertensive medications if possible, unless BP elevation is **extreme** (eg >240/130 ischemic, >200/120 ICH)

- Give IV labetalol 10mg over 1-2 minutes
- The dose may be repeated or doubled every 10-20 minutes up to a total dose of 150mg
- Monitor BP every 15 minutes during labetolol treatment and observe for development of hypotension

- If no satisfactory response, infuse sodium nitroprusside (0.5-10ug/kg per minute)* or glyceryl trinitrate (GTN)**

Hypotension

Hypotension is a common problem in those hospitalised with stroke and may result in extension of an ischemic stroke. Hypotension should be avoided and the underlying cause treated.

All patients should have SBP maintained >100-110 mmHg

Some patients (eg those with severe bilateral carotid stenosis or carotid occlusion) may be symptomatic at “normal” levels of BP. Consider the possibility of exacerbation of stroke symptoms due to inadequate BP in any patient with progression or fluctuation of symptoms.

Suggested management

- Assess hydration status and correct dehydration
- Withdraw hypotensive medications
- Nurse lying flat if hypotensive
- ECG +/- TNT to assess for AF, other arrhythmia, MI or myocardial ischemia
- Assess for and treat congestive heart failure, if present
- Assess for blood-loss, particularly if taking aspirin or warfarin
- Consider bilateral full-length compression stockings
- Medications to elevate BP could be considered in rare cases, eg if symptoms are fluctuating while a patient is waiting for carotid intervention

Antihypertensive medication for secondary prevention after stroke/TIA

- Blood pressure-lowering treatment is recommended for all people after stroke or TIA unless the person has symptomatic hypotension.

- For all people presenting with an acute stroke or TIA, lowering blood pressure reduces the risk of a recurrent stroke and other major vascular events, irrespective of the person’s baseline blood pressure [PROGRESS trial].

- The optimal time to start blood pressure-lowering treatment is not known, but it is usually advisable to wait 7-14 days after an acute stroke.

- The combination of an angiotensin-converting enzyme inhibitor and a diuretic is of proven benefit in preventing recurrent vascular events. This benefit is seen irrespective of the patient's baseline blood pressure, including patients considered to be normotensive. There is insufficient evidence to determine whether a beneficial effect is specific to this combination of antihypertensive drugs or whether other blood pressure-lowering drugs are equally effective.

- Dose titration takes time so will need to be managed by the GP or stroke rehabilitation physicians. A clearly documented plan is required on the discharge summary.

- It may be appropriate to defer decisions regarding appropriate long-term antihypertensive therapy for patients presenting with major severely disabling stroke, particularly when the patient is to be transferred to another inpatient facility within 7-14 days of stroke onset.

- Patients with severe bilateral carotid stenoses should not have intensification of antihypertensive therapy until the symptomatic carotid lesion has been repaired.

Management of blood sugar

Diabetes and hyperglycemia after acute stroke

There is an association between hyperglycemia and poor outcome after stroke. At present there is insufficient evidence to support aggressive treatment of hyperglycemia for all patients after stroke. However,

- European stroke guidelines recommend maintenance of blood sugar level (BSL) <10mmol/L
- American guidelines recommend intervention if BSL >16.7mmol/L.

Until there are more data to guide treatment, management of hyperglycemia should be similar to that for other persons with an elevated blood glucose (C)*

Management of hyperglycemia and diabetes after stroke is sometimes complicated due to;

- reduced dietary intake when patients are made 'Nil by Mouth' (NBM)
- the use of nasogastric feeding

The aim of these guidelines is to encourage a consistent approach to management of hyperglycemia and diabetes after stroke on the stroke unit.

General recommendations

All patients who are NBM (or have limited oral intake) after stroke should be prescribed either parenteral fluids for hydration or have nasogastric tube (NGT) placement to allow feeding

- Normal saline is the parenteral fluid of choice
- IV glucose-containing fluids should be avoided unless as part of a dextrose + insulin infusion protocol
- The subcutaneous route of fluid administration should be considered for supplemental hydration needs and avoids direct intravenous glucose administration if fluids other than normal saline are required

* Recommendation from *Life After Stroke: NZ guideline for the management of stroke*. See www.nzgg.org.nz

Management of patients with known diabetes or documented hyperglycemia

Blood sugar level measurement

Measure BSL four hourly over the first 24 hours

If stable, BSL can then be checked four times daily, prior to meals if the patient is eating.

If BSL are unstable, and/or insulin boluses, or intravenous insulin are required, more frequent BSL monitoring (two hourly or more) may be necessary

Diabetic patients taking oral hypoglycaemic agents

- Stop sulphonylureas and Acarbose unless patient is on usual diet
- Continue metformin and/or Thiazolidinediones (eg Rosiglitazone and Pioglitazone), if the patient is usually on them and if there are no contraindications

Use of Insulin PRN

Novorapid insulin boluses, usual dose 10-20% of total daily insulin dose, may be used if BSL is greater than 15mmol/L up to two hourly. More frequent BSL monitoring (two hourly or more) will then be required. If patients are requiring repeated doses, the diabetes regimen should be reviewed and intra-venous insulin may need to be considered. Liaison with the Diabetes team is recommended.

Diabetic patients taking insulin

If NBM

- Use twice daily Protaphane, with total daily dose to equal half of usual (pre-stroke) daily insulin requirements
- Additional boluses of Novorapid, of around 10-20% of total daily insulin dose may be required if BSL> 15mmol/L

- The daily insulin dose can then be titrated up or down depending on blood sugar recordings, aiming to keep blood sugars between 4 and 10mmol/L

If enteral feeding

This is a complex situation and liaison with the Dietitian is recommended and referral to the Diabetes team should be considered. Factors to be considered include stability/reliability of the feeding tube, rate, timing and frequency of feeding.

- Twice daily Protaphane as for NBM patients to cover basal insulin requirements could be considered
- Novorapid boluses could be used to cover feeding regimen
- Intra-venous insulin infusions may be suitable for unstable patients

Impaired oral intake

Use twice daily Protaphane with total daily dose to equal half of usual (pre-stroke) daily insulin requirements, plus Novorapid after food varied to match intake.

For example: Daily Novorapid dose to equal half of total daily pre-stroke insulin. Divide this dose by three and give post meal in proportion to oral intake for example:

- None of meal eaten — Do not give Novorapid
- Half of meal eaten — Give half of Novorapid dose
- Entire meal eaten — Give total Novorapid dose

For example if usual premorbid Protaphane dose is 36units, give 9units of Protaphane twice daily, plus 6 units of Novorapid after a meal, if the entire meal is eaten.

Normal diet

- Give usual insulin dose and oral hypoglycemic agents if no contraindications.
- Top up Novorapid may be required if blood glucose > 15mmol/L

Type 2 diabetic patients taking maximal oral hypoglycaemic agents and nocturnal protaphane

NBM

Give half of nocturnal Protaphane dose twice daily.

Enteral feeding

- Give a total daily dose of insulin that is one and a half times the usual nocturnal Protaphane dose. Give half of this total dose twice daily. (The total insulin dose is greater than pre-stroke dose to cover the withdrawal of sulphonylureas.
- Novorapid boluses could be used to cover feeding regimen.
- Intra-venous insulin infusions may be suitable for unstable patients.
- Liaison with the diabetes team is advised

Impaired oral intake

- Give one and a half times nocturnal Protophane dose divided by two, twice daily
- Novorapid boluses may be required after meals as per other insulin requiring patients and for blood sugars > 15mmol/L

Normal diet

- Give usual insulin and oral hypoglycemic agents

Type 2 diabetic patients controlled with diet alone or oral hypoglycaemic agents

NBM

See guidelines above for all diabetic patients post-stroke

Enteral feeding

- Insulin may be required. Consider use of Novorapid for BSL > 15mmol/L

- liaison with the Dietitian is recommended and referral to the Diabetes team should be considered

Impaired oral intake

- If blood sugars are greater than 15mmol/L Novorapid may be used.
- Liaison with the Dietitian is recommended and referral to the Diabetes team should be considered

Normal diet

- Prescribe usual oral antidiabetic agents

Patients with raised blood sugar levels and not previously diagnosed with diabetes

- Patients with non-fasting blood glucose of >11.1mmols/L or fasting blood glucose of >7.0mmols/L may have undiagnosed diabetes and/or be at risk of poor outcome after stroke.
- Although HbA1C is not a diagnostic test for diabetes, it may help to differentiate temporary stress hyperglycemia from undiagnosed diabetes.
- If glucose is initially high (>/= 12mmol/L) and remains high and/or HbA1C is >8% consider treating with insulin during the acute post-stroke period as per insulin requiring diabetes.
- Liaison with the Diabetes team is recommended

Note

- These guidelines are a recommendation only
- Patients with unstable blood sugars may be best managed with intra-venous insulin infusions
- Liaison with the diabetes team is recommended for most patients who have altered insulin requirements or difficult blood glucose control

Management of vascular risk factors

Secondary prevention following stroke/TIA

This protocol is based on and intended to be read in conjunction with *Life After Stroke: NZ guideline for the management of stroke*. December 2003. See www.nzgg.org.nz

All people with stroke or transient ischemic attack should be assessed for vascular risk factors and be treated appropriately (B)*

Anti-platelet therapy

Aspirin

All cases of stroke/TIA unless contraindicated.

300mg stat and 75-150mg daily for first event

A CT scan scan should be obtained prior to starting anti-platelet therapy (C)*

Consider 300mg daily for recurrent events in case of aspirin resistance

Dipyridamole

The combination of aspirin and dipyridamole has been shown to be effective as secondary vascular prevention in patients with TIA or ischemic stroke

Dipyridamole may also be used in aspirin intolerant patients

At present, dipyridamole can only be prescribed in patients who have failed aspirin therapy and a physician must complete special authority application

Clopidogrel

Clopidogrel is recommended as a safe and effective antiplatelet treatment for the secondary prevention of stroke. However, Clopidogrel is more expensive than aspirin and currently is not funded for secondary stroke prevention.

* Recommendations from *Life After Stroke: NZ guideline for the management of stroke*. See www.nzgg.org.nz

Anti-coagulant therapy

Warfarin

Anticoagulation should be started in everyone with an ischemic stroke or TIA and atrial fibrillation (paroxysmal or permanent) unless contraindicated (A)*

Consider anticoagulation in everyone with an ischemic stroke or TIA and significant mitral valve disease, prosthetic heart valves, or myocardial infarction within 3 months (C)*

- A target INR of 2.5 (range 2.0 to 3.0) is recommended
- Exclude intracranial hemorrhage by brain imaging first
- Discuss the potential benefits and risks with each patient

Anticoagulation is usually started after 14 days

- May be earlier with minor strokes if intracerebral hemorrhage has been excluded and if there is a high risk of early recurrent stroke
- It is preferable to commence anticoagulation prior to hospital discharge

Aspirin is recommended for patients with ischemic stroke or TIA and contraindications to anticoagulation

Blood pressure-lowering treatment

Recommended for all people after stroke or TIA unless the person has symptomatic hypotension

Benefit occurs regardless of the baseline blood pressure

Do not lower BP rapidly

Use low dose thiazide or an appropriate drug for co-morbidities

Usual target BP level is <130/80

Individual BP targets should take into account the number and dose of medications as well as co-morbidities and frailty, especially in elderly

The optimal time to start blood pressure lowering therapy is not known, but it is usually advisable to wait 7-14 days after an acute stroke

Cholesterol lowering

A statin is recommended for most people after TIA

Benefit occurs even in those with normal or low baseline cholesterol

Simvatstatin - either 40mg (trial dose) or at lower dose and titrate up

A lower dose approach may be more appropriate in frail older people

Optimal levels include total cholesterol < 4 and LDL <2.5

Internal carotid artery (ICA) re-vascularisation

Carotid endarterectomy

Carotid endarterectomy is recommended for patients with symptomatic severe (70−99%) stenosis of the proximal ICA (A)*

- 'symptomatic' = stroke or TIA in the territory of that artery

Patients with symptomatic 50−69% ICA stenosis should be selected for carotid endarterectomy on a case-by-case basis because the absolute benefit is modest

Carotid endarterectomy is not recommended in patients;

- with symptomatic ICA stenosis of <50%
- where the ischemic event was likely to have been due to cardiogenic embolism
- where the stroke resulted in serious disabilities
- with important medical co-morbidities
- Routine carotid endarterectomy is not recommended for unselected patients with asymptomatic carotid stenosis because the absolute benefit is modest and surgery must be performed by surgeons with exceptional skill (perioperative complication rates of ≤ 2%)

Carotid angioplasty and stenting

The relative risks and benefits of carotid stenting and endarterectomy are not known. At the present time carotid endarterectomy, and not carotid

angioplasty with stenting, is the recommended management for appropriate patients with internal carotid artery stenosis.

Carotid angioplasty and stenting should be performed by experienced interventionists with a low periprocedural complication rate (C)*

General management

All people with stroke or transient ischemic attack should be given appropriate advice on lifestyle factors such as not smoking, regular exercise, diet, achieving a satisfactory weight, reducing the use of added salt (C)*

Cigarette smoking

Cigarette smoking should be discontinued(C)*

- Evidence from randomised controlled trials is lacking, but observational studies suggest that stopping smoking decreases the risk of stroke by at least 1.5 times. Counselling, nicotine replacement therapies and formal smoking cessation programmes may all be helpful

Alcohol consumption

Excessive alcohol consumption (>4 units/day generally and > 1 unit/day in the elderly) should be discontinued.

Physical activity

- Physical inactivity is associated with an increased risk of stroke.
- Moderate exercise (30−60 minutes of brisk walking, jogging, cycling, or other aerobic activity at least 3 times per week) is recommended.
- Medically supervised exercise programmes are recommended for high-risk patients (e.g. those with cardiac diseases)

Body weight

Diet and exercise are recommended to maintain a bodyweight ≤ 120% of ideal bodyweight for height (B)*

Management of transient ischemic attack

The causes of ischemic stroke and transient ischemic attack are identical. By definition, the symptoms associated with a TIA last less than 24 hours. However, many patients present within 24 hours of the onset of symptoms when a stroke may not be distinguishable from a TIA.

Most TIAs, resolve within the first hour. If neurological symptoms persist for more than 1 hour without improvement, the patient should be managed as if a stroke has occurred.

Diagnosis

Diagnosis of TIA can be problematic. Diagnosis in primary care and ED is likely to only be 50-60% accurate. TIA diagnosis more likely to be correct if;

- Symptoms begin abruptly, with neurological deficit maximal at onset
- There is focal loss of brain or monocular function – that is typical for TIA, i.e. consistent with vascular cause and territory. [see below]
- Rapid recovery occurs - most TIAs resolve within minutes and 60-70% within 1 hour. If symptoms/signs persist then stroke is likely

Differential diagnosis

In order of frequency as seen in primary care includes;

- migraine aura (+/- headache), syncope & hypotension, labyrinthine disorders (isolated vertigo +/- secondary nausea & ataxia), partial (focal) epileptic seizures, transient global amnesia, drop attacks, hypoglycaemia and hyperventilation.

TIA symptoms and signs

Typical of TIA*	**Not typical of TIA** (If in isolation - without typical symptoms)
Unilateral weakness face/arm/leg (50%)	Confusion (exclude dysphasia)
Unilateral altered sensation (35%)	Impaired consciousness
Dysphasia (18%)	Dizziness or light headed
Monocular Blindness (18%)	Fainting or syncope
Hemianopia (5%)	Amnesia
	Generalised weakness or sensory symptoms
	Bilateral blurred vision or scintillating scotoma
	Incontinence – bladder or bowel

* (%) = frequency reported in Oxfordshire Community Stroke Project

Note – dysarthria (23%), ataxia (12%), vertigo(5%), diplopia(5%) and dysphagia (1%) are not diagnostic of TIA but may be consistent with TIA if occur in conjunction with typical symptoms

Investigations

Imaging with CT (or MRI) is recommended for patients after a hemispheric TIA, especially if TIAs are recurrent and stereotyped (C)*

- Brain imaging is not routinely recommended after a vertebrobasilar TIA.

Carotid ultrasound (US) as an inpatient (or outpatient if in the next few days) should be obtained in patients with carotid circulation TIA's and who are potential carotid revascularisation candidates.

- Carotid US is not required for patients with a posterior circulation TIA.

* Recommendations from *Life After Stroke: NZ guideline for the management of stroke*. See www.nzgg.org.nz

Other investigations should be performed as recommended for patients who have had an ischemic stroke.

Depending on the clinical features other investigations may include;

- coagulation studies
- echocardiography
- magnetic resonance angiography

Patients with TIA should be assessed as soon as possible & within 7-14 days.

There is a significant risk of stroke early after TIA - up to 10% at 1 week and 18% at 3 months. This risk makes current delays in accessing out-patient services inappropriate for the initial assessment and investigation of patients with TIA.

Who to admit

Patients with TIA are at high risk of recurrent TIA, stroke, cardiac event or sudden death. This risk is highest in the first week after TIA. Patients with prolonged neurological deficits (particularly motor or language/cognitive deficits) have a higher risk of early stroke recurrence than patients with rapidly resolved symptoms (usually <10 minutes) or pure sensory symptoms.

All patients should be seen by the Stroke Service prior to discharge. If not, an urgent outpatient clinic referral should be sent to either the Neurology department stroke clinic or General Medicine outpatients.

ABCD 7 Day Stroke Risk Following TIA

The ABCD 7 day stroke risk following TIA score can be used as a guide of who may require admission.

This is a guideline only. There are always exceptions for example patients with crescendo TIA's and a score of ≤4 require admission.

Age	≥60	=1
Blood Pressure	>140 Sys and/or Dias ≥90 mm Hg	=1
Clinical features	Unilateral weakness Speech disturbance & no weakness Other	=2 =1 =0
Duration of symptoms	≥60 minutes 10 – 59 <10	=2 =1 =0

From Rothwell et al. Lancet. 2005;366:29-36

7 Day Stroke risk

≤4	=0.4%	requires stroke service or medical review as inpatient or outpatient
5	=12.1%	requires urgent inpatient stroke service assessment
6	=31.4%	requires urgent inpatient stroke service assessment

This is a guideline only. There are always exceptions for example, patients with crescendo TIA's and a score of ≤4 require admission.

Summary of stroke risk

Scores: < 4 have a low 7 day stroke risk following TIA and most may be discharged from ED/APU if;

- investigations are complete (or will be in the next week)
- management plan has been formulated
- secondary vascular prevention therapy has been initiated
- outpatient follow-up is arranged

Scores: 5 (12-16% 7 day stroke risk) and 6 (31-35%);

- Have a very high risk of stroke
- Most should remain as inpatient until;
    - Physician review (consider referral to specialist with expertise in stroke) and
    - All investigations completed (including urgent Carotid US if applicable) and
    - A management plan has been initiated

Treatment of TIA vascular risk factors

The management of vascular risk factors is the same as for stroke. See "Management of vascular risk factors" section for full details.

Antiplatelet and anti-coagulant therapy

- Aspirin
- Dipyridamole
    - Only if recurrent TIA on aspirin or if aspirin intolerant[1]
- Warfarin
    - Only if in AF or other cardiac source of emboli identified[1]
    - CT head scan must be done first to exclude hemorrhage or other pathology
    - Target INR of 2.5 (range 2-3) is recommended
- IV heparin
    - Consider IV heparin for 3-7 days if recurrent events in past week (pending investigations, especially carotid ultrasound)
    - this is not evidence based but recommended by some authorities.

Blood pressure-lowering treatment

Recommended for all people after stroke or TIA unless the person has symptomatic hypotension[1]

Cholesterol lowering

A statin is recommended for most people after TIA

General management

All patients should be given lifestyle advice[1]

Smoking cessation/ reducing alcohol consumption / moderate physical activity

Driving Advice following TIA

See driving guidelines

Transient Ischemic Attack (TIA) management checklist: Hawke's Bay Hospital

(fax to GP)

Patients with suspected TIA should initially be assessed in ED or AAU – see full TIA guideline

Doctor Completing: Patient ID: (or Sticker)
Signature: Patient Name:
Date:

Diagnosis – Are you confident it was a TIA? (if in doubt see full guide) **Y or N**

Assess risk of stroke within next 7 days – see discharge. **ABCD score = ___**

Age ≥ 60yrs (1), **B**P > 140 syst or > 90 dias (1), **C**linical features - unilateral weakness (2), speech affected (1), **D**uration of TIA - > 60 mins (2), 10-59 mins (1)

Investigations	Done	N	Abn	Risk factors	yes	no	unk
				Hypertension			
FBC				Diabetes			
ESR				Cholesterol			
U&Es				Smoking – Past			
Creatinine				Smoking – Current			
Glucose				Atrial Fibrillation (any)			

CT Scan - most patients with carotid TIA (not routine if post circulation) **Request: Y N N/A**

Carotid Ultrasound Scan – this is a consultant decision. **Request: Y N N/A**
Only if patient has carotid territory TIA (i.e. not **post circulation** event), *and* is fit for surgery *and* has life expectancy > 2-3 years

Aspirin – all cases unless contraindicated. **Done: Y N N/A**
300mg stat and 75-150mg daily for first event, (after CT scan)

Dipyridamole – only if recurrent TIA on aspirin or if aspirin intolerant
Physician must complete special authority application. **Done: Y N N/A**

Warfarin – only if in AF or other cardiac source of emboli identified. **Done: Y N N/A**
Must have CT brain. Potential risks/benefits must be discussed with patient and documented

Blood pressure-lowering treatment **Done: Y N N/A**
Start (or increase current dose) unless hypotension. Do not lower BP rapidly
Use low dose thiazide or an appropriate drug for any co-morbidities
GP follow up, usual target <130/80 but caution if elderly or co-morbidities

Cholesterol lowering treatment - recommended for most **Done: Y N N/A**
Start simvatstatin 40mg (20mg and titrate up if frail, elderly)

General Management **GP follow up - Advised Y or N**
Lifestyle advice (smoking, exercise & diet), information about stroke and Stroke Foundation contact (0800 STROKE) recommended.

Driving Advice – document driving status and advice. **Done: Y N N/A**
Private licence; single TIA = no driving for 1 month, multiple TIAs = 3 months

Discharge Arrangements (PTO for details)
Low risk patients - ABCD score ≤ 4 may be discharged home with GP or OP follow up

High risk patients *- ABCD score 5 (12%) and 6 (33% 7 day stroke risk) require inpatient care*

TIA discharge arrangements

Low risk patients *- ABCD score ≤ 3 (0% risk) and 4 (<1-2% 7 day stroke risk)*

Can be discharged with either Physician or GP follow up within 1-2 weeks if -

- All investigations completed or only awaiting OP CT & Carotid US scan and
- A management plan has been initiated

High risk patients *- ABCD score 5 (12%) and 6 (33% 7 day stroke risk)*

Must remain as inpatient until

- Physician review (consider referral to a specialist with expertise in stroke) and
- All investigations completed (including urgent Carotid US if applicable) and
- A management plan has been initiated
- If recurrent events in last week - consider IV heparin for 3-7 days pending investigations, especially carotid ultrasound – this is not evidence based but recommended by some authorities.

Nursing guidelines for management of acute stroke

Airway and Respiratory management

Record respiratory rate and SaO2 as per territory (see below) for 48 hours

O2 saturations to remain above 95%

Administer oxygen if hypoxia present (oxygen as charted)

Assess and document

- fluctuating consciousness
- pooling of secretions
- ineffective cough, swallow assessment
- wet and gurgly voice
- oral suction required

Change position 2 hourly

Physiotherapy referral (day 1 – blanket referral)

Observations

Parameters should be documented by admitting Registrar based on type and territory of stroke

- monitor for increasing Intracranial Pressure (ICP)
- report temperature >37.5 °C - pyrexia is associated with poor outcome
- blood glucose >10mmols to be reported to medical staff - hyperglycemia in acute stroke associated with poor outcome

Ischemic stroke: anterior circulation

4 hourly for 24 hours (then review)

- vital signs (P, BP, T, R)
- neuro obs (GCS, pupillary reaction and size, limb power)
- capillary blood glucose

Report BP (unless otherwise documented)

- systolic >220 mmHg
- diastolic >120 mmHg

Monitor ECG for arrythmias

Ischemic stroke: posterior circulation

2 hourly for 24 hours, 4 hourly for 48 hours (then review)

- neuro obs (GCS, pupillary reaction and size, limb power)
- vital signs (P, BP, T, R)

Report BP (unless otherwise documented)

- systolic >220 mmHg
- diastolic >120 mmHg

4 hourly for 24 hours (then review)

- capillary blood glucose

Monitor ECG for arrythmias

Intracerebral hemorrhage

2 hourly for 24 hours, 4 hourly for 48 hours (then review)

- neuro obs (GCS, pupillary reaction and size, limb power)
- vital signs (P, BP, T, R)

Report BP (unless otherwise documented)

- >160 systolic
- >100 diastolic

4 hourly for 24 hours (then review)

- capillary blood glucose

Monitor ECG for arrythmias

Nutrition and Hydration

- NBM status until swallow assessment completed
- Nurse dysphagia screen as appropriate
- Approximately 40% of acute stroke patients have some degree of dysphagia
- Maintain IV fluids as charted
- dextrose saline NOT recommended in acute stroke
- Check U&E results as appropriate
- Baseline weight documented
- Maintain accurate Fluid Balance Chart / Food Chart
- Regular mouthcares and dental hygiene
- Refer to SLT/ Dietitian/Diabetes Nurse Specialist as appropriate

Continence

Document bladder and bowel output

Monitor for urinary retention and incontinence

- Avoid IDC where possible
- Consider catheter only if unconscious, urinary retention or danger of skin problems
- Promote early TROC

Record bowel function

- Administer apperients if BNO 2/7 with oral laxatives +/- suppositories PRN or regular
- Avoid regular enemas if possible

Refer to continence nurse as required (form for community follow up)

Mobility

- Falls risk and Waterlow assessment on admission
- Assessment of motor power and function & record ADL ability
- Encourage early mobilisation usually day 1 following admission unless contraindicated (see below)
- Lying and standing BP on first mobilisation – report postural hypotension
- Protect the hemiplegic shoulder during transfers

Mobilisation should be avoided if patient unstable

BP systolic ≥ 180mmHg or ≤ 90mmHg

diastolic ≥ 110mmHg or ≤ 50mmHg

R patient is in respiratory distress

P symptomatic bradycardia or tachycardia

Strict bed rest for 24 hours following administration of t-PA

If reduced mobility;

- Maintain correct body alignment / positioning
- 2 hourly pressure area care
- Pressure relieving mattress as appropriate
- Use TED compression stockings
    - risk of DVT & PE high following stroke

Hemiplegic shoulder pain

- Due to paralysed/weak arm
- Education staff, family etc. support arm
- Protect limb at all times (especially neglect patients)

- Positioning

Refer to Physiotherapy section of these guidelines

Cognition and communication

Monitor and document:

- Signs of acute confusion
- Communication deficit / disorder
- Perceptual / visuo-spatial deficits
- Mood / behaviour
- Memory deficits

Education and psychosocial

Patient and family education oriented to environment and support offered as needed. This includes:

- Explanations given prior to any treatment
- Patient and family to understand ongoing treatment plans
- Stroke information
    - e.g. Stroke Foundation booklet
    - stroke education videos
- Contact with Stroke Foundation Field Officer offered

Refer to SLT and OT as appropriate

Patient transfer/mobilisation checklist

Checklist for transferring a patient with stroke

1. Has the person received t-PA? **YES / NO**

- If yes, must stay in bed for 24 hours

Lying on the bed

2. Can the person move the stroke affected side? **YES / NO**
3. Is the person aware of the stroke affected side? **YES / NO**

Sitting on the bed

4. Can the person straighten the affected knee? **YES / NO**
5. Can the person sit, with feet on the floor without help? **YES / NO**

If no to any of questions 2-5, hoist transfer until physio assessment and recommendation made

If yes to all of questions 2-5, try transferring the patient

- Make sure feet are flat on the floor and positioned under the knees
- Adjust the height of the bed to >90º at hips and knees
- Use a transfer belt. Do not hold under the armpit
- Use two people for safety
- Prepare to brace the affected knee in case it gives way on standing
- Transfer towards the unaffected side through 90º

Hydration, swallow assessment and nutrition

Water swallow test

The water swallow test should be used as a part of the screening for aspiration risk in stroke patients

Clinical history taking should take into account co-morbidities and other risk factors (e.g., smoking or respiratory disease) to identify increased risk of developing aspiration pneumonia.

Swallow Screening

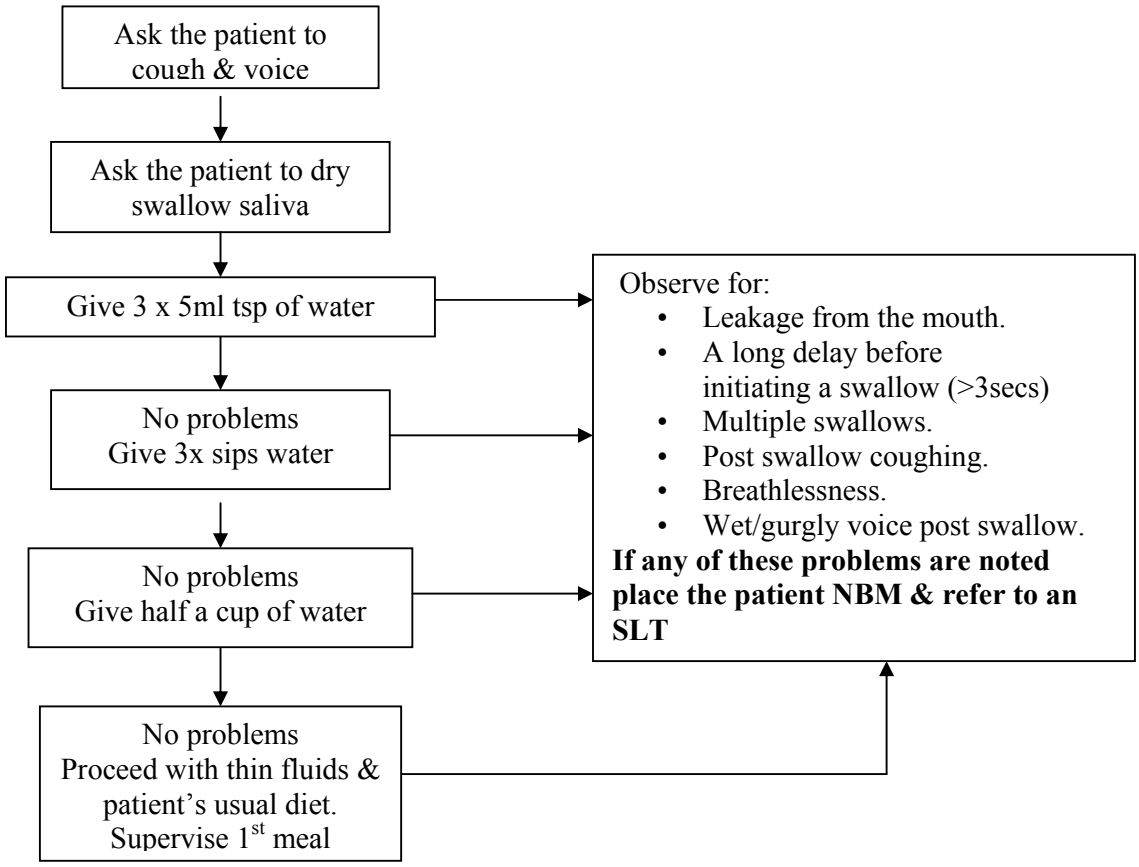
A typical swallow screening procedure should include:

- Observation of the patient's level of consciousness
- Observation of the patient's degree of postural control

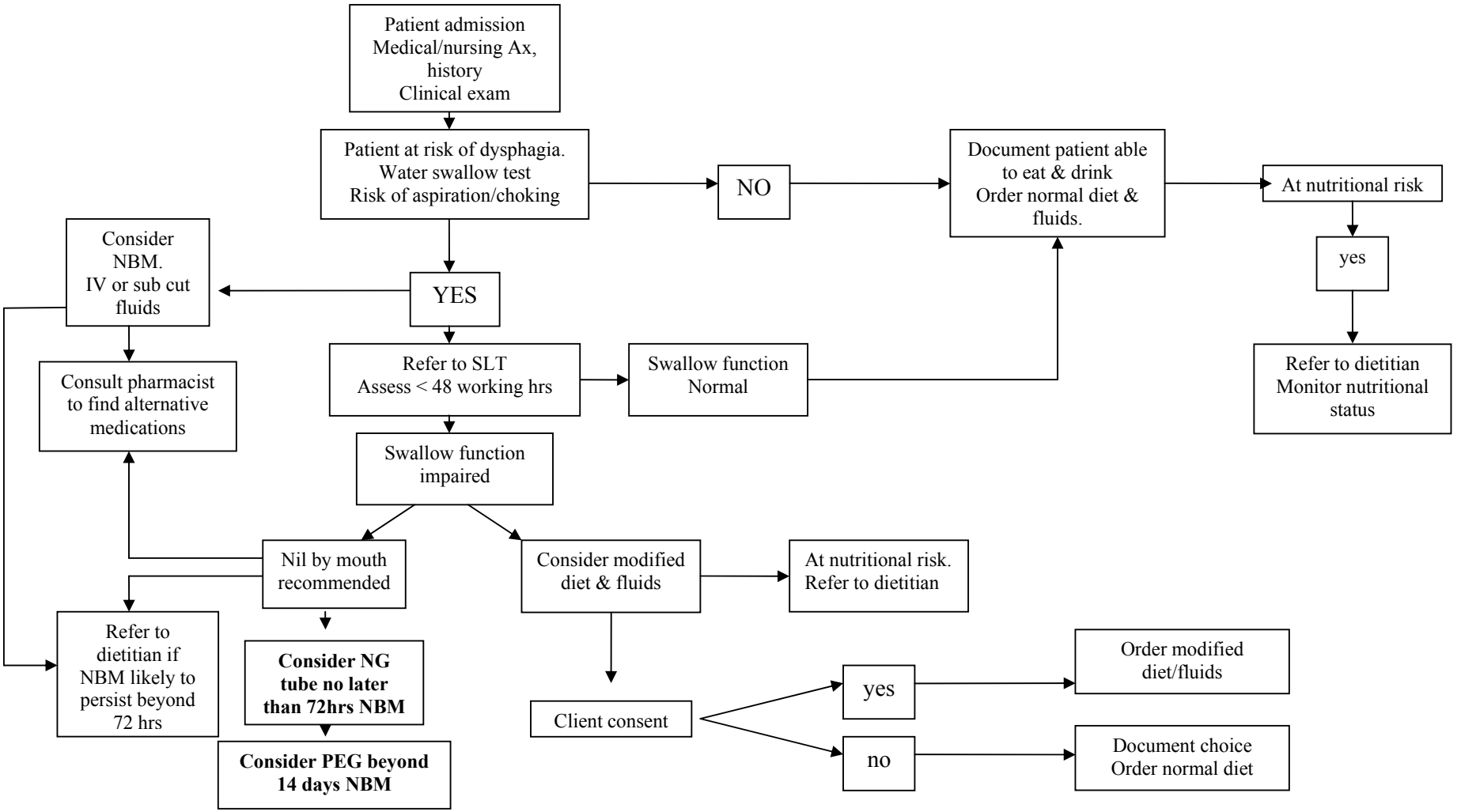
If the patient is able to actively cooperate and is able to be supported in an upright position the procedure should also include:

- Observation of oral hygiene
- Observation of control of oral secretions
- If appropriate, a water swallow test

Procedure for a typical Water Swallow Test



Management of impaired swallow



Hydration after acute stroke

Dehydration is a common and avoidable problem after acute stroke. Patients are frequently unable to eat or drink adequately or are made 'Nil by Mouth". Dehydration can result in discomfort, hypotension and decreased cerebral perfusion. Avoidance of both dehydration and hypotension are associated with improved patient outcomes after stroke.

All patients who are NBM or who have limited oral intake after acute stroke should be prescribed parenteral fluids or have nasogastric tube (NGT) or PEG placement to allow feeding.

For parenteral fluids, subcutaneous (SC) administration should be considered if there is no other indication for IV cannulation.

- An IV line in a paretic arm can result in an edematous limb and an IV line in a non-affected limb can result in a patient having two non-functional arms. These problems can be avoided by administering fluids via the SC route over the trunk area.

In general, 2 litres of fluid per day is required. However, caution is needed in patients with congestive heart failure or raised intracranial pressure.

Normal saline will generally be the parenteral fluid of choice. Intravenous glucose-containing fluids should be avoided.

- Hyperglycemia is associated with poor outcome after stroke.
- Use of dextrose-saline or 5% dextrose can result in hyponatremia.

Enteral feeding should be considered for patients who remain NBM for longer than 72 hours. The decision whether or not to commence enteral feeding is a team one to ensure all relevant issues are addressed.

- NG feeding – short term use only
    - not urgent start within first 3-4 days
- PEG (Percutaneous Endoscopic Gastrostomy) feeding tube
    - if long term feeding required
    - not usually recommended within first 3 weeks post stroke unless problems with NG feeding

Nutrition after acute stroke

All Patients

Patients are to be weighed within 24 hours of admission and discharge from the stroke unit

Routine biochemistry: urea & electrolytes, creatinine, glucose, albumin, CRP

Food charts or monitoring of oral intake if admitted over the weekend.

Patients receiving ongoing dietetic input

Twice weekly weigh

Pre-albumin if requested

Patients receiving enteral feeding

Food and fluid charts to be kept during transition periods

Twice weekly weigh

Weekly biochemistry as indicated

Electrolytes, glucose, phosphate, magnesium if at risk of re-feeding syndrome

Continence assessment and catheter care

Active bowel and bladder management should occur from admission (C)*

Catheters should be used only after full assessment and as part of a catheter management plan (B)*

If incontinence persists after 3 weeks in spite of an active bowel and bladder management programme, further tests (urodynamics, anorectal physiology tests) should be considered (C)*

Incontinent inpatients should not be discharged until adequate arrangements for continence aids and services have been arranged at home and the carer has been adequately prepared (C)*

Bowel

Document continence daily, record action if incontinent

Give oral laxatives +/- suppositories PRN or regular

Anticipate need, especially if immobile

Avoid regular enemas if possible

Bladder

Urethral catheter only if;

- unconscious
- urinary retention
- danger of skin problems

- Recommendations from Life After Stroke: NZ guideline for the management of stroke. See www.nzgg.org.nz

Physiotherapy guidelines

Approaches to early rehabilitation

Physiotherapy improves functional outcome and reduces length of hospital stay. The greater the intensity of intervention, the larger the potential benefit.

All stroke patients should be involved in daily goal-focussed activity, whether or not this involves a therapist.

One of the current therapeutic approaches to movement re-education should be used.

Task specific practice as opposed to an impairment focussed approach should be provided for people who have difficulty sitting, standing from a chair, maintaining a standing position, using their upper limb or walking.

Patients should perform movement re-education tasks repetitively.

Group therapy involving task-specific practice or video self-modelling may be used to increase the amount of practice in rehabilitation.

Supervision and feedback should be provided.

Goal setting and outcome measures

Stroke unit multidisciplinary teams should conduct at least one formal meeting per week at which patient problems are identified, rehabilitation goals set, progress monitored and discharge is planned.

Goals should be patient centred and should involve the patient and family as appropriate.

Goals should be meaningful and challenging but achievable.

Both short- and long-term goals should be set.

Clinicians should use assessments or measures of change in function that have been shown to be valid and reliable.

Patients should be reassessed at appropriate intervals.

Management

Acute

Stroke patients should be managed by physiotherapists with experience in stroke and rehabilitation.

All patients with stroke should be assessed by a physiotherapist within 24-48 hours of admission. C*

A full neurological assessment should be completed for every stroke patient.

A respiratory assessment should be completed as appropriate (see respiratory and neurological assessment clinical guidelines).

Positioning and mobilisation

Therapeutic positioning should be practised by therapists and nursing staff to prevent secondary complications such as contractures, pain, respiratory problems, pressure sores and to promote functional recovery.

Nursing staff should be advised on transfer and positioning methods for individual patients.

Visual guidelines should be available for staff to optimise positioning and regular educational updates on positioning should occur.

Mobilisation should be encouraged as soon as possible after stroke onset.

Patients receiving thrombolysis therapy require 24 hrs bed rest following infusion.

In some patients early mobilisation will be into a chair/wheelchair. In these cases, the chair provided needs to have adequate postural support for the patient.

Monkey bars/ bed attached overhead pulleys are not routinely recommended as these are associated with shoulder pain and learned non use of the affected side.

* Recommendations from *Life After Stroke: NZ guideline for the management of stroke*. See www.nzgg.org.nz

Strength and aerobic training

Resisted exercise should be considered to improve muscle strength in targeted muscles.

Bilateral arm training may improve upper limb motor performance.

Rehabilitation should include interventions to increase cardiovascular fitness once people have sufficient strength in the large lower limb muscle groups.

The following strategies may be considered for selected patients

- Constraint-induced movement therapy (CIT)
- Treadmill training
- Functional electrical stimulation (FES)
- Biofeedback

Management of spasticity

For people at risk of developing contractures, management may include prolonged positioning and/ or splinting of muscles in a lengthened position to maintain range of movement.

Spasticity should not limit the use of strength training.

In patients with disabling or symptomatic distressing spasticity, botulinum toxin injections may be considered in conjunction with physiotherapy for reducing tone and / or increasing the range of joint motion.

Orthotics (including splinting and casting)

Individually fitted ankle-foot orthoses should be considered for people with severe ankle dorsiflexion weakness to improve walking ability.

Ankle foot orthoses should not be used without proper assessment and follow-up to establish effectiveness.

Splinting may be considered to prevent contractures. Inflatable air splints should not be used on a routine basis.

Pain

All patients with stroke should be asked whether pain is a problem on a regular basis.

The cause of all reported pain should be established. This may require referral to an appropriate clinical specialist.

Management of musculoskeletal pain may include:

- exercise, passive movement, changes to seating and positioning.
- analgesics where non-pharmacological treatments are ineffective.

Management of intractable post-stroke central pain may require early referral to a specialist pain service C*

Shoulder Pain

Physiotherapists should provide education to staff, patients and carers on correct handling of the affected upper limb.

Consistent, supportive positioning strategies should be practiced at all times.

Routine use of the following interventions to prevent or alleviate shoulder pain are not recommended

- arm slings. However, arm slings may support the weight of a densely hemiplegic arm during mobilisation and may also give visual feedback to staff to handle the limb with caution.
- shoulder strapping B*
- intra-articular steroid injections B*
- functional electrical stimulation and transcutaneous electrical nerve stimulation (TENS) A*

Sensory impairment

Sensory-specific or sensory-related training may be used to increase tactile and kinaesthetic sensation.

There is no clear evidence of benefit for acupuncture or TENS and these techniques should only be used in the context of a clinical trial A*

Spatial awareness (neglect/ inattention)

Therapy sessions should be modified to focus a patient's attention to the side of impaired awareness.

Techniques such as cueing, scanning, limb activation, and environmental adaptations should be utilised.

Attention

Patients who are unable to concentrate or are easily distracted require careful planning of therapy sessions to minimise the attentional demands placed on them. The following strategies can be considered:

- avoidance of therapy times where a patient is most likely to be tired
- avoidance of background visual/ auditory distractions
- short treatment sessions
- frequent rest breaks

Praxis

The presence of apraxia should be considered in patients demonstrating functional difficulties. This assessment may be performed in conjunction with a speech and language therapist if any communication difficulty is present.

Interventions should consider novel, sequential, voluntary movements and the impact of different input routes (verbal, visual, tactile).

Distinction between impairments in voluntary and automatic actions should be made.

Mobility aids

Early use of walking aids in an acute or rehabilitation setting is not indicated in most patients with stroke due to the encouragement of abnormal biomechanical, balance and sensory adaptations.

Walking aids should be considered in the case of permanent, unchanging impairment or for safety reasons in the case of early discharge.

Walking aids can improve patient stability, confidence and independence whilst reducing energy expenditure and fatigue.

Prescription of any equipment or aids for an individual patient should only be made by a therapist with experience in treating patients with stroke.

Prescription of equipment should take into account the physical and social environment in which it is to be used.

The patient and/or carer should be trained in the safe and effective use of any equipment supplied.

The suitability and ongoing use of any aids provided should be reviewed over time as needs may change.

All patients should be given a contact number for future advice or help with equipment provided.

Secondary prevention

Moderate exercise (30-60 minutes of brisk walking, jogging, cycling, or other aerobic activity at least 3 times per week) is recommended A*

Medically supervised exercise programmes are recommended for high-risk patients (e.g. those with cardiac disease) A

Emotional response to stroke

Many people experience some emotional difficulties following a stroke. They may feel a natural sense of grief due to the effects of their stroke. They may also experience feelings of sadness or depression, but still be able to be cheerful at times, and feel that things are getting better. Friends and family can help by being supportive and understanding, and gently encourage and provide opportunity for social and leisure activities.

However, some people who have had a stroke may go on to become clinically depressed. The symptoms of depression include:

- A persistent sad mood
- Loss of interest or pleasure in usual activities
- Difficulty concentrating
- Feelings of guilt, worthlessness, helplessness or hopelessness about the future
- Thoughts about death or suicide
- Reduced energy, tiredness or being “slowed down”
- Problems sleeping (insomnia, early-morning waking, or oversleeping)
- Eating disturbances (loss of appetite and weight or weight gain)

Grieving following a stroke can cause similar symptoms, but depression symptoms are more pervasive and persistent. If someone has one or more of these symptoms for more than two weeks, and they are causing significant distress or interfere with the person’s desire or willingness to undertake their usual activities they may be clinically depressed.

Depression after stroke is common, with prevalence estimated at 10−47%. Other mood disorders such as anxiety (19−31%), agoraphobia, adjustment disorder, irritability and apathy are also common, but are less well researched.

Mood disorders following stroke

People with stroke should be screened for depression and anxiety within the first month, and their psychological state kept under review. A standardised questionnaire (in those who can respond to it) may be used for screening but clinical diagnosis should be confirmed by clinical interview (C)*

* Recommendations from *Life After Stroke: NZ guideline for the management of stroke*. See www.nzgg.org.nz

- No screening questionnaires have been trialled specifically for stroke although some research studies have used them for this purpose. The Hospital Anxiety and Depression (HAD) Scale and the Geriatric Depression Scale are examples. Any screening questionnaire needs to be used with awareness of its limitations, including in dysphasic patients and overemphasis on somatic symptoms in the elderly.

Any person diagnosed with one form of mood disorder should be assessed for other psychiatric comorbidity (B)*

Mood disorder that is causing persistent distress should be managed by, or with advice from, an experienced psychologist or psychiatrist (C)*

Treatment of mood disorders following stroke

People with persistently depressed mood (greater than 6 weeks) after stroke should be offered treatment with antidepressant medication (A)*

- Antidepressant treatment for depression persisting at 6 weeks or longer has been shown to be more effective than placebo.

- If a good response is achieved treatment should be continued for at least 6 months although the optimal duration after stroke is not known.

- Non-pharmacological treatments such as social and activity groups should also be considered

Treatment of emotionalism following stroke

People with severe, persistent or troublesome tearfulness (emotionalism) following stroke should be offered antidepressant drug treatment, with the frequency of crying monitored to check effectiveness (A)*

- Fluoxetine has been shown to be of benefit in this situation in a randomised controlled trial.

Hospital Anxiety and Depression Scale

Instructions: Doctors are aware that emotions play an important part in most illnesses. If you doctor knows about these feelings he or she will be to help you more. This questionnaire is designed to help your doctor know how you feel. Read each item and place a firm tick in the box opposite the reply which comes closest to how you have been feeling in the past week. Don't take too long over your replies; your immediate reaction to each item will probably be more accurate than a long thought out response.

I feel tense or 'wound up':	A
☐ Most of the time	3
☐ A lot of the time	2
☐ From time to time, occasionally	1
☐ Not at all	0

I still enjoy the things I used to enjoy:	D
☐ Definitely as much	0
☐ Not quite so much	1
☐ Only a little	2
☐ Not at all	3

I get a sort of frightened feeling as if something awful is about to happen:	A
☐ Very definitely and quite badly	3
☐ Yes, but not too badly	2
☐ A little, but it doesn't worry me	1
☐ Not at all	0

I can laugh and see the funny side of things:	D
☐ As much as I always could	0
☐ Not quite so much now	1
☐ Definitely not so much now	2
☐ Not at all	3

Worrying thoughts go through my mind:	A
☐ A great deal of the time	3
☐ A lot of the time	2
☐ From time to time, but not too often	1
☐ Only occasionally	0

I feel cheerful:	D
☐ Not at all	3
☐ Not often	2

☐ Sometimes 1
☐ Most of the time 0

I can sit at ease and feel relaxed: A
☐ Definitely 0
☐ Usually 1
☐ Not often 2
☐ Not at all 3

I feel as if I am slowed down: D
☐ Nearly all the time 3
☐ Very often 2
☐ Sometimes 1
☐ Not at all 0

I get a sort of frightening feeling like “butterflies in the stomach”: A
☐ Not at all 0
☐ Occasionally 1
☐ Quite often 2
☐ Very often 3

I have lost interest in my appearance: D
☐ Definitely 3
☐ I don’t take quite as much care as I should 2
☐ I may not take quite as much care 1
☐ I take as much care as ever 0

I feel restless, as if I have to be on the move: A
☐ Very much indeed 3
☐ Quite a lot 2
☐ Not very much 1
☐ Not at all 0

I look forward with enjoyment to things: D
☐ As much as I ever did 0
☐ Rather less than I used to 1
☐ Definitely less than I used to 2
☐ Hardly at all 3

I get sudden feelings of panic: A
☐ Very often indeed 3
☐ Quite often 2

☐ Not very often	1
☐ Not at all	0

I can enjoy a good book or radio or TV programme: D

☐ Often	0
☐ Sometimes	1
☐ Not often	2
☐ Very seldom	3

Scoring

Questions relating to anxiety are indicated by an "A" while those relating to depression are shown by a "D".

- Scores of 0-7 in respective subscales are considered normal
- 8-10 borderline
- 11 or over indicating clinical "caseness"

Reference

Zigmond AS and Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand. 1983;67:361-370.

The Geriatric Depression Scale

Suitable as a screening test for depressive symptoms in the elderly. Ideal for evaluating the clinical severity of depression, and therefore monitoring treatment.

Instructions

Undertake the test orally. Obtain a clear yes or no answer. If necessary repeat the question. Cross off either yes or no for each question (depressive answers are bold/italicised). Count up 1 for each depressive answer.

Are you basically satisfied with your life? Yes
No

Have you dropped many of your activities and interests? ***Yes***
No

Do you feel happy most of the time? Yes
No

Do you prefer to stay at home rather than going out and doing new things? ***Yes***
No

If none of the above responses suggest depression, STOP HERE.

If any of the above responses suggest depression ask questions 5 – 15.

Do you feel that life is empty? ***Yes***
No

Do you often get bored? ***Yes***
No

Are you in good spirits most of the time? Yes
No

Are you afraid that something bad is going to happen to you? ***Yes***
No

Do you feel helpless? ***Yes***
No

Do you feel that you have more problems with memory than most? ***Yes***
No

Do you think it is wonderful to be alive? Yes
No

Do you feel pretty worthless the way you are now? ***Yes***
No

Do you feel full of energy? Yes
No

Do you feel that your situation is hopeless? ***Yes***
No

Do you think that most people are better off than you are? ***Yes***
No

Scoring intervals

No depression 5-10 Mild depression 11+ Severe depression

References
Evaluation of the feasibility, reliability and diagnostic value of shortened versions of the geriatric depression scale. Van-Marwijk –HW; Wallace-P; De-Bock-GH; Hermans-J; Kaptein-AA; Mulder-JD; Br-J-Gen-Pract. 1995 Apr; 45(393): 195-9
Screening for anxiety and depression in elderly medical outpatients. Neal-RM; Baldwin-RC. Age-Ageing. 1994 Nov; 23(6): 461-4

Guidelines for further rehabilitation

Any patient with residual impairment after medical investigation and treatment of stroke should be referred to an appropriate inpatient specialist rehabilitation service unless an early supported discharge service is available, or the patient is already in institutional care and a community rehabilitation service available.

Key issues that are essential to know prior to making a decision about further rehabilitation

- Type and severity of stroke and stroke related disabilities
- Progress since stroke
- Complications from stroke
- Ability to actively participate in a rehabilitation programme
- Previous level of functioning has a major impact on stroke rehabilitation
- Severity of disability
- Previous living arrangements, functioning at home, in an institution
- What does the person want / aspire to?
- What does family or their caregiver want / aspire to?

Where should rehabilitation take place?

- Home – what is home like and who lives at home?
- In hospital – is the person with stroke still dependent, requires assistance with self-cares and/ or mobility?

Younger stroke patient rehabilitation pathway

All stroke patients <65years who require further rehabilitation should initially be referred to the appropriate rehabilitation facility.

- Patients who have very poor function and who require a lot of nursing care, are doubly incontinent, have poor trunk control, require hoist transfers and posture support, have marked fatigue and significant cognitive impairments may need to be placed in a private hospital care facility (with some tailored PT/OT input). This may be an interim arrangement and, if there is good recovery over time, they could be re-referred for further assessment and possible inpatient rehab at that stage.

All older stroke patients 65 and over require further rehabilitation should initially be referred to Older Persons Health.

Exceptions to these pathways should *always* be discussed between the relevant clinicians of each service and funding responsibilities will need to be agreed. There should be clear documentation of these exceptions in the patient's notes.

Exceptions might include:

- Younger patients in 60-65 age group who have multiple co-morbidities similar to patients much older than their years

- Patients in paid employment, or wanting to be employed, irrespective of age,

- Geographic or social reasons making one unit far more suitable than the other

The key question that should be asked is "Where are this person's needs best met?" and the decision to transfer be made on that basis, rather than on other issues such as waiting times to access a service.

Discharge planning

Discharge is appropriate if appropriate secondary prevention measures have been instituted or planned, a person has achieved agreed therapy goals and no new goals are identified and, appropriate supports are in place.

Early hospital discharge (before the end of acute rehabilitation) should only be undertaken if there is a specialist stroke rehabilitation team in the community that can offer equivalent input and the patient is able to transfer safely from bed to chair. There must also be a competent carer at home.

Early hospital discharge to generic (non-specialist) community services should not be undertaken.

Decisions about discharge destination should be made in the context of support services available and the wishes of the person with stroke and carer.

Any continuing treatment required should be provided without delay by a specialist service in the community, a day hospital or outpatients.

Patients and families should be prepared and fully involved in plans for transfer.

Carers should receive all necessary equipment and training in moving and handling, in order to position and transfer the patient safely in the home environment.

Patients should be given information about The Stroke Foundation and any other appropriate community support services.

Patients should continue to have access to specialist stroke care and rehabilitation after discharge.

People with stroke and carers should be provided with a contact person for any post-discharge queries.

Any patient with reduced activity at 6 months or later after stroke should be assessed for a period of further targeted rehabilitation.

Driving after a stroke or TIA

Stroke affect may affect the ability to drive safely. In addition, driving skills may be overestimated by the person with stroke and even their spouse. The most discriminating deficits which predict poor on-road performance are;

- homonymous hemianopia (which constitutes an absolute reason for not driving)
- visuospatial and attentional deficits
- reduced speed of motor processing
- motor impairment
- a right cerebral hemisphere lesion

Guidelines

All people who have had a stroke who intend to resume driving should be assessed with regard to their ability to drive safely (C)* (recommendation from *Life After Stroke: NZ guideline for the management of stroke*. See www.nzgg.org.nz)

Evaluation of safe driving skills should include a neurological examination by a specialist physician. If there is doubt about the person's ability to drive safely, assessment by a neuropsychologist or specialist occupational therapist is required. If uncertainty still exists, an on-road test should be undertaken (C)*

All people unable to drive after a stroke should be advised on alternative means of transport and the availability of disability taxi vouchers (available through the Stroke Foundation)

The responsibilities of registered medical practitioners under the Transport Act (Vehicle and Driver Registration and Licensing) 1998 are detailed in *Medical aspects of fitness to drive: a guide for medical practitioners* (www.ltsa.govt.nz/publications/docs/ltsa-medical-aspects). The Land Transport Safety Authority (LTSA) guidelines should be adhered to

New Zealand law requires medical practitioners to:

- advise the Director of Land Transport Safety (via the Chief Medical Advisor's office) of any individual who poses a danger to public safety by continuing to drive when advised not to
- consider the guidelines in *Medical aspects of fitness to drive* (www.ltsa.govt.nz/publications/docs/ltsa-medical-aspects) when conducting a medical examination to determine whether an individual is fit to drive.

Driving guidelines summary

Private licence

Generally class 1 (private motor vehicles) or class 6 (any motorcycle)

TIA

- Single drive after a minimum of 1 month
- Multiple drive after a minimum of 3 months providing the condition has been adequately investigated and treated

Stroke

- Minimum of 1 month and only if the patient has fully recovered with no significant disabilities likely to compromise safety. This will require the patient pass a screening test of driving ability by specialist physician & therapists.
- If fails the screening tests, further assessment by a neuropsychologist or specialist occupational therapist can be performed.
- If fails this further assessment or there is doubt about the ability to drive safely, an on road test may be performed.

Vocational licence

Generally classes 2-5 (heavy commercial motor vehicles including those towing trailers)

TIA

- Single drive after a minimum of 6 months
- Multiple must cease driving. However, the Director, LTSA, may consider return to driving with supporting specialist physician report.

Stroke

- Must cease driving. However, if full recovery and no suggestion of recurrence over 3 years, the Director, LTSA, may consider return to driving with supporting specialist physician report.

Driving license revocation procedures

The following summarises the guidelines for action to be taken when a medical practitioner considers that a patient is medically unfit to drive.

The options are:

- voluntary surrender of the licence and discontinuation of driving with no questions asked.
- compulsory review by the Secretary for Transport which may lead to:
- revocation of any class(es) or all classes of licence held;
- limitations on the use of any class(es) held; and
- the right to have any revocation or limitation reviewed by the District Court.

The doctor's role is to:

- advise the person with regard to the above options, if necessary in writing; and
- advise the person that a second opinion may be obtained, if required; and
- advise the Secretary for Transport in the event that the doctor's advice to cease or limit driving is not accepted by the person, and in the opinion of the doctor, the person is likely to continue driving.

For full details see www.ltsa.govt.nz/publications/docs/ltsa-medical-aspects, pages 17−20.

Patient/carer information sheets

Ward outings: information sheet

The staff encourages you, (or your family member / friend) to leave the hospital grounds for visits / outings. It is important for staff to have some notice about pending visits so that we can ensure that the relevant issues below have been addressed.

There are some factors that you need to consider to ensure your visit is a success. Take a look through this checklist and if necessary discuss these with their primary nurse / staff member.

Are you/they medically fit to leave the ward ?

Will you/they require medication during the visit / outing ?

Are you/they aware of any continence needs ?

Can you/they mange toileting ? – including accessing the toilet and transferring on / off toilet ?

Are you/they mobilising / transferring safely with an aid – If not can the family safely help with mobility

Has consideration been made to the environment being visited e.g. access, steps, uneven ground, distances

Can the you/they get in / out of the car safely ?

Can a walking aid / wheelchair fit into / be lifted safely in / out of the car as required ?

Are you/they aware of dietary requirements / safe feeding techniques. Will you/they safely comply with these during the visit, i.e. thickened fluids, low fat, positioning while eating

Are there appropriate communication strategies in place?

Are family aware of potential behavioural risks such as impulsiveness, mood levels, confusion?

Are you/they aware of appropriate activity levels to prevent “over tiredness”?

Liaison/family meeting: information for patients and family

What is a liaison meeting and why have one?

During the first stages of an illness or an event such as a stroke, people often feel overwhelmed with everything that is going on. A liaison meeting is where the staff working with you have an opportunity to meet with you and your family. We have these meetings to help keep you, your family and friends (if applicable) informed. Liaison meetings can be held at different times and for different reasons. Some examples are;

- soon after admission to share information and/or set goals
- to discuss the “in-hospital” phase of your rehabilitation
- if medical complications arise
- near the end of your time in hospital to discuss discharge details.

Before any meeting is arranged, we will discuss the reason for having a meeting and ask your permission to arrange it and who you would like to be present.

Who will be there and what will be discussed?

Anybody who you want to have at the liaison meeting is welcome. This may include close family, friends and carers. Personal information may be discussed at the meeting and this might include continence, mood changes and your medical history. This may affect whom you wish to invite. Some members of the ward team, who have been working the most with you, will also attend.

Your progress, the current issues and plans towards getting you back home are mainly discussed. Information about the type of stroke is given to you and your family and you have the chance to ask questions. However sometimes we do not make as much progress as we (you and the staff) would like and we need to discuss this openly and honestly with you. This may involve a discussion as to whether to continue rehabilitation on the ward or not.

You may wish to write down any questions that you wish to ask in the meeting. Please feel free to ask these questions at any time.

When do we have the meeting?

It is often difficult to find a time that suits everyone within a busy family and busy ward. We work hard to do this but please let a team member know if family wish to come from outside town, or if work commitments limit availability. We will try our best to find a time that suits all concerned. It is possible for people to join us via telephone as long as we have prior warning to arrange this.

Liaison meetings take approximately half an hour

Emotional response to stroke: information sheet

Many people experience some emotional difficulties following a stroke. They may feel a natural sense of grief due to the effects of their stroke. They may also experience feelings of sadness or depression, but still be able to be cheerful at times, and feel that things are getting better. Friends and family can help by being supportive and understanding, and gently encourage and provide opportunity for social and leisure activities.

However, a percentage of people who have had a stroke may go on to become clinically depressed. The symptoms of depression include:

- A persistent sad mood
- Loss of interest or pleasure in usual activities
- Difficulty concentrating
- Feelings of guilt, worthlessness, helplessness or hopelessness about the future
- Thoughts about death or suicide
- Reduced energy, tiredness or being “slowed down”
- Problems sleeping (insomnia, early-morning waking, or oversleeping)
- Eating disturbances (loss of appetite and weight or weight gain)

If someone has one or more of these symptoms for more than two weeks, and they are causing significant distress or interfere with the person’s desire or willingness to undertake their usual activities they may be clinically depressed.

It is important not to ignore these symptoms, as there are effective treatments for depression. These treatments may also improve the person’s physical and intellectual recovery.

If you or your family is concerned that you, or someone close to you, may be clinically depressed contact your General Practitioner.

Alternatively you could contact the Stroke Service Nurse Specialist via phone: 307 4949 ext 23200 (between 8 am and 4 pm Monday to Friday) who can advise you on where you can get help from in the community.

Driving following a stroke or TIA: information sheet

Why worry?

Driving a motor vehicle requires many complex skills which may be affected by a stroke or TIA. These include:

- co-ordination
- decision-making
- vision
- concentration
- planning and organising

The rules

Following a stroke or TIA you must not drive a private motor vehicle for a minimum of one month. The Land Transport Safety Authority dictates that after this period you should not drive until you are 'fully recovered with no significant disabilities likely to compromise safety'. (Section 2.6.1 Fitness to drive).

The best way to determine your fitness to drive is to consult with your medical professional i.e. your Specialist, GP or Occupational Therapist, who can advise you when it is safe to resume driving.

If you have ongoing problems, your medical professional may refer you to a Drive Assessment Service to further assess your fitness to drive. This service is not provided by the hospital and is usually operated by an Occupational Therapist. You may ask for a list of assessors. The driving assessment is composed of:

- off road assessments
- practical assessments
- driving related interview
- on-road tests (as appropriate)

Remember

It is your responsibility to consider the safety of yourself and others when you drive a motor vehicle.

You are obliged to inform your insurance company of your stroke/TIA.

If you choose to drive against medical advice you risk being reported to the Land Transport Safety Authority and your licence will be revoked.

Stroke and legal matters: information sheet

There may be times when you would like to attend to the legal matters of your relative or friend such as:

- Setting up or changing a will
- Setting up an enduring power of attorney
- Signing authority with a bank etc.

Should this situation arise, please contact the ward staff to check with the appropriate people, such as a social worker, to see whether there might be any problems with signing legal documents.

After a stroke, there may be difficulties with language and understanding, or confusion, which may impair a person's judgement when signing legal documents.

It is essential for families, lawyers, Trust Companies etc, to check with the staff before proceeding with the setting up of a document.

We want to minimise any potential problems and avoid the situation where a document is invalid because the person lacked the capacity, or understanding, at the time it was signed.

Available through the social worker

- "Do you have enduring power of attorney? Planning your future" (Age Concern, NZ)
- "Powers of Attorney – Do the right thing – see your Lawyer first" (New Zealand Law Society)
- "Enduring Powers of Attorney. Setting out your wishes in case you need help with your affairs". (Public Trust)

Appendices

Hawke's Bay Hospital Acute stroke admission checklist - medical

Doctor Completing: Patient ID: (or Sticker)
Signature: Patient Name:
Date:

Diagnosis - stroke type? – see stroke guideline for diagnosis/classification:

	Ischemic stroke	or	**Intracerebral hemorrhage**
	TACI - Total Anterior Circulation Infarction, e.g. middle cerebral artery occlusion		Ischemic stroke with hemorrhagic transformation
	PACI - Partial ACI, branch artery occlusion		**PICH** - Primary IC Hemorrhage
	LACI - Lacunar stroke small vessel occlusion		**SAH** - Sub Arachnoid Hemorrhage
	POCI - Posterior Circulation Infarction		**Other ICH** (SDH, trauma, AVM etc)
	Unknown Subtype		

Diagnosis - likely etiology?

	Thrombo-embolic	large vessel (including extra-cranial) atherosclerosis
	Small vessel disease	small vessel atherosclerosis
	Cardio-embolic	e.g. AF, Acute MI or Valvular Heart Disease
	Hemorrhage	
	Unknown	

Investigations and **vascular risk factor assessments** – all patients

Investigations	**Done**	**N**	**Abn**	**Risk factors**	**yes**	**no**	**unk**
				Hypertension			
FBC				Diabetes			
ESR				Cholesterol			
U&Es				Smoking – Past			
Creatinine				Smoking – Current			
Glucose				Atrial Fibrillation (any)			
Fasting Lipids				Alcohol Excess (> 4-6)			

CT Brain Scan: **Requested** **Done** **Not applicable** (circle relevant)
For most patients within 24-48 hrs, unless for palliative care.
Can usually wait until next working day, unless important to exclude hemorrhage acutely.

Carotid ultrasound **Requested** **Done** **Not applicable** (circle relevant)
Note – this is a physician decision . Only consider in selected patients e.g. carotid territory strokes, good recovery, fit for surgery and life expectancy > 2-3 years

Aspirin **Awaiting CT** **Given** **Not applicable** (circle relevant)
300mg stat & 75-150mg daily if ischemic stroke. Consider rectal aspirin if NBM
Start within 24-48 hours of event but after CT scan excludes hemorrhage.

Dipyridamole **Awaiting CT** **Given** **Not applicable** (circle relevant)
150mg B.D. Only if ischemic stroke and already on aspirin or intolerant of aspirin.
Physician must complete and fax special authority (SA) approval request form. **Done**

Simvastatin Done Not appl. Contraindicated
40mg daily (20mg in frail older people) for most unless poor prognosis or contraindicated

VTE prophylaxis **Done** **Not appl.** **Contraindicated**
Consider Clexane 20-40mg SC once daily if ischemic stroke and high VTE risk; immobile, flaccid leg, past history VTE or known coagulopathy.

ACH stroke unit MDT meeting

Date of meeting ___ / ___ / ___

Date of Stroke onset ___ / ___ / ___

Unit Admission Date ___ / ___ / ___

Stroke type _____

Mechanism _____

Ongoing Medical/Nursing management

Assessments commenced

SLT	☐	OT	☐	Dietitian	☐
PT	☐	SW	☐	Diabetes Nurse	☐

Mood

Continence

Short term goals of therapy in acute setting

Rehabilitation

Rehab Plus ☐

OPH ☐

Additional comments…

NIH Stroke Scale

Lyden et al. Improved reliability of the NIH Stroke Scale using video training. Stroke 1994;25:2220-6.

Date……..

Instructions	Scale definitions	Score
1a. Level of Consciousness The Investigator must choose a response, even if a full evaluation is prevented by such obstacles as an endotracheal tube, language barrier, orotracheal trauma/bandages. A 3 is scored only if the patient makes no movement (other than reflexive posturing) in response to noxious stimulation.	0=Alert; keenly responsive. 1=Not alert, but arousable by minor stimulation to obey, answer or respond. 2=Not alert; requires repeat stimulation to attend or is obtunded and requires strong or painful stimualtion to make movements (not stereotyped). 3=Responds only with reflex motor or autonomic effects or totally unresponsive, flaccid, areflexic.	.....
1b. Level of Consciousness: Questions LOC Questions: The patient is asked the month and his/her age. The answer must be correct - there is no partial credit for being close. Aphasic and stuporous patients who do not comprehend the questions will score 2. Patients unable to speak because of endotracheal intubation, orotracheal trauma, severe dysarthria from any cause, language barrier or any other problem not secondary to aphasia are given a 1. It is important that only the initial answer be graded and that the examiner not "help" the patient with verbal or non-verbal cues.	0= Answers both questions correctly. 1= Answers one question correctly. 2= Answers neither questions correctly.	.....
1c. Level of Consciousness: Commands LOC Commands: The patient is asked to open and close the eyes and then to grip and release the non-paretic hand. Substitute another one step command if the hands cannot be used. Credit is given if an unequivocal attempt is made but not completed due to weakness. If the patient does not respond to command, the task should be demonstrated to them (pantomime) and score the result (ie, follows none, one or two commands). Patients with trauma, amputation, or other physical impediments should be given suitable onestep commands. Only the first attempt is scored.	0= Performs both tasks correctly. 1= Performs one task correctly. 2= Performs neither tasks correctly	.....

Instructions	Scale definitions	Score
2. Best gaze Only horizontal eye movements will be tested. Voluntary or reflexive (oculocephalic) eye movements will be scored but caloric testing is not done. If the patient has a conjugate deviation of the eyes that can be overcome by voluntary or reflexive activity, the score will be 1. If a patient has an isolated peripheral nerve paresis (CN, III, IV or VI) score a 1. Gaze is testable in all aphasic patients. Patients with ocular trauma, bandages, pre-existing blindness or other disorder of visual acuity or fields should be tested with reflexive movements and a choice made by the Investigator. Establishing eye contact and then moving about the patient from side to side will occasionally clarify the presence of a partial gaze palsy.	0= Normal. 1= Partial gaze palsy. This score is given when gaze is abnormal in one or both eyes, but where forced deviation or total gaze paresis are not present. 2= Forced deviation, or total gaze paresis not overcome by oculocephalic maneuver.	……..
3.Visual Visual fields (upper and lower quadrants) are tested by confrontation, using finger counting or visual threat as appropriate. Patient must be encouraged, but if they look at the side of the moving fingers appropriately, this can be scored as normal. If there is unilateral blindness or enucleation, visual fields in the remaining eye are scored. Score 1 only if a clear-cut asymmetry, including quadrantanopia is found. If patient is blind from any cause score 3. Double simultaneous stimulation is performed at this point. If there is extinction patient receives a 1 and the results are also used to answer question 11.	0= No visual loss. 1= Partial hemianopia. 2= Complete hemianopia. 3= Billateral hemianopia (blind including cortical blinding).	.....
4. Facial Palsy Ask, or use pantomime to encourage the patient to show teeth or raise eyebrows and close eyes. Score symmetry of grimace in response to noxious stimuli in the poorly responsive or non-comprehending patient. If facial trauma/bandages, orotracheal tube, tape or other physical barrier obscures the face, these should be removed to the extent possible.	0= Normal symmetrical movements. 1= Minor paralysis (flattened nasolabial fold, asymmetry on smiling). 2= Partial paralysis (total or near total paralysis of lower face). 3= Complete paralysis of one or both sides (absence of facial movement in the upper and lower face).	.....
Instructions	**Scale definitions**	Score
5. & 6. Motor Arm and Leg	0= No drift, limb holds 90 (or 45) degrees for full 10	

Each limb is tested in turn, beginning with the non-paretic arm, if known. The limb is placed in the appropriate position: extend the arm (palm down) 90 degrees (if sitting) or 45 degrees (if supine) and the leg 30 degrees (always tested supine). Drift is scored if the arm falls before 10 seconds or the leg before 5 seconds. The aphasic patient is encouraged using urgency in the voice and pantomine but not noxious stimulation. Only in the case of amputation or joint fusion at the shoulder or hip may the score be "9".	seconds. 1= Drift, limb holds 90 (or 45) degrees, but drifts down before full 10 seconds; does not hit bed or other support. 2= Some effort against gravity, limb cannot get to or maintain (if cued) 90 (or 45) degrees, drifts down to bed, but has some effort aginst gravity. 3= No effort against gravity, limb falls. 4= No movement. 9= Amputation, joint fusion **5a Left Arm** **5b Right arm**	....
	0 = No drift, leg holds 30 degree position for full 5 seconds. 1= Drift, leg falls by the end of the 5second period, but does not hit the bed. 2= Some effort against gravity, leg falls to bed by seconds, but has some effort aginst gravity. 3= No effort against gravity, leg falls to bed immediately. 4= No movement. 9= Amputation, joint fusion **6a Left leg** **6b Right Leg**	....
7. Limb Ataxia This item is aimed at finding evidence of a unilateral cerebellar lesion. Test with eyes open. In case of visual defect, insure testing is done in intact visual field. The fingernose- finger and heel-shin tests are performed on both sides, and ataxia is scored only if present out of proportion to weakness. Ataxia is absent in the patient who cannot understand or is paralyzed. Although the use of untestable is discouraged, in the case of amputation, joint fusion or some fractures, the item may be scored "9". In case of blindness, test by touching nose from extended arm position.	0 = Absent 1 = Present in one limb 2 = Present in two limbs If present, is ataxia in Right arm 0= no 1= yes 9 = amputation or joint fusion Left arm 0= no 1= yes 9 = amputation or joint fusion Right leg 0= no 1= yes 9 = amputation or joint fusion Left leg 0= no 1= yes 9 = amputation or joint fusion	....
Instructions	**Scale definitions**	Score
8. Sensory Sensation or grimace to pin prick when tested, or withdrawal from noxiousstimulus in the obtunded or	0 = Normal; no sensory loss. 1 = Mild to moderate sensory loss; patient feels pin prick is less sharp or is dull on the affected side;or there is loss	

aphasic patient. Only sensory loss attributed to stroke is scored as abnormal and the examiner should test as many body areas [arms (not hands), legs, trunk, face] as needed to accurately check for hemisensory loss. A score of 2, "severe or total" should only be given when a severe or total loss of sensation can be clearly demonstrated. Stuporous and aphasic patients will therefore probably score 1 or 0. The patient with brain stem stroke who has bilateral loss of sensation is scored 2. If the patient does not respond and is quadriplegic score 2. Patients in coma (item1a=3) are arbitrarily given a 2 on this item.	of superficial pain with pinprick but patient is aware he/she is being touched. 2= Severe to total sensory loss; patient is not aware of being touched in the face, arm and leg.	.....
9. Best language A great deal of information about comprehension will be obtained during the preceding sections of the examination. The patient is asked to describe what is happening in the attached picture, to name the items on the attached naming sheet, and to read from the attached list of sentences. Be complete. Have the patient name all items on the naming sheet and read all phrases on the two reading sheets. Comprehension is judged from responses here as well as to all of the commands in the preceding general neurological exam. If visual loss interferes with the tests, ask the patient to identify objects placed in the hand, repeat, and produce speech. The intubated patient should be asked to write. The patient in coma (question 1a=3) will arbitrarily score 3 on this item. The examiner must choose a score in the patient with stupor or limited cooperation but a score of 3 should be used only if the patient is mute and follows no one step commands.	0 = No aphasia, normal. 1 = Mild to moderate aphasia; some obvious loss of frequency or facility of comprehension, without significant limitation on ideas expressed or form of expression. Reduction of speech and/or comprehension, however, makes the conversation about provided material difficult or imposible. For example in conversation about provided materials examiner can identify picture or naming card from patient's response. 2 = Severe aphasia; all communication is through fragmentary expresion; greatneed for interference, questioning, and guessingby the listener. Range of information that can be exchanged is limited; listener carries burden of cmmunication. Examiner cannot identify materials provided from patient response. 3 = Mute global aphasia; no usable speech or auditory comprehension.	.....
Instructions	**Scale definitions**	Score
10. Dysarthria: If patient is thought to be normal an adequate sample of speech must be obtained by asking patient to read or repeat words from the attached list. If the patient has severe aphasia, the clarity of articulation of spontaneous speech can be rated. Only if the patient	0 = Normal 1 = Mild to moderate; patient slurs at least some words, at worst, can be understood with some difficulty. 2 = Severe; patient's speech is so slurred as to be unintelligible in the absence of or out of proportion to any dysphasia or is mute/anarthric. 9= Intubated or other physical barrier	.....

is intubated or has other physical barrier to producing speech, may the item be scored "9". Do not tell the patient why he/she is being tested.		
11. Extinction and innatention (formerly Neglect): Sufficient information to identify neglect may be obtained during the prior testing. If the patient has a severe visual loss preventing visual double simultaneous stimulation, and the cutaneous stimuli are normal, the score is normal. If the patient has aphasia but does appear to attend to both sides, the score is normal. The presence of visual spatial neglect of anosagnosia may also be taken as evidence of abnormality. Since the abnormality is scored only if present, the item is never untestable.	0 = No abnormality. 1 = Visual, tactile, auditory, spacial, or personal inattention or extintion to bilateral simultaneous simulation in one of the sensory modalities. 2= Profound hemi-inattention or hemi-inattention to more than one modality. Does not recognize own hand or orients to only one side of space.	.....

Total score: ……

Modified Rankin Scale

0 No symptoms at all

The patient should be unaware of any new limitation or symptom caused by the stroke, however minor.

1 No significant disability despite symptoms; able to carry out all usual duties and activities

The patient has some symptoms as a result of the stroke, whether physical or cognitive. For example may have symptoms that affect; speech, reading or writing; or physical movement; or sensation; or vision; or swallowing; or mood – but can continue to take part in all previous work, social and leisure activities. The crucial question to distinguish grade 1 from 2 (below) may be, "Is there anything that you can no longer do that you used to do until you had the stroke?" As a guide, an activity that was undertaken more frequently than monthly could be regarded as a "usual activity".

2 Slight disability; unable to carry out all previous activities but able to look after own affairs without assistance

The patient is unable to undertake some activity that was possible before the stroke (e.g. driving a car, dancing, reading or working) but is still able to look after him/herself without help from others on a day to day basis. Thus, the patient can manage dressing, moving around, feeding, toileting, preparing simple meals, shopping and travelling locally without needing assistance from anyone else. Supervision is not necessary. This grade assumes the patient could be left alone at home for periods of a week or more without concern.

3 Moderate disability; requiring some help, but able to walk without assistance

The patient is independently mobile (using a walking frame or aid if necessary) and can manage dressing, toileting, feeding etc but needs help from someone else for more complex tasks e.g. someone else may need to undertake shopping, cooking or cleaning and will need to visit the patient more often than weekly to ensure these activities are completed. The assistance can be advisory rather than physical: e.g. patients who need supervision or encouragement to cope with financial affairs are in this grade.

4 Moderately severe disability; unable to walk without assistance, and unable to attend to own bodily needs without assistance

The patient requires someone else to help with some daily tasks, whether walking, dressing, toileting or eating. This patient will be visited at least once and usually twice or more times daily, or must live in proximity to a carer. To distinguish grade 4 from 5 (below), consider whether the patient can regularly be left alone for moderate periods during the day.

5 Severe disability: bedridden, incontinent, and requiring constant nursing care and attention

Someone else will always need to be available during the day and at times during the night, though not necessarily a trained nurse.

Modified Rankin Scale: Notes

The modified Rankin scale measures functional outcome after stroke.

The official definitions of each category are shown in bold. The italicized text provides guidance that may reduce inter-observer variability, without requiring a structured interview.

Note that only symptoms arising since the stroke should be considered. Walking aids or other necessary mechanical devices are disregarded provided that the patient can use these without external assistance.

If two options appear equally valid and if further questions are considered unlikely to clarify the correct choice, then the more severe category should be selected.

References

Wilson JTL, Hareenndran A, Grant M, Baird T, Schulz UGR, Muir KW, Bone I, Improving the assessment of outcomes in stroke: Use of structured interview to assign grades on the Modified Rankin scale. Stroke 2002: 33: 2243-2246

University of Glasgow – Modified Rankin Scale Training and Certification programme V1.1

ACH acute Stroke Service assessment

Date of onset __ / __ / __ **Time** ___ : ___ : ___

Date of admission __ / __ / __ **Time** ___ : ___ : ___

Date of assessment __ / __ / __

Vascular Risk Factors

Previous TIA	Y / N	Previous Stroke	Y / N
Hypertension	Y / N	Dyslipidemia	Y / N
Past/Current Smoker	Y / N	IHD	Y / N
Valvular Heart Disease	Y / N	Recent MI	Y / N
Atrial Fibrillation	Y / N	Diabetes	Y / N
PVD	Y / N	Family Hx	Y / N

Other Medical History

Medications on admission

Aspirin	☐	Dipyridamole	☐	Warfarin	☐
Statin	☐	Antihypertensives	☐	Other	☐

Residence _____

History of presenting problem

Examination **BP**_____ **Temp**_____

Neurological Exam

Examination contd

ECG **SR** **AF**

Imaging **CT** **MRI/A** **Carotid U/S** **Echo**

Diagnosis

Ischemic stroke **ICH** **Other**

Classification **TACI** **PACI** **LACI** **POCI**

Stroke territory _____

Mechanism
Large Artery ☐ Cardioembolic ☐ Lacune ☐
Other ☐ Unknown ☐

TIA ☐

ABCD Score _____ (7 Day Stroke risk)

NIH Stroke Scale ☐ **Modified Rankin Scale** ☐

Swallow assessment required **Y / N**

Referrals required

Cardiology SLT OT
Vascular PT SW
Dietitian Kai Atawhai Palliative Care
Other….

Current Driver **Y / N** Advice given **Y / N**

Recommendations

Signed

ACH stroke risk & intervention checklist

Patient Sticker

Stroke Unit Admission date: _____

Presentation: _____

_____

_____

Visit entered in Stroke Admission book ☐

Stroke Risk Factors

- ☐ Hypertension
- ☐ Hyperlipidemia – Consider dietitian referral
- ☐ Diabetes - Consider diabetes nurse referral
- ☐ Smoking
- ☐ Atrial Fibrillation
- ☐ IHD
- ☐ Previous TIA/Stroke

- ☐ **Stroke Information Booklet**
- ☐ **Return to work information/certificate**
- ☐ **Post Stroke/TIA driving fact sheet**
- ☐ **Consent for Stroke Foundation contact** – sticker in SF book

Education video ☐ **1** ☐ **2**

Auckland Hospital Stroke Service/Oct 02

ACH stroke register

Patient demographics
including gender/ethnicity

DATE ____ / ____ / _____ TIME ___ : ___

PHYSICIAN

AB	DS
AC	O

ASSESSED BY GP

Yes	No

ADMITTING SERVICE

General Medicine	Stroke Unit	Vascular	OPH
DCCM	Neurosurgery	Other	

ADMISSION LOCATION

General Medicine	Stroke Unit	Vascular	OPH
DCCM	Neurosurgery	Other	

ONSET

Known Onset	___:___ ___ / ___ / 20 ___
Noted on Waking	___:___ ___ / ___ / 20 ___
Not Known	

ED / APU

Arrival	___:___ ___ / ___ / 20 ___
ED Assess	___:___ ___ / ___ / 20 ___
Med Assess	___:___ ___ / ___ / 20 ___

PRE-STROKE MODIFIED RANKIN SCORE

0	1	2	3	4	5

ADMISSION NIHSS

RESIDENCE

Home Alone	Home Not Alone	Rest Home	Private Hospital	Other

ADMISSION MEDICATION

Aspirin	Dipyridamole	Other Anti-thrombotic	Not Known
Warfarin	Antihypertensive	Lipid Lowering Agent	

KNOWN RISK FACTORS

Previous Stroke	Previous TIA	Not Known
Hypertension	Atrial Fibrillation	Comments
Valvular Heart Disease	IHD	
Diabetes I	Diabetes II	
Hyperlipidaemia	PVD	
Carotid Stenosis	In Hospital Stroke	
Smoking Past	Smoking Present	

CT SCAN

Yes	____ / ____ / 20___
No	____ : ____

MR SCAN

Yes	____ / ____ / 20___
No	____ : ____

FINAL DIAGNOSIS

Ischemic Stroke
Intracerebral Hemorrhage
TIA
Other

OXFORD **TOAST**

TACI	Large artery atherosclerosis
LACI	Cardioembolic
PACI	Lacune
POCI	Other cause

INVESTIGATIONS

Lipids	Glucose level	___ . ___
AF on ECG	ESR	_____
Angiography	CRP	_____
TOE	INR	___ . ___
TTE		

CAROTID US

Yes	____ / ____ / 20____
No	

DISCHARGE MEDICATION

Aspirin	Started	Continued
Dipyridamole	Started	Continued
Warfarin	Started	Continued
Antihypertensive	Started	Continued
Lipid-lowering agent	Started	Continued
Other Anti-thrombotic	Started	Continued

DISCHARGE NIHSS

DISCHARGE mRS

DISCHARGE BP

/

DISCHARGE DATE

/ / 20

DISCHARGE DESTINATION

Admission Destination	Waitakere OPH	Private Hospital
Rehab +	Other Public Health Facility	Death
Auckland OPH	Rest Home	

WAITEMATA DISTRICT HEALTH BOARD (WDHB) NEUROVASCULAR CLINIC: FIRST ASSESSMENT

Date: / /

Name of GP:

Copies of letter to (check PIMS to find current providers):

Accompanying relatives/friend?

MEDICAL

Date of stroke/TIA: / /

Previous strokes or TIAs (yes/no): (dates and comment)

CT head scan date: / /
Report:

Carotid ultrasound date & report: / /

Echocardiogram date & report: / /

CONTINUING PROBLEMS FROM STROKE/TIA

Current medications (drugs + doses):

MMSE: /30

Weight:

Height:

BMI:
(normal for age =)

RISK FACTORS AND SECONDARY PREVENTION (tick or cross out)

☐ Hx Hypertension
☐ BP (sitting) HR= BP(standing) HR:
☐ Atrial Fibrillation Yes/no ☐ On Warfarin
☐ Hx IHD ☐ Hx Valvular heart disease
☐ Current smoker ☐ Ex smoker (months/years)
☐ On low dose aspirin
☐ Dyslipidemia ☐ On statin ☐ Last cholesterol date:
☐ Diabetes ☐ Suboptimal exercise
☐ Diet Optimal / sub-optimal (see below)

Other risk factors:

CO-MORBIDITY

ADVICE ON DIET (Cross out is does not apply)

Referred to dietitian? Advice on Alcohol? General dietary advice

Comments:

QUALITY OF LIFE ISSUES

Stroke Impact Scales review summary:

Driving (yes / No):

OTHER NOTES

NIH Stroke scale (refer to full guide sheet)

1.a Level consciousness
0 Alert
1 Requires stimulation to attend
2 requires repeated stimulation
3 Coma

1.b.Ask patient month and age
0 Both correct
1 one correct
2 Both incorrect

1.c. Ask "open and close eyes"
0 Obeys both correctly
1 Obeys one correctly
2 Both incorrect

2. Best gaze (only horizontal eye movement)
0 Normal
1 Partial gaze palsy
2 Forced deviation

3. Visual fields
0 No visual field loss
1 Partial hemianopia
2 Complete hemianopia
3 Bilateral hemianopia (blind incl. cortical blindness)

Modified Rankin Scale (refer guide)
0 No Symptoms
1 No significant disability
2 Slight disability
3 Moderate disability
4 Moderately severe
5 Severe
6 Dead

4. Facial paresis
0 Normal
1 Minor paralysis
2 Partial paralysis
3 complete paralysis

5. Motor function – Arm (R & L)
(extends arms 90 (or 45) degrees for 10 seconds without drift)
0 Normal
1 Drift
2 Some effort against gravity
3 No effort against gravity
4 No movement
5 Untestable (joint fused etc)

6. Motor function Leg (R & L)
(hold leg 30 degrees position for 5 secs)
0 Normal
1 Drift
2 Some effort against gravity
3 No movement
4 Untestable

7. Limb ataxia
0 No ataxia
1 Present in one limb
2 Present in two limbs

Hemiplegic Shoulder assessment
No Pain
Pain pre-stroke
Some pain on passive movement
Moderate to severe pain
Shoulder – hand syndrome

Balance
Normal
Mildly impaired
Needs assistance
Poor

8. Sensory (Use pinprick arms, legs, trunk, face – compare side to side)
0 Normal
1 Mild to moderate decrease
2 Severe to total sensory loss

9. Best language
0 No aphasia
1 Mild to moderate aphasia
2 Severe aphasia
3 Mute

10.Dysarthria
0 Normal articulation
1 Mild to moderate slurring
2 Near intelligible or unable to speak
9 Intubated or other physical barrier
11.

11. Extinction and inattention
0 Normal
1 Inattention or extinction to bilateral simultaneous stimulation of the sensory modalities
2 severe hemi-inattention to more than one modality

NIHSS score:

Continence
Continent
Infrequent problem
Frequent problem
Requires IDC (risk to skin)
Problems prior to stroke

Other clinical Findings :

Impressions:

Personal and environmental issues

ADLS	INDEPEN	ASSIST	DEPEND		INDEPEND	ASSIST	DEPEND
PERSONAL				HOUSEWORK			
HYGIENE				LAUNDRY			
DRESSING				SHOPPING			
BATHING				GARDENING			
TOILET				COOKING			
EATING/FEED							

Accommodation		Lives with		Home Access		Bathroom		Toilet		Cooking/ Storage	
Own house	A	Alone	A	Level	A	Bath	A	Raised	A	Range	A
Rental	B	Partner	B	Few steps	B	Shower	B	Seat	B	Microwave	B
Relatives	C	Family	C	Many steps	C	Bath board	C	Commode	C	Top plate	C
Other	d	Friends	D	Ramp	D	Rails	D	Rails	D	Fridge	D
				Internal stairs	E	Stool	E	Separate	E	Freezer	E

RESOURCES INVOLVED (tick if current, add note if need to be referred)

☐ **Stroke Foundation referral (Field Officer visit, half price taxi vouchers etc)**

☐ **Pamphlets** ☐ **LAS book** ☐ **videos** ☐ **diary** ☐ **other:**

☐ **GP F/U**

☐ **Community PT** ☐ **Community OT** ☐ **Com SLT** ☐ **NASC**

☐ **Neurovascular / Stroke clinic follow up _____months**

☐ **Other:**

ASSESSED BY: **DATE:**

(Please send copies of clinic letter to all clinicians actively involved.)