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Supporting Information

Supplementary table

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Appendix to: English C, Hill K, Cadilhac DA, et al. Living clinical guidelines for stroke: updates, challenges and opportunities. *Med J Aust* 2022; doi: 10.5694/mja2.51520.

Summary of all new and updated recommendations

Problem / clinical issue	Specific recommendations	New or updated Change in GRADE	Summary of change
Chapter 1 – Pre-hospital care			
	Regular stroke education may improve patient identification by clinicians.	New Practice point	Practice point in response to new studies[1,2]
Chapter 3 – Acute Medical and Surgical Management			
Thrombolysis	For patients with potentially disabling ischaemic stroke without large vessel occlusion who meet specific clinical and brain imaging eligibility criteria, tenecteplase may be used as an alternative to alteplase within 4.5 hours of onset.	New Weak recommendation for	Alternative antithrombotic drug (tecnecteplase) may be used where imaging findings suggest benefit
	For patients with potentially disabling ischaemic stroke who meet perfusion mismatch criteria in addition to standard clinical criteria, intravenous alteplase (dose of 0.9 mg/kg, maximum of 90 mg) should be administered up to 9 hours after the time the patient was last known to be well, or from the midpoint of sleep for patients who wake with stroke symptoms, unless immediate endovascular thrombectomy is planned.	New **Strong recommendation for**	Extends the time window recommended for thrombolysis treatment up to 9 hours after time of stroke where imaging findings suggest benefit
	For patients with potentially disabling ischaemic stroke of unknown onset time who meet MRI FLAIR-diffusion mismatch criteria in addition to standard clinical criteria, intravenous alteplase (dose of 0.9 mg/kg, maximum of 90 mg) may be administered	New Weak recommendation for	New evidence[3] for the safety and benefit of thrombolysis treatment when the time of stroke is unknown and where imaging findings suggest benefit
	For patients with potentially disabling ischaemic stroke due to large vessel occlusion who meet specific eligibility criteria, intravenous tenecteplase (0.25mg/kg, maximum of 25mg) or alteplase (0.9mg/kg, maximum of 90mg) should be administered up to 4.5 hours after the time the patient was last known to be well.	New **Strong recommendation for**	Addition of a new recommended antithrombotic agent (tenecteplase) in patients with large vessel occlusion

	For patients with potentially disabling ischaemic stroke without large vessel occlusion who meet specific clinical and brain imaging eligibility criteria, tenecteplase may be used as an alternative to alteplase within 4.5 hours of onset.	New Weak recommendation for	Addition of a new recommended antithrombotic agent (tenecteplase) in patients without large vessel occlusion
Neurointervention	For patients with ischaemic stroke caused by a large vessel occlusion in the internal carotid artery, proximal middle cerebral artery (M1 segment), or with tandem occlusion of both the cervical carotid and intracranial large arteries, endovascular thrombectomy should be undertaken when the procedure can be commenced between 6-24 hours after they were last known to be well if clinical and CT perfusion or MRI features indicate the presence of salvageable brain tissue.	New **Strong recommendation for**	Extends the time window for endovascular clot retrieval out to 24 hours, in specific circumstances.
Acute anti-thrombotic therapy	Aspirin plus clopidogrel should be commenced within 24 hours and used in the short term (first 3 weeks) in patients with minor ischaemic stroke or high-risk TIA to prevent stroke recurrence.	New **Strong recommendation for**	New evidence[4] of benefit of dual antiplatelet therapy to prevent secondary stroke
	Aspirin plus ticagrelor commenced within 24 hours may be used in the short term (first 30 days) in patients with minor ischaemic stroke or high-risk TIA to prevent stroke recurrence.	New Weak recommendation for	New evidence[5] of benefit for aspirin to prevent secondary stroke
	Acute antiplatelet therapy should not be given within 24 hours of thrombolysis administration with the exception of patients who require stent implantation as part of acute stroke therapy.	Updated No change in recommendation strength	Additional information related to exceptions provided.
Oxygen therapy	For acute stroke and Transient Ischaemic Attack (TIA) patients who have SpO2 >92% on room air, the routine use of supplemental oxygen is not recommended.	Updated No change in recommendation strength	More specific threshold target for the use of supplemental oxygen
	If supplemental oxygen is required (SpO2 <93% on room air) a target oxygen saturation of 94-96% is reasonable, or 88-92% if the patient is at risk of hypercapnic respiratory failure.	Updated No change in recommendation strength	More specific threshold target for the use of supplemental oxygen
Acute telehealth services	In hospitals without onsite 24/7 stroke medical specialist availability, telestroke systems should be used to assist in patient assessment and decision making regarding acute thrombolytic therapy and possible transfer for endovascular therapy. This system should include the ability for stroke medical specialists to access remote brain imaging scans and preferably include the use of videoconferencing facilities or, if not possible, ensure the diagnosis and management discussions between local clinicians/family/patient occurs via a telephone consultation.	New **Strong recommendation for**	This recommendation aims to ensure all Australians have access to best practice acute therapies after stroke, regardless of where they live.

Head position	Patients with acute stroke, while in bed and not receiving nasogastric feeding, may be managed in any position during the first 24 hours after hospital admission.	New Weak recommendation for	Clinical equipoise existed, based on trials investigating the effect of lying flat versus elevated head positions after stroke. Trial outcomes have been equivocal.
Chapter 4 – Secondary prevention			
Antiplatelet therapy	In patients with spontaneous (or primary) intracerebral haemorrhage who were previously prescribed antithrombotic therapy for secondary prevention of cardiovascular and/or cerebrovascular disease, restarting antiplatelet therapy after the acute phase may be considered, although the optimal timing is undetermined (see practical information in the living guidelines).	New Weak recommendation for	New trial evidence[6] showing no harm from restarting antiplatelet therapy after intracerebral haemorrhage.
Cholesterol lowering therapy	In patients with ischaemic stroke, cholesterol lowering therapy should target LDL cholesterol < 1.8 mmol/L for secondary prevention of atherosclerotic cardiovascular disease.	New **Strong recommendation for**	New trial evidence[7]showing more aggressive lowering of low-density lipoprotein levels reduced recurrent cardiovascular events.
Patent foramen ovale management	In patients with ischaemic stroke aged <60 in whom a patent foramen ovale is considered the likely cause of stroke after thorough exclusion of other aetiologies, percutaneous closure of the PFO is recommended.	Updated Strength of recommendation upgraded. **Now strong recommendation for**	Two new trials, long term follow-up of a previous trial and a new meta-analysis[8] have confirmed the benefits of PFO closure where it is considered the likely cause of stroke.
Management of atrial fibrillation	For patients with ischaemic stroke due to atrial fibrillation and a genuine contraindication to long-term anticoagulation, percutaneous left atrial appendage occlusion may be a reasonable treatment to reduce recurrent stroke risk.	New Weak recommendation for	This was previously a practice point, but new evidence from a single trial[9] showed benefit in a select group of people after stroke.

Lifestyle modifications	Interventions addressing secondary stroke risk factors may be used for all people with stroke and TIA. Such interventions should include multiple components including individual (support and counselling) and organisational approaches (regular reviews by relevant health care professionals) and include exercise training as a component.	New Weak recommendation for	Previously the Guidelines have referred to general Australian guidelines for management of lifestyle risk factors, including physical activity and diet. There is now sufficient evidence, albeit from small trials, about the efficacy of non-pharmacological secondary prevention services to reduce stroke risk factors.
	All patients with stroke or TIA should be supported to follow a Mediterranean or similar style diet (high intake of plant-based foods such as fruit, vegetables, whole grain cereals, legumes and nuts, moderate intake of low-fat dairy products, and low intake of processed and red meat and sugary foods, as well as olive oil as the main added dietary fat) to reduce the risk of recurrent stroke.	Update Consensus based recommendation (from previous practice point)	A recent review[10] found moderate strength evidence for the efficacy of Mediterranean-style diets to reduce recurrent stroke risk factors.
Chapter 5 - Rehabilitation			
Weakness	For stroke survivors with reduced strength in their arms or legs, progressive resistance training should be provided to improve strength.	Updated **Strong recommendation for**	Based on new systematic review,[11] there is now sufficient evidence to specify the type of strength training that is most efficacious.
	For stroke survivors with arm weakness, repetitive practice using assistive technology, constraint induced movement therapy (CIMT), and robotics may be used to improve arm strength. For stroke survivors with leg weakness, task specific training, repetitive practice using cycling, or electrical stimulation may be used to improve leg strength.	New Weak recommendation for	Based on new systematic review,[12] additional specific intervention types may improve strength. Divided into recommendations for arm strengthening and leg strengthening.
Standing	For stroke survivors who have difficulty with standing, activities that challenge balance should be provided.	Updated No change in recommendation strength	Recommendation simplified and greater specificity on the types of activities needed.

	For stroke survivors who have difficulty with standing, one or more of the following interventions may be used in addition to practising tasks that challenge balance: • Virtual reality training, which may include treadmill training, motion capture or force sensing devices (e.g. Wii Balance Boards) • Visual or auditory feedback e.g. force platform biofeedback • Electromechanically assisted gait or standing training	Updated No change in recommendation strength	Recommendation simplified and greater specificity on the types of activities needed.
Arm activity	Virtual reality and interactive games may be used to improve upper limb function.	Updated No change in recommendation strength	Updated evidence[13] leading to removing previous criteria related to timing and amount of intervention
Activities of Daily Living	Acupuncture is not routinely recommended to improve activities of daily living.	Updated Strength of recommendation upgraded. Now weak recommendation against (from strong against)	A review of low-quality trials[14] suggested acupuncture may improve activities of daily living. This means we are more uncertain that acupuncture is not efficacious.
	Selective serotonin reuptake inhibitors should not be used to reduce disability.	Updated Strength of recommendation changed direction. **Now weak recommendation against**	Updated meta-analysis including two new large trials[15] show no benefit and some harm associated with fluoxetine use to reduce disability.
Telerehabilitation	Telehealth services may be used as an alternative approach to delivering rehabilitation, especially for patients who cannot access specialist rehabilitation in the community. It may also be used as an adjunct to in-person therapy. Delivering of specific interventions via telehealth should only be considered for those that have demonstrated benefits.	New Weak recommendation for	The COVID-19 pandemic led to an uptake in the use of telehealth for rehabilitation services. This along with new evidence[16] necessitated a specific recommendation to guide clinical decision making.
Memory	For stroke survivors with memory deficits, cognitive rehabilitation may be used to improve memory function in the short term. Memory rehabilitation strategies may include internal (mental) strategies (e.g. association, mental rehearsal, rhymes) and external compensatory aids (e.g. notebooks, diaries, calendars, alarms, audio recordings, photos, mobile phones).	Updated Now weak recommendation for (from consensus-based recommendation)	New, small trials[17,18] suggest specific types of memory training can be efficacious in the short term.

Chapter 6 – Managing complications			
Shoulder pain	For stroke survivors with shoulder pain, electrical stimulation may be used to manage pain.	Updated Recommendation changed direction. Now weak recommendation for	An updated systematic review[19] including new trial evidence suggests electrical stimulation may reduce shoulder pain.
	For stroke survivors with shoulder pain, acupuncture in addition to comprehensive rehabilitation may be used to reduce pain.	New Weak recommendation	Updated systematic review [20] suggesting acupuncture may reduce pain.
Contracture	For stroke survivors at risk of developing contracture who are receiving comprehensive, active therapy the routine use of splints or stretch of the arm or leg muscles is not recommended.	Updated No change in recommendation strength	Minor change to wording and updated systematic review [21]
Fatigue	Stroke survivors and their families/carers should be provided with information, and education and strategies to assist in managing about fatigue. While there is insufficient evidence to guide practice, possible interventions could include cognitive behavioural therapy (focusing on fatigue and sleep with advice on regular exercise), exercise and improving sleep hygiene.	Updated No change in recommendation strength	Minor wording changes and a mention of cognitive behavioural therapy as a possible intervention.
Swelling of the extremities	For stroke survivors with severe weakness who are at risk of developing swelling of the extremities, management may include the following: • passive mobilisation; • elevation of the limb when resting.	Updated No change in recommendation strength	Recommendation updated based on new evidence.[22] Passive mobilisation added, electrical stimulation and dynamic pressure garments removed.
	For stroke survivors who developed swelling of the hands or feet, management may include the following: • passive mobilisation; • elevation of the limb when resting.		Recommendation updated based on new evidence.[22] Passive mobilisation added, electrical stimulation and dynamic pressure garments removed.

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