

STANDARD OPERATING PROCEDURE

ISCHEMIC STROKE

Diagnosis and Management

Special Region (1)

UNION OF MYANMAR

Version 1.0

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Approved by: Internal Medicine Unit

1. Purpose

To provide standardized guidance for diagnosis, acute management, antiplatelet therapy, rehabilitation, and secondary prevention of ischemic stroke.

2. Definition

Ischemic stroke is an acute focal neurological deficit caused by cerebral infarction due to arterial occlusion without intracranial hemorrhage.

3. Initial Assessment

- ABC stabilization
- Capillary blood glucose
- NIHSS scoring
- Establish Last Known Well
- Urgent CT brain
- Baseline labs
- ECG

4. Reperfusion Therapy

4.1 IV Thrombolysis

4.1.1 Criteria to Proceed IVT

- Age ≥ 16 years
- **Symptom onset < 4.5 hours** and disabling stroke symptoms
- **NIHSS usually ≥ 1** with disabling deficits or imaging evidence of infarction
- CT/MRI excludes **intracranial haemorrhage** and large established infarct (no massive early signs / ASPECTS favourable)

4.1.2 Contraindications for IVT

Absolute contraindications:

- Active intracranial haemorrhage on imaging
- Platelet count $< 100 \times 10^9/L$ (relative in some care systems)
- Current anticoagulant therapy with INR > 1.7
- Recent intracranial surgery or significant head trauma

Relative / expert-consensus contraindications:

- Major surgery at non-compressible site within 14 days
- Recent gastrointestinal bleeding
- Uncontrolled severe hypertension (must be lowered $< 185/110$ mmHg before IVT)

4.1.3 Thrombolytic Agents & Dosing

1) Alteplase (rtPA)

Dose & Administration:

- 0.9 mg/kg IV (maximum 90 mg total) infused over 60 minutes
- 10% of total dose given as IV bolus over 1 minute, then the remainder over 60 minutes

Time Window:

- Best benefit if given within 4.5 hours of symptom onset

Key Notes:

- Do NOT give alteplase if haemorrhage is present

- Maintain BP < 185/110 mmHg prior to and during infusion
- Repeat CT after 24 hours before starting antithrombotic

2) Tenecteplase (TNK-tPA)

Dose & Administration:

- 0.25 mg/kg IV bolus, single dose (max 25 mg) over ~5–10 seconds

Rationale:

- Tenecteplase has greater fibrin specificity and longer half-life compared with alteplase
- Evidence shows similar or superior functional outcomes with TNK 0.25 mg/kg versus alteplase when used within 4.5 hours

Time Window:

- Within 4.5 hours of symptom onset is recommended

4.2 Mechanical Thrombectomy

Large vessel occlusion within 6 hours (up to 24 hours in selected cases).

5. Blood Pressure Management

Table 1 Blood Pressure Targets by Clinical Scenario

Scenario	Target
Thrombolysis candidate	< 185/110 mmHg before IVT
No thrombolysis (first 48 hours)	If BP ≥ 220/120, reduce ≤ 15% in first 24 hours
After 48 hours	Gradual target < 140/90 mmHg

6. Antiplatelet Therapy

Start antiplatelets only after hemorrhage excluded. If IVT given, start after 24-hour CT confirms no bleed.

6.1 Dual Antiplatelet Therapy (DAPT)

For those who have not received IVT and are eligible for DAPT.

Eligibility Criteria

- Minor ischemic stroke
- NIHSS ≤ 5
- Non-cardioembolic stroke
- Initiated within 24 hours
- No high bleeding risk

DAPT Options

Option A: Ticagrelor 180 mg loading, then 90 mg twice daily + Aspirin 75–100 mg daily

Option B: Clopidogrel 300 mg loading, then 75 mg daily + Aspirin 75–100 mg daily

DAPT Duration: 21 days only

Transition After 21 Days of DAPT

Switch to single antiplatelet therapy:

- Ticagrelor 90 mg BD
- Clopidogrel 75 mg daily
- Aspirin 75–100 mg daily

6.2 Single Antiplatelet Therapy

For those who have not received IVT and are not eligible for DAPT.

Start Aspirin 150–300 mg daily for 14 days. After 14 days, switch to single antiplatelet therapy as a lifelong treatment (Ticagrelor, Clopidogrel, or Aspirin).

7. Statin Therapy

Start after 48 hours when stable and swallowing safe.

High-intensity therapy: Atorvastatin 40–80 mg daily OR Rosuvastatin 20–40 mg daily.

8. Anticoagulation

Anticoagulation is **NOT routinely started immediately** in all acute ischemic strokes. It is indicated **only when a cardioembolic or specific thrombotic cause is identified**. It is mostly due to atrial fibrillation.

Table 2 Timing of Anticoagulation Initiation by Stroke Severity

Stroke Severity	NIHSS Range	Suggested Start of Anticoagulation
TIA	0 (no infarct on imaging)	Day 1
Mild stroke	NIHSS 1–4	Day 3
Moderate stroke	NIHSS 5–15	Day 6
Severe stroke	NIHSS > 15	Day 12–14

Mnemonic: 1–3–6–12 rule

Drug Choice

- DOAC preferred (apixaban, rivaroxaban, dabigatran, edoxaban)
- Warfarin if mechanical valve or significant valvular stenosis or regurgitation

9. General Management

9.1 Airway & Positioning

- Head elevation 30°
- Lateral position if high aspiration risk
- Frequent suctioning if secretions
- Oral hygiene 2–4 times daily

9.2 Bladder Care

Avoid unnecessary catheterization.

Indications for Foley catheter:

- Urinary retention
- Strict fluid monitoring
- Incontinence causing skin breakdown

Prevention:

- Remove catheter early (within 48–72 hours if possible)
- Monitor for UTI

9.3 Bowel Care

Prevention of Constipation:

- Start bowel chart
- Ensure adequate hydration
- Stool softener (e.g., lactulose) if no bowel motion > 48 hours
- Avoid faecal impaction

If Constipated:

- Glycerin suppository
- Enema if needed

Constipation increases ICP and aspiration risk during straining.

9.4 Skin Care & Pressure Ulcer Prevention

High risk due to immobility.

Prevention Protocol:

- Reposition every 2 hours
- Use pressure-relief mattress
- Keep skin clean and dry
- Inspect sacrum, heels, occiput daily

Nutrition:

- Ensure adequate protein intake
- Early enteral feeding

9.5 Nutrition

- Keep NPO until swallow assessment
- NG feeding if impaired consciousness
- Calculate caloric needs
- Monitor electrolytes

9.6 DVT Prevention

- Intermittent pneumatic compression
- Early mobilization when safe

9.7 Temperature Control

- Treat fever promptly
- Paracetamol
- Investigate infection

9.8 Eye Care

- Lubricating eye drops if reduced blink reflex
- Tape eyelids closed if incomplete closure

Prevents corneal ulceration.

9.9 Secretion & Pulmonary Care

- Chest physiotherapy
- Frequent repositioning
- Suctioning as needed

9.10 Contracture Prevention

- Passive limb range-of-motion exercises daily
- Splints if needed

9.11 Family Communication

- Explain prognosis
- Discuss goals of care if severe stroke

10. Dysphagia Management

Neurogenic dysphagia in acute ischemic stroke is impaired swallowing due to cortical, brainstem, or subcortical lesions affecting the swallowing cortex, corticobulbar tracts, and brainstem swallowing centres (medulla). It occurs in 40–60% of all acute ischemic strokes.

Clinical features: Coughing during swallowing, drooling, and difficulty handling saliva.

All acute ischemic stroke patients must undergo bedside swallow screening **BEFORE** oral intake.

If Screening Fails

- Keep patient **Nil Per Oral (NPO)**
- Insert **Nasogastric (NG) tube**
- Refer to speech and swallow therapist

Table 3 Outlook of Dysphagia Recovery

Timeframe	Recovery Rate
First 7 days	~50% improve
2 weeks	~60–70% recover swallow
1 month	Majority recover
> 3 months	Persistent dysphagia in 10–15%

If persistent dysphagia, video fluoroscopic swallow study (VFSS) or fiberoptic endoscopic evaluation of swallowing (FEES) are considered for confirmatory assessment.

Nutritional Support for Patients with Dysphagia

Short-Term (first 2–3 weeks): NG feeding preferred

Long-Term (> 3–4 weeks): Consider PEG tube

Evidence suggests waiting at least 2–3 weeks before PEG unless clearly severe.

Behavioural & Compensatory Interventions

First-line therapies that should be provided by speech and swallow therapists.

A. Postural Techniques

- Chin tuck
- Head turn toward weak side

- Upright sitting during meals

B. Diet Modification

- Thickened liquids
- Pureed or soft diet
- Avoid thin liquids if aspiration risk

C. Feeding Strategies

- Small bolus size
- Slow feeding
- Supervised feeding

Rehabilitative Swallow Therapy

Meant to restore swallowing function.

A. Swallow Exercises

Effortful swallow, Mendelsohn manoeuvre, supraglottic swallow

B. Oral Motor Exercises

Tongue strengthening and lip closure training

C. Neuromuscular Electrical Stimulation

11. Rehabilitation

- Early mobilization within 24–48 hours if stable
- Refer to physiatrist within 48–72 hours

12. Secondary Prevention

- BP control < 140/90
- High-intensity statin
- Long-term single antiplatelet
- Anticoagulation if AF
- Lifestyle modification

13. Mortality and Functional Recovery

13.1 Mortality

30-Day Mortality for Ischemic Stroke

Table 4 30-Day Mortality by Stroke Category

Stroke Category			30-Day Mortality (%)	Comments
All ischemic strokes (overall)			10–15%	Global pooled estimate ~13%
Mild (NIHSS ≤ 5)			1–5%	Very low early mortality
Moderate (NIHSS 6–15)			5–15%	Depends on age/comorbidities
Severe (NIHSS > 15)			20–40%	Strongly severity dependent
Malignant MCA infarction			40–80% (without surgery)	Decompressive surgery reduces mortality to ~20–30%
Basilar	artery	occlusion	70–90%	Highest mortality subtype
(untreated)				
Large	Vessel	Occlusion	30–50%	Lower with thrombectomy
(untreated)				
Thrombectomy-treated LVO			15–25%	Significant survival benefit

1-Year Mortality for Ischemic Stroke

Table 5 1-Year Mortality by Stroke Category

Stroke Category		1-Year Mortality (%)	Comments
All ischemic strokes		20–25%	Increases with age
Mild stroke		5–10%	Usually good prognosis
Moderate stroke		15–25%	Functional dependence contributes
Severe stroke		30–50%	Especially large hemispheric infarcts
Age > 85 years		30–40%+	Age strongest predictor

13.2 Functional Recovery

Table 6 Functional Independence at 90 Days

Severity	Functional Independence (90 days)
Mild (NIHSS ≤ 5)	70–85%
Moderate (6–15)	40–60%
Severe (> 15)	10–30%
With thrombectomy (selected LVO)	~45–50%

14. Follow-Up Checklist

- mRS or NIHSS assessment
- BP management if hypertension
- Review antiplatelet/anticoagulation
- Optimize serum lipid: LDL target
- Optimize diabetes control if DM+
- Joint care with rehab team
- Screen depression
- Assess swallowing

14.1 Modified Rankin Scale

Table 7 Modified Rankin Scale (mRS) Scoring

Score	Description	Clinical Interpretation
0	No symptoms	Completely asymptomatic
1	No significant disability despite symptoms	Able to carry out all usual activities
2	Slight disability	Unable to perform all previous activities but able to look after own affairs without assistance
3	Moderate disability	Requires some help but able to walk without assistance
4	Moderately severe disability	Unable to walk without assistance and unable to attend to bodily needs without help
5	Severe disability	Bedridden, incontinent, requires constant nursing care
6	Death	—

14.2 Post-Stroke Depression Screening

Post-stroke depression occurs in 25–35% of patients. Routine screening is recommended at follow-up.

PHQ-9 (Patient Health Questionnaire-9)

Ask patient: *"Over the last 2 weeks, how often have you been bothered by the following problems?"*

Table 8 PHQ-9 Questionnaire

Question	Not at all (0)	Several days (1)	> Half the days (2)	Nearly every day (3)
Little interest or pleasure in doing things				
Feeling down, depressed, or hopeless				
Trouble sleeping				
Feeling tired or low energy				
Poor appetite or overeating				
Feeling bad about yourself				
Trouble concentrating				
Moving or speaking slowly or being restless				
Thoughts of self-harm				

PHQ-9 Scoring

Table 9 PHQ-9 Score Interpretation

Total Score	Severity
0–4	Minimal
5–9	Mild
10–14	Moderate
15–19	Moderately severe
20–27	Severe

Action Threshold:

- **Score ≥ 10** → Treat or refer
- Any positive answer to Question 9 → Immediate psychiatric evaluation

15. References

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