Hyperacute Essential Stroke Care Checklist

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This guideline is tailored for healthcare professionals in the in-hospital stroke patient care at both essential and advanced stroke centers. The format of this guideline prioritizes actionable, evidence-based recommendations. Hospitals aiming to implement this checklist must meet specific prerequisites, including access to a CT scan, laboratory facilities, a well-equipped Emergency Department, an ICU, the potential for acute thrombolytic therapy and endovascular treatment and a demonstrated proficiency in stroke care. For healthcare facilities with a lower level of stroke care, immediate transfer of suspected stroke patients to the nearest stroke-ready hospital is recommended.

Patient name: **Patient Date of birth:**

Date of presentation: **Time of presentation:**

A – General measures in hyperacute stroke care

- Suspected stroke / pre-notified stroke: Activate stroke code or inform stroke team if possible / when available (neurologist, emergency physician, radiologist, nurse)
- Perform brain imaging without delay upon hospital arrival!
- Perform the following tasks in parallel by physicians and nurses according to a fixed protocol:

Airway and breathing:

- Measure oxygen saturation:
- Provide supplemental oxygen to maintain saturation >94%.
- Tracheal intubation (with ICU team consultation if/when needed) is indicated for a compromised airway (reduced level of consciousness? GCS ≤8?) or insufficient ventilation (respiratory rate ≤ 6/minute?)

Circulation:

- Measure blood pressure:
- Correct hypotension and hypovolemia with crystalloid infusion.
- Treat hypertension when required by comorbidities.
    - In patients with hypertension >220/120mmHg, it's reasonable to lower BP by 15% during the first 24 hours after stroke onset.
    - Lower BP in patients who are eligible for thrombolysis or thrombectomy to <185/110 before the procedure.

Lab diagnostics:

- Establish IV access (2 large bore cannulas)
- Check blood glucose: _____
    - Treat hypoglycemia (<60mg/dl or 3.3mmol/L) with IV dextrose.
    - Treat hyperglycemia with a target of 140-180mg/dl (avoid hypoglycemia)

Neurological examination:

- Do a focused examination using a stroke severity scale (NIHSS): _____/42.

1a. Level of Consciousness (LOC) Instructions:	0 = Alert; keenly responsive. 1 = Not alert; but arousable by minor stimulation 2 = Not alert; requires repeated stimulation to attend, 3 = Responds only with reflex motor or autonomic effects or totally unresponsive, flaccid, and areflexic.		
1b. LOC Questions:	0 = Answers both questions correctly. 1 = Answers one question correctly. 2 = Answers neither question correctly.		
1c. LOC Commands:	0 = Performs both tasks correctly. 1 = Performs one task correctly. 2 = Performs neither task correctly.		
2. Best Gaze:	0 = Normal. 1 = Partial gaze palsy. 2 = Forced deviation.		
3. Visual Fields:	0 = No visual loss. 1 = Partial hemianopia. 2 = Complete hemianopia. 3 = Bilateral hemianopia.		
4. Facial Palsy:	0 = Normal symmetrical movements. 1 = Minor paralysis. 2 = Partial paralysis. 3 = Complete paralysis of one or both sides.		
5. Motor Arm: **5a. Left Arm** **5b. Right Arm**	0 = No drift. 1 = Drift. 2 = Some effort against gravity. 3 = No effort against gravity; limb falls. 4 = No movement.		
6. Motor Leg: **6a. Left Leg** **6b. Right Leg**	0 = No drift. 1 = Drift. 2 = Some effort against gravity. 3 = No effort against gravity; limb falls. 4 = No movement.		
7. Limb Ataxia:	0 = Absent. 1 = Present in one limb. 2 = Present in two limbs.		
8. Sensory:	0 = Normal. 1 = Mild-to-moderate sensory loss. 2 = Severe to total sensory loss.		
9. Best Language:	0 = No aphasia; normal. 1 = Mild-to-moderate aphasia. 2 = Severe aphasia. 3 = Mute, global aphasia.		
10. Dysarthria:	0 = Normal. 1 = Mild-to-moderate dysarthria. 2 = Severe dysarthria.		
11. Extinction and Inattention:	0 = No abnormality. 1 = Visual, tactile, auditory, spatial, or personal inattention. 2 = Profound hemi-inattention or extinction to more than one modality.		

History - Obtain information about:

- Symptom onset / time last seen well:
- Current medication (if any):
  - Anticoagulants: last time of drug intake:
- Absolute contraindications for thrombolytics:
- Premorbid modified Rankin- Scale: /6.

Consider Doing:

- Delay nasogastric tube and bladder catheter, if the patient can be safely managed without.
- Obtain other blood tests (CBC, electrolytes, creatinine, INR, pTT, troponin when indicated) but do not delay the initiation of reperfusion therapy.
- Do ECG but do not delay initiation of reperfusion therapy.

DON'T DO:

- Blood pressure lowering in patients with ischaemic stroke and not receiving reperfusion therapy unless blood pressure is very high (>220/120 mmHg) or blood pressure lowering is indicated for other reasons.
- Systolic blood pressure should not be reduced more than 90 mmHg in acute ICH to prevent kidney injury.
- Do not use antiepileptic drugs for primary prevention of seizures.

B - Imaging and recanalization for acute ischemic stroke

ACUTE IMAGING AND RECANALIZATION ALGORITHM

Time since onset 0 – 4.5h
(known time window)

Plain CT for IVT:
- Exclude bleeding
→ Thrombolysis (NINDS & ECASS 3)

Time since onset 4.5-9h
(known time window)

Penumbral imaging for IVT
CT and CT Perfusion OR
MRI&MR-Perfusion
→ IVT is indicated if:
- Core <70ml
- Hypoperfused/Core ratio >1.2
- mismatch volume >10ml
(=EXTEND criteria)

Unknown onset >4.5 h from LSW

Penumbral imaging OR FLAIR-DWI-Mismatch for IVT:
MRI
– DWI pos/ FLAIR (neg) –mismatch (WAKE-UP) (MRI prefereable in minor strokes/ lacunas etc)

CT and CT Perfusion or MRI Perfusion
- Core <70ml
- Hypoperfused/Core ratio >1.2
- mismatch volume >10ml
(=EXTEND criteria)

>9 - < 24 hours

NO Thrombolyis!

CT – Angio for MT:
- LVO?
→ Thrombectomy
(MR-CLEAN, EXTEND-1A, ESCAPE, REVASCAT, SWIFTPRIME)

CT – Angio or MR-Angio: Detect Large Vessel Occlusion (LVO)?

→ < 6 hours since onset: EVT
→ > 6 hours: Penumbral imaging / clinical-core mismatch for MT: CT-Perfusion/ MR-Perfusion
EVT is indicated if one of the following criteria sets is fulfilled:

DEFUSE-3[2]: 6 to 16 hours since time last known well:
– Age ≤90 years and NIHSS ≥6: infarct core volume <70 ml and penumbra volume >15 ml and penumbra volume/core volume >1.8

DAWN[3]: 6 to 24 hours since time last known well:
– Age <80 years: infarct core ≤30 ml if NIHSS ≥10; infarct core ≤ 51 ml if NIHSS ≥20.
– Age ≥80 years: infarct core ≤20 ml and NIHSS ≥10

SELECT-2[4]
- LVO and ASPECTS 3-5 or core>50ml

ANGEL – ASPECTS[5]
- LVO and ASPECTS 3-5 or core 70 -100ml

MR CLEAN-LATE[6] (CT and CTA only):
- LVO (incl M2)
- collateral flow >0% (grade 1-3)

C - Thrombolysis and Thrombectomy

Door - to - imaging time: _____ MIN (TARGET < 30 MIN!)
Door - to - needle time: _____ MIN (TARGET <30 min, SHOULD/MUST be <60 min!)
Door - to - groin time: _____ MIN (TARGET < 90 MIN!)

Administration:

Alteplase:

Total dose: _____ kg*0.9mg/kg = _____ (max dose 90mg).
Bolus dose (10%) = _____ mg (IV push over 1 minute): Starting time: _____
infusion dose over 1 hours = _____ mg

Tenecteplase:

Total dose: _____ kg*0.25mg/kg = _____ Starting time: _____
Blood pressure at thrombolysis: _____ mm/Hg
Absolute Contraindications: _____

References:

2023: WSO Synthesis of global guidelines, ESO Guidelines, 2021: AHA Guidelines, Angels Initiative Checklists, (1) N Engl J Med 2015; 372:1009-1018, (2) N Engl J Med 2018; 378:708-718, (3) N Engl J Med 2018; 378:11-21, (4) N Engl J Med 2023; 388:1259-1271, (5) N Engl J Med 2023; 388:1272-1283, (6) Lancet. 2023 Apr 22;401(10385):1371-1380, (7) N Engl J Med 2018; 379:611-622

Abbreviations:

IVT : intravenous thrombolysis

EVT: endovascular treatment / mechanical thrombectomy