STROKE MANAGEMENT SOP FOR DOCTORS & STROKE AWARENESS FOR GENERAL PUBLIC

OCTOBER 2024

Prepared by AHPI Scientific Committee

ASSOCIATION OF HEALTHCARE PROVIDERS INDIA

Stroke protocol SOP

1. All those patients who present with stroke symptoms within 6 hours of symptom onset

A Green Corridor in Hospital

Upon arrival at the hospital entry gate, the on-duty security person plays a crucial role. They promptly inquire about the patient's condition from the attendants. Suppose stroke-related symptoms are reported (sudden onset weakness on one side, sudden onset difficulty in speech, sudden onset difficulty in walking, sudden onset severe headache, and sudden onset vision loss), and symptom onset is within 6 hours. In that case, they ensure that the patient is immediately escorted to the emergency room, bypassing any routine formalities that could delay treatment. This swift response is paramount in stroke cases, where early detection and intervention can significantly improve outcomes.

In Emergency

Upon arrival at the emergency room of a suspected stroke Patient, the on-duty doctors immediately attend to the patient. They thoroughly assess the patient's condition, focusing on identifying stroke-related symptoms. While the duty doctor gathers a brief medical history and performs a relevant examination (NIHSS scoring is not conducted at this stage), the on-duty nursing staff checks the patient's vital signs, including

pulse, blood pressure (BP), and random blood sugar (RBS).

The situation encountered and the emergency management protocols.

If the suspected stroke patient is conscious, has BP below 210 mm Hg, blood sugar above 70 mg%, and is breathing normally, we don't give any treatment at this stage to avoid delay. We immediately shift the patient to the CT room, which is present on the ground floor, near the emergency room, and get it done to identify the nature of the stroke (ischemic/hemorrhagic).
In the meantime, the emergency duty doctor informed the neurosurgeon on duty

If the patient is in hypoglycemia (RBS <70 mg%), we first treat it by giving intravenous 25% dextrose 100 ml to rule out stroke mimics. If the improves, it's not a stroke, and the physician on call is informed for further evaluation and treatment protocols.

If Pt is in hypotension (systolic BP < 90 mm Hg, mean arterial pressure < 65 mm Hg), the chances of the stroke become less, and we resuscitate the Pt first by giving intravenous fluids and vasopressor, informing the

physician to evaluate him further clinically to find out the cause.

If the BP is more than 210 mm Hg, we give a bolus 4ml injection of Labetalol slowly over 5 minutes, shift the patient to the CT room, and inform the neurosurgeon on duty.

In Pts with a normal pulse, BP, and RBS who present with stroke symptoms, the chances of stroke become doubtful; if they still have a positive Babinski sign in the affected extremity, we consider them as stroke else, and to rule out stroke, we shift them for stroke protocol MRI brain (T2 flair, DWI, GRE sequences), escorted with duty staff, and prior information to MRI center to avoid any delay in treatment if they turned out to be stroke.

Stroke treatment within 6 hours of symptom onset

Stroke treatment within 6 hours depends on whether the stroke is ischemic or hemorrhagic. By the time the CT scan is completed, the neurosurgeon on duty remains present to inform and discuss further treatment protocols with the patient and attendants. During this time of informed discussion of stroke specialist with attendants, an on-duty doctor performs NIHSS scoring of the Pt to have a baseline neurological status.

1a-Level of consciousness	0=Alert;keenly responsive
	1=Not alert;but arousable by minor stimulation
	2=Not alert ;requires repeated stimulation
	3=Unresponsive or respeonds only with reflex
1b-Level of conciousness questions:	0=Answer two questions correctly
what is your age?	1=Answer one question correctly
What is the month?	2=Answer neither questions correctly
1c- Level of consiouness commands:	0=Performs both tasks correctly
Open and close your eyes	1=Performs one task correctly
Grip and release your hand	0=Performs neither tasks correctly
2- best gaze	0= Normal
	1= partial gaze palsy
	2= Forced deviation
3- visual	0=no visual lost
	1= partial hemianopia
	2=complete heminaopia
	3=Bilateral hemianaopia
4- Facial palsy	0= Normal symmetric movements
	1= minor paralysis
	2=partial paralysis
	3=complete paralysis of one or both sides
5-Motor arm	0= No drift
left arm	1= Drift
Right arm	2= some effort against gravity
	3= no effort against gravity
	4= no movement
6-Motor leg	0= No drift
left leg	1= Drift
Right leg	2= some effort against gravity
	3= no effort against gravity
	4= no movement
7-Limb ataxia	0= Absent
left leg	1= present in one limb
Right leg	2= present in two limbs
8- Sensory	0=Normal; no sensory loss
	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-Dysthria	0=Normal
	1=Mild to moderate dysthria
	2=Severe dysthria
11- Extinction and inattention	0= No abnormalityy
	1= Visual , tactile, auditory, sptial or personal inattention
	2+ profound hemi- inattention or extinction.
Score = 0-42	

1. If pt has an ischemic stroke-
We informed the attendants about the possible treatment options and advised thrombolysis.
With informed consent, we started thrombolysis immediately in the emergency room, provided no contraindication remained, to avoid any delay.

2. Suppose it is a parenchymal bleed on the CT head-
In that case, the treatment protocols aiming to reduce the BP below 140 mm Hg and other supportive management as per Pt's condition, consisting of ABC management, dehydrants, antiemetics, analgesics, lipid-lowering agents, and blood sugar control in hyperglycemic Pts, with regular insulin injection.

3. Suppose it is a SAH/Atypical location for hypertensive bleed/suspected cerebral venous thrombosis.
CT angiography of the brain is done to look for aneurysms or vascular malformation, and CT/MR venography is done to look for venous thrombosis.

Thrombolysis Protocols
Indication
Ischemic stroke within 4 & 1/2 hours for anterior circulation and 6 hours for posterior circulation.
Age > 18 years
Contraindication
Hemorrhagic stroke

Any active bleeding (present or happened within the last 21 days) from natural orifices
Known bleeding tendency
On anticoagulant with INR>1.7/PT 15 seconds/blood thinners
Recent significant trauma/surgery within three months
Arterial puncture at a non-compressible site within the last seven days
Recent stroke/MI within three months
Intracranial neoplasm/vascular lesions

Investigations

In an ischemic stroke pt with no other co-morbidity and on no previous treatment, we check only RBS and start thrombolysis; however, in those who are on antiplatelet, and anticoagulants, we first check complete blood count, PT, PTT, and INR before thrombolysis.

Treatment

We use inj Alteplase for thrombolysis.
Total dose= Weightx 0.9mg. (Max. 90 mg).
10% is given as a bolus over 1 minute and rest by infusion over 1 hour.
The patient is monitored with BP over a 15-minute interval during transfusion, followed by an ICU transfer and further monitoring at an hourly interval.
Transfusion is stopped during clinical worsening/ headache, and a CT head is advised.

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Post-thrombolysis management

After thrombolysis, patients require proper post-thrombolysis management to ensure the treatment's effectiveness and prevent complications.

Pt's BP is monitored to keep below 180mm Hg and blood sugar between 100-200 mg%.

An MRI of the brain is done after 24 hours in a stable pt to look for stroke volume and any hemomhagic transformation.

If no bleed on the post-thrombolysis scan is evident, then we start tab Ecosprine 75 mg OD, and further stroke evaluation is done to find out the cause and stroke risks.

In suspected large vessel occlusion stroke

We explain the patient, start IV thrombolysis, and shift the patient with ongoing thrombolysis with the medical team to a center equipped for endovascular intervention.

2. All those patients who present with stroke symptoms after 6 hours/if time is uncertain of symptom onset/wake-up stroke

We first stabilize these patients with ABC management and check BP and RBS.

BP above 210 mmHg is controlled with inj Labetalol, and RBS above 200 with inj regular
insulin

If the patient's GCS is 15, we send them for an MRI brain stroke protocol with perfusion studies; in all other

pts, we send them for an NCCT head. MRI gives better information regarding diagnostic confirmation, especially for ischemic stroke, and future predictions on its evolution. In all other pts, we first rule out hemorrhagic stroke, and in case of diagnostic uncertainties only, we go for an MRI brain.

In a stroke presenting after 6 hours, and in those with preserved penumbra on perfusion studies, we inform the patient regarding endovascular options and shift them if willing.

In ischemic stroke presenting late (after 6 hrs), those who either refused thrombolysis or are not suitable candidates for thrombolysis, no antihypertensive is given for BP up to 210 mm Hg and blood sugar is kept below 200 mg% (managed with sliding scale or insulin infusion depending on the clinical scenario).

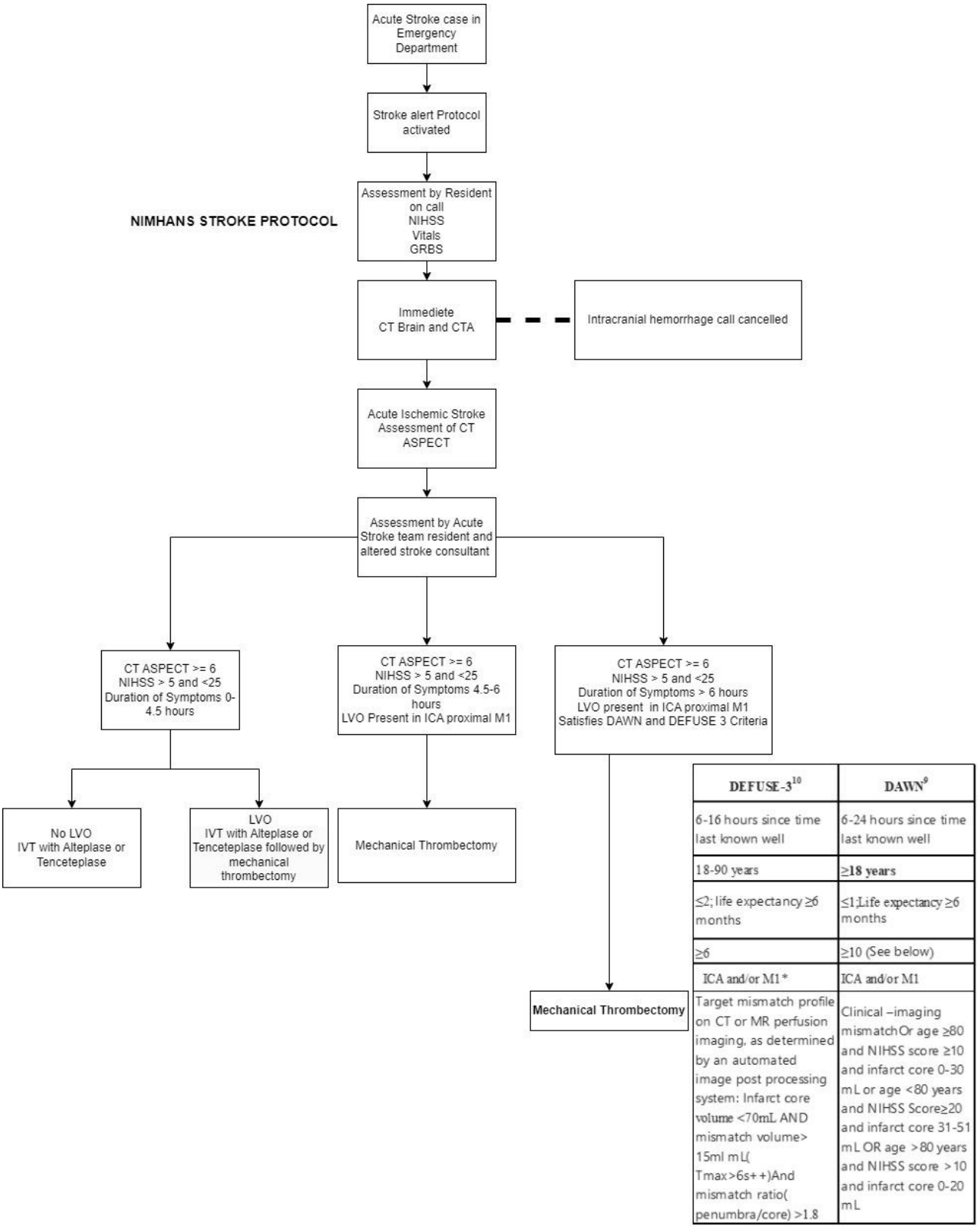
Blood pressure in hemorrhagic stroke is controlled emergently to keep ideally below 140 mm
Hg with bolus Inj labetolol and its infusion and tab Nicardia and Arkamine as required.

However, a>40 mm Hg reduction in the first 6 hours is avoided in those with >220 mm Hg systolic BP.

Follow-Up Imaging Protocols

A repeat CT head is done after 24 hours in cases with bleeds and large infarcts to determine their evolution and identify potential surgical patients before their clinical deterioration. Per the clinical scenario, it is done even before in patients with clinical worsening.

NIMHANS STROKE PROTOCOL



DEFUSE-3[10]	DAWN[9]
6-16 hours since time last known well	6-24 hours since time last known well
18-90 years	≥18 years
≤2; life expectancy ≥6 months	≤1;Life expectancy ≥6 months
≥6	≥10 (See below)
ICA and/or M1*	ICA and/or M1
Target mismatch profile on CT or MR perfusion imaging, as determined by an automated image post processing system: Infarct core volume <70mL AND mismatch volume> 15ml mL(Tmax>6s++)And mismatch ratio(penumbra/core) >1.8	Clinical –imaging mismatchOr age ≥80 and NIHSS score ≥10 and infarct core 0-30 mL or age <80 years and NIHSS Score≥20 and infarct core 31-51 mL OR age >80 years and NIHSS score >10 and infarct core 0-20 mL

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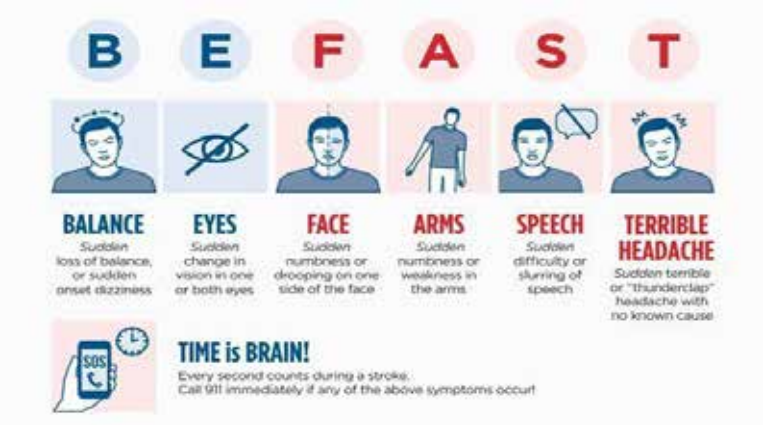
SOP on Management of Stroke by Doctors

Acute stroke cases in emergency will land up with following signs and symptoms:

Remember B.E. F.A.S.T

- Balance (Body balance)
- Eye movement
- Face drooping
- Arm weakness
- Speech difficulty
- Time to call medical care



OTHER ASSOCIATED SYMPTOMS:

- Sudden confusion or trouble understanding
- Sudden trouble seeing in one or both eyes
- Sudden dizziness, loss of balance or coordination
- Sudden severe headache

Resident doctor/Emergency Medical Officer to activate stroke alert protocol

ASSESSMENT BY RESIDENT

1. NIHSS - National Institute of Stroke Scale to assess and quantify neurological deficit following stroke. (NIHSS training is available online for free)

NIH Stroke Scale | National Institute of Neurological Disorders and Stroke

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Normal range:

0 = no stroke.

1-4 = minor stroke.
5-15 = moderate stroke.
15-20 =moderate/severe.

The NIHSS score strongly predicts the likelihood of a patient's recovery after stroke. A score >20 forecasts a high probability of death or severe disability, whereas a score <6 forecasts early and often complete recovery.

2. Check vital signs
3. GRBS - General Random Blood Sugar

Investigations:

Immediate CT Brain and CTA - Computed Tomography Angiography
(Intracranial hemorrhage call cancelled)

Assessment by Acute stroke team resident and stroke consultant

In case of Acute Ischemic stroke - Assessment of CT ASPECT (The ASPECTS (Alberta Stroke Program Early CT Score) is a quantitate score that measures the extent of early ischemic anterior circulation hyperacute ischemic stroke)

ASPECTS (Alberta Stroke Program Early CT Score) Measurement Using Hounsfield Unit Values WhenSelecting Patients for Stroke Thrombectomy (ahajournals.org)

What is a good aspect score?

What is normal ASPECTS score? An ideal ASPECTS score is 10 when none of the vital Structures are involved by acute ischemic changes. But patients with scores ≤8 have a higher chance for independent outcome.

What is aspects score for thrombectomy?

According to the American Heart Association/American Stroke Association guidelines, patients with ASPECTS ≥ 6 should be prioritized for thrombectomy treatment. Therefore, most randomized trials typically use ASPECTS ≤ 5 as an exclusion criterion.

MANAGEMENT OF ACUTE STROKE

Situation 1 :

CT ASPECT >=6
NIHSS >5 and <25
Duration of symptoms 0-4.5 hours
If No LVO detected (large vessel occlusion e.g. occlusion of the internal carotid artery and of proximal segments (M1, M2) of the middle cerebral artery) :
Treatment: IVT (Intravenous Thrombolysis) with Alteplase or Tenceteplase
If LVO detected
Treatment: IVT with Alteplase or Tenceteplase followed by Mechanical Thrombectomy

Situation 2 :

CT ASPECT >=6
NIHSS >5 and <=25
Duration of symptoms 4.5- 6 hours
LVO present in ICA proximal M1
Treatment: Mechanical Thrombectomy

Situation 3 :

CT ASPECT >=6
NIHSS >5 and <=25
Duration of symptoms >=6 hours
LVO present in ICA proximal M1

Satisfies DAWN and DEFUSE 3 criteria
Treatment: Mechanical Thrombectomy

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Mini stroke or 'Transient ischemic attack (TIA)

a. Mini stroke or 'Transient ischemic attack (TIA)' is temporary blockage of brain blood vessels.
b. Symptoms are present for short period.
c. If no treatment is given, patient may develop permanent stroke.
d. Mini stroke is an emergency and proper treatment can prevent stroke from happening

Signs and symptoms, Investigations and treatment guidelines are same as stroke

Key Facts:-

e. Early recognition makes a big difference- B.E.F.A.S.T check
f. Specialized stroke unit care increases the chance of a good outcome by 14%
g. Thrombolytic therapy increases chances of good outcome by 30%
h. Clot retrieval treatment increases the chance of good outcome by 50%
i. Rehabilitation is a critical step in the treatment process.

One in four survivors will have another stroke so preventive therapy by drugs and to control risk factors is very important.