1:30 – 2:30 pm

Primary Care of the Stroke Patient

SPEAKER
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Presenter Disclosure Information

The following relationships exist related to this presentation:

- Thomas P. Bleck, MD, MCCM, FNCS: Clinical trial steering committee for Zoll Corporation. DSMB chair for Sage Corporation and Edge Corporation.

Off-Label/Investigational Discussion

- In accordance with pmiCME policy, faculty have been asked to disclose discussion of unlabeled or unapproved use(s) of drugs or devices during the course of their presentations.

Learning objectives

1. Recognize transient ischemic attacks and the major forms of ischemic stroke
2. Identify patients who may benefit from acute stroke intervention
3. Review the management of stroke patients in the first two weeks after stroke
4. Recommend appropriate use of antiplatelet and anticoagulant agents for primary stroke prevention
5. Practice state-of-the-art secondary stroke prevention

Case

- 50 M with ischemic cardiomyopathy (EF 15%), AF, and remote stroke with full recovery, admitted to CICU with CHF.
- Had been noncompliant with warfarin, received a dose of rivaroxaban with breakfast
- Last known normal 6:35 pm
- Right-sided weakness and aphasia noted at 7 pm

INITIAL NIH STROKE SCALE 7:10 PM

1a. Level of consciousness: 1 - not alert but arousable by minor stimulation to obey, answer or respond
1b. Level of consciousness questions: 2 - answers neither question correctly
1c. Level of consciousness commands: 2 - performs neither task correctly
2. Best Gaze: 1 - partial gaze palsy
3. Visual: 2 - complete hemianopia
4. Facial Palsy: 2 - partial paralysis (total or near total paralysis of the lower face)
5a. Motor left arm: 0 - no drift, limb holds 90 (or 45) degrees for full 10 seconds
5b. Motor right arm: 3 - no effort against gravity, limb falls
6a. Motor left leg: 0 - no drift; leg holds 30 degree position for full 5 seconds
6b. Motor right leg: 4 - no movement
7. Limb Ataxia: 0 - absent
8. Sensory: 1 - mild to moderate sensory loss; patient feels pinprick is less sharp or is dull on the affected side; there is a loss of superficial pain with pinprick but patient is aware of being touched
9. Best Language: 3 - mute, global aphasia; no usable speech or auditory comprehension
10. Dysarthria: 2 - severe; patient speech is so slurred as to be unintelligible in the absence of or our of proportion to any dysphagia, or is mute/anarthric
11. Extinction and Inattention: 1 - visual, tactile, auditory, spatial or personal inattention or extinction to bilateral simultaneous stimulation in one of the sensory modalities

TOTAL: 24

NIHSS values

Post intervention	29
+2 hours	26
+16 hours	26
+20 hours	5
+30 hours	5
+36 hours	2

Types of stroke

- Ischemic stroke (70%)
- Intracerebral hemorrhage (20%)
- Subarachnoid hemorrhage (10%)

Types of stroke

- Ischemia
  - TIA
  - RIND (no longer used)
  - Ischemic stroke
- Intracerebral hemorrhage
- Subarachnoid hemorrhage

Ischemic stroke subtypes

1. Large artery atherosclerosis (12%)
2. Cardioembolic (29%)
3. Small artery occlusion (27%)
4. Other defined cause (e.g., vasculitis; 6%)
5. Uncertain (usually more than one possibility, 26%)

TOAST criteria
(Trial of ORG 10172 in Acute Stroke Treatment)

Modified Rankin Scale

0 - No symptoms.

1 - No significant disability. Able to carry out all usual activities, despite some symptoms.

2 - Slight disability. Able to look after own affairs without assistance, but unable to carry out all previous activities.

3 - Moderate disability. Requires some help, but able to walk unassisted.

4 - Moderately severe disability. Unable to attend to own bodily needs without assistance, and unable to walk unassisted.

5 - Severe disability. Requires constant nursing care and attention, bedridden, incontinent.

6 - Dead.

Other AHA/ASA recommendations

- No acute therapeutic anticoagulation
  - Prophylaxis for DVT OK
    - (when to start anticoagulation in AF for secondary prevention uncertain)
- ASA within 48 hours
    - (we give in ambulance or on ED arrival; crush or give rectally unless swallowing has been cleared)
- Uncertainty about blood pressure augmentation or volume expansion

The neurologists' secret

- If you give the stroke dose of rt-PA to someone who is not having a stroke, and who does not have a mass visible on a CT scan, there is less than a 1% chance of an intracerebral hemorrhage

Airway management recommendations

• LHI patients with signs of respiratory insufficiency or neurological deterioration should be intubated immediately *(strong recommendation, very low quality of evidence)*.

• Extubation should be attempted in LHI patients who meet the following criteria, even if communication and cooperation cannot be established *(strong recommendation, very low quality of evidence)*:

- Successful spontaneous breathing trials
- Absence of oropharyngeal saliva collections
- Absence of demand for frequent suctioning
- Presence of cough reflex and tube intolerance,
- Free of analgesia and sedation

• Tracheostomy should be considered in LHI patients failing extubation or in whom extubation is not feasible by 7–14 days from intubation *(weak recommendation, low quality of evidence)*.

Hyperventilation

• We recommend against prophylactic hyperventilation in LHI patients *(strong recommendation, very low quality of evidence)*.

• We suggest using hyperventilation for short period of time as a rescue maneuver in LHI patients showing clinical signs of brain *herniation (weak recommendation, very low quality of evidence)*.

Analgesia and sedation

• We recommend analgesia and sedation if signs of pain, anxiety, or agitation arise in LHI patients *(strong recommendation, very low quality of evidence)*.

• We recommend the lowest possible sedation intensity and earliest possible sedation cessation, while avoiding physiologic instability and discomfort in LHI patients *(strong recommendation, very low quality of evidence)*.

• We recommend against the routine use of daily wakeup trials in LHI patients. Caution is particularly warranted in patients prone to ICP crises. Neuromonitoring of at least ICP and CPP is recommended to guide sedation, and daily wake-up trials should be abandoned or postponed at signs of physiological compromise or discomfort *(strong recommendation, very low quality of evidence)*.

Blood pressure recommendations

• We recommend that clinicians follow current blood pressure management guidelines for ischemic stroke in general when caring for LHI patients. Maintain a MAP >85 mmHg in ischemic stroke without hemorrhagic transformation. Lower SBP to <220 mmHg *(strong recommendation, low quality of evidence)*.

• We suggest avoiding blood pressure variability, especially in the early phase of LHI treatment *(weak recommendation, low quality of evidence)*.

Steroids

• We recommend against using steroids for brain edema in patients with LHI *(strong recommendation, low quality of evidence)*.

Temperature control

• We suggest considering hypothermia as a treatment option in patients who are not eligible for surgical intervention *(weak recommendation, low quality of evidence)*.

• If hypothermia is considered, we suggest a target temperature of 33–36 C for duration of 24–72 h *(weak recommendation, low quality of evidence)*.

• We suggest maintaining normal core body temperature *(weak recommendation, very low quality of evidence)*.

Head position recommendations

• We suggest a horizontal body position in most patients with LHI. However in patients with increased ICP, we suggest a 30 backrest elevation *(weak recommendation, very low quality of evidence)*.

Osmotic therapy recommendations

• We recommend using mannitol and hypertonic saline for reducing brain edema and tissue shifts in LHI only when there is clinical evidence of cerebral edema *(strong recommendation, moderate quality of evidence)*.

• We suggest using osmolar gap instead of serum osmolality to guide mannitol dosing and treatment duration *(weak recommendation, low quality of evidence)*.

• Hypertonic saline dosing should be guided by serum osmolality and serum sodium *(strong recommendation, moderate quality of evidence)*.

• We recommend using mannitol cautiously in patients with acute renal impairment *(strong recommendation, moderate quality of evidence)*.

• We recommend using hypertonic saline cautiously in patients with volume overload states (i.e., heart failure, cirrhosis, etc.,) since this agent will expand intravascular volume *(strong recommendation, high quality of evidence)*.

Decompressive hemicraniectomy

• We recommend DHC as a potential therapy to improve survival after LHI regardless of patient age *(strong recommendation, high quality of evidence)*.

• In patients older than 60 years, we recommend taking in consideration patients and family wishes, since in this age group, DHC can reduce mortality rate but with a higher likelihood of being severely disabled *(strong recommendation, moderate quality of evidence)*.

• There is currently insufficient data to recommend against DHC in LHI patients based on hemispheric dominance *(strong recommendation, low quality of evidence)*.

Decompressive hemicraniectomy

• To achieve the best neurological outcome, we recommend performing DHC within 24–48 h hours of symptom onset and prior to any herniation symptoms *(strong recommendation, moderate quality of evidence)*.

• We recommend a size of 12 cm as an absolute minimum for DHC. Larger sizes of 14–16 cm seem to be associated with better outcomes *(strong recommendation, moderate quality of evidence)*.

• We suggest that that lobectomy or duraplasty should only be considered as an individualized treatment option *(weak recommendation, low quality of evidence)*.

• We suggest that the resection of the temporal muscle should only be considered as an individualized treatment option *(weak recommendation, low quality of evidence)*.

Barbiturates

• Barbiturate therapy is not recommended in patients with LHI because the risks outweigh the benefits *(strong recommendation, low quality of evidence)*.

VTE prophylaxis

• We recommend early mobilization to prevent DVT in hemodynamically stable LHI patients with no evidence of increased ICP *(strong recommendation, very low quality of evidence)*.

• We recommend DVT prophylaxis for all LHI patients upon admission to the ICU and for the duration of immobilization *(strong recommendation, very low quality of evidence)*.

• We recommend using IPC for DVT prophylaxis *(strong recommendation, moderate quality of evidence)*.

• We recommend using LMWH for DVT prophylaxis *(strong recommendation, low quality of evidence)*.

• We recommend against the use of compression stockings for DVT prophylaxis *(strong recommendation, moderate quality of evidence)*.

Anticoagulation for embolism

• We suggest that oral anticoagulation be reinitiated 2–4 weeks after LHI in patients at high thromboembolic risk *(weak recommendation, very low quality of evidence)*.

• We suggest that earlier re-initiation of oral anticoagulation should be based on clinical risk assessment and additional diagnostic tests (e.g., prosthetic valve, acute DVT, acute PE, or TEE showing intracardiac thrombus) *(weak recommendation, very low quality of evidence)*.

• We suggest using aspirin during the period of no anticoagulation in LHI with AF or increased thromboembolic risk, provided surgery is not imminent *(weak recommendation, very low quality of evidence)*.

GI recommendations

• We suggest dysphagia screening in the early phase of LHI. Dysphagia can be assessed once the patient is weaned from sedation and ventilation *(weak recommendation, very low quality of evidence)*.

• LHI patients with dysphagia should receive a nasogastric tube as soon as possible *(weak recommendation, very low quality of evidence)*.

• We suggest that high NIHSS scores and persisting dysphagia on endoscopic swallowing should prompt discussion with the family on placement of a PEG tube between weeks 1 and 3 of the ICU stay *(weak recommendation, very low quality of evidence)*.

Glucose control recommendations

• We recommend that hypoglycemia and hyperglycemia should be avoided in LHI. Intermediate glycemic control (serum glucose level 140–180 mg/dl) should be the target of insulin therapy in LHI patients *(strong recommendation, very low quality of evidence)*.

• We recommend that intravenous sugar solutions should be avoided in LHI *(strong recommendation, very low quality of evidence)*.

Anemia management

• We recommend maintaining a hemoglobin of 7 g/dl or higher in LHI patients *(strong recommendation, very low quality of evidence)*.

• Clinicians should also consider specific situations such as planned surgery, hemodynamic status, cardiac ischemia, active significant bleeding, and arteriovenous oxygen extraction compromise when determining the ideal hemoglobin for a patient *(weak recommendation, very low quality of evidence)*.

• Consider reducing blood sampling wherever possible in order to decrease the risk of anemia in LHI *(Weak recommendation, very low quality of evidence)*.