

ED Physician Stroke Review 2020

SHARP HEALTHCARE



Objectives

Define the benefits of being a stroke certified organization

Be able to recall the stroke code diagnostic goals (door to interventions)

Be able to discuss the value of utilizing stroke order sets while caring for stroke patients

Know where to find the stroke policies and procedures in SharpNet

Be able to recall the emergency stroke code process as defined for Sharp HealthCare

Know the different types of strokes (Ischemic Stroke, Transient Ischemic Attack and Hemorrhagic Stroke) and their treatment protocols.

Understand the symptoms presented when a patient experiences a posterior stroke

Be able to verbalize treatment for angioedema secondary to Alteplase administration

Verbalize blood pressure management of the stroke patient, blood pressure parameters for Alteplase administration

Verbalize tPA and EVT inclusion and exclusion criteria for stroke

Be able to verbalize treatment and assessment process for hemorrhagic stroke, understand the process for transfer of SAH for aneurysmal treatment (ED to ICU, ICU to ICU)

Stroke Certification - Joint Commission

The Joint Commission offers four advanced stroke certifications for hospitals:

- [Comprehensive Stroke Center \(CSC\)](#) certification is the most demanding and is designed for those hospitals that have specific abilities to receive and treat the complex stroke cases. **Sharp Grossmont Hospital**
- [Thrombectomy-Capable Stroke Center \(TSC\)](#) certification is designed for hospitals providing endovascular procedures and post-procedural care.
- [Primary Stroke Center \(PSC\)](#) certification is designed for hospitals providing the critical elements to achieve long-term success in improving outcomes.

Sharp Memorial Hospital, Sharp Chula Vista Medical Center

- [Acute Stroke Ready Hospital \(ASRH\)](#) certification is for hospitals or emergency centers with a dedicated stroke-focused program.

Sharp Coronado Hospital



**The Joint
Commission®**



**American Heart
Association®
American Stroke
Association®**

STROKE CERTIFICATION

The premier certifications for stroke systems of care helps you provide the highest possible quality for your patients. Joint Commission's Advanced Certifications for CSC, TSC, PSC, and ASRH are offered in collaboration with the American Heart Association/American Stroke Association.

<https://www.jointcommission.org/accreditation-and-certification/certification/certifications-by-setting/hospital-certifications/stroke-certification/advanced-stroke/>

Benefits of being a Joint Commission Certified Stroke Center

Supports Strategic Priorities

Adds Value to the Patient

Supports Quality of Patient Care Improvement

Supports High Reliability in Safety, Quality and Experience Processes and Outcomes

Fosters a Cohesive Clinical Team

Provides Distinctive Care Competencies

Demonstrates Evidence of Organizational Commitment to Continuous Improvement

Sharp HealthCare's stroke policies, protocols and procedures.

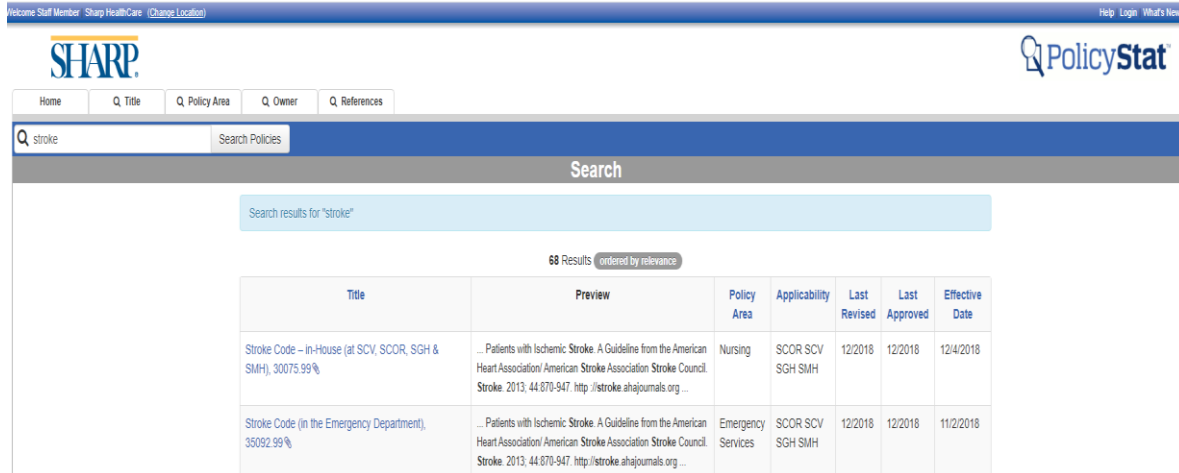
Sharp Healthcare has protocols, policies and procedures which are essential to ensure all stroke patients receive organized care throughout the continuum in a safe and effective manner. Utilizing these protocols helps ensure that recommended treatments are administered, and prohibited medications or treatments are not administered. These protocols encompass care for ED as well as in-hospital patients. They are developed and reviewed annually by the Stroke Steering and System Committees to reflect changes in medical knowledge, care standards, and guidelines.

These policies, protocols and procedures are for Acute Ischemic Stroke (AIS), Transient Ischemic Attack (TIA) and Hemorrhagic Strokes (Subarachnoid Hemorrhage and Intracranial Hemorrhage).

Where To Find Stroke Policies And Procedures

All Policies and Procedures can be accessed through Sharp's Intranet. These policies and procedures contain stroke code algorithms and treatments for all Sharp Hospitals:

- Go to <http://sharpnet.sharp.com/>
- Click on A-Z Directory
- Click on the letter P and open the Policies and Procedures link, which will provide you with a search box
- Type in "Stroke" and there you will locate the following:
 - **35092.99**: ED STROKE CODE (SMH, SGH, SCVMC, SCOR)
 - **30075.99**: STROKE CODE - IN-HOUSE (at SMH, SGH & SCVMC, SCOR)
 - **34021, 34022** : ADMISSION, TRANSFER, & DISCHARGE GUIDELINES – SGH, SMH STROKE UNITS
 - **34011**: ADMISSION, TRANSFER & DISCHARGE GUIDELINES PCU (SCVMC)



The screenshot shows the Sharp PolicyStat search interface. At the top, there's a navigation bar with 'Home', 'Q Title', 'Q Policy Area', 'Q Owner', and 'Q References'. A search bar contains the text 'stroke' and a 'Search Policies' button. Below the search bar, a 'Search' header is visible. The results section shows '68 Results ordered by relevance'. A table displays the search results with columns: Title, Preview, Policy Area, Applicability, Last Revised, Last Approved, and Effective Date. Two results are visible in the table.

Title	Preview	Policy Area	Applicability	Last Revised	Last Approved	Effective Date
Stroke Code - in-House (at SCV, SCOR, SGH & SMH), 30075.99%	... Patients with Ischemic Stroke: A Guideline from the American Heart Association/ American Stroke Association Stroke Council. Stroke. 2013; 44:870-947. http://stroke.ahajournals.org ...	Nursing	SCOR SCV SGH SMH	12/2018	12/2018	12/4/2018
Stroke Code (in the Emergency Department), 35092.99%	... Patients with Ischemic Stroke: A Guideline from the American Heart Association/ American Stroke Association Stroke Council. Stroke. 2013; 44:870-947. http://stroke.ahajournals.org ...	Emergency Services	SCOR SCV SGH SMH	12/2018	12/2018	11/2/2018

Clinical Practice Guidelines

- Guidelines for the early management of patients with acute ischemic stroke: 2019 update to the 2018 guidelines for the early management of acute ischemic stroke: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2019;50. <http://stroke.ahajournals.org>
- Guidelines for the Management of (Adults) Spontaneous Intracerebral Hemorrhage: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association *Stroke*. (2015;46:000-000). <http://stroke.ahajournals.org>
- Guidelines for the Management of Aneurysmal Subarachnoid Hemorrhage: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. *Stroke*. published online May 3, 2012; <http://stroke.ahajournals.org/content/early/2012/05/03/STR.0b013e3182587839>
- Comprehensive Overview of Nursing and Interdisciplinary Care of the Acute Ischemic Stroke Patient. AHA/ASA 2009 <http://stroke.ahajournals.org/content/41/9/e563.full.pdf+html>
- 2018 Guidelines for the early management of patients with acute ischemic stroke: A guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2018;49:e46–e99. <http://stroke.ahajournals.org>

ED Standardized Order Sets

Our ED Stroke program utilizes the following tools listed below to facilitate a streamlined process across the continuum – **these must be used per Joint Commission.**

Standardized Order Sets

- Emergency Department
 - ED Stroke Code
 - ED Stroke/TIA: No stroke code
 - ED Intracerebral Hemorrhage
 - ED Subarachnoid Hemorrhage
 - Stroke Ischemic Thrombolysis

Diagnostic Stroke Tools

BE FAST

Balance, Eyes, Face, Arm, Speech and Time to treatment or time to last known well. Remembering **B.E. F.A.S.T.** is an easy way to quickly identify the early warning signs of a stroke.

NIHSS – National Institute of Health Stroke Scale

The National Institutes of Health Stroke Scale (NIHSS) is used mostly by stroke teams for quantifying neurologic impairment. It enables rapid determination of the severity and possible location of the stroke. **The NIHSS focuses on anterior strokes** (80% of all strokes). A patient's score on the NIHSS is strongly associated with outcome, and it can help identify those patients who are likely to benefit from thrombolytic therapy and those who are at higher risk for developing hemorrhagic complications of thrombolytic use.*

mRS – Modified Rankin Score

6 point disability **scale** with possible **scores** ranging from 0 to 5. A separate category of 6 is usually added for patients who expire. The Modified **Rankin Score** (mRS) is the most widely used outcome measure in stroke clinical trials.

ASPECTS Score – to be calculated by radiology

Alberta Stroke Program Early CT **score** (**ASPECTS**) is a 10-point quantitative **score** used to assess early ischemic changes on non-contrast CT head.

* <https://www.medscape.com/answers/1910519-41733/what-is-the-national-institutes-of-health-stroke-scale-nihss>

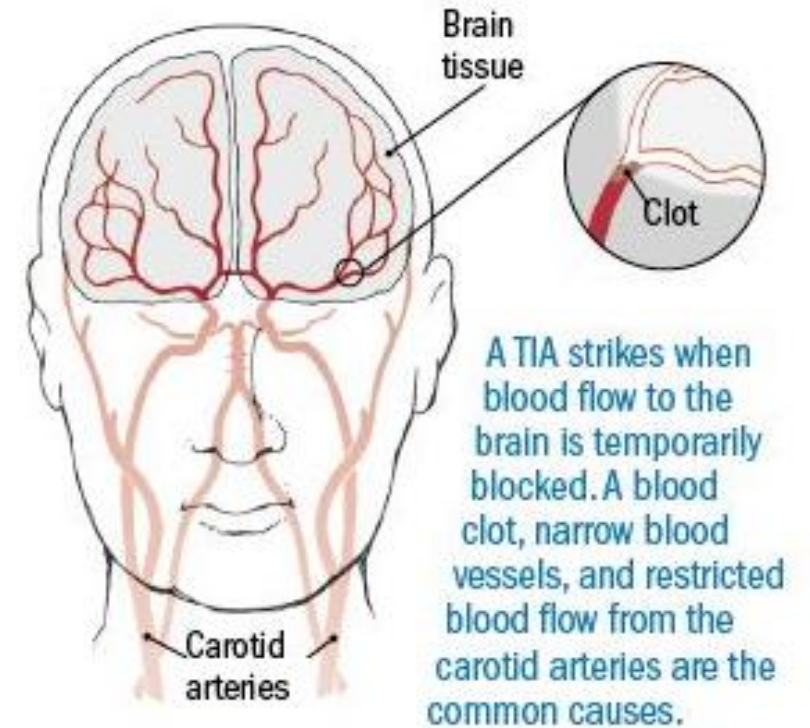
Stroke types

TRANSIENT ISCHEMIC ATTACK, ISCHEMIC STROKES, POSTERIOR STROKES, HEMORRHAGIC STROKES, CEREBRAL ANEURYSM

Transient Ischemic Attack (TIA)

- 15% of major strokes are preceded by TIAs
- 1/3 of people who have TIA and don't have treatment have a severe stroke within a year
- 1/3 of U.S. adults have had symptoms of TIA
- Average symptoms last about a minute with complete resolution
- Major warning sign of impending stroke

Transient ischemic attack (TIA)



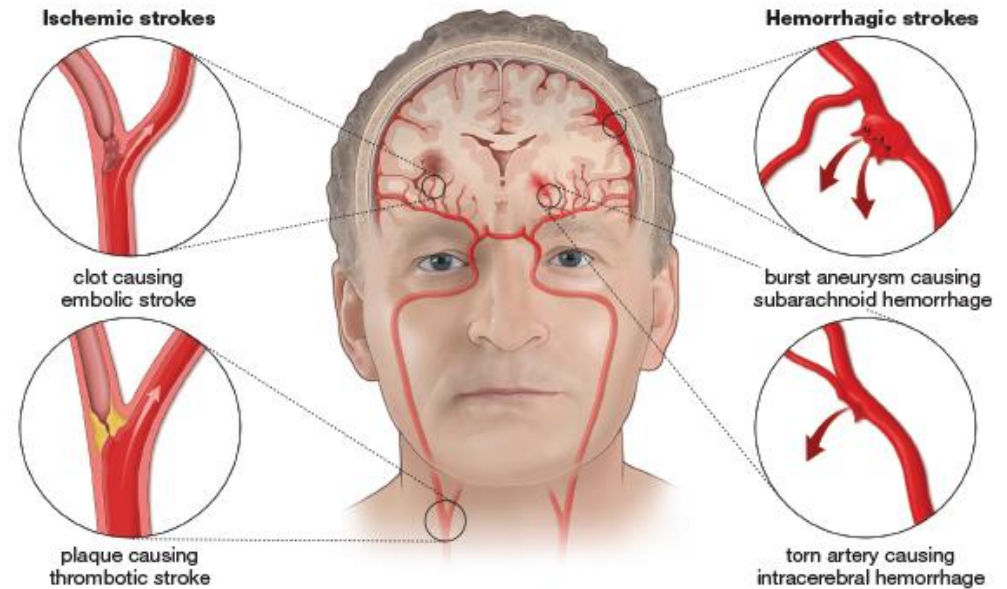
Stroke Types

Ischemic Stroke

- Blocked blood vessel, usually by a clot
- Portions of the brain becomes deprived of oxygen.
- 87% of all strokes.
- 32,000 brain cells die in a second
- 1.9 million brain cells die in 59 seconds

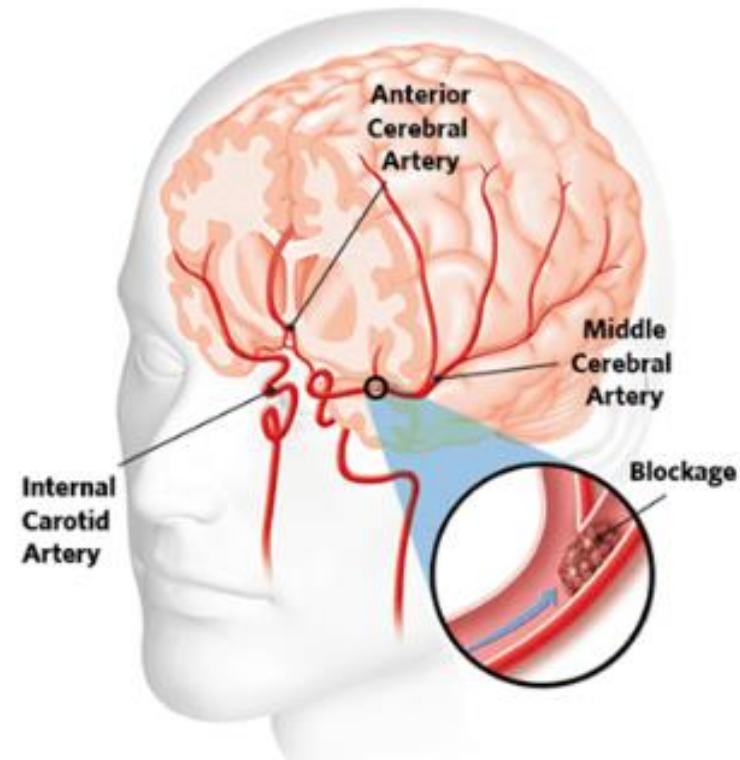
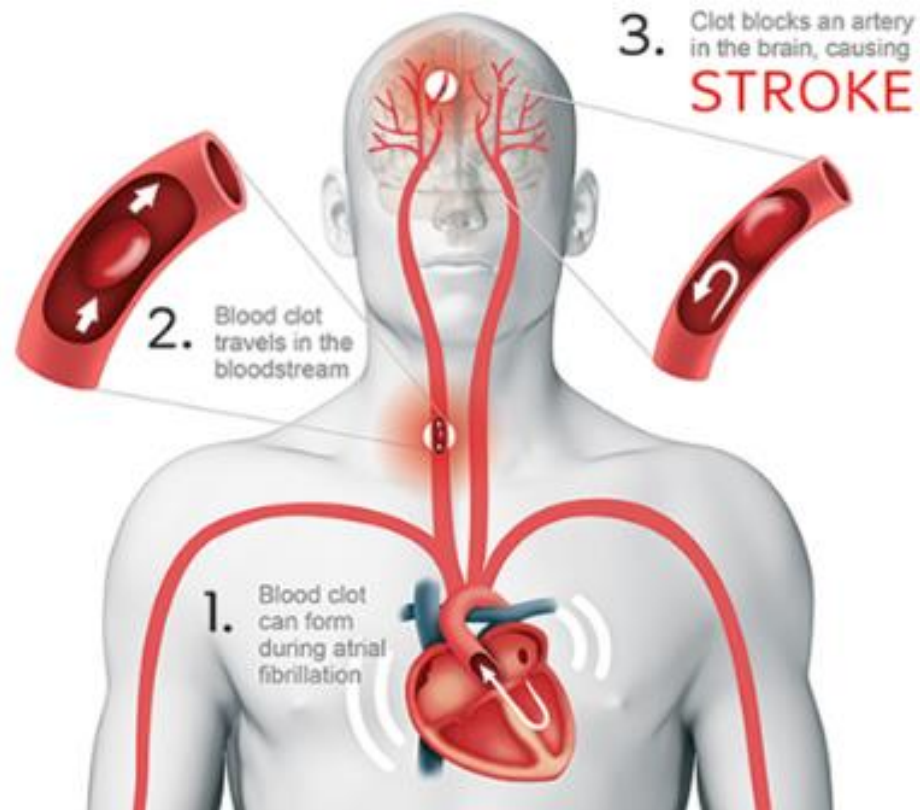
Hemorrhagic Stroke

- Intracerebral
- Subarachnoid
- Surrounding tissue flooded with blood.
- Higher fatality rate
- Poorer prognosis



<https://www.strokeinfo.org/stroke-facts-statistics/>

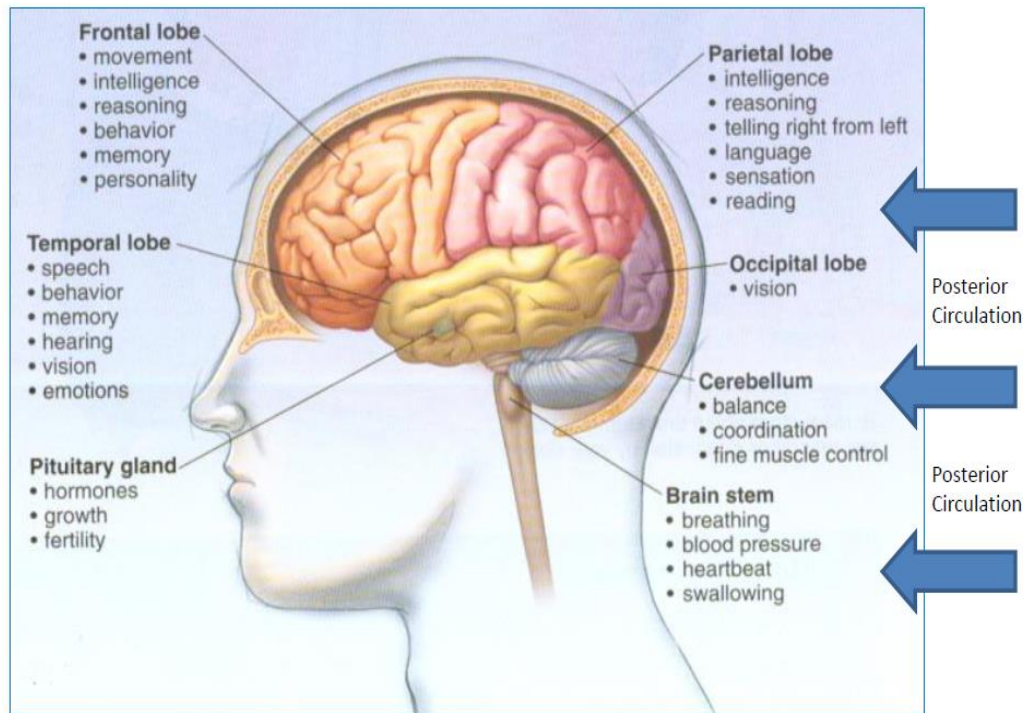
Acute Ischemic stroke (AIS)



<http://virclinic.com/stroke/acute-ischemic-stroke/>

Posterior Circulation Stroke

Lobes of the Brain



~20% of ischemic CVAs occur in post circulation

Posterior circulation strokes are often missed

- FAST and NIHSS sensitive to anterior circulation
- Imaging: MRI can miss post circulation in first 6-12 hrs

What about posterior circulation?

- Balance and Eyes in BE-FAST for improved detection of post circulation

Common Symptoms: Posterior Circulation Stroke

- **Dizziness**
- Ataxia (limb, trunk, gait)
- Incoordination
- Nystagmus
- Visual disturbances
- Nausea, vomiting
- Difficulty speaking
- Hiccups
- Horse voice
- Sensory and motor weakness (but not always)
- Cranial nerve problems

“Red flag” Symptoms: Dizziness Plus Posterior Circulation Stroke

5Ds

- Dizziness
- Drop attacks (loss of power or consciousness)
- Diplopia (blurred vision or even transient hemianopia),
- Dysphagia (problems swallowing)
- Dysarthria (problems speaking)

3Ns

- Nystagmus
- Numbness
- Nausea



Differentiating Factors: Posterior Circulation Stroke

- Peripheral Vestibular/inner ear conditions
- AVS (neuritis, labyrinthitis, meniers)
- Migraine
- Anxiety
- Drug Toxicity
- Metabolic
- ETOH
- Cardiac

Acute Ischemic Stroke *Emergent* Treatment

*Assess using BE-FAST

Balance – sudden loss of balance

Eyes – Sudden loss of vision or double vision

Face – Sudden weakness of the face

Arms – Sudden weakness of an arm or leg

Speech – Sudden difficulty speaking

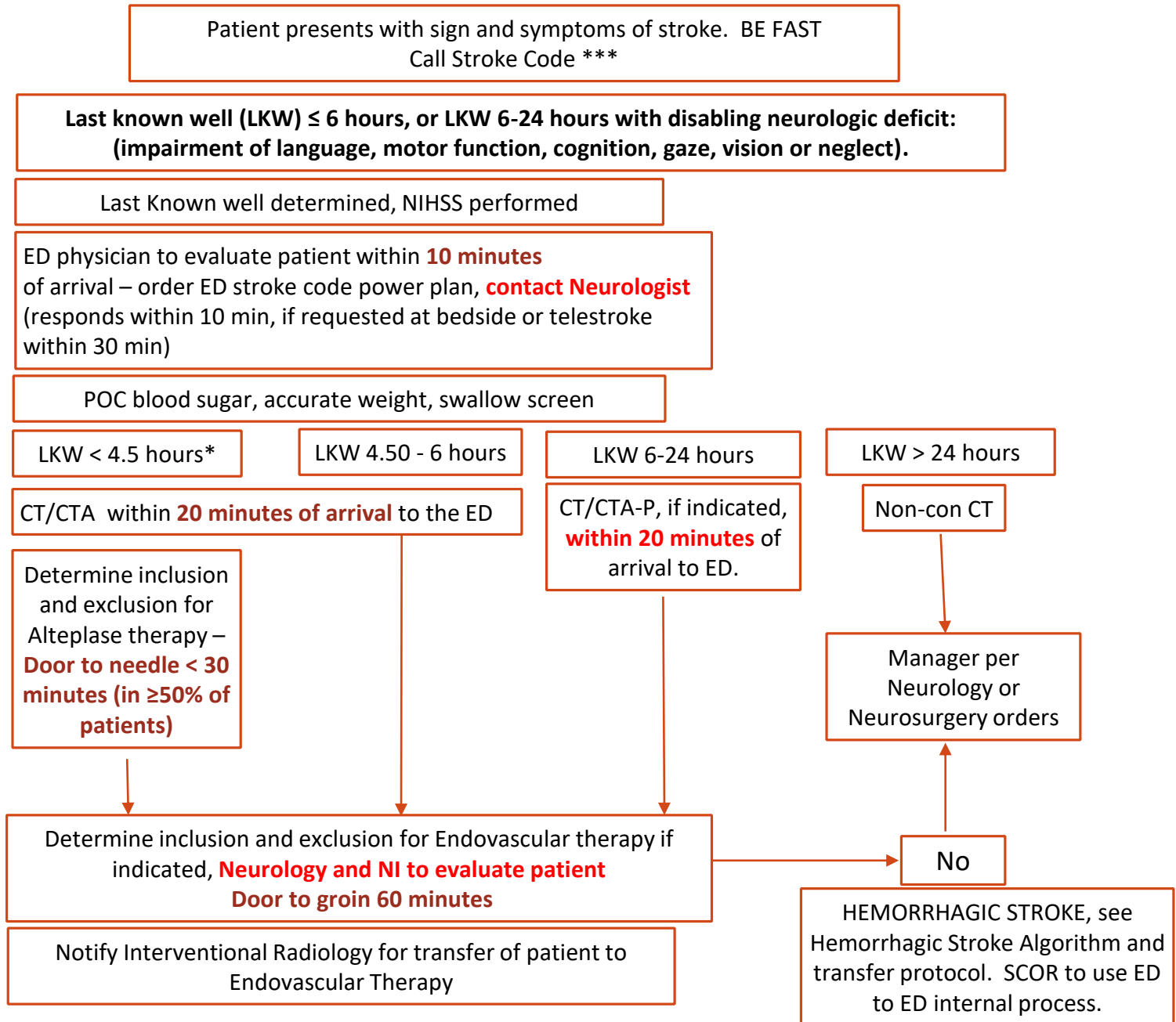
Time – Time the symptoms started

* Determine Last Known Well (LKW)

Time of last normal interaction with another person

Bedtime and when patient awoke with deficits

Patient-reported onset time, when this is dependable despite current deficits



* *Stroke*. 2019;50. <http://stroke.ahajournals.org> Within 3 h—Mild disabling stroke For otherwise eligible patients with mild but disabling stroke symptoms, IV Alteplase is recommended for patients who can be treated within 3 h of ischemic stroke symptom onset or patient last known well or at baseline state.

Emergency Department Stroke Code Diagnostic Goals

Diagnostic Goal	Time
Door To Initial Evaluation	10 minutes
Door To NIHSS Goal By RN	15 minutes
Door To CT (Initial Scan)	≤ 20 minutes
Door To CT Interpretation	≤ 45 minutes
Door To Labs Resulted	≤ 45 minutes
Door To T-pa (Thrombolytic Bolus)	≤ 30 minutes
Door To Groin Puncture	≤ 60 minutes
Transfer Goals	Time
Transfer For SAH Treatment (Door In Door Out)	≤ 120 minutes
Other	Time
Modified Rankin	As close to arrival as possible

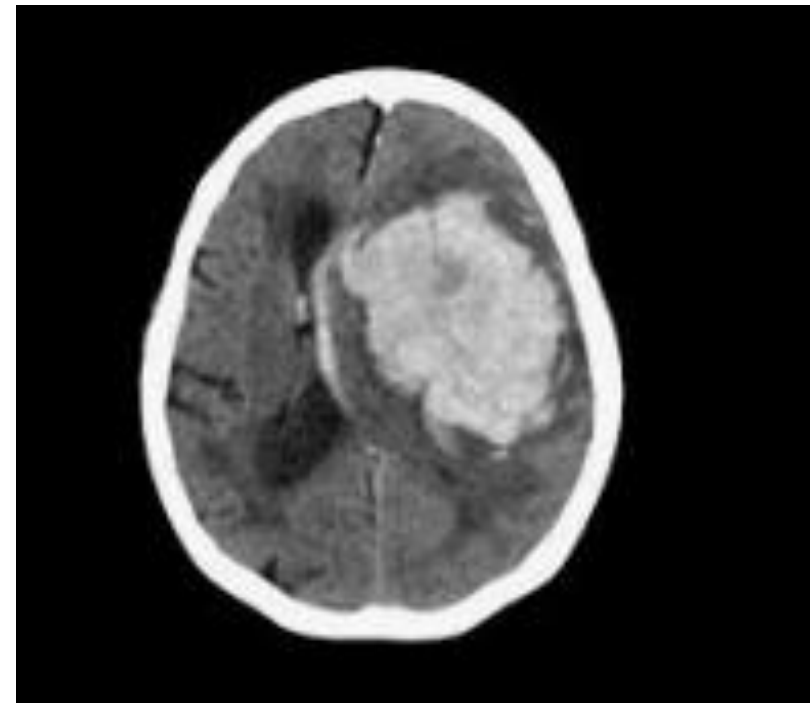
Hemorrhagic Stroke

Signs and Symptoms of Hemorrhagic Stroke

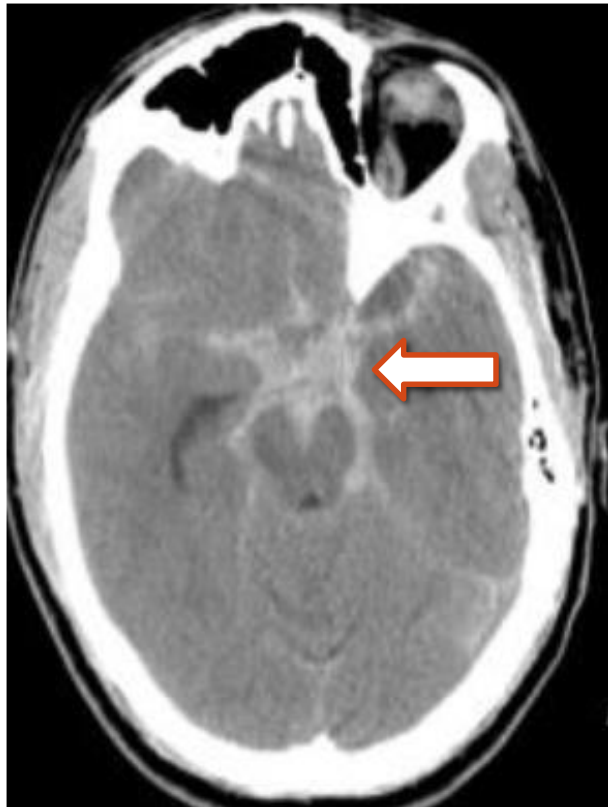
Intracerebral

- Headache
- Nausea and vomiting
- Decreased level of consciousness
- Seizure
- Localized findings

Intracerebral Hemorrhage from hypertension is by far the most common type of hemorrhagic stroke.



Signs and Symptoms of Hemorrhagic Stroke



Subarachnoid

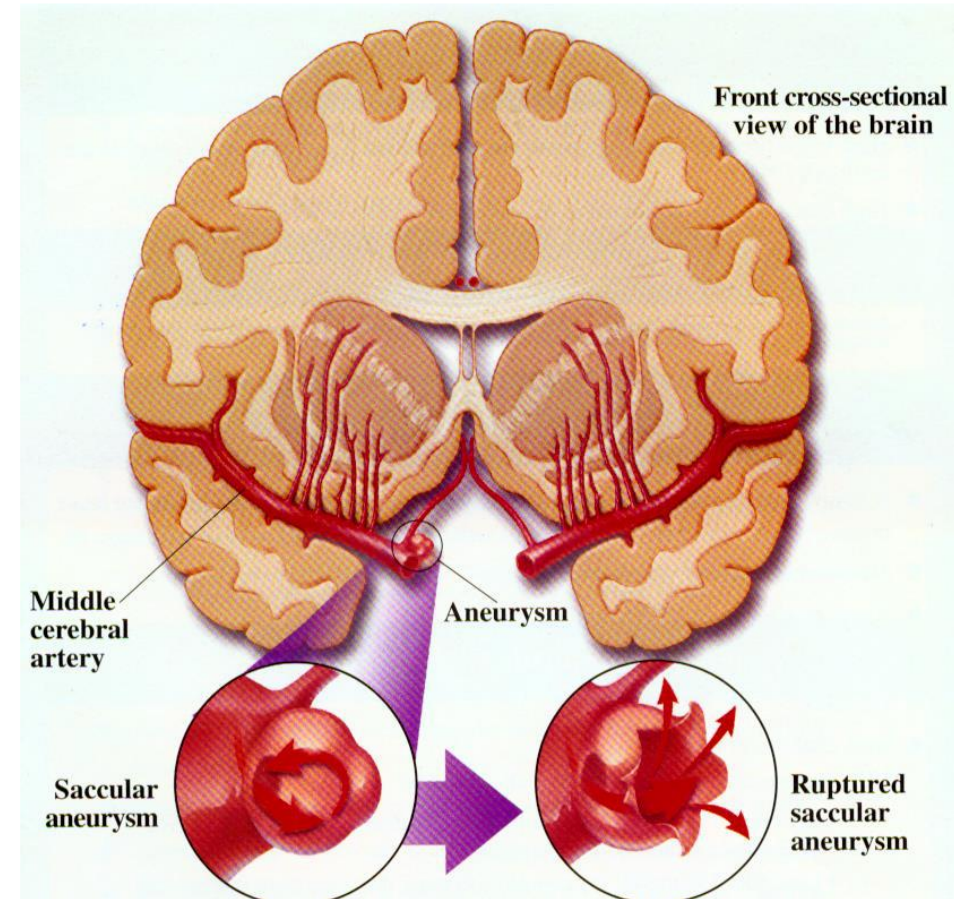
- “Worst Headache of my life”
- Nausea and vomiting
- Sensitivity to light
- Stiff Neck
- Decreased level of consciousness
- Seizure

Blood typically located in:

- Basal cisterns around Circle of Willis
- Major fissures
- Within ventricles (occasionally only intraventricular blood seen)

Cerebral Aneurysm

A **cerebral or intracranial aneurysm** is an abnormal focal dilation of an artery in the brain that results from a weakening of the inner muscular layer (the intima) of a blood vessel wall. The vessel develops a "blister-like" dilation that can become thin and rupture without warning.

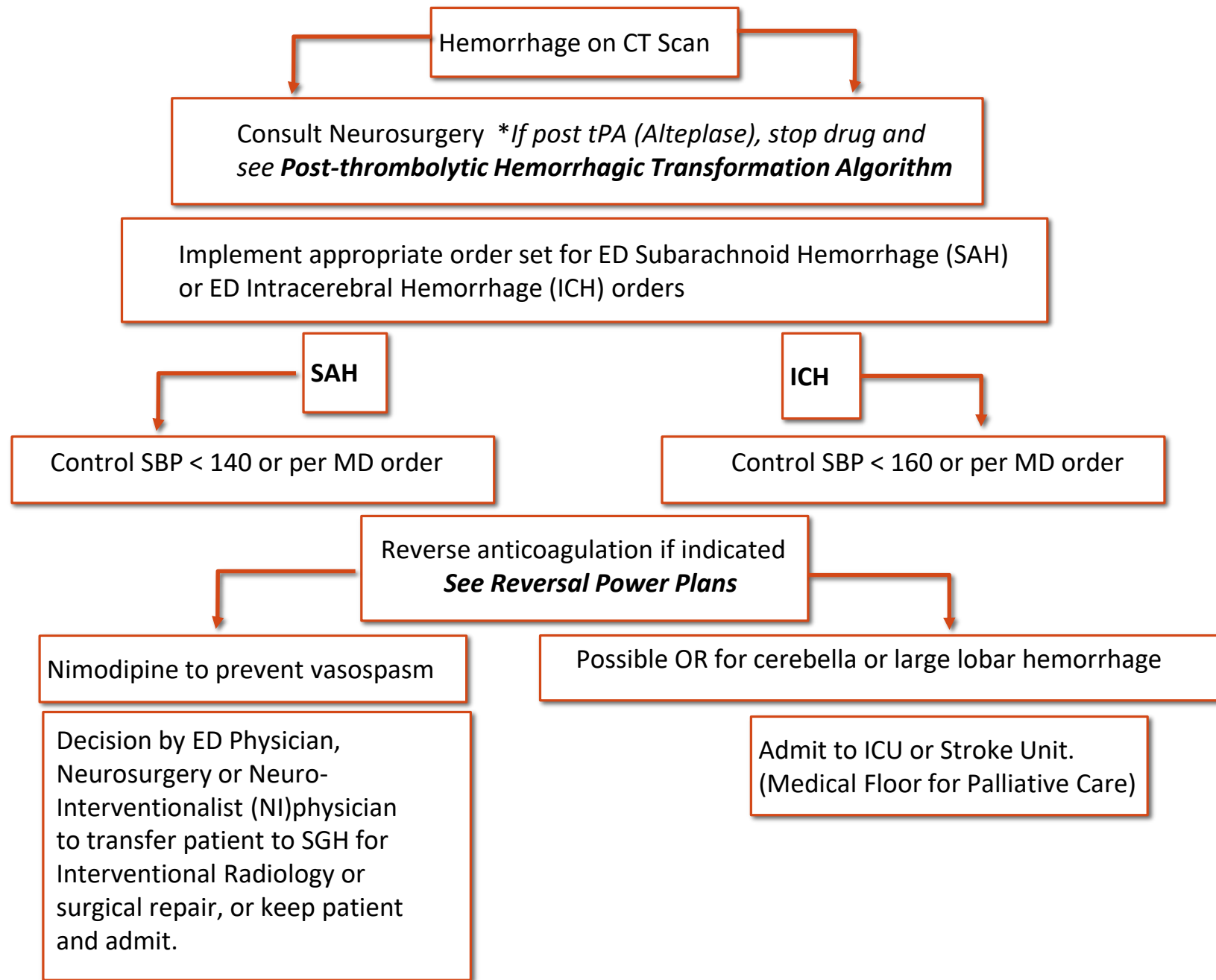


Management of Hemorrhagic Stroke in the ED

Transfer process to Comprehensive Stroke Center for Interventional Radiology or surgical repair:

1. Ensure CTA completed prior to transfer
2. Consult between ED MD and SGH NI. NI 24/7 number 858-210-7366
3. SGH NI arranges IR at SGH
4. SGH on call Neurosurgeon to accept patient
5. NOTIFY Administrative Liaison (AL) who:
 1. Sets up Rapid Response CCT
 2. Notifies Central Patient Placement Center to arrange ICU bed
 3. Confirms bed assignment and accepting Intensivist
6. Report given between ED MD and accepting Intensivist
7. ED RN contacts SGH ICU RN for report
8. Once CCT arrives, report given. Patient transported.

SCOR to use ED to ED internal transfer process.



Emergent Stroke Treatment

BLOOD PRESSURE MANAGEMENT, ALTEPLASE, ANGIOEDEMA
MANAGEMENT, ENDOVASCULAR TREATMENT

Blood Pressure Management During Alteplase Treatment

IV Alteplase requires the BP to be <185 mm Hg systolic and <110 mm Hg diastolic before treatment and <180/105 mm Hg for the first 24 hours after treatment.

If BP is not maintained $\leq 185/110$ mm Hg, do not administer Alteplase

Patients who have elevated BP and are otherwise eligible for treatment with

IV Alteplase should have their BP carefully lowered so that their SBP is <185

mm Hg and their diastolic BP is <110 mm Hg before IV fibrinolytic therapy is initiated

- Labetalol 10–20 mg IV over 1–2 min, may repeat 1 time; **or**
- Nicardipine 5 mg/h IV, titrate up by 2.5 mg/h every 5–15 min, maximum 15 mg/h; when desired BP reached, adjust to maintain proper BP limits; **or**
- Other agents (eg, Hydralazine, Enalapril) may also be considered

Guideline for Thrombolytic Therapy For Ischemic Stroke

Dosing:

IV Alteplase (0.9 mg/kg, maximum dose 90 mg over 60 minutes with initial 10% of dose given as bolus over 1 minute) is also recommended for selected patients who can be treated within 3 and 4.5 hours of ischemic stroke symptom onset or patient last known well or at baseline state.

Exclusion Criteria for IV Thrombolytic Template For Documentation:

- Presentation beyond the 3 - 4.5 hour window from last known well date, or unknown last known well.
- Hx Acute Ischemic Stroke within 3 months, Hx Intracranial Hemorrhage within 3 months, Hx Intraspinal Surgery within 3 months, Hx Head trauma within 3 months
- Hx GI Bleed within 21 days
- Unable to determine if patient is on oral anticoagulants, or has other contraindication to thrombolytic therapy.
- Lack of measurable neurological deficit with no impairment of language, motor function, cognition, and/or of gaze, vision, or neglect; or return to baseline with resolution of acute neurological deficits.
- Neurological deficits due to alternate explanation other than acute stroke, e.g. stroke mimic (seizure, hypoglycemia, etc.)
- Presence of acute hemorrhage on CT of the head.
- Full anticoagulation with Coumadin with INR >1.7, or Platelets < 100,000/mm³, aPTT > 40s or PT > 15s or with novel oral anticoagulant or parenteral anticoagulants.
- Received LMWH within previous 24 hours.

Powers WJ, et al. Guidelines for the early management of patients with acute ischemic stroke: 2019 update to the 2018 guidelines for the early management of acute ischemic stroke: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2019; 50:e.

Angioedema Secondary To Alteplase

Orolingual angioedema following tPA for acute ischemic stroke is a transient, self-resolving hemi-facial swelling contralateral to neurological deficits that can rarely progress to the airway, compromising it and leading to a life-threatening situation if not managed promptly. Reported incidence is 1-5%.

Table 7. Management of Orolingual Angioedema Associated With IV Alteplase Administration for AIS

COR IIb	LOE C-EO
Maintain airway	
Endotracheal intubation may not be necessary if edema is limited to anterior tongue and lips.	
Edema involving larynx, palate, floor of mouth, or oropharynx with rapid progression (within 30 min) poses higher risk of requiring intubation.	
Awake fiberoptic intubation is optimal. Nasal-tracheal intubation may be required but poses risk of epistaxis after IV alteplase. Cricothyroidotomy is rarely needed and also problematic after IV alteplase.	
Discontinue IV alteplase infusion and hold ACE inhibitors	
Administer IV methylprednisolone 125 mg	
Administer IV diphenhydramine 50 mg	
Administer ranitidine 50 mg IV or famotidine 20 mg IV	
If there is further increase in angioedema, administer epinephrine (0.1%) 0.3 mL subcutaneously or by nebulizer 0.5 mL	
Icatibant, a selective bradykinin B ₂ receptor antagonist, 3 mL (30 mg) subcutaneously in abdominal area; additional injection of 30 mg may be administered at intervals of 6 h not to exceed a total of 3 injections in 24 h; and plasma-derived C1 esterase inhibitor (20 IU/kg) has been successfully used in hereditary angioedema and ACE inhibitor-related angioedema	
Supportive care	



Mechanical Thrombectomy – Endovascular Treatment

Guideline for: Endovascular Therapy For Ischemic Stroke

Mechanical Thrombectomy Inclusion Criteria

- Clinical Diagnosis of ischemic stroke causing a disabling neurologic deficit (impairment of language, motor function, cognition, gaze, vision, or neglect)
- Age greater than or equal to 18 years of age
- Symptom onset clearly established to be less than 24 hours
- Pre stroke Modified Rankin Score score of 0-2
- ASPECTS of ≥ 6 (to be calculated by radiology)
- Large vessel occlusion per CT/CTA/MRA

Guideline for: Endovascular Therapy For Ischemic Stroke

Mechanical Thrombectomy Exclusion Criteria:

- Significant mass effect with midline shift
- Pre stroke Modified Rankin Score score > 2
- ASPECTS of ≤ 6
- Oral anticoagulant with INR 3 or PTT 3 times normal

Your Stroke Team leadership

Sharp Memorial Hospital – Primary Stroke Center

Stroke Medical Director – Dr. Madjid Keyvani

Stroke Manager – Christine Sundby RN

Sharp Coronado Hospital – Acute Stroke Ready Hospital

Stroke Medical Director – Dr. Madjid Keyvani

Stroke Coordinator – Marla Poston RN

Sharp Chula Vista Medical Center – Primary Stroke Center

Stroke Medical Director – Dr. Jim Coskun

Stroke Manager – Lindsey Lehman NP

Sharp Grossmont Hospital – Comprehensive Stroke Center

Medical Director – Dr. Dennis Cheng

Stroke Manager – Diane Royer RN



References

- Activase [prescribing information]. South San Francisco, CA: Genentech, Inc; 2018.
- Connolly, Sander., Rabinstein, AA., et al. Guidelines for the Management of Aneurysmal Subarachnoid Hemorrhage: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. *Stroke*. published online May 3, 2012; <http://stroke.ahajournals.org/content/early/2012/05/03/STR.0b013e3182587839>
- Easton, D., Saver., et al. Guidelines for the Prevention of Stroke in Patients With Stroke and Transient Ischemic Attack: A Guideline for Healthcare Professionals. *Stroke*. 2014;45:2160-2236. <http://stroke.ahajournals.org/content/45/8/e172.full.pdf>
- Hemphill, J Claude, Greenburg, Steven, et al. Guidelines for the Management of (Adults)Spontaneous Intracerebral Hemorrhage: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. *Stroke*. 2015; 46:000-000. <http://stroke.ahajournals.org>
- J Anest & Inten Care Med 7(4): JAICM.MS.ID.555716 (2018)
- Powers WJ, Rabinstein AA, Ackerson T, et al. Guidelines for the early management of patients with acute ischemic stroke: 2019 update to the 2018 guidelines for the early management of acute ischemic stroke [published online ahead of print October 30, 2019]. *Stroke*. doi:10.1161/STR.0000000000000211. <http://stroke.ahajournals.org>
- Powers WJ, Rabinstein AA, Ackerson T, et al. Guidelines for the early management of patients with acute ischemic stroke: A guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2018;49:e46–e99. doi: 10.1161/STR.0000000000000158. <http://stroke.ahajournals.org>
- Summers, D., Leonard,, A., et al. Comprehensive Overview of Nursing and Interdisciplinary Care of the Acute Ischemic Stroke Patient. *Stroke*. 2009; 40:2911-2944. <http://stroke.ahajournals.org/content/41/9/e563.full.pdf+html>