FY 22

BREMS Regional Stroke Triage Plan

BREMS Blue Ridge Emergency Medical Services Council

BREMS

Blue Ridge EMS

Council

Updated March 2022

Index

Executive Summary

Under the Code of Virginia § 32.1-111.3, The Office of Emergency Medical Services, acting on behalf of the Virginia Department of Health, has been charged with the responsibility of maintaining a Statewide Stroke Triage Plan. The Statewide Stroke Triage Plan establishes a strategy through formal regional stroke triage plans that incorporate each region's geographic variations and acute stroke care capabilities and resources.

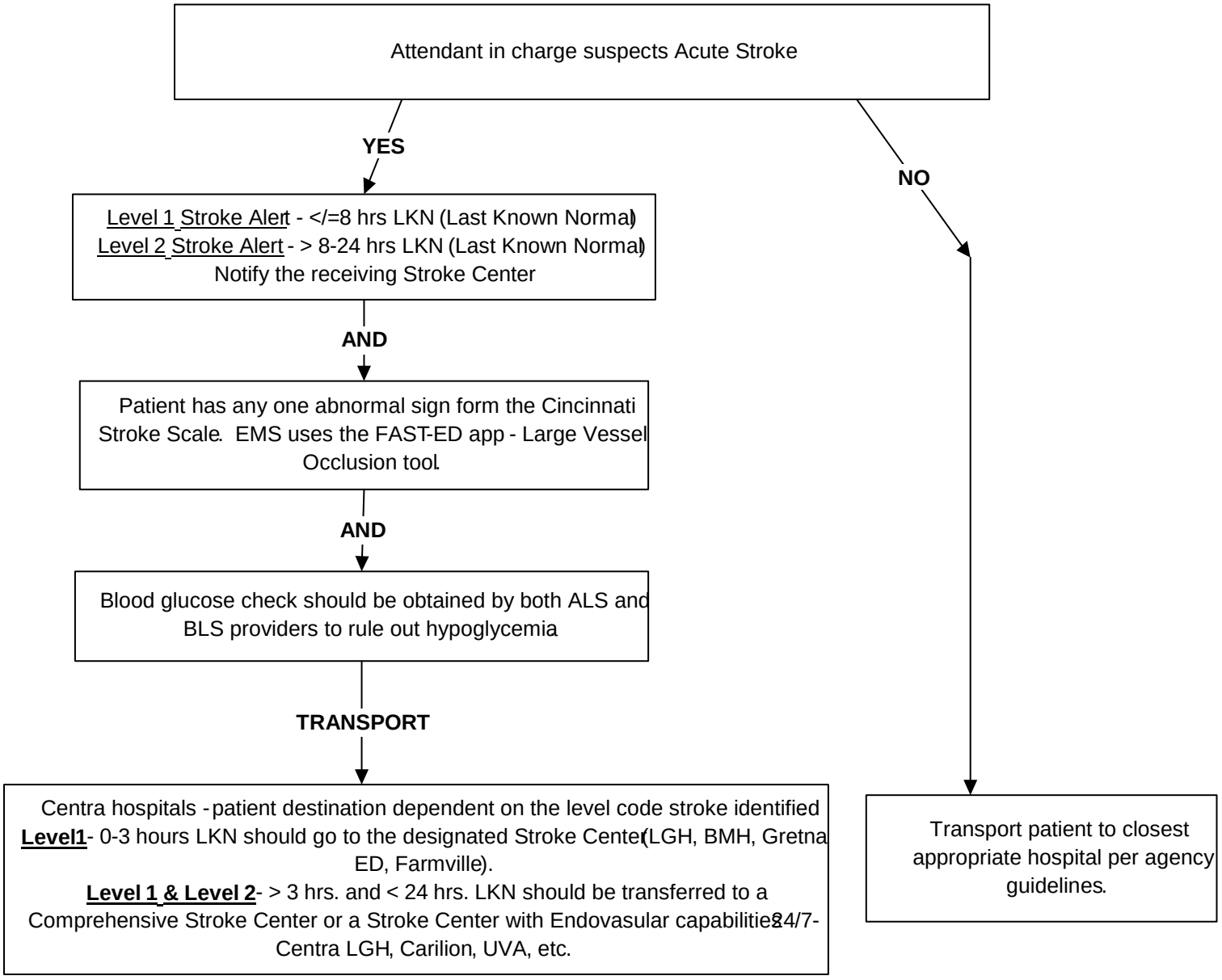
The Commonwealth of Virginia recognizes three levels of stroke certification (a Certified Stroke Center) consistent with recommendations of the Brain Attack Coalition. These are Comprehensive Stroke Centers, Primary Stroke Centers, and Acute Stroke Ready Hospitals. There are multiple certifying bodies including the Joint Commission, DNV, and potentially others.

The purpose of the Statewide Stroke Triage Plan is to establish a uniform set of criteria for the pre-hospital and inter-hospital triage and transport of acute stroke patients. Formal regional or local stroke triage plans may augment the State Stroke Triage Plan to acknowledge and address variations in each region's EMS and hospital resources. This State Stroke Triage Plan, and the related regional plans, addresses patients experiencing an "acute stroke." For the purposes of this document, "acute stroke" is defined as any patient suspected of having an acute cerebral ischemic or hemorrhagic event. The primary focus of the plan is to provide guidelines to facilitate the early recognition of patients suffering from acute stroke and to expedite their transport to a center able to provide definitive care within an appropriate time window.

It is very important to note that because of the continuing evolution of scientific evidence indicating successful management of acute stroke regardless of time of onset, EMS *providers are encouraged to initiate real-time contact with regional or local medical direction to discuss individual cases that may fall outside of their established agency protocol.* The closest hospital may not necessarily be the most appropriate hospital for that patient. In selected cases it may be determined that expeditious transfer or transport directly to a Certified Stroke Center may be of benefit for a specific patient. Some selected acute stroke types may benefit from intervention *for an extended period* following symptom onset (Acute Ischemic Stroke-Healthcare Professional Resource Page). Regardless of time of onset the sooner an acute stroke is treated, the better the potential outcome ("Time is Brain"). Based on an individual patient's time of symptom onset and following discussion with Medical Control, EMS should carefully consider what mode of transport would be most appropriate to transport the patient expeditiously to a Certified Stroke Center.

The purpose of the BREMS Regional Stroke Triage Plan is to establish a uniform set of criteria for the pre-hospital and inter-hospital triage and transport of stroke patients. Formal regional or local stroke triage plans may augment the Commonwealth's Stroke Triage Plan to incorporate each region's geographic variations. This stroke triage plan and those developed as a result, address patients experiencing an "acute stroke".

BREMS Field Stroke Triage Decision Scheme



Guidance Materials

Cincinnati Pre-hospital Stroke Scale (CPSS)

All patients suspected of having an acute or non-acute stroke should undergo a formal screening algorithm such as the CPSS. Use of stroke algorithms has been show to improve identification of acute strokes by EMS providers up to as much as 30 percent. The results of the CPSS should be noted on the pre-hospital medical record.

F-(face)	FACIAL DROOP: Have patient smile or show teeth. (Look for asymmetry) Normal: Both sides of the face move equally or not at all. Abnormal: One side of the patient's face droops.
A-(arm)	MOTOR WEAKNESS: Arm drift (close eyes, extend arms, palms up) Normal: Remain extended equally, drifts equally, or does not move at all. Abnormal: One arm drifts down when compared with the other.
S-(speech)	"You can't teach an old dog new tricks" (repeat phrase) Normal: Phrase is repeated clearly and correctly. Abnormal: Words are slurred (dysarthria) or abnormal (aphasia) or none.
T-Time	Time of SYMPTOM ONSET:_____

*** Results of the F.A.S.T. should be included on the patient's pre-hospital medical record**

FAST ED App

The FAST ED app is a screening tool used to identify Large Vessel Occlusion (LVO). This screening tool will help identify thrombectomy patients. It is a free downloaded with your iPhone or Android device.

Below are some articles on using the LVO screening tool.
http://jnis.bmj.com/content/early/2016/02/17/neurintsurg-2015-012131.abstract
http://stroke.ahajournals.org/content/48/5/1278.short

BREMS Guidelines Specific to Stroke/CVA

Patient Care Guidelines should include:

- An initial/primary assessment
- Focused assessment to include:
    - Obtaining glucose level (if authorized to perform skill)
    - Time of onset
    - Cincinnati pre-hospital stroke scale; FAST ED screening tool app
    - SAMPLE history to include mention of stroke mimics (i.e. seizures, migraines, hypo/hyperglycemia and others as deemed appropriate)
    - SAMPLE history to include thrombolytic exclusions (i.e. pregnancy, seizure at onset, terminal illness and others as deemed appropriate)
- Appropriate treatment
- Transport criteria that preferentially directs acute stroke patients to a designated stroke center (in the BREMS Region- look at Stroke Code Level 1 & 2 Definition in the Triage Decision Scheme)

Acute Stroke Patient Transport Considerations

EMS Patient Care Guidelines should address transport considerations. Each jurisdiction is unique in its availability of acute stroke care resources. Consideration should be given to the hospital(s) that is available in the region and the resources that they have available to acute stroke patients when developing plans and guidelines.

Consideration should also be given to pre-hospital resources including use of Air Transport services available at the time of the incident, and other conditions such as transport time and weather conditions. Use of Air Transport (Air ambulances) services can assist with acute stroke patients reaching a designated stroke center within the three hour window.

Field transports by helicopter of acute stroke patients as defined in this plan should:

- Lessen the time from on scene to a hospital compared to ground transport.
- Should be utilized to achieve the goal of having acute stroke patients arrive in a designated stroke center within a four hour window.
- May be utilized to achieve the goal of having acute stroke patients arrive at a hospital not designated as a stroke center when a designated stroke center cannot be reached within the three hour window.
- Extenuating circumstances such as safety, access should be documented similar to other "extraordinary" care scenarios.

Stroke

Assessment

Pediatric Pearls:
- Use pediatric dosing of medications or electrical therapy for a pediatric patient < 37 kg and as defined by the Broselow® Tape or Handtevy.
- Fluids and medications titrated to maintain SBP > 70 + (age x 2) mmHg

Signs & Symptoms:
- Altered Mental Status
- Weak / Paralysis
- Blindness or other sensory loss
- Aphasia / Dysarthria
- Syncope
- Vertigo / Dizziness
- Headache
- Seizure
- Sense of Impending Doom
- Hyper/hypotension
- Facial asymmetry or droop
- Impaired speech or comprehension

Differential:
- Altered Mental status
- Transient Ischemic Attack (TIA)
- Seizure
- Hypoglycemia
- Hypoxia / Hypocarbia
- Stroke
- Thrombotic/embolic
- Hemorrhagic
- Tumor
- Trauma
- Atypical Migraine

Clinical Management Options

EMT	AEMT	I	P	APP
● Provide oxygen as needed to maintain SpO_2 94 – 98%				
● Basic airway management as needed				
● Blood glucose assessment – address hypoglycemia per protocol				
● Head of bed to 20 deg unless concern for trauma or hypotension				
● Cincinnati Prehospital Stroke Scale (CPSS) / VAN assessment / Time last normal				
● Positive Stroke Screen / Glucose > 50 / last known well ≤ 24 hours, contact Medical Control for Stroke Alert and < 15 minute-on-scene time				
● Patient should remain NPO until a swallow evaluation can be done				
● Identify any anticoagulant medication the patient is taking, such as aspirin, Coumadin, Plavix, Eliquis, supplements, etc.				
● Cardiac monitor and EKG; transmit as indicated				
	● Consider IV/IO access as indicated			
	● 20 ml/kg IV fluid bolus with isotonic crystalloid as indicated. May repeat for hypotension.			
				● Advanced airway management as indicated

Consult Online Medical Control As Needed

Critical Benchmarks:
1. Documentation of stroke scale used and findings
2. EMS scene time less than 20 minutes
3. Pre-arrival notification of receiving facility

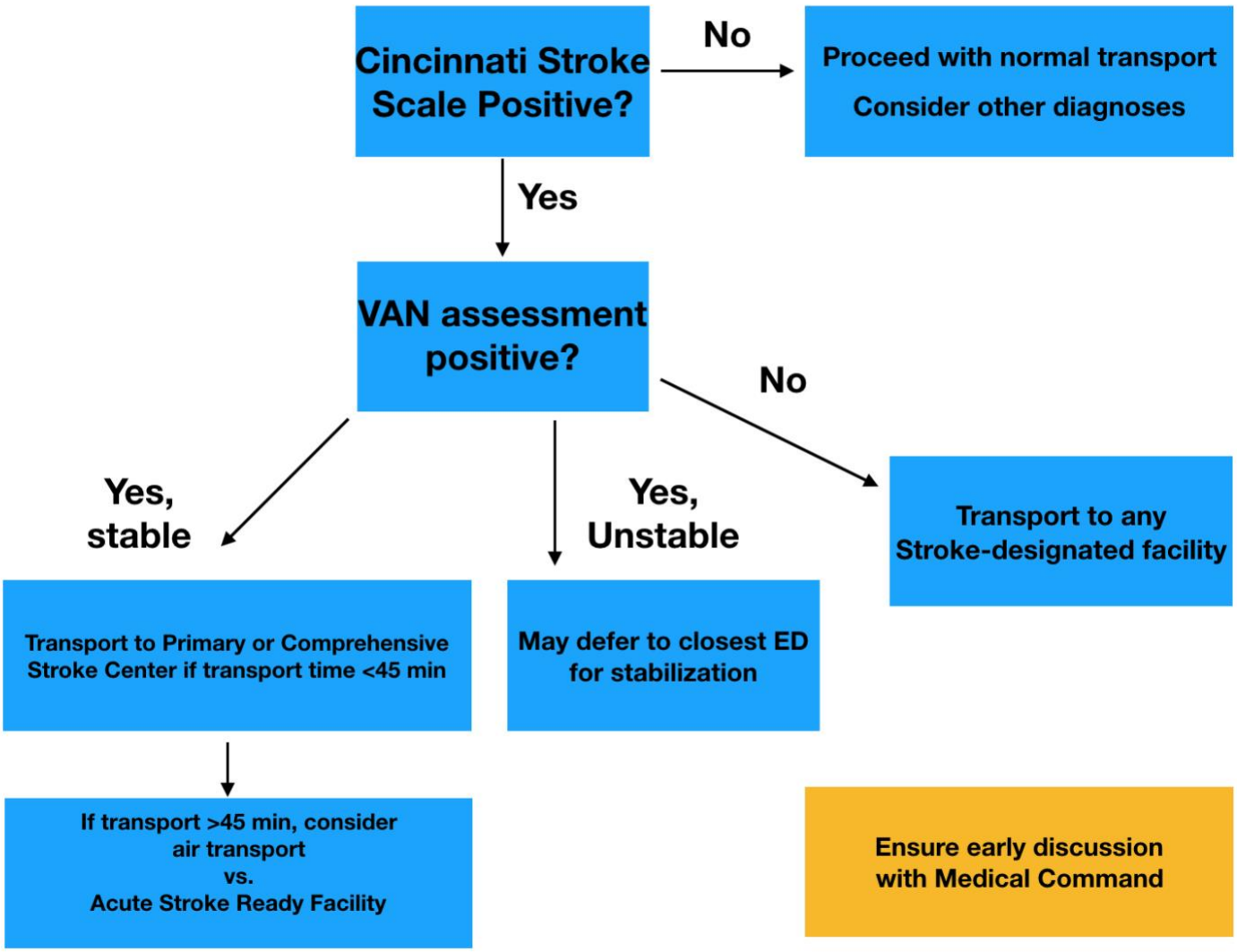
Stroke

Notes:

- Refer to drug formulary charts or Handtevy for all medication dosing for both adults and pediatric patients.
- All suspected stroke patients should receive a CPSS assessment; if this assessment is positive, then a VAN assessment for large vessel occlusion should be completed.
- Contact Medical Command for all patients with acute stroke-like symptoms that have onset within 24 hours of estimated arrival at the receiving facility, so the receiving hospital can prepare for the patient's arrival. Describe your findings, including CPSS/VAN results, preferably to the Medical Command Physician. Medical command may order transport to another facility depending on resources best tailored for the patient. If the medical command physician is not at the receiving facility, that physician should ideally relay pertinent information to the receiving facility. EMS should continue with appropriate Medical Control alerts as well.
- Transport to the closest certified Primary Stroke Center or Comprehensive Stroke Center if the patient can arrive at the stroke center within 45 minutes of initiating transport. Otherwise, transport to an Acute Stroke Ready Hospital, if the patient can arrive at that facility within 45 minutes.
- Patients meeting VAN criteria should preferably be transported to a facility capable of endovascular intervention unless the situation requires otherwise, such as in the setting of patient instability.
- **It is always acceptable to defer to the closest Emergency Department for assistance in stabilizing the patient.**
- If a patient can be delivered by air (but not by ground) to a receiving facility within 24 hours of symptom onset, this may be advisable. Consider contact with Medical Command for assistance in deciding upon the utility of air medical transport.
- Onset of symptoms is defined as the last time the patient was seen symptom free; for example, awakening with stroke symptoms would be defined as an onset time of the previous night when the patient went to bed symptom free.
- Whenever possible, a family member should accompany the patient to the hospital to provide a detailed history or provide the hospital with the name and contact information of someone who can.
- IV access is preferred (sizes 20g or 18g with AC placement).

Stroke

Transport Decision Tree



Stroke

STOKE DESIGNATION	FACILITY
Acute Stroke Ready Hospitals	Bedford Memorial Hospital
	Gretna Medical Center
	Southside Community Hospital
Primary Stroke Centers	Lynchburg General Hospital
	Roanoke Memorial Hospital
Comprehensive Stroke Center	University of Virginia Medical Center

Cincinnati Prehospital Stroke Scale (CPSS)			
Sign/Symptom	**How tested**	**Normal**	**Abnormal**
Facial Droop	Have the patient show their teeth or smile	Both sides of the face move equally	One side of the face does not move as well as the other
Arm Drift	The patient closes their eyes and extends both arms straight out for 10 seconds	Both arms move the same, or both do not move at all.	One arm either does not move, or one arm drifts downward compared to the other.
Speech	The patient repeats "The sky is blue in Cincinnati".	The patient says correct words with no slurring of words.	The patient slurs words, says the wrong words, or is unable to speak

Stroke

VAN (Vision, Aphasia, Neglect) Stroke Assessment Checklist

Table 1 Vision, aphasia, neglect emergent large vessel occlusion screening tool

Stroke VAN	
How weak is the patient? Raise both arms up	☐ Mild (minor drift) ☐ Moderate (severe drift—touches or nearly touches ground) ☐ Severe (flaccid or no antigravity) ☐ Patient shows no weakness. Patient is VAN negative (exceptions are confused or comatose patients with dizziness, focal findings, or no reason for their altered mental status then basilar artery thrombus must be considered; CTA is warranted)
Visual disturbance	☐ Field cut (which side) (4 quadrants) ☐ Double vision (ask patient to look to right then left; evaluate for uneven eyes) ☐ Blind new onset ☐ None
Aphasia	☐ Expressive (inability to speak or paraphasic errors); do not count slurring of words (repeat and name 2 objects) ☐ Receptive (not understanding or following commands) (close eyes, make fist) ☐ Mixed ☐ None
Neglect	☐ Forced gaze or inability to track to one side ☐ Unable to feel both sides at the same time, or unable to identify own arm ☐ Ignoring one side ☐ None

Patient must have weakness plus one or all of the V, A, or N to be VAN positive. VAN positive patients had 100% sensitivity, 90% specificity, positive predictive value 74%, and negative predictive value 100% for detecting large vessel occlusion.
CTA, CT angiography; VAN, vision, aphasia, and neglect.

Stroke

References:

1. Lima FO, Silva GS, Furie KL, et al. Field assessment stroke triage for emergency destination: A simple and accurate prehospital scale to detect large vessel occlusion strokes. Stroke. 2016;47:1997-2002. doi: 10.1161/STROKEAHA.116.013301

2. Evan Hodell, Shana D. Hughes, Megan Corry, Sean Kivlehan, Brian Resler, Nicolas Sheon & Prasanthi Govindarajan (2016) Paramedic Perspectives on Barriers to Prehospital Acute Stroke Recognition, Prehospital Emergency Care, 20:3, 415-424, DOI: 10.3109/10903127.2015.1115933

3. J. Adam Oostema, Todd Chassee, William Baer, Allison Edberg & Mathew J. Reeves (2020) Accuracy and Implications of Hemorrhagic Stroke Recognition by Emergency Medical Services, Prehospital Emergency Care, DOI: 10.1080/10903127.2020.1831669

4. Fu, Paul, Zi Wang, and Yuchuan Ding. "Prehospital Stroke Care, a Narrative Review." *Brain Circulation* 4, no. 4 (2018): 160. https://doi.org/10.4103/bc.bc_31_18.

Designated Stroke Centers

The Commonwealth of Virginia defines a Designated Stroke Center as a hospital that has achieved Primary Stroke Center Certification by the Joint Commission. The process of Stroke Designation/Certification is entirely voluntary on the part of the hospitals and identifies hospitals that have established and maintain a stroke program that provides a higher level of care of stroke care to patients. Designation ensures that the hospital is prepared to provide definitive stroke care at all times and has an organized approach to providing clinical care, performance improvement, education etc.

Information on State Wide Stroke Centers-

http://www.vdh.virginia.gov/emergency-medical-services/trauma-critical-care/virginia-stroke-system/

Link to Joint Commission Certified Stroke Centers

- Certification Data Download - Data Download | QualityCheck.org

Link to DNV Certified Stroke Centers

- DNV GL - Healthcare | DNV GL - Healthcare

Link to a map of Virginia Stroke Certified Hospitals

- Acute Care Stroke Care Hospitals

Virginia Stroke System Web page

- Virginia Stroke Systems Task Force

Virginia Office of EMS Stroke Web page

- Virginia Stroke System-Emergency Medical Services

The Joint Commission

- What is Accreditation? | Joint Commission

American Heart Association

- Stroke Resources for Professionals

National Stroke Association

- Stroke Resources | Stroke.org

Centers for Disease Control and Prevention

- Stroke Information | cdc.gov

BREMS Stroke Quality Assurance

Stroke Triage Quality Monitoring State

The Virginia Office of EMS, acting on behalf of the Commissioner of Health, will report aggregate acute stroke triage findings on an intermittent basis, but no less than annually, to assist EMS systems and the Virginia Stroke Systems Task Force to improve the agency, regional, and Statewide Stroke Triage Plans. A version (without identifiers) of the report will be available to the public and will include, minimally, as defined in the statewide plan, the frequency of (i) over and under triage to Designated Stroke Centers in comparison to the total number of acute stroke patients delivered to hospitals and (ii) inter-facility transfers that do not meet criteria for transfer to Designated Stroke Centers (iii) HEMS utilization. The program reports shall be used as a guide and resource for health care providers, EMS agencies, EMS regions, the Virginia Office of EMS, and the Virginia Stroke Systems Task Force. Additional specific data points to be collected within the EMS pre-hospital patient care report (written or electronic) will be established collaboratively between OEMS and VSSTF. Information to be contained in routine reports on both system and patient-level indicators and outcomes will be developed by OEMS to guide further system development in a patient focused way.

Hospitals, EMS agencies, and EMS Regions are encouraged to utilize their performance improvement programs to perform quality monitoring and improve the delivery of acute stroke care within their regions.

Annual reporting on the State Stroke Triage Plan will typically be provided through OEMS, Division of Trauma/Critical Care's report and on an ad-hoc basis in response to appropriate inquiries.

Regional

Stroke calls will be reviewed by the Stroke Coordinator and referred to the Clinical Team with reference to the BREMS Medical PI Committee when needed.

BREMS will follow up on calls where there are questions and offer assistance and training to the agencies on better management and transport of the Stroke patient.

BREMS assist the Stroke Team in agency education across the region and participates in the monthly Centra Stroke meetings.

BREMS Code Stroke

Code Stroke Level 1

- 0-8 hours from Last Known Normal (LKN)
- Glucose ≥ 60 (less < 60 treat per protocol)
- Perform EMS stroke scale – such as Cincinnati pre-hospital stroke scale
- Completion of a LVO (large vessel occlusion) identification tool such as ***FAST-ED*** (app available from App Store or Google Apps) with a score > 4 or ***VAN + results*** to determine if the patient may need endovascular treatment
- A patient with a positive Cincinnati Stroke Scale (CSS), in this time window should go to the nearest facility that can provide IV tPA/alteplase
- A patient with a positive Cincinnati Stroke Scale (CSS), in the time window of **0-4.5 hours** should go to the nearest facility that can provide IV tPA/alteplase
- Facilities that can provide IV tPA/alteplase:
    - Lynchburg General ER
    - Bedford Memorial ER
    - Gretna ED
    - Medical College of Virginia ER
    - Southside (Farmville) ER
    - University of Virginia ER
    - Roanoke Memorial ER

If the patient meets the criteria for a Level 1 stroke, qualifies for stroke treatment and is greater than 45 minutes from LGH – utilize air transport to an appropriate facility (thrombectomies can be performed at University of Virginia, Medical College of Virginia and Roanoke Memorial ER).

BREMS Code Stroke

Code Stroke Level 2

- 8-24 hours from Last Known Normal (LKN)
- Glucose ≥ 60 (less < 60 treat per protocol)
- Perform EMS stroke scale – such as Cincinnati pre-hospital stroke scale
- Completion of a LVO (large vessel occlusion) identification tool such as ***FAST-ED*** (app available from App Store or Google Apps) with a score > 4 or ***VAN + results*** to determine if the patient may need endovascular treatment

If the patient meets the criteria for a Level 2 stroke, qualifies for stroke treatment and is greater than 45 minutes from LGH – utilize air transport to an appropriate facility (thrombectomies can be performed at University of Virginia, Medical College of Virginia and Roanoke Memorial ER).

Stroke VAN (Vision, aphasia, neglect) LVO (large vessel occlusion) Assessment Tool

How weak is the patient?

Raise both arms up:
□ Mild (minor drift)
□ Moderate (severe drift—touches or nearly touches ground)
□ Severe (flaccid or no antigravity)
□ Patient shows no weakness. Patient is VAN negative
(VAN negative means STOP)

(Exceptions are confused or comatose patients with dizziness, focal findings, or no reason for their altered mental status then basilar artery thrombus must be considered)

Visual disturbance

□ Field cut (which side) (4 quadrants)
□ Double vision (ask patient to look to right then left; evaluate for uneven eyes)
□ Blind new onset
□ None

Aphasia

□ Expressive (inability to speak or paraphasic errors); do not count slurring of words (repeat and name 2 objects)
□ Receptive (not understanding or following commands) (close eyes, make fist)
□ Mixed
□ None

Neglect

□ Forced gaze or inability to track to one side
□ Unable to feel both sides at the same time, or unable to identify own arm
□ Ignoring one side
□ None

Patient must have weakness plus one or all of the V, A, or N to be VAN positive.
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