

**CARE OF PATIENTS  
(Revised October 2019)**

**VA PUGET SOUND  
HEALTHCARE SYSTEM**

**MEMORANDUM TX-069  
MARCH 2019**

**ACUTE ISCHEMIC STROKE MANAGEMENT POLICY**

1. **EXECUTIVE SUMMARY:** The purpose of this memorandum is to define VA Puget Sound Healthcare System (VA Puget Sound) policy and describe procedures for the evaluation, treatment, and monitoring of patients with a suspected acute ischemic stroke (AIS).
2. **October Update:** Revised Attachment K (page 53).
3. **BACKGROUND:**
  - a. Stroke is a disease that affects the arteries leading to and within the brain and is a leading cause of death and disability.
  - b. When it comes to stroke, time is brain! For every hour treatment is delayed, the brain ages approximately 10 years. The faster a patient can access specialized stroke care, the better their chance of recovery.
  - c. There are two acute stroke therapies for AIS (not mutually exclusive): IV alteplase and endovascular therapy. IV alteplase is a clot dissolving (thrombolytic) drug (also referred to as tissue plasminogen activator: tPA) that can reverse stroke effects. Alteplase must be administered within a few hours of symptom onset. Patients must have an urgent brain scan and be evaluated by a physician to determine alteplase eligibility. Select patients may be eligible for endovascular therapy (also known as mechanical thrombectomy); which involves physical removal of a large blood clot. Although alteplase therapy is preferred prior to endovascular therapy, a patient may be considered for endovascular therapy without prior alteplase.
4. **DEFINITIONS:**
  - a. **Acute Ischemic Stroke (AIS):** AIS is a stroke caused by thrombotic or embolic occlusion of an artery or arteries resulting in decreased blood flow to the brain. AIS is clinically manifested by abrupt onset of focal neurological deficits and is defined as patients who present for medical attention within 23 hours of symptom onset or last known well (LKW).
  - b. **Last Known Well (LKW):** LKW is the time the patient was last seen to be well or "normal" without their current stroke symptoms. An accurate LKW is crucial for determining eligibility for acute stroke therapies.

- c. **Acute Stroke Therapies:** Suspected AIS patients presenting < 23 hours of LKW may be eligible for acute stroke therapies. These therapies are: IV alteplase (within 4.5 hours) and endovascular therapy (within 24 hours). These treatments are not mutually exclusive. All patients should be assessed for alteplase eligibility and treated if eligible. Select patients should be referred for endovascular therapy.
  - 1) **Alteplase-Eligible Patient:** Any suspected AIS patient presenting with a LKW < 3.5 hours (assumes 1 hour for evaluation/treatment). See Appendix B for alteplase inclusion and exclusion criteria.
  - 2) **Endovascular-Eligible Patient:** Any suspected AIS patient:
    - a) Presenting with LKW < 15 hours and NIH stroke scale  $\geq 6$ ,
    - b) Presenting with LKW 15-23 hours prior and NIH stroke scale  $\geq 10$ , and
    - c) See Appendix C for endovascular inclusion and exclusion criteria.
- d. **Treatment of AIS Complications:** Patients at risk for brain edema should be monitored closely by staff with expertise in neuro-critical care, in the event an urgent decompressive craniectomy is needed. Decompressive craniectomy can be life-saving; however, it does NOT treat AIS or reverse AIS symptoms.
  - 1) **Decompressive Craniectomy Eligible Patient:**
    - a) Hemispheric infarcts: Very large infarcts (MCA or MCA+ACA) in patients less than 60 years of age (Can be considered in patients > 60 years, though benefit is less certain).
      - (1) Identified clinically by presence of MCA syndrome, and
      - (2) Identified on imaging by a large area of ischemic change.
    - b) Cerebellar infarcts: Infarcts involving the majority of a cerebellar hemisphere may rapidly compress the brainstem, impairing vital functions, so suboccipital craniectomy should be considered in all such patients.
      - (1) Identified clinically by presence of unilateral ataxia, and
      - (2) Identified on imaging by an area of ischemic change involving most or all of a cerebellar hemisphere.
- e. **National Institute of Health Stroke Scale (NIHSS):** NIHSS is a standardized measure of acute stroke severity. A higher number generally indicates

increasing neurological deficit, however patients with NIHSS  $<3$  may still have disabling deficits. AIS treatments should be based on degree of disability, not simply the NIHSS score. See Appendix D.

- f. **Stroke Team:** The interprofessional team responsible for determining patient eligibility to receive acute stroke therapy. The stroke team is distinct from non-stroke critical response teams. This team includes the Neurology Attending, Neurology residents, Critical Care RN, Intensivist/Nocturnist, Pharmacist, Laboratory Staff, CT Technicians, and Neuroradiologists for rapid assessment, triage, and stabilization of patients.
- g. **Code Stroke:** A mechanism by which the VAMC urgently alerts the stroke team of patients who may be eligible for acute stroke treatment. See Appendix E for Stroke Code Operator Paging Guide.

## 5. PROCEDURES:

- a. **Adherence to Evidence-Based Guidelines:** Patients presenting with signs and symptoms of AIS will be treated according to current guidelines from the American Heart Association (AHA)/American Stroke Association (ASA) for the early management of patients with AIS and VHA Directive 1155 “Treatment of Acute Ischemic Stroke.”
- b. **Stroke Center Designation:** The VAMC is designated as a Primary Stroke Center (PSC) based on criteria in VHA Directive 1155 “Treatment of Acute Ischemic Stroke.” This means that the VAMC has the necessary infrastructure to rapidly evaluate and treat AIS patients (including administration of alteplase) 24 hours a day, 7 days a week, 365 days a year.
- c. **Transfer Facilities (During All Hours):**
  - 1) Post-alteplase patients: VAMC will admit post-alteplase patients to the Medical Intensive Care Unit (MICU) for a minimum of 24 hours following alteplase administration. All critical care units are covered by critical care attending physicians, critical care fellows, and medicine residents during business hours of operation. After regular business hours, a nocturnist team (medicine hospitalist) provides intensive care coverage with available critical care attending back-up.
  - 2) All endovascular eligible patients (LKW  $< 15$  hours and NIH stroke scale  $\geq 6$  OR LKW between 15-23 hours and NIH stroke scale  $\geq 10$ ) will be transferred to: Harborview Medical Center (transfer center 206-744-3597), Swedish Medical Center (transfer center 866-470-4233), or Virginia Mason Medical Center (transfer center 206-341-1141) via ambulance through Seattle Fire Department Medic 1. Written transfer agreements will be maintained by the

VA Puget Sound Director of Hospital Specialty Medicine and VA Puget Sound Director.

- 3) All decompressive craniectomy patients will be transferred to: Harborview Medical Center (transfer center 206-744-3597), Swedish Medical Center (transfer center 866-470-4233), or Virginia Mason Medical Center (transfer center 206-341-1141) via ambulance through Seattle Fire Department Medic 1. Written transfer agreements will be maintained by the VA Puget Sound Director of Hospital Specialty Medicine and VA Puget Sound Director.
- d. **VA Puget Sound Facilities Geographically Distinct from the VA Puget Sound Seattle Campus:** VA Puget Sound facilities geographically distinct from the main Seattle campus including American Lake and Community Based Outpatient Clinics (CBOCs) do not have the infrastructure or personnel to care for patients with AIS (i.e., ability to obtain CT within 20 minutes of patient arrival and STAT labs) and will call 911 for transport to the nearest emergency room if a patient presents with signs and symptoms consistent with an AIS.
- e. **Acute Stroke Target Process Times:** All patients who may be experiencing AIS will be treated as expeditiously as possible to ensure rapid diagnosis and treatment. VA Puget Sound target process times (from patient entry into facility or recognition of symptoms if inpatient) are as follows:
  - 1) Initial evaluation (ED physician, hospitalist, intensivist, or neurologist)  $\leq 10$  minutes,
  - 2) CT scan completed  $\leq 20$  minutes for  $\geq 50\%$  of AIS patients who may be candidates for IV alteplase and/or mechanical thrombectomy,
  - 3) CT scan interpreted by radiologist and/or neurologist/neurosurgeon (in-person or via telehealth)  $\leq 45$  minutes. Must be read  $\leq 15$  minutes from image completion.
  - 4) Door to needle time:
    - a) Primary Goal:  $\leq 60$  minutes for  $\geq 50\%$  of AIS patients treated with IV alteplase, and
    - b) Secondary Goal:  $\leq 45$  minutes for  $\geq 50\%$  of AIS patients treated with IV alteplase.
  - 5) Transfer endovascular eligible stroke patients (door in door out)  $\leq 120$  minutes.
- f. **Alteplase:**

- 1) Extended Time Window: Although the FDA has not approved alteplase for use in the 3 to 4.5-hour time from LKW, VAPSHCS will use alteplase to treat AIS patients up to 4.5 hours after LKW based on endorsement from the AHA/ASA.
  - 2) Storage: One 100 mg box of alteplase will be stored in the ED and ICU as backup although in most cases alteplase will be reconstituted in the pharmacy and delivered to patient bedside.
  - 3) Reconstitution and Administration: Reconstitution of alteplase will be performed by the pharmacy and immediately delivered to patient bedside.
  - 4) Informed Consent: The patient or a legally authorized surrogate will be informed of the risks and benefits of alteplase. If patient or surrogate is unable to consent, follow surrogate decision-making guideline outlined in VA Puget Sound policy RI-06. If the patient/surrogate declines administration of alteplase, the reason(s) (if known) and the expected outcome will be documented in the medical record. Signature consent for alteplase will be documented using iMed Consent. If iMed Consent is not immediately available, consent will be obtained using VA Form 10-0431a (see Appendix F).
- g. **Capture and Reporting of Stroke Data**: The VA Puget Sound Stroke Coordinator will complete monthly reporting of required stroke data to the VA IPEC acute stroke data management system. AIS patients will be identified by CPRS health factors in real-time and via weekly data pulls for ED and discharge ICD-10 codes. All QI/QA data will be manually extracted and maintained in a HIPAA-compliant folder housed on the VA Puget Sound network drive. The current indicators are as follows:
- 1) Percentage of eligible patients given thrombolytic therapy (alteplase),
  - 2) Percentage of eligible patients receiving or transferred for endovascular therapy,
  - 3) Percentage of AIS patients that have the NIHSS completed,
    - a) Prior to alteplase, endovascular therapy, or transfer for patients eligible for acute treatment, or
    - b) Within 12 hours of admission for patients presenting outside the window for acute therapies.
  - 4) Percentage of patients being screened for dysphagia before oral intake.

- h. **Performance Improvement:** Improving the quality of AIS care requires the involvement of multiple stakeholders including Neurology, Emergency Medicine, Intensive Care, Hospital Medicine, Radiology, Pharmacy, Laboratory Services, Rehabilitation Medicine, and Nursing. Representatives of these groups meet monthly as part of the Stroke Advisory Committee. Standing agenda items include review of IPEC reporting measures, review of stroke codes with an emphasis on alteplase and thrombectomy cases, and review of AIS Core Performance Measures tracked through the American Heart Association's (AHA) Get with the Guidelines data repository. Data is presented to the Acute Care Committee (ACC) on a quarterly basis. The ACC in turn reports to the Clinical Executive Board (CEB).
  - i. **AIS Educational Program for Staff and Patients:**
    - 1) The AIS educational program will be led by the VA Puget Sound Stroke Coordinator and the VA Puget Sound Stroke Education Committee. Educational sessions will include shift huddles, mock stroke codes, and periodically highlighting recent publications relevant to AIS care. See Appendix G for annual staff education requirements.
    - 2) Veterans will be provided a stroke awareness pamphlet for stroke identification and emergency actions required during new patient orientation. All patients hospitalized with AIS will receive more detailed education packets (e.g., The Veteran's Self-Management Guide to Stroke Prevention) prior to discharge. Nursing staff will review general risk factor reduction guidelines, medications, and signs and symptoms of stroke. Patients in outpatient neurology and medicine clinics at risk for stroke or who have suffered stroke but were not hospitalized at VA Puget Sound will also receive a stroke awareness booklet/brochure.
6. **PROTOCOL (AIS MANAGEMENT PLAN):** See Appendix A.
7. **RESPONSIBILITIES:**
- a. **VA Puget Sound Director:** All responsibilities will be delegated to the VA Puget Sound Stroke Director and Associate Stroke Director, who will provide regular updates to the Director via the Acute Care Committee (ACC) and Clinical Executive Board (CEB).
    - 1) Submitting this policy to the VISN 20 Network Director and notifying the VISN 20 Network Director of any substantive changes.
    - 2) Ensuring the local AIS policy is developed and is current.
    - 3) The overall management of patients with AIS, according to the policies and protocols described herein.

- 4) Ensuring VA Puget Sound has a stroke unit or designated location (specific nursing unit, stepdown unit, or ICU) where AIS patients are admitted that is staffed with medical personnel who have additional training and expertise in stroke.
  - 5) Establishing the following written transfer agreements:
    - a) For the urgent transfer of all endovascular-eligible patients to the nearest facility capable of performing endovascular therapy.
    - b) For the urgent transfer of all craniectomy-eligible patients to the nearest facility with neurocritical care and neurosurgical capabilities.
  - 6) Ensuring this AIS policy is readily available in the ED and ICU and is posted to the VA Puget Sound SharePoint. See Appendix L and Appendix M.
  - 7) Ensuring VA Puget Sound completes monthly reporting of required data to the VA Inpatient Evaluation Center (IPEC) acute stroke data module.
  - 8) Ensuring that patient and staff stroke education activities are completed annually.
  - 9) Ensuring VA Puget Sound is meeting Acute Stroke Process Times as defined in this policy and instituting process improvement as needed to achieve timeframes.
- b. **VA Puget Sound Chief of Staff:** All responsibilities will be delegated to the VA Puget Sound Stroke Director and Associate Stroke Director, who will provide regular updates to the Chief of Staff via the Acute Care Committee (ACC) and Clinical Executive Board (CEB).
- 1) Ensuring medical providers are educated in and adhere to the policies and protocols described herein.
  - 2) Regularly reviewing VA Puget Sound AIS policy and updating as necessary.
  - 3) Regularly reviewing VA Puget Sound data reported on the VA IPEC acute stroke data module and instituting process improvement as necessary to ensure delivery of optimal acute stroke care.
  - 4) Meeting Acute Stroke Process Times as defined in this memorandum.
- c. **VA Puget Sound Deputy Director of Patient Care Services:** All responsibilities will be delegated to the VA Puget Sound Stroke Program

Coordinator, who will provide regular updates to the Deputy Director of Patient Care Services.

- 1) Ensuring designated nursing staff are educated in and adhere to the policies and protocols described herein.
- 2) Ensuring this AIS policy is readily available in the ED and ICU and is posted to VA Puget Sound SharePoint. See Appendix L and Appendix M.
- 3) Meeting Acute Stroke Process Times as defined in this memorandum.

**d. VA Puget Sound Chief of the Emergency Department:**

- 1) Ensuring staff are educated in and adhere to the policies and protocols described herein.
- 2) Meeting Acute Stroke Process Times as defined in this memorandum.

**e. VA Puget Sound Chief of Radiology:**

- 1) Ensuring radiology staff (radiologists and CT technicians) are educated in and adhere to the policies and protocols described herein.
- 2) Ensuring at least one CT technician is in-house 24/7 and able to urgently perform non-contrast CTs.
- 3) Ensuring that patients with suspected strokes are prioritized for CT.
- 4) Ensuring that the CT technician immediately responds to the code stroke page by preparing CT.
- 5) Ensuring CT is immediately uploaded to VistA Imaging and VA National Teleradiology Program after hours.
- 6) Meeting Acute Stroke Process Times as defined in this memorandum, specifically the need for CT to be completed within 20 minutes of symptom recognition or patient arrival and for CT to be read within 15 minutes of completion.

**f. VA Puget Sound Chief of Laboratory:**

- 1) Ensuring all laboratory staff are educated in and adhere to the protocol for management of patients with AIS described herein.



- 2) Meeting Acute Stroke Process Times as defined in this memorandum:  
Specifically, the need for results within 30 minutes of symptom recognition or patient arrival.
  - g. **VA Puget Sound Chief of Pharmacy:**
    - 1) Ensuring pharmacy staff are educated in and adhere to the management of patients with AIS, according to policies and procedures described in this memorandum.
    - 2) Ensuring one box of alteplase is stored in both the ED and ICU.
    - 3) Ensuring staff are able to use alteplase in the extended time frame (up to 4.5 hours from LKW).
    - 4) Ensuring alteplase is reconstituted in the inpatient pharmacy and hand-delivered at patient bedside within 15 minutes of alteplase order. Depending on clinical needs, pharmacy will be available to reconstitute alteplase at patient bedside.
    - 5) Ensuring relevant pharmacists are trained in reconstitution of alteplase.
    - 6) Ensuring immediate response of on-call pharmacist to patient bedside when code stroke is activated.
  - h. **VA Puget Sound Chief, Center of Education and Development:** The Chief, Center of Education and Development is responsible for ensuring all staff involved in the intake, assessment, management, treatment, and disposition of AIS patients receive education regarding prompt recognition and treatment of AIS.
8. **REFERENCES:**
- a. [VHA Directive 1155\(1\), Treatment of Acute Ischemic Stroke \(AIS\), June 2, 2018 \(Amended November 13, 2018\).](#)
  - b. VHA Neurology SharePoint:  
<https://vaww.infoshare.va.gov/sites/MedicalSurgical/neurology/Documents/Forms/AllItems.aspx?RootFolder=%2Fsites%2FMedicalSurgical%2Fneurology%2FDocuments%2FStroke&FolderCTID=0x012000FE6140A70CFD9E46901B4A8414E940BB&View=%7B77238B88%2D5378%2D4E91%2D8DC7%2D96B0C7EA9B0D%7D>. (This is an internal VHA SharePoint site with limited access).
  - c. [Powers WJ, et. al; on behalf of the American Heart Association Stroke Council. 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. doi.](#)

- d. [Benjamin EJ, et. al.; on behalf of the American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2018 update: a report from the American Heart Association. \*Circulation\*. 2018;137:e67–e492. DOI.](#)
  - e. [Clinical Policy: Use of Intravenous Tissue Plasminogen Activator for the Management of Acute Ischemic Stroke in the Emergency Department. American College of Emergency Physicians Clinical Policies Subcommittee \(Writing Committee\) on Use of Intravenous tPA for Ischemic Stroke. \*Ann Emerg Med\*. 2015 Sep;66\(3\):322-333.e31.](#)
  - f. [Higashida R, et. al.; on behalf of the American Heart Association Advocacy Coordinating Committee. Interactions within stroke systems of care: a policy statement from the American Heart Association/American Stroke Association. \*Stroke\*. 2013;44:2961–2984.](#)
  - g. [Pharmaceutical Use Outside of Approved Indications Guidance on “Off-label” Prescribing. Department of Veterans Affairs Center for Medication Safety, Veterans Health Administration Pharmacy Benefits Management Services VA Medical Advisory Panel and VISN Pharmacist Executives. August 2013.](#)
  - h. Prescribing information for Activase® (alteplase), Genentech, Revised: 01/2017. [https://www.gene.com/download/pdf/activase\\_prescribing.pdf](https://www.gene.com/download/pdf/activase_prescribing.pdf) and <https://www.activase.com/>
9. **RESCISSION:** Memorandum TX-069, November 2014.
10. **FOLLOW-UP RESPONSIBILITY:** VA Puget Sound Stroke Director and Associate Stroke Director.
11. **RECERTIFICATION DATE:** Last business day of March 2022.

**MICHAEL C. TADYCH, FACHE**  
Director

Attachments:

- A. Protocol (AIS Management Plan)
- B. Alteplase Inclusion and Exclusion Criteria
- C. Endovascular Inclusion and Exclusion Criteria
- D. NIH Stroke Scale
- E. Stroke Code Operator Paging Protocol
- F. Alteplase Consent Form

- G. Staff and Provider Stroke Education Requirements
- H. RN Dysphagia Screen
- I. Intracranial Hemorrhage Transfer Policy
- J. Reversal of Coagulopathies in Patients with Intracranial Hemorrhage
- K. Protocol for Suspected Intracranial Hemorrhage after IV Alteplase
- L. Emergency Department Acute Stroke Protocol
- M. Inpatient Acute Stroke Protocol

**PROTOCOL (AIS MANAGEMENT PLAN)****a. Identify Stroke Patient:**

(1) **Recognize acute stroke patient:** Notify ED triage RN immediately. **Act FAST!** Strokes are often painless. AIS symptoms include, but not limited to:

- (a) Sudden unilateral weakness or numbness of face, arm or leg
  - (b) Sudden mental confusion, trouble speaking or understanding
  - (c) Sudden trouble walking
  - (d) Sudden dizziness, loss of balance or coordination
  - (e) Sudden trouble seeing in one or both eyes
  - (f) Sudden severe headache with no known cause
- (2) Take patient and witnesses to acute exam room.
- (a) Assess patient for stroke symptoms.
  - (b) Notify physician immediately of suspected stroke patient.

**b. Conduct Rapid Assessment:**

(1) **Determine time of LKW**, whether witnessed, and time elapsed since LKW or onset of symptoms. LKW determines treatment patient is eligible to receive. Post LKW time outside patient's room.

(2) **Determine if patient is eligible for acute stroke treatment:**

- (a) **Alteplase-Eligible Patient:** Any suspected AIS patient with a LKW < 3.5 hours. See Appendix B for inclusion and exclusion criteria. *NOTE: For facilities participating in NTSP, activate for all strokes for LKW ≤ 8 hours.*
- (b) **Endovascular-Eligible Patient:** Any suspected AIS patient with LKW < 15 hours and NIH stroke scale ≥ 6 OR LKW between 15-23 hours and NIH stroke scale ≥ 10. See Appendix C for inclusion and exclusion criteria.

**c. Activate Code Stroke for ALL Potential Acute Stroke Treatment Candidates:**

(1) **Page VAPSHCS stroke team.** Dial 911 on an internal phone. Do not include Protected Health Information (PHI) or Personally Identifiable Information (PII) when activating local stroke team. Operator will follow paging tree (appendix E) to

activate voice pagers, CT technician, MICU resident or on-call hospitalist, and neurology resident and attending.

- (a) CT technician immediately prepares CT.
- (b) Lab technician reports to bedside to perform i-Stat labs and/or transport labs.
- (c) Pharmacist reports to bedside.
- (d) Neurologist reports to bedside immediately if in-house or within 30 minutes if taking home call. When on home call, the neurology resident must respond by phone within 5 minutes. If the resident has not responded within 5 minutes, the neurology attending should be paged.
- (e) Other stroke team members including MICU RN, stat RN, MICU resident, or hospitalist/nocturnist report to bedside to assist in data collection and transportation.

**d. Complete Acute Stroke Evaluation:**

(1) **Check baseline vital signs** and place patient on continuous oxygen monitor and telemetry. Assess need for supplemental oxygen to keep SpO<sub>2</sub> > 94%.

(1) **Conduct Baseline NIHSS**. See Appendix D.

(2) **Sign Stroke Pathway Orders** in electronic medical record through Emergency Department Orders or Orders by Indication/Disease Management.

(3) **Immediately Complete Non-Contrast Head CT**. When CT ready, transport patient to/from CT. Stay with patient. If CT is available, do **NOT** delay for further assessment. CTA Head and Neck may be performed at the time of non-contrast head CT but should not delay treatment with IV alteplase. CTA may proceed without waiting for renal function labs if there is a high suspicion for large vessel occlusion, if the patient has no history of renal impairment, or at the discretion of the neurology provider if the benefits of early diagnosis of large vessel occlusion are thought to outweigh the risks of contrast-induced nephropathy.

(4) Immediately **upload images to VistA Imaging**. After hours images should be immediately pushed to VA National Teleradiology Program with a STAT labeling. During business hours, neuroradiology will provide ASPECTS score for patients considered thrombectomy candidates. Vascular Neurologist may provide this information after hours, if needed.

(5) **Draw labs and send STAT to lab**. Do **NOT** delay CT for labs. Chemistries and troponin can be performed using iStat.

- (a) CBC (including PLT) STAT
- (b) Prothrombin time & INR Plasma STAT
- (c) PTT plasma STAT
- (d) BMP+Plasma STAT
- (e) B-HCG if relevant
- (f) POCT glucose

(6) **Obtain 12-lead EKG**

(7) **Obtain accurate patient weight**

(8) **Maintain nothing by mouth (NPO) status** (including medications) until patient has swallow screen performed. See Appendix H.

(9) **Obtain medical history** including confirming LKW time and establishing alteplase inclusion/exclusion criteria (see Appendix B).

e. **If Blood Identified on Non-Contrast Head CT**: If epidural, subdural, subarachnoid, or intraparenchymal blood is identified on non-contrast head CT, the ED physician and neurology provider will discuss transfer to the nearest level 1 trauma center with 24/7 in-house Neurosurgery coverage, usually Harborview Hospital. Depending on the nature and size of the bleed, some patients may be able to be monitored closely in the VAPSHCS MICU (see Appendix I). Additional labs should be drawn on discovery of intracranial hemorrhage, including type and screen, thrombin time, and fibrinogen. Consider reversal of any anti-platelet or anticoagulant medications per protocol (appendix J).

f. **Manage Blood Pressure (BP)**: Set BP to record every 15 minutes. If BP > 185/>110, notify physician.

(1) **Pre-Alteplase Patients:**

(a) If Systolic BP <185 and diastolic BP <110 NO antihypertensive treatment indicated.

(b) If Systolic BP >185 OR diastolic BP >110 may give:

1. Labetalol 10-20 mg IV over 1-2 minutes; after 10 minutes, may give a 2nd dose

2. Nicardipine (preferred if on  $\beta$  blocker as outpatient)

3. 5 mg/hour IV; titrate up by 2.5 mg/hour every 5-15 minutes (maximum of 15 mg/hour); when desired BP reached, adjust to maintain BP goal.

**(2) For Patients Ineligible for Alteplase:**

(a) If Systolic BP  $\leq$  220 OR diastolic BP  $\leq$  120:

1. Observe unless other end-organ involvement (e.g., aortic dissection, acute myocardial infarction pulmonary edema, hypertensive encephalopathy).

2. Treat other symptoms of stroke (e.g., headache, pain, agitation, nausea, vomiting).

3. Treat other acute complications of stroke, including hypoxia, increased intracranial pressure, hypoglycemia, or seizures.

(b) If Systolic BP  $>$  220 OR diastolic BP 121-140, aim for a 10-15% reduction in BP. May give:

1. Labetalol 10-20 mg IV given over 1-2 minutes. May repeat or double every 10 minutes (maximum dose 300 mg)

2. Nicardipine 5 mg/hour IV infusion as initial dose; titrate up by 2.5 mg/hour every 5-15 minutes (maximum of 15 mg/hour); when a 10-15% reduction in BP is reached, adjust to maintain BP.

(c) If Diastolic BP  $>$  140 may give:

1. Sodium Nitroprusside 0.5 mcg/kg/min IV infusion as initial dose with continuous BP monitoring.

**g. Prepare for Alteplase Administration:**

(1) Ensure 2 large bore IVs are in place (18 gauge at least). Avoid jugular and subclavian sticks. No D5W in any IV fluids or admixtures.

(2) IVs – 0.9 NS / @ 60 cc/hr.

(3) Insert foley catheter if needed. Do NOT delay alteplase to place foley catheter.

(4) When notified by physician, immediately begin reconstituting alteplase.

(a) Total dose=0.9mg/kg (max 90mg)

(b) Prepare 10% of total dose in a syringe=bolus dose

(c) Remove excess from alteplase bottle, leaving 90% of total dose to be infused over 1 hour

**h. Diagnosis and Treatment Plan:**

(1) The neurology provider will contact the on-call Vascular Neurologist by calling the VA Stroke Director between 7:00-17:00 on Monday-Friday or the Harborview Hospital Stroke Phone (206-744-6789) after hours and weekends to review the history, imaging, and lab data.

(2) Confirm diagnosis and treatment plan with ED or inpatient attending physician and VA neurology attending, but do not delay alteplase administration.

(3) Execute physician recommendations. Do **NOT** delay treatment for written documentation.

**i. Administer Alteplase (if recommended):**

(1) **Obtain and document consent.** iMed consent preferred. If not immediately available, use paper consent form. For patients for whom consent cannot be obtained, the reason(s) must be documented. If treatment will proceed without consent, the reason must be documented and agreed upon by two physician. See Appendix F.

(2) **MD Enters Alteplase (tPA) For Acute Stroke Order** in electronic medical record to order alteplase and post-alteplase monitoring.

(3) **Reconstitute alteplase.** Use patient weight to calculate total alteplase dose, discard quantity, bolus dose, and infusion dose. The dose will be confirmed with the neurologist

(4) After preparing the bolus dose, the nurse will state "alteplase (tPA) XXmg bolus, give over 1 minute."

(5) Complete brief pre-alteplase time-out to confirm patient's eligibility, consent, and treatment plan.

(6) **Administer alteplase bolus** (10% of total dose over 1 minute), then immediately begin alteplase infusion.

(7) **Monitor blood pressure and neurologic status** and record in EMR.

(a) Every 15 minutes for the first hour after infusion is stopped.

(b) Every 30 minutes for next six hours.



- (c) Hourly from the eighth post-infusion hour until 24 hours after infusion.
  - (7) Check for bleeding—both major and minor bleeding.
  - (8) Discontinue infusion and obtain an emergency CT scan if patient develops severe headache, acute hypertension, nausea, or vomiting, or has neurologic deterioration beyond baseline deficits.
  - (9) Monitor for signs of orolingual angioedema. If angioedema is noted, promptly discontinue alteplase infusion and follow protocol for angioedema.
- j. **Manage Blood Pressure During and Post-Alteplase:** Once IV alteplase given, BP must be maintained below 180/105 to limit risk of intracerebral hemorrhage. Administer antihypertensive medication to maintain BP at or below these levels:
- (1) **If Systolic BP >180 OR diastolic BP >105 may give:**
    - (a) Labetalol 10 mg IV followed by Labetalol drip at 2-8 mg/min to maintain BP <180/105
    - (b) Nicardipine 5 mg/hour IV infusion as initial dose; titrate up by 2.5 mg/hour every 5-15 minutes (maximum of 15 mg/hour); when desired BP reached, adjust to maintain BP <180/105.
  - (2) **If Diastolic BP >140, or BP not controlled with the above measures:**
    - (a) Sodium Nitroprusside 0.5 mcg/kg/min IV infusion as initial dose, titrate by 2.5mg q5 minutes until diastolic BP decreases by 20%. Continuous arterial monitoring advised; weigh bleeding risk of arterial puncture against possibility of missing dramatic BP changes during infusion.
- k. **Manage Alteplase Complications:**
- (1) **Hypertension:** Confirm BP goal with neurology.
  - (2) **Hyperthermia:** Acetaminophen 1 gram orally, or 650mg rectally every 4 to 6 hours. Do not exceed 4 grams in 24 hours.
  - (3) **Hyperglycemia:** Keep blood glucose level 140-180mg/dL. Do not use glucose-containing IV fluids.
  - (4) **Hypoxia:** Oxygen 2L via NC – titrate to keep SpO2 > 94%.
  - (5) **Hypotension:** IV fluids. Lower head of bed if neurologic worsening.

(6) **Anaphylaxis and Angioedema**: If stridor (a high-pitched breath sound, which is a sign of a narrowed or obstructed airway), oropharyngeal swelling, or urticaria (commonly known as hives) occurs:

(a) Maintain airway.

1. Endotracheal intubation may not be necessary if edema is limited to anterior tongue and lips.

2. Edema involving the larynx, palate, floor of the mouth or oropharynx with rapid progression (within 30 minutes) poses a higher risk of requiring intubation.

3. Awake fiberoptic intubation is optimal. Nasotracheal intubation may be required but poses risk of epistaxis. Cricothyrotomy is rarely needed, and is also problematic after alteplase.

(b) Immediately discontinue alteplase infusion and hold all ACEIs.

(c) Administer the following:

1. Methylprednisolone 125 mg IV (may continue TID regimen for continued stridor)

2. Diphenhydramine 50 mg IV

3. Famotidine 20 mg IV or Ranitidine 50 mg IV

(d) If there is further increase in angioedema, administer epinephrine (0.1%) 0.3ml subcutaneously or 0.5ml by nebulizer.

(e) Supportive Care

(7) **Symptomatic Intracranial Bleeding within 24h of IV alteplase**: See Appendix K. If intracranial hemorrhage suspected (i.e. neurologic deterioration to worse than baseline, severe headache, acute hypertension, nausea, vomiting, seizure):

(a) Immediately discontinue alteplase infusion and perform NIHSS

(b) Draw and send STAT CBC, PT (INR), aPTT, fibrinogen level, and type and crossmatch

(c) Emergent non-contrast head CT scan

(d) To treat symptomatic intracranial hemorrhage:

1. Cryoprecipitate 10U infused over 10-30 minutes (onset in 1h, peaks in 12h). Administer an additional dose for fibrinogen level <200mg/dL

2. Tranexamic acid 1000mg IV infused over 10 minutes OR ε-aminocaproic acid 4-5g IV over 1h, followed by 1g/hour IV until bleeding is controlled (peak onset in 3h).

(e) Continue supportive management

(f) Hematology and neurosurgery consultations

**m. Disposition:**

(1) **Patients Receiving Alteplase:** Refer to Section 5d above for plan.

(2) **Endovascular Candidates:** Refer to Section 5d above for plan.

(3) **Decompressive Craniectomy Candidates:** Refer to Section 5d above for plan.

(3) **Patients Ineligible For Acute Stroke Therapies:** VAPSHCS will generally admit all patients with suspected AIS who are ineligible for acute stroke therapies. Most patients will be admitted to the designated stroke unit (6 West). Exceptions include intubated patients, patients with large hemispheric or cerebellar strokes at risk for swelling and herniation, patients with fluctuating or worsening symptoms, or patients requiring intensive blood pressure monitoring and treatment. These patients will be admitted to the MICU.

**n. Hospital Care for AIS Patients:**

(1) **For Patients Ineligible For Alteplase:**

(a) Document reason for not giving alteplase in electronic medical record.

(b) All PO medications may be administered ONLY AFTER swallowing screen or speech language pathology swallow evaluation is complete unless patient is receiving comfort care measures only.

(c) NIHSS documented within 12 hours of arrival

(d) Acute aspirin therapy: Give ASA if no contraindications, allergy, or bleeding:

1. 325 mg PO if patient passes swallowing screen OR

2. 300 mg PR if patient fails swallowing screen OR

3. Clopidogrel 75mg PO in patients with aspirin allergy

4. Short-term dual antiplatelet therapy (aspirin & clopidogrel) started within 24 hours can benefit patients with minor stroke or TIA, but should only be continued for 21-90 days.

(2) **For ALL Patients:**

(a) **Prevent systemic complications:**

1. DVT prevention for patients who are not ambulatory, which should include intermittent pneumatic compression.

2. Repositioning and early mobilization to prevent skin breakdown

(b) **Secondary stroke prevention:**

1. Complete work-up to assess stroke etiology and determine the optimal secondary stroke prevention strategy.

2. Evaluation for carotid stenosis within 24 hours of admission for those who might be candidates for carotid endarterectomy or stenting

3. Perform any carotid revascularization within 2-7 days of stroke

4. Antiplatelet therapy started within 48 hours if no contraindication

a. Aspirin: 81–325 mg daily

b. Clopidogrel: 75 mg daily

c. Aggrenox: one (1) tablet twice daily

d. Dual antiplatelet therapy

5. Anticoagulation for cardioembolic stroke/atrial fibrillation (within 4-14 days unless contraindicated)

a. Warfarin

b. NOAC (dabigatran, apixaban, rivaroxaban, edoxaban)

6. Assess rehabilitation needs:

a. Formal assessment of ADLs, IADLs, communication, and functional mobility for all stroke patients

b. Rehabilitation consultation for functional assessment in patients with residual deficits.

7. Improve control of vascular risk factors:

a. High-dose statin therapy for stroke due to atherosclerosis unless contraindicated

b. Moderate-dose statin may be considered in those >75 years

c. Initiate or re-initiate antihypertensive therapy once patients are neurologically stable if BP is >140/90.

d. Smoking cessation counselling and assistance for current smokers, and avoidance of second-hand smoke.

e. For diabetics, target a hemoglobin A1C level of <7% unless contraindicated.

f. Stroke education for patient and/or caregiver/family, including recommendations for diet and exercise

8. Evaluate for post-stroke depression (may be done at follow up)

**o. Follow Up Care:**

(1) Patients will be scheduled for appropriate follow up with their primary care physician for continued management of modifiable risk factors.

(2) Patients will be provided with a follow up appointment (generally within 4-8 weeks of discharge) in the Neurology Stroke Clinic.

(3) All patients will be provided with education on signs and symptoms of stroke and will be instructed to call 911 should they experience any of these symptoms. This education will be provided verbally by the Stroke Team as well as in a discharge booklet.

## **Alteplase Inclusion and Exclusion Criteria**

### **Indication**

- Clinical diagnosis of ischemic stroke with a potentially disabling neurologic deficit
- LKW established as <4.5 hours (270 minutes) before treatment can begin

### **Contraindications**

- Glucose < 50mg/dL or >400 (may be treated once normalized)
- Excess Systemic Bleeding Risk:
  - Any active internal bleeding;
  - Significant GI or genitourinary (GU) hemorrhage in the past 21 days
  - Structural gastrointestinal (GI) malignancy
  - Aortic arch dissection
  - Known bleeding risk, including but not limited to:
    1. Current use of oral anticoagulants with PT > 15 sec. or INR > 1.7
    2. Administration of heparin within 48 hrs. and elevated aPTT > 40 seconds at presentation
    3. Platelet count <100,000
    4. Use of low-molecular-weight heparin within the previous 24 hours
    5. Use of dabigatran, rivaroxaban, apixaban, or edoxaban within past 48 hours\*  
(\*Could consider if coags, ecarin clotting time, or Xa levels are normal.)
- Current Uncontrolled hypertension: (SBP >185 or DBP >110) despite treatment
- Excess Intracranial Bleeding Risk:
  - History of intracranial hemorrhage
  - Evidence of intracranial hemorrhage or frank hypodensity on baseline CT
  - Suspicion of subarachnoid hemorrhage
  - Previous stroke within past 3 months
  - Any intracranial or intra-spinal surgery, or severe head trauma in the past 3 months
  - Intra-axial neoplasm or intracranial aneurysm >10mm
  - Infective endocarditis

### **Use with Caution (factors that increase bleeding risk; not contraindications)**

#### **Excess Systemic Bleeding Risk:**

- Major surgery or trauma within the past 14 days
- Arterial puncture at a non-compressible site within the past 7 days
- ST-elevation Myocardial infarction involving the lateral left ventricle or apex within the past 3 months; acute pericarditis, cardiac myxoma, or papillary fibroelastoma
- Systemic malignancy

#### **Excess Intracranial Bleeding Risk:**

- Intracranial arterial dissection or intracranial vascular malformation
- Cerebral amyloid angiopathy, or a high burden of cerebral microbleeds

### **Extended Time Window (3-4.5 hours after LKW):**

The American Heart /American Stroke Association endorsed alteplase up to 4.5 hours after last known well. Although alteplase in the 3 to 4.5-hour time window is not FDA-approved, VA policy permits alteplase use in this time window based on the AHA/ASA endorsement.

Cautions in Extended Time Window include all the above, plus:

- Current use of oral anti-coagulants, even with INR  $\leq 1.7$
- NIHSS greater than 25 (benefit is uncertain)

## Endovascular Therapy Inclusion and Exclusion Criteria

### Patients eligible or potentially eligible for endovascular therapy

1. Patients meeting all following criteria **SHOULD** receive endovascular therapy (Class I; Level of Evidence A):
  - Minimal to no pre-stroke disability (Potential clinical exclusion, IPEC item 11)
  - Causative occlusion of the internal carotid or proximal middle cerebral artery (Potential vascular imaging exclusion, IPEC item 13); (clinically indicated by presence of a middle cerebral artery syndrome: (Potential clinical exclusion, IPEC item 11)
  - Age  $\geq 18$  years
  - NIHSS score of  $\geq 6$  (Potential clinical exclusion, IPEC item 11)
  - Minimal ischemic changes on head CT (ASPECTS of  $\geq 6$ ) (Potential brain imaging exclusion, IPEC item 12)
  - Can achieve groin puncture within six (6) hours of symptom onset (Potential transfer availability exclusion, IPEC item 15)
2. Patients meeting the following criteria **MAY ALSO** be considered for endovascular therapy within 6 hours of symptom onset (Class IIb; Level of Evidence B-R):
  - Causative occlusion of the anterior cerebral artery, vertebral artery basilar artery, posterior cerebral artery, or M2/M3 segments of the middle cerebral artery.
  - Causative occlusion of the internal carotid or proximal middle cerebral artery in the setting of disability, ischemic changes on head CT, or NIHSS  $< 6$ .
3. Endovascular therapy is **RECOMMENDED** in patients within 6-16 hours of LKW who have large vessel occlusion of the internal carotid, middle cerebral, or anterior cerebral arteries AND meet delayed EVT eligibility criteria.
4. Endovascular therapy is **REASONABLE** in patients within 16-24 hours of LKW who have large vessel occlusion of the internal carotid, middle cerebral, or anterior cerebral arteries AND meet delayed EVT eligibility criteria.

### Key delayed EVT Eligibility criteria:

- Within 15 hours of LKW AND NIHSS  $\geq 6$
  - 15-24 hours of LKW AND NIHSS  $\geq 10$
  - Minimal to no pre-stroke disability
  - Minimal ischemic changes on baseline head CT (ASPECTS score  $\geq 6$ )
  - Involvement of  $< 1/3$  of the MCA territory
  - Causative occlusion of the internal carotid or proximal middle cerebral artery (clinically indicated by presence of a middle cerebral artery syndrome)
- Additional imaging criteria (done at site performing endovascular therapy)



### NIH Stroke Scale

<b>1A. Level of Consciousness</b> 0 Alert 1 Not alert, but arousable with minimal stimulation 2 Not alert, requires repeated stimulation to attend 3 Coma		<b>6. Motor Function - Leg:</b> (holds leg at 30 degrees for 5 seconds) 0 Normal 1 Drifts but not to bed 2 Some effort against gravity 3 No effort against gravity 4 No movement	_____ R  _____ L
<b>1B. Ask patient the month and their age:</b> 0 Answers both correctly 1 Answers one correctly 2 Both incorrect		<b>7. Limb Ataxia</b> 0 No ataxia 1 Present in one limb 2 Present in two limbs	
<b>1C. Ask patient to open and close eyes</b> 0 Obeys both correctly 1 Obeys one correctly 2 Both incorrect		<b>8. Sensory</b> 0 Normal 1 Mild to moderate decrease in sensation 2 Severe to total sensory loss	
<b>2. Best gaze (only horizontal eye movement):</b> 0 Normal 1 Partial gaze palsy 2 Forced deviation		<b>9. Best Language</b> (describe picture, name items, read sentences) 0 No aphasia 1 Mild to moderate aphasia 2 Severe aphasia 3 Mute	
<b>3. Visual Field testing:</b> 0 No visual field loss 1 Partial hemianopia 2 Complete hemianopia 3 Bilateral hemianopia (blind, including cortical blindness)		<b>10. Dysarthria (read several words)</b> 0 Normal articulation 1 Mild to moderate slurring of words 2 Near unintelligible or unable to speak	
<b>4. Facial Paresis</b> (Ask patient to show teeth, raise eyebrows and close eyes tightly): 0 Normal symmetrical movement 1 Minor paralysis (flattened nasolabial fold, asymmetry on smiling) 2 Partial paralysis (total or near total paralysis of lower face)		<b>11. Extinction and inattention</b> 0 Normal 1 Inattention or extinction to bilateral simultaneous stimulation in one of the sensory modalities 2 Severe hemi-inattention or hemi-inattention to more than one modality	

3 Complete paralysis of one or both sides (upper and lower face)			
<b>5. Motor Function - Arm:</b> (holds arm at 45 degrees for 10 seconds) 0 Normal 1 Drifts but not to bed 2 Some effort against gravity 3 No effort against gravity 4 No movement	_____ _ R  _____ _ L	<b>TOTAL SCORE</b>	

## Stroke Code Operator Paging Protocol

Name of caller: \_\_\_\_\_ Ext/Location: \_\_\_\_\_  
Date/Time: \_\_\_\_\_

### Stroke Code Procedures

#### Any Hour


- Operator will dial \*55-200 and announce (Stroke Code at \_\_building #, \_\_ward, room number).  
Repeat two times.
- Operator will call CT Tech in-house, ext. 62419, and announce (Stroke Code at \_\_building #, \_\_ward, room number). Repeat two times.
- Digital Page MICU Resident or Hospitalist On-Call: 24/7 (206-416-4712).

#### Special Hours as indicated below

\*If Neurology does not arrive within 30 minutes, page stroke physician Dr. Andrew Huffer:  
8:00am-4:30pm M-F (206-797-1046).

#### Neurology Providers after hours, including weekends and Holidays, and Thursday after 3pm

- Notify On Call Neurology Chief Resident **individual page numbers followed by \*911 on Neurology On-Call sheet.**
- Notify On Call Neurology Resident **individual page number followed by \*911 listed on Neurology On-Call sheet.**
- Notify On-Call Neurology Attending **individual page numbers followed by \*911 listed on- Neurology On-Call sheet**

 Department of Veterans Affairs	<b>Consent for Clinical Treatment/Procedure</b>
<b>A. IDENTIFICATION</b>	
<b>1. Patient name, Social Security Number and Date of Birth:</b>	
Name: Last, First Middle Date of Birth	Social Security Number
<b>2. Decision-making capacity:</b> <input type="checkbox"/> The patient HAS decision-making capacity (skip to item 3).  <input type="checkbox"/> The patient DOES NOT HAVE decision-making capacity. Enter surrogate name and relationship to the patient. (If the patient's surrogate is not established or available, refer to Handbook 1004.1 for guidance.)	
Name: Last, First Middle Date of Birth	Social Security Number
<b>3. Name of treatment (s)/procedures (s):</b> INTRAVENOUS INJECTION/INFUSION OF TISSUE PLASMINOGEN ACTIVATOR (ALTEPLASE)	
<b>4. Part of the body on which the treatment/procedure will be performed:</b> (Correct site includes the correct side [i.e., left or right] and the precise anatomical part, such as a specific finger. DO NOT ABBREVIATE.) N/A	
<b>5. Practitioner obtaining consent:</b>	
Name: Last, First Middle	
<b>6. Supervising practitioner (if applicable):</b>	
Name: Last, First Middle	
<b>7. Additional practitioner(s) performing or supervising the treatment/procedure: (if not listed above)</b>	
Name: Last, First Middle	
<b>B. INFORMATION ABOUT THE TREATMENT/PROCEDURE</b>	
<b>8. Reason for the treatment/procedure (diagnosis, condition, or indication):</b> Acute Ischemic Stroke. This is caused by a blockage in a blood vessel in the brain that stops blood flow and deprives the surrounding brain tissue of oxygen.	
<b>9. Brief description of the treatment/procedure:</b>	

This procedure involves injecting alteplase through a vein, usually in the arm. Alteplase travels in the blood to the blocked blood vessel in your brain. The drug, Alteplase, is a naturally-occurring enzyme found in your body. It is used to break-up clots. It is also used to prevent or halt further brain damage. Alteplase must be given within three to four and a half hours after start of stroke symptoms.

**10. Potential benefits of the treatment/procedure:**

This procedure may restore blood flow in your brain. It may allow oxygen and other nutrients to reach the damaged part of your brain, restoring brain function.

**11. Known risks and side effects of the treatment/procedure: (Include potential problems related to recuperation.)**

- The procedure may not cure or relieve your symptoms. They may come back or worsen.
- Bleeding
- Embolism (movement of an air bubble, blood clot, or piece of fat through your bloodstream)
- Reactions to medicine(s) given or used during or after the procedure
- Death

**12. Alternatives to the treatment/procedure:**

- Watching and waiting with your doctor.
- Inter-arterial therapy (for blockage of large vessels only)
- You may choose not to have this procedure.

**13. Anesthesia / Moderate Sedation (CHECK ONE):**

☒ Neither anesthesia nor moderate sedation will be used in this treatment/procedure.

☐ **Moderate sedation will be used.** Medications will be administered to decrease anxiety and

discomfort during the treatment/procedure. These medications will be administered by a qualified

practitioner. Patient response to some of these medications varies. Patients are expected to remain aware and responsive during the treatment or procedure. Minor risks of moderate sedation include temporary amnesia or forgetfulness and drowsiness. Moderate sedation can interfere with your ability to drive, operate machinery, or make important decisions for up to 24 hours. Medications used for moderate sedation can cause allergic reactions, respiratory depression (this is when your breathing slows down and may stop), low blood pressure, and a slow or irregular heartbeat. In rare instances these complications can cause death. Tell your health care team if you do not want to receive moderate sedation.

☐ **Anesthesia will be administered.** A member of the anesthesia care team will visit you before your

treatment to discuss the type(s) of anesthesia you may need and to give you more information

about anesthesia. It may become necessary to alter your anesthesia care plan after this discussion. Devices may be applied to your body and placed in your veins and arteries to monitor you during your anesthesia. All forms of anesthesia involve some risk. Minor (not life-threatening) risks include: nausea, vomiting, and pain where an injection is given. Although rare, severe complications include: injury to blood vessels,

drug reactions, bleeding, blood clots, loss of sensation or limb function, infection, paralysis, stroke, brain damage, heart attack, and death.

Here is a basic description of the major types of anesthesia including their risks in addition to those described above:

**General anesthesia** involves drugs that are injected into the bloodstream or breathed into the lungs. A tube or other device may be inserted into your airway to help you breathe. The expected benefit is that you will be totally unconscious and you will not feel pain during the procedure. Additional risks include: injury to the teeth, throat, eyes, or lung. In less than one case in a thousand, patients may be aware of activities during their surgery.

**Spinal or epidural analgesia/anesthesia** involves a drug being injected through a needle or catheter placed into the spinal canal. The expected benefit is a temporary decreased feeling in the area of surgical incision, allowing surgery to proceed without pain. Additional risks include: headache, backache, convulsions, persistent weakness and or numbness, abnormal heart rhythms, and incomplete pain relief during the operation that may require general anesthesia.

**Major/minor nerve block** involves a drug being injected near nerves providing loss or reduction of sensation and movement to the area. The expected benefit is a temporary loss of feeling and/or movement of a specific limb or area of your body. Additional risks include: convulsions, persistent weakness and or numbness, and incomplete pain relief during the operation that may require general anesthesia.

**Monitored anesthesia** care involves monitoring of the heart and lungs to make sure that they are functioning adequately during your procedure. A local anesthetic will be injected to prevent pain, and the anesthesia care provider may use drugs to help you relax, and lessen any pain. You may remain conscious throughout your procedure, or you may be given medications that will make you unconscious. The expected benefit is that you will be comfortable during your operation with a minimum amount of anesthesia. This may result in a shorter stay in the hospital. Additional risks include: incomplete pain relief during the operation that may require additional anesthesia. Convulsions from the injected drug are a rare but serious complication

#### 14. Blood products (CHECK ONE)

☒ It is not expected that blood products will be used in this treatment/procedure.

It is anticipated that blood products may be needed in this treatment/procedure and:

☐ I CONSENT to the use of blood products during this treatment/procedure if they are needed to

improve my overall condition or save my life. I understand that my consent for use of blood products is valid during the treatment/procedure and during the recovery period after the treatment/procedure. My provider will determine when this recovery period ends. I will be asked again for my consent for use of blood products if this consent form expires, my treatment plan changes, or if blood products are needed for a reason that is unrelated to this treatment/procedure. I understand that common risks

of using blood products include (but are not limited to) infection or irritation where the needle is placed, fever, chills, and skin rashes. Other rare but more serious complications may occur such as allergic reactions, heart failure due to fluid overload, acute pulmonary edema (fluid leaking into the lungs), shock, or death. I also understand that transfusions of blood or blood products involve a small risk of transmission of diseases such as Hepatitis B (1 in 137,000), Hepatitis C (1 in 1,000,000), and HIV/AIDS (1 in 1,900,000). There is also a small risk of bacterial infection when blood products are transfused. Alternatives to blood or blood products may be available if my health, time, and procedure permit. These alternatives may include auto-donation (using my own previously donated blood) and intra-operative salvage (my own blood collected during surgery). In addition, medications may be used to reduce the need for blood products. (Please note exceptions to consent in the "Comments" section of the consent form.)

☐ I DO NOT CONSENT to the use of blood products and I do not wish them to be used even if it is

determined that they are needed to improve my overall condition or save my life. Alternatives to blood or blood products may be available if my health, time, and procedure permit. These alternatives may include auto-donation (using my own previously donated blood) and intra-operative salvage (my own blood collected during surgery). In addition, medications may be used to reduce the need for blood products.

#### **15. Additional information**

VA hospitals are teaching facilities, and trainees may participate in or observe this treatment/procedure. In certain circumstances, the presence of a vendor representative (company representative) is important to the success of the procedure. Prior to the procedure, the representative will sign an agreement to strictly adhere to VA's privacy rules. The representative may provide technical advice but will not physically participate in the procedure. The representative will be closely monitored by the VA treatment team.

#### **16. Comments**

### **C. SIGNATURES**

#### **Practitioner obtaining consent:**

- All relevant aspects of the treatment/procedure and its alternatives (including no treatment) have been discussed with the patient (or surrogate) in language that s/he could understand. This discussion included the nature, indications, benefits, risks, side effects, and likelihood of success of each alternative.
- The patient (or surrogate) demonstrated comprehension of the discussion.
- I have given the patient (or surrogate) an opportunity to ask questions.
- I did not use threats, inducements, misleading information, or make any attempt to coerce the patient/surrogate to consent to this treatment/procedure.
- I have offered the patient (or surrogate) the opportunity to review a printed copy of the consent form.

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 Signature

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 Date and Time
**Patient or surrogate:**

- Someone has explained this treatment/procedure and what it is for.
- Someone has explained how this treatment could help me and things that could go wrong.
- Someone has told me about other treatments/procedures that might be done instead, and what would happen if I have no treatment.
- Someone has answered all my questions.
- I know that I may refuse or change my mind about having this treatment/procedure. If I do refuse or change my mind, I will not lose my health care or any other VA benefits.
- I have been offered the opportunity to read the consent form.
- I choose to have this treatment/procedure.

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 Signature

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 Date and Time

**Witnesses:** No witness is required if the patient or surrogate signs their name. Two witnesses are required only when the patient's signature is indicated with an "X" or some other identifying mark.

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 Witness name (please print)

---

 Signature

---

 Date and Time

---

 Witness name (please print)

---

 Signature

---

 Date and Time



**VAPSHCS Staff and Provider Stroke Education Requirements  
For Fiscal Year 2018-2019**

**Emergency Department providers:**

Mandated (by VA Director) to complete 1 hour of stroke education annually, which can be split over 2 sessions. Any stroke continuing education programs that the Stroke Center Directors have emailed or stroke education that is viewed on or is archived on the UW website may be used for credit. Additionally, the Chief of ED may direct particular stroke education to complete. The Stroke Center Advisory Council also requires completion of NIHSS training and maintenance of certification for any staff member or provider that complete NIHSS: NIHSS DVDs available in library, on designated VA computers or can complete on home computer; [www.stroke.org](http://www.stroke.org) (free of charge) or the AHA/ASA website (fee). Submit proof of completion to designated education manager by September 28, 2019.

**Emergency Department nursing staff:**

Mandated to complete 2 hours of stroke education annually; choices will be provided by Stroke Center Education Committee. The Stroke Center Advisory Council also requires completion of NIHSS training and maintenance of certification: NIHSS DVDs available in library, on designated VA computers or can complete on home computer; [www.stroke.org](http://www.stroke.org) (free of charge) or the AHA/ASA website (fee). Submit proof of completion to manager by Sept. 28<sup>th</sup>, 2019.

**Hospitalists, Nocturnists and Critical Care Medicine, Primary Care Providers:**

Mandated (by VA Director) to complete 1 hour of stroke education annually, which can be split over 2 sessions. Any stroke continuing education programs that the Stroke Center Directors have emailed or stroke education that is viewed on or is archived on the UW website may be used for credit. Additionally, the Chief of Hospitalists and Critical Care Medicine may direct particular stroke education to complete. The Stroke Center Advisory Council recommends (but does not require) completion of NIHSS training and maintenance of certification for any staff member or provider that complete NIHSS: NIHSS DVDs available in library, on designated VA computers or can complete on home computer; [www.stroke.org](http://www.stroke.org) (free of charge) or the AHA/ASA website (fee). Submit proof of completion to designated education manager by September 28, 2019.

**Nursing and rehabilitation staff on MICU, SICU, 4 East, 2 West, PACU, Bone Marrow, CLC, 1 East Rehab., SCI, 3 East, IP Psych., Seattle and American Lake Primary Care and other nurses that float regularly to these floors:**

Mandated to complete 2 hours of stroke education annually; choices to be provided by Stroke Center Education Committee. Since Primary Care nurses and providers are new to this educational requirement will limit to just 1-hour annual education requirement. The Stroke Center Advisory Council also requires completion of NIHSS training and maintenance of certification (with the exception of IP Psych. due to low volume of patients with acute stroke): NIHSS DVDs available in library, on designated VA computers or can complete on home computer; [www.stroke.org](http://www.stroke.org) (free of charge) or the AHA/ASA website (fee). Submit proof of completion to manager by Sept. 28<sup>th</sup>, 2019.

**Stroke Code Team members (Neurology Providers, MICU nurses, Stroke Center Coordinator):**

Mandated to complete complete 2 hours of stroke education (choices to be given by Stroke Center Directors). The Stroke Center Advisory Council also mandates the nurses and neurology providers on this team to complete NIHSS training and maintain certification: NIHSS DVDs available in library or can complete on home computer; [www.stroke.org](http://www.stroke.org) (free of charge) or the AHA/ASA website (fee). Submit proof of NIHSS certification and completed education to Stroke Center Directors by September 28<sup>th</sup>, 2019.

**Stroke Center Directors:**

Mandated to complete 8 hours of stroke education annually and submit proof of education completion to Stroke Center Directors, by September 28<sup>th</sup>, 2018. The Stroke Center Advisory Council also requires completion of NIHSS training and maintenance of certification: complete on TMS, NIHSS DVDs available in library, on designated VA computers or can complete on home computer; [www.stroke.org](http://www.stroke.org) (free of charge) or the AHA/ASA website (fee).

A completion report will be submitted to the VA PSHCS Director at year end.  
FMI: Maria Kimmerle, RN Stroke Center Coordinator, Neurology x61551.

## **RN Dysphagia Screen**

**Indications for Use:** To establish a safe system of assessment and management of patients who are at risk for swallowing problems relating to illness, aging, and/or dental problems.

**Rationale/Principle:** Goals include early detection of risk factors, notification of Speech Pathology for further evaluation and initiation of aspiration precautions to prevent complications.

**Precautions & Key Points:**

Many patients are at risk for swallowing difficulties. Contributing factors to swallowing problems include yet are not limited to: stroke, infections, demyelinating disease, cervical level SCI, ALS, GERD, tumor, esophageal cancer, Alzheimer's, dementia, age 70 or older, Parkinson's, cerebral palsy, prolonged intubation, oral surgery and head/neck surgery. Any condition that affects levels of consciousness or cognitive status can predispose the patient to swallowing problems. Herein are examples but not limited to the following Exclusion and Inclusion diagnosis:

Potential Exclusion Criteria (Diagnosis):

- Acute mental status changes not stroke related
- Non-acute stroke (History)
  - History of aspiration pneumonia
  - Stroke mimic (hypoglycemia, epilepsy, multiple sclerosis, intracranial tumors)
  - Traumatic intracranial hemorrhage
  - Intraparenchymal and intracerebral hemorrhage
  - Traumatic subarachnoid hemorrhage

Inclusions (Contributing Factors):

- Acute ischemic stroke
- Rule out stroke
- Cerebral Vascular Accident
- Cerebral Infarct
- Non-traumatic aneurismal subarachnoid hemorrhage
- Arterial-Venous malformation rupture
- Multi-infarct dementia
- Non-traumatic intraparenchymal/cerebral hemorrhage
- Parkinson's Disease
- Cervical level Spinal Cord Injury
- Dementia

**Equipment/Tools:**

1. Gloves, oral suction
2. Dysphagia and Oral screening criteria (found in the nursing admission assessment template or CPRS under nursing template).
3. 2 cups, medicine cup, or, 60 mL syringe to measure 5 mL and 90 mL into the cup

**Risk Factors**

In addition, the patient's risk for dysphagia and aspiration is increased in the presence of preexisting conditions or factors that produce general muscle weakness, altered mental status, structural obstructions, and side effects from medications used for treatment.

Examples of these preexisting conditions and factors include:

- Presence of a tracheostomy tube
- Presence of orogastric or nasogastric tubes
- Tube feedings
- Decreased gastrointestinal motility
- Facial trauma
- Head or neck surgery
- History of recent ex-tubation

**Characteristics**

Characteristics of dysphagia that are predictive of an aspiration risk and warrant further evaluation include:

- Wet-sounding voice
- Weak, voluntary cough
- Coughing or choking during or after meals
- Prolonged swallow
- Frequent drooling
- Loss of food from mouth during eating

Additional characteristics of dysphagia include:

- Voice change after swallowing
- Hoarseness
- Difficulty or pain in speaking
- Slow, weak, or slurred speech
- Abnormal gag
- Regurgitation
- Pain upon swallowing
- Reports of food sticking in the throat
- Need for multiple attempts to swallow food

**Actions:****Evidence/Key Points:**

<b>Assessment</b>							
<ol style="list-style-type: none"> <li>1. Perform hand hygiene before patient contact.</li> <li>2. Verify the correct patient using two identifiers.</li> <li>3. Ask the patient about any trouble with chewing or swallowing various food textures.</li> <li>4. Explain the procedure to the patient</li> </ol>							
<b>Admission:</b>							
<ol style="list-style-type: none"> <li>1. Assess the patient for signs and symptoms of dysphagia. Use the dysphagia screening tool in the CPRS NAAT.</li> </ol>							
<p>In the NAAT:</p> <ol style="list-style-type: none"> <li>1. Complete Glasgow Coma Scale (GCS).             <ol style="list-style-type: none"> <li>a. IF GCS &lt; 13, or the patient is admitted with a diagnosis of aspiration pneumonia or tracheostomy, do not proceed with the dysphagia screen.                 <ol style="list-style-type: none"> <li>i. Place patient NPO, notify physician.</li> <li>ii. Consult Speech Pathology for Swallow Evaluation</li> <li>iii. Place Pharmacy "At Risk for Aspiration" consult (auto generated based on box check)</li> </ol> </li> <li>b. GCS &gt; 13 Screen the patient for Slurred Speech, proceed with Dysphagia Screen</li> </ol> </li> </ol>	<p>Glasgow Coma Scale (last rating):</p> <p>GLASGOW COMA SCALE</p> <table> <tr> <td>EYE OPENING = 4 (OPEN SPONTANEOUSLY)</td><td>02/22/2006</td></tr> <tr> <td>VERBAL = 5 (ORIENTED)</td><td>02/22/2006</td></tr> <tr> <td>MOTOR = 6 (RESPONSE ON COMMAND)</td><td>02/22/2006</td></tr> </table> <p><input type="checkbox"/> S: Patient reports the following:</p> <p>O: Patient exhibits the following behaviors</p> <p>EYE OPENING</p> <p><input checked="" type="radio"/> 4 - Eyes open spontaneously</p> <p><input type="radio"/> 3 - Eyes open to speech</p> <p><input type="radio"/> 2 - Eyes open to pain</p> <p><input type="radio"/> 1 - Eyes do not open</p> <p>BEST VERBAL RESPONSE</p> <p><input checked="" type="radio"/> 5 - Patient is oriented</p> <p><input type="radio"/> 4 - Patient is confused</p> <p><input type="radio"/> 3 - Inappropriate speech</p> <p><input type="radio"/> 2 - Incomprehensible sounds</p> <p><input type="radio"/> 1 - No verbalization</p> <p>BEST MOTOR RESPONSE</p> <p><input checked="" type="radio"/> 6 - Motor response on command</p> <p><input type="radio"/> 5 - Movement localizes pain</p> <p><input type="radio"/> 4 - Withdraws from pain</p> <p><input type="radio"/> 3 - Abnormal flexion</p> <p><input type="radio"/> 2 - Abnormal extension</p> <p><input type="radio"/> 1 - No motor response</p> <p>***** Changes of 1-2 points may be significant *****</p> <p>Assessment - select one</p> <p>(see Attachment A)</p> <p>GCS provides a structured, accurate and replicable assessment detecting impairment of conscious level in response to defined stimuli.</p>	EYE OPENING = 4 (OPEN SPONTANEOUSLY)	02/22/2006	VERBAL = 5 (ORIENTED)	02/22/2006	MOTOR = 6 (RESPONSE ON COMMAND)	02/22/2006
EYE OPENING = 4 (OPEN SPONTANEOUSLY)	02/22/2006						
VERBAL = 5 (ORIENTED)	02/22/2006						
MOTOR = 6 (RESPONSE ON COMMAND)	02/22/2006						
<ol style="list-style-type: none"> <li>2. Perform initial nursing dysphagia nutritional assessment/screening and place an (RD/CDT) consult as necessary, prior to oral intake.</li> </ol>	<p>Consult the Nutrition and/or Speech Pathologist, as indicated.</p>						

	VA Puget Sound Memorandum PE-12 , <a href="#">Nutrition Risk Screening and Assessment</a> <a href="#">TX-51 – Management of Dysphagia &amp; Feeding Disorder</a>
<b>Change in Patient Condition:</b>	
1. Complete the dysphagia screening if patient is displaying any of the characteristics identified on page 2.	
<b>Post Intubation:</b>	
Re-screen for all post-intubation regardless of medical or diagnostic procedural purpose prior to oral intake, 1. If patient answers “NO” to screening questions, dysphagia screen is complete, and proceed with oral intake. 2. If patient answers “YES” to any one of the screening questions, proceed and perform the RN Bedside Dysphagia Screening.	
<b>Screening</b>	
1. Risk Questions A. Does Veteran have Dysarthria? * Yes * No  B. Does Veteran have Facial Asymmetry? * Yes * No	Ensure HOB is elevated as high as tolerated for the screen  <i>Ask the patient open ended questions, e.g., “Tell me, what brought you here in the hospital?” Prompt patient for more verbal output, if needed.</i>  Lower facial weakness, observe lower face and note subtle weakness by asking patient to smile & count the number of teeth seen from midline to each side.  <div style="border: 1px solid black; padding: 5px;"> Is there Facial Asymmetry/Weakness? * <input type="checkbox"/> Yes <input type="checkbox"/> No  Is there Tongue Asymmetry/Weakness? * <input type="checkbox"/> Yes <input type="checkbox"/> No  Is there Palatal Asymmetry/Weakness? * <input type="checkbox"/> Yes <input type="checkbox"/> No   If any one of the answers to the screening questions 1-4 is “YES”, means failing the screening and patient should remain NPO until formal dysphagia evaluation by speech therapy is completed. Otherwise proceed </div>

<p>C. Does Veteran report any swallowing difficulties? <i>(i.e. effortful/painful swallow, food getting “stuck”, coughing or throat clearing with PO intake or difficulty swallowing medications)</i> * Yes * No</p> <p>D. Does Veteran have a history of tracheostomy or aspiration pneumonia? * Yes * No</p> <p>E. Does Veteran have a history of head and neck surgery or radiation? * Yes * No</p> <p>F. Does Veteran have a progressive neurological disease (i.e. Parkinson’s, ALS, Multiple Sclerosis, Dementia)? * Yes * No</p> <p>G. Does Veteran have a recent diagnosis of a neurologic event? * Yes *No</p> <p>H. Was Veteran admitted with dehydration, malnutrition, or Failure to Thrive?  * Yes *No</p>	<p>(<a href="#">Refer to Inclusion Criteria</a>) (See p.1)</p>
<p>2. If all answers are “no”, dysphagia screen is complete!</p> <ul style="list-style-type: none"> <li>• Provide patient with an oral hygiene kit</li> <li>• Continue with Diet Order as Prescribed by Admitting Provider or consult with Admitting Provider to get appropriate Diet order as needed.</li> <li>• Continue to observe swallow function throughout patient’s length of stay.</li> </ul>	

<i>If there are any changes, immediately alert the MD and request NPO status, and initiate <a href="#">dysphagia screening</a>.</i>	
3. If any one of the answers to the screen questions is “yes”, continue with RN Bedside Dysphagia Screen.	
<b>RN Bedside Dysphagia Water Screen</b>	
<i>Materials: 2 cups-fill 1 with water, and a medicine cup or 60 ml syringe to measure 5 ml and 90 ml into cup</i>	
<b>Conduct Oral Care before performing the Dysphagia Water Screen</b>	



**First 5 ml. Water Swallow:**

1. Measure out 5 ml (1 teaspoon) of water and place into a cup.
2. Instruct the patient to drink the entire amount in 1 swallow.
3. After the patient has swallowed the water, ask the patient to say "AHHHHHH"

Listen for the following:

- Wet, gurgly voice while patient is saying "AHHHHHH"
- Cough after Swallow
- Audible Throat Clear after Swallow

4. Are there audible changes to voice or cough or throat clear after swallow?  
\* Yes \* No

**If Yes** – Stop Screening, keep NPO;  
***place the following consults: Speech Pathology, Pharmacy Risk of Aspiration***

**If No** – Proceed.

**Second 5 ml. Water Swallow:**

1. Measure out 5 ml (1 teaspoon) of water with the medicine cup or syringe and place into a cup.
2. Instruct the patient to drink the entire amount in 1 swallow.
3. After the patient has swallowed the water, ask the patient to say "AHHHHHH"

Listen for the following:

- Wet, gurgly voice while patient is saying "AHHHHH"
  - Cough after Swallow
  - Audible Throat Clear after Swallow
4. Are there audible changes to voice or cough or throat clear after swallow?  
\* Yes \* No

**If Yes** – Stop Screening, keep NPO; place the following consults: Speech Pathology and Pharmacy Risk of Aspiration

**If No** – Proceed.

If necessary, help the patient hold the cup. ***DO NOT use a straw.***

<p><b>90 ml. Water Swallow:</b></p> <ol style="list-style-type: none"> <li>1. Measure out 90 ml of water with the large syringe and place it in a cup.</li> <li>2. Tell the patient drink this entire amount of water without stopping. Keep the cup up to your lips and keep drinking, swallow after swallow, until the water is gone or I tell you to stop.”</li> <li>3. If the patient cannot continuously swallow even with encouragement, <b><i>stop the patient from drinking; remove the cup of water.</i></b></li> <li>4. Are there audible changes to voice or cough or throat clear after swallow? * Yes * No</li> </ol> <p><b>If Yes</b> – Stop Screening, keep NPO; place the following consults: Speech Pathology and Pharmacy Risk of Aspiration</p> <p><b>If No</b> – Proceed with diet as ordered.</p>	
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***Patient Education:***

- If positive for dysphagia, teach aspiration precautions.
- Describe the signs and symptoms of aspiration and have the patient and family members repeat the information.
- Advise that the patient should be upright for meals and should remain sitting upright after eating to reduce the risk of aspiration from food remaining in pharynx.
- Advise the patient not to use a straw when drinking fluids.
- Emphasize the importance of frequent oral hygiene to reduce plaque and secretions containing bacteria that may lead to pneumonia.
- Ensure that the patient and family understand appropriate food choices, strategies to increase caloric intake if necessary, and modifications to food and liquid textures as instructed by the speech therapist.
- Advise the family of a high-risk patient to have an oral suction device available.

- Emphasize the importance of family members having training in performing the Heimlich maneuver.
- Encourage questions and answer them as they arise.

**References:**

- [Anderson, J.A. et al. \(2016\).](#) Rapid aspiration screening for suspected stroke: Part 2: Initial and sustained nurse accuracy and reliability, 97(9):1449-1455. doi: 10.1016/j.apmr.2016.03.024.
- Christensen, M. and Trapl, M. (2017), Development of a modified swallowing screening tool to manage post-extubation dysphagia. Nurs Crit Care. doi:10.1111/nicc.12333
- Cohen, D.L. et al. (2016). Post-stroke dysphagia: A review and design considerations for future trials. International Journal of Stroke, 11(4), 399-411. doi:10.1177/1747493016639057
- Daniels, S. K. et al. (2016). Rapid aspiration screening for suspected stroke: Part 1: Development and validation. Arch Phys Med Rehabilitation, 97(9),1440-1448. doi: 10.1016/j.apmr.2016.03.025.
- Department of Veteran Affairs (2006, May 17). *VHA Directive 2006-032, Prevention of Aspiration Pneumonia*. Retrieved from: <http://www.va.gov/vhapublications/>
- Ebihara, S. (2016). Dysphagia, dystussia, and aspiration pneumonia in elderly people. Journal of Thoracic Disease, 8(3), 632-639. doi:10.21037/jtd.2016.02.60
- Frey, K.L., Ramsberger, G. (2011). Comparison of outcomes before and after implementation of a water protocol for patients with cerebrovascular accident and dysphagia. Journal of Neuroscience Nursing, 43(3), 165-171. doi:10.1097/JNN.0b013e3182135adf
- Metheny, N.A. (2011). Preventing Aspiration in Older Adults with Dysphagia. *Head and Neck Nursing*, 29(3):20-21.
- Metheny, N.A. (2012). Preventing aspiration in older adults with dysphagia. Retrieved May 17, 2017, from <https://consultgeri.org/try-this/general-assessment/issue-20.pdf>
- O'Connor, L.J. (2012). Oral healthcare in aging: Nursing standard of practice protocol: Providing oral health care to older adults. Retrieved September 9, 2017, from <https://consultgeri.org/geriatric-topics/oral-healthcare>
- Perry, A.G., Potter, P.A., Ostendorf, W.R. (Eds.). (2018). Clinical nursing skills & techniques (9th ed.). St. Louis: Elsevier

Perrut Veiga, H. et al. (2014). Sequential swallowing of liquid in elderly adults: Cup or straw? *Dysphagia*, 29(2), 249-255. doi:10.1007/s00455-013-9503-8.

Ra, J. Y., Hyun, J. K., Ko, K. R., & Lee, S. J. (2014). Chin tuck for prevention of aspiration: Effectiveness and appropriate posture. *Dysphagia*, 29(5), 603-609. Retrieved from: <http://go.va.gov/ae64>

[Schepp, S. K., Tirschwell, D.L., Miller R.M., Longstreth, W. T. \(2012\). Swallowing screens after acute stroke: A systematic review. \*Stroke\*, 43, 869-871.](#)

Sheffler, K. (2014). Providing oral care. Retrieved from: [www.swallowstudy.com](http://www.swallowstudy.com)

VA Puget Sound Healthcare System, (2013, July). *Memorandum TX-51: Management of Patients with Dysphagia or Feeding Disorders*. Retrieved from: [Management of Patients with Swallowing \(Dysphagia\) or Feeding Disorders](#)

VA Puget Sound Healthcare System, (2017, July). *Memorandum PE-12 Nutrition Risk Screening and Assessment*. Retrieved from: [Nutrition Risk Screening and Assessment](#)

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**VAPSHCS INTRACRANIAL HEMORRHAGE TRANSFER POLICY**

These guidelines should not replace individual clinical judgement. If there is any concern for acute neurological decline or need for monitoring in a specialty neuro-critical care setting not explicitly covered below, then immediate transfer to an appropriate facility should be pursued.

**1. CRITERIA FOR POSSIBLE ADMISSION TO THE SEATTLE VA****A. Chronic subdural hemorrhage WITHOUT:**

1. Any acute hemorrhage
2. GCS < 13
3. SDH thickness  $\geq$  10 mm
4. Midline shift  $\geq$  5 mm
5. Signs of increased intracranial pressure
6. Recent or current use of warfarin, direct oral anticoagulant (DOAC), or heparin product

**B. Traumatic subarachnoid hemorrhage meeting the following criteria:**

1. Localized to the cerebral convexity
2. Involves only one sulcus
3. No overlying skull fracture
4. No associated epidural, subdural, or intraparenchymal hemorrhage
5. GCS  $\geq$  13

**C. Spontaneous intraparenchymal hemorrhage WITHOUT:**

1. Baseline Glasgow Coma Scale < 13
2. Age  $\geq$  80
3. Hemorrhage volume  $\geq$  30 mL
4. Intraventricular extension
5. Infratentorial origin of hemorrhage

6. Known recent use of warfarin, direct oral anticoagulant (DOAC), or heparin product
  7. Signs of active, ongoing hemorrhage (dot sign on post-contrast head CT, expansion of hemorrhage on serial CT)
  8. Evidence of mass effect including midline shift > 4 mm, effacement of basal cisterns or other radiographic signs of impending herniation
- D. Post-IV Alteplase (tPA) hemorrhage without exclusionary criteria listed under 1C above PLUS:
1. Worsening of post-tPA NIHSS > 2 points
  2. STAT fibrinogen < 125 mg/dL or platelet count < 100,000
- E. Goals of care inconsistent with more aggressive care:
1. Patient on hospice
  2. Patient or family not interested in pursuing more aggressive care after full discussion and documentation of risks of not intervening by neurology or neurosurgery team.

## **2. CRITERIA FOR IMMEDIATE TRANSFER TO A LEVEL 1 STROKE CENTER**

- A. Any spontaneous or traumatic epidural hemorrhage
- B. Spontaneous or traumatic subdural hemorrhage with any acute component
- C. Any spontaneous subarachnoid or intraventricular hemorrhage
- D. Traumatic subarachnoid hemorrhage not meeting criteria in 1B, above
- E. Spontaneous intraparenchymal hemorrhage not meeting criteria in 1C, above
- F. Any traumatic intraparenchymal hemorrhage

## **PROTOCOL FOR REVERSAL OF COAGULOPATHIES IN PATIENTS WITH SYMPTOMATIC SPONTANEOUS INTRAPARENCHYMAL HEMORRHAGE**

This protocol is meant to supplement guidelines outlined in “Reversal of Oral Anticoagulants” (TX-60) through the VA Puget Sound Pharmacy. Specifically, these guidelines apply to patients with spontaneous, symptomatic intraparenchymal hemorrhage that is by definition severe or “life-threatening” due to potential for rapid neurologic decline and/or death with continued bleeding. It is expected that most, if not all, patients treated according to these guidelines will benefit from expedited transfer to an appropriate Level 1 Stroke Center with neurosurgical capabilities after initial stabilization.

### **1. FOR ALL PATIENTS**

- A. Order STAT Coagulation Labs: CBC, platelets, PT/INR, aPTT, thrombin time (TT) for patients with suspected dabigatran effect, and fibrinogen. Note that anti-factor Xa activity is not available at VAPSHCS and is therefore not likely to be helpful in guiding the acute management of intraparenchymal hemorrhage in patients taking factor Xa inhibitors.
- B. Order type and screen through “Blood Orders” in CPRS
- C. Obtain history regarding use of any antithrombotic agents including antiplatelet, vitamin K antagonists (VKA), direct thrombin inhibitors (DTI), factor Xa inhibitors, unfractionated or low molecular weight heparin (LMWH). If possible, obtain date and time of last dose.
- D. Obtain focused history of recent (< 3 months) thromboembolic events including deep venous thrombosis (DVT), pulmonary embolism (PE), ischemic stroke (IS), cerebral venous sinus thrombosis (CVST), myocardial infarction (MI) or unstable angina; known prothrombotic conditions including malignancy, pregnancy, disseminated intravascular coagulation (DIC), hepatic disease, heparin induced thrombocytopenia (HIT), anti-cardiolipin antibody syndrome, etc.
- E. Discuss patient with Stroke Phone (206-744-6789) or VA Stroke Attending, if available; Neurosurgery should also be contacted if there is high likelihood of emergent intervention (ventricular drain placement, crash craniotomy).
- F. Order Hematology Consult
- G. Discontinue Antithrombotic (anticoagulant and/or antiplatelet therapy) and any other medications that increase bleeding risk



**2. IF ON WARFARIN (VITAMIN K ANTAGONIST)**

A. Give vitamin K 10 mg IV

B. **If INR 1.6-1.9, follow fresh frozen plasma (FFP) pathway** unless there is significant concern for volume overload (severe congestive heart failure (CHF), oliguric renal failure, etc.)

1. Order 4 units emergency uncrossmatched FFP and request 4 additional units of type specific thawed FFP STAT (order type and cross) through CPRS "Blood Orders."
2. Place orders for nursing blood administration and transfusion reaction management.
3. Consider concurrent administration of furosemide 20mg IV x 1, (may repeat) if the patient has a history of mild-moderate congestive heart failure or chronic renal insufficiency.
4. Immediately repeat STAT coagulation labs upon completion of the infusion.
5. If INR is still > 1.5, give an additional 4 units of matched FFP.
6. Repeat STAT coagulation labs and if INR still > 1.5 repeat vitamin K 10 mg IV and consult hematology.
7. Once INR  $\leq$  1.5, repeat INR every 6 hours for 24 hours to ensure that it does not drift above 1.5 again.

C. **If INR  $\geq$  2.0, determine eligibility for Kcentra® pathway** (4-factor prothrombin complex concentrate, PCC).

1. Review absolute and relative contraindications as follows:
  - a. **Absolute contraindications:** Prior anaphylactic or severe systemic reaction to Kcentra® or any component of Kcentra® (includes heparin, factors II, VII, IX, and X, protein C and S, antithrombin III, and human albumin), patient currently with DIC, patient with known history of HIT and has not been re-challenged with heparin

- b. **Relative contraindications:** Any thromboembolic event in the prior 3 months (see item 1D for examples).

2. Order Kcentra® STAT from pharmacy at the indicated dosing:

INR	Kcentra® Dose	Maximum Dose
2.0-3.9	25 units/kg	2500 units
4.0-5.9	35 units/kg	3500 units
> 6.0	50 units/kg	5000 units

3. Recheck INR at 1, 6, and 24 hours after completion of Kcentra® infusion.
4. If INR is still > 1.5, consider other causes for coagulopathy including low fibrinogen or presence of an inhibitor.
5. Consider additional administration of FFP per the pathway described in 2B, above, unless there is significant concern for volume overload.
6. Consult hematology for further reversal options.

**3. IF ON DABIGATRAN (DIRECT THROMBIN INHIBITOR) AND TT PROLONGED (a normal TT suggests minimal to no plasma dabigatran)**

- A. If ingestion within 2 hours, give 1 dose oral activated charcoal.
- B. Consider giving Idarucizumab 5 gm (supplied as two 2.5 gm vials), a humanized monoclonal antibody fragment that competitively binds to dabigatran, minimizing its thrombin inhibitory effect. The pharmacy currently only stocks one dose of this medication based on cost and rarity of clinical indication. Exclusionary criteria have not yet been established, but hypersensitivity reactions are possible. Evidence for Idarucizumab use in this setting is extremely limited. Contact inpatient pharmacy for prescribing information at extension 61332 or page 206-416-4103.
- C. If patient has renal failure or known overdose, consider emergent hemodialysis. Renal failure may increase dabigatran's  $t^{1/2}$  from 12 to 34 hours in severe renal impairment. Approximately 60% of dabigatran is removed after 2-4 hours of dialysis.

**4. IF ON RIVAROXABAN, APIXABAN, OR EDOXABAN (FACTOR Xa INHIBITORS) AND PT PROLONGED**

- A. If ingestion within 2 hours, give 1 dose oral activated charcoal. Consider extending time window for oral activated charcoal administration to 8 hours for rivaroxaban and 6 hours for apixaban based on manufacturers' recommendations.
- B. Consider giving Kcentra® 50 units/kg (maximum dose 5000 units) after reviewing the absolute and relative exclusion criteria outlined in Item 2C. Evidence for PCC use in this setting is currently limited and of low quality.
  - a. Consider limiting to 25 units/kg (maximum 2500 units) for intraparenchymal hemorrhage due to increased risk of thromboembolic complications
- C. Rivaroxaban and apixaban are not dialyzable. Half-life for both may be increased in the setting of renal failure.

**5. IF ON ANTIPLATELET AGENTS (aspirin, clopidogrel, ticlopidine, prasugrel, abciximab, eptifibatide, or tirofiban)**

- A. Order blood products from Puget Sound Blood Bank through "Blood Orders" in CPRS: type and cross, 2 doses of apheresis platelets STAT.
- B. Place blood administration and transfusion reaction management orders.
- C. Desmopressin 0.3 – 0.4 mcg/kg IV x 1

**6. IF ON FULL-DOSE UNFRACTIONATED HEPARIN**

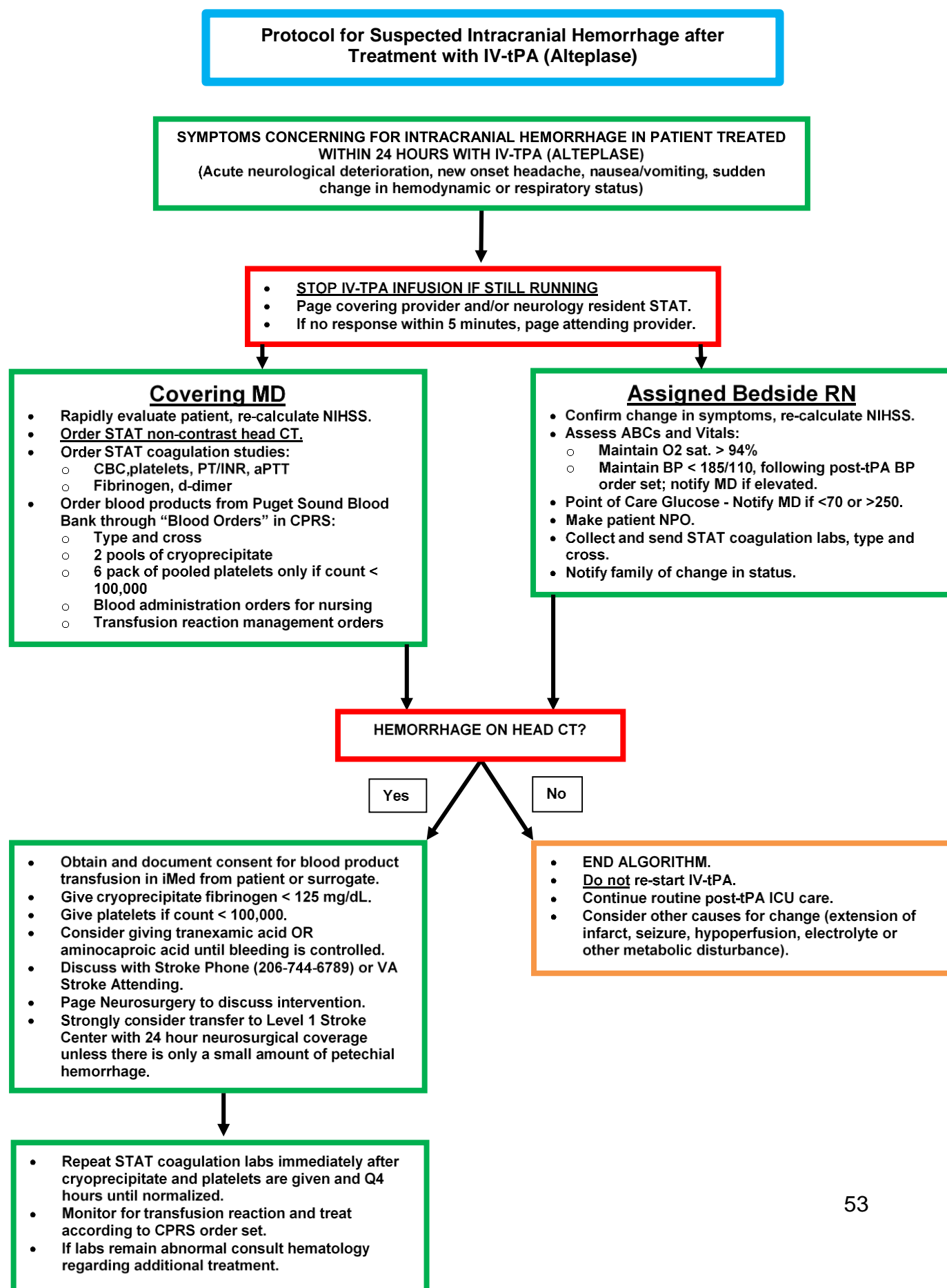
- A. Immediately stop infusion.
- B. Give protamine 25 mg IV before blood results return.
- C. Immediately repeat STAT aPTT upon completion of the infusion.
- D. If aPTT > 43 seconds consider administering additional 10 mg protamine doses until aPTT < 43 seconds (maximum cumulative dose 55 mg).

**7. IF ON LOW-MOLECULAR WEIGHT HEPARIN (enoxaparin, dalteparin, tinzaparin)**

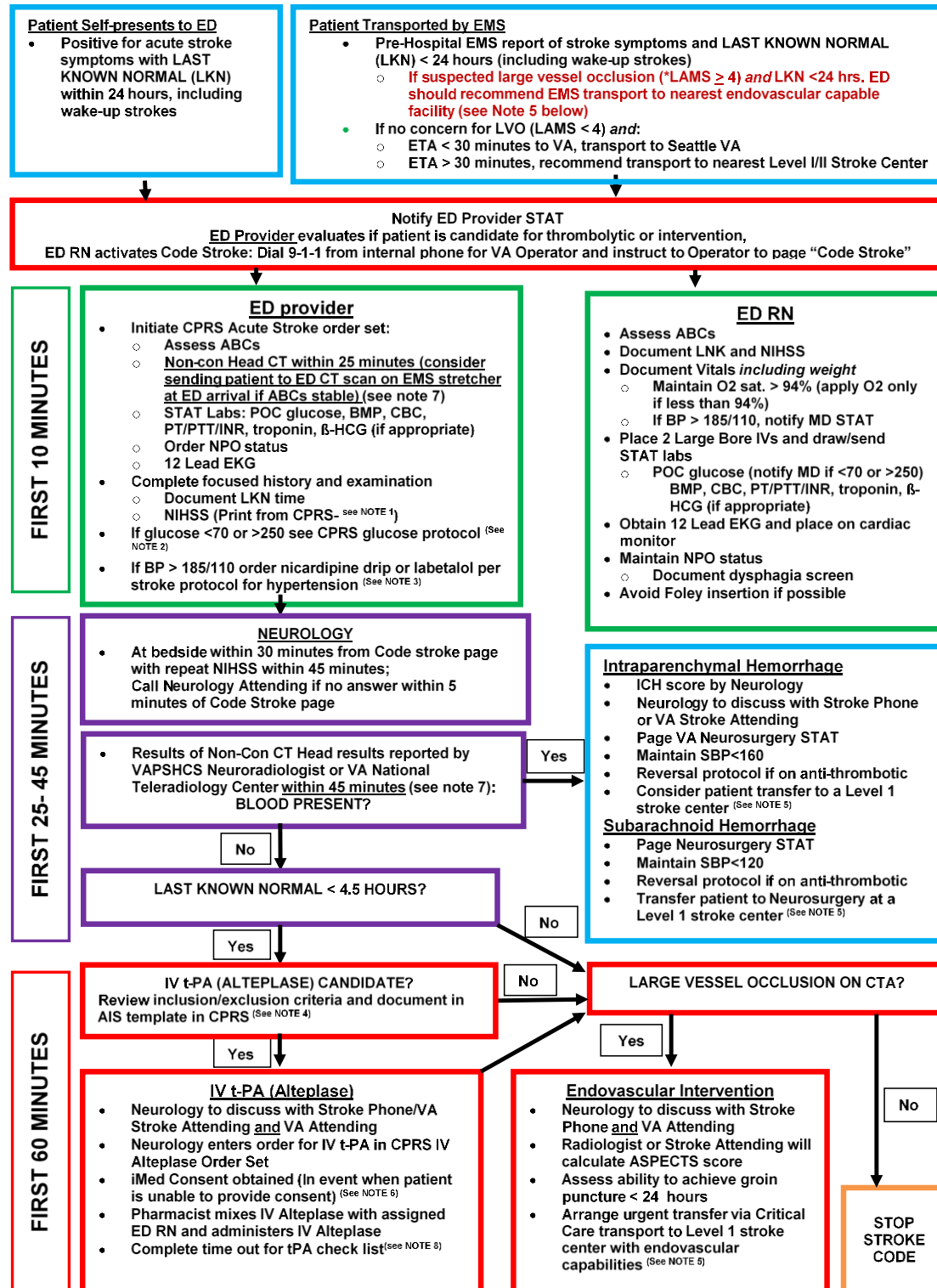
- A. Discontinue LMWH order.
- B. If last dose > 24hour do not give specific reversal agent.
  - a. Minimal utility in reversal > 12 hrs, may consider protamine 25mg IV 12-24hr
- C. If last dose within 8-12 hours or uncertain timing of last dose, give protamine 25 mg IV before blood results return.
- D. If last dose within 8 hours give protamine 50 mg IV before blood results return.

**8. IF PATIENT TREATED WITH IV ALTEPLASE (tPA) WITHIN 24 HOURS**

Refer to separate "Protocol for Suspected Intracranial Hemorrhage after Treatment with IV tPA (Alteplase)"



## VAPSHCS Emergency Department Acute Stroke Protocol



## VAPSHCS Inpatient Acute Stroke Protocol

