**P o ocol fo he an po of oke pa ien b EMS di ec l o he imaging i e and b pa ing he con en ional ED iage and f ll a e men p oce ha e been a ocia ed i h doo - o-needle ime of <30 min e and b an ial imp o emen in doo - o-needle ime epo ed b elec cen e . Thi i incl ded a one of he Ta ge : S oke Pha e II Be P ac ice S a egie . The ke elemen o implemen ch p o ocol in ol e EMS p e-ho pi al no ifica ion of a po-en ial oke pa ien i h pa ien de ail , CT/MRI canne being ale ed and clea ed p io o pa ien a i al, acq i i ion of hi o and po en-ial medical con aindica ion d ing an po , pa ien an po b EMS di ec l o CT/MRI, and ne ologic e amina ion and in a eno PA deli e on he CT/MRI able.**

## P o ocol O e ie

- Emergency Medicine Service pre-hospital notification with stroke patient details
- Intravenous line placed by EMS, in accordance with local practice.
- Pre-registration of patient by ED administrative staff
- Brain imaging ordered and scanner cleared prior to patient arrival
- Pre-retrieval of tPA from ED or storage in CT/MRI suite
- Rapid triage in ED with brief ED physician assessment while on EMS gurney
- Direct transport of patient to CT/MRI on EMS gurney

## P io o Pa ien A i al

1. EMS pre-notification including:
   a. Stroke last known well time
   b. Phone number for detailed history during transport
   c. Patient name and date of birth, if permitted by local regulation, to facilitate retrieval of medical record number, access history, and create new encounternum ĭ ȷ from field or alias placeholder

Doe) for later

## Upon Patient Arrival

1. Verify patient registration
2. Rapid assessment of vital signs, airway, breathing, circulation (with or without initial NIHSS)
3. Rapid transport of stable patients to CT/MRI scanner on EMS gurney

## Upon Patient Arrival to CT/MRI Scanner

1. Focused clinical assessment, examination, and initial NIHSS (if not already performed)
2. Verify functioning intravenous line and determine whether additional lines are needed
3. Brain imaging to exclude imaging contraindications to tPA or stroke mimics
4. Check finger stick blood glucose (if not previously checked) and draw other laboratories, as indicated
5. Review indications and potential contraindications for intravenous tPA
6. If patient determined to be a candidate, mix and administer tPA bolus and start continuous infusion in CT/MRI suite
7. After tPA start, follow hospital-specific protocol for the next phase of acute stroke care which may include additional vascular imaging, assessment for endovascular treatment, further acute care in the ED, admission to the stroke unit or transfer to another facility for admission

## Additional Elements

Certain patients should be stabilized in ER without going direct to CT/MRI: need for airway management, hemodynamic instability, agitated/combative, or presenting with signs or symptoms suggestive of simultaneous acute coronary syndrome.

- tPA should not be delayed awaiting for laboratory testing (other than blood glucose) unless there is clinical suspicion of bleeding abnormality or thrombocytopenia, the patient has received heparin or warfarin, or the patient has received other anticoagulants (direct thrombin inhibitor or direct factor Xa inhibitors). Finger stick or serum blood glucose levels should always be measured. In patients on warfarin or with unknown warfarin use status, point of care INR can be used if available.
- Point of care testing for blood laboratories, if available, may facilitate timely care. Some sites have achieved reductions in treatment times by also shifting to point of care testing or treating in advance of laboratory results to eliminate delays.
- It is preferred that CT/MRI be interpreted immediately by the stroke team in the CT/MRI suite unless a radiologist is available without any delay.
- There is no requirement to wait for ECG or CXR which can be obtained, if indicated, after initiation of IV tPA, unless high level of clinical suspicion for acute cardiopulmonary process.


- Edward C. Jauch, MD, MS. FAHA, Chair; Jeffrey L. Saver, MD, FAHA; Adnan I. Qureshi, MD, FAHA; Kenneth Rosenfield, MD, FAHA; Phillip A. Scott, MD, FAHA; Debbie R. Summers, RN, MSN, FAHA; David Z. Want, DO, FAHA; Max Wintermark, MD; Howard Yonas, MD on behalf of the American Heart Association Stroke Council, Council on Cardiovascular Nursing, Council on Peripheral Vascular Disease, and Council on Clinical Cardiology. 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, 2013;44:870-947.
- Meretoja A, Strbian D, Mustanoja S, Tatlisumak T, Lindsberg PJ, Kaste M. Reducing in-hospital delay to 20 minutes in stroke thrombolysis. Neurology. 2012;79:306-313.
- Meretoja A, Weir L, Ugalde M, Yassi N, Yan B, Hand P, Truesdale M, Davis SM, Campbell BC. Helsinki model cut stroke thrombolysis delays to 25 minutes in Melbourne in only 4 months. Neurology. 2013;81:1071-1076.
- Ford AL, Williams JA, Spencer M, McCammon C, Khoury N, Sampson TR, Panagos P, Lee JM. Reducing door-to-needle times using Toyota's lean manufacturing principles and value stream analysis. Stroke. 2012;43:3395-3398.
- Walter S, Kostopoulos P, Haass A, Lesmeister M, Grasu M, Grunwald I, Keller I, Helwig S, Becker C, Geisel J, Bertsch T, Kaffiné S, Leingärtner A, Papanagiotou P, Roth C, Liu Y, Reith W, Fassbender K. Point-of-care laboratory halves door-to-therapy-decision time in acute stroke. Ann Neurol. 2011;69(3):581-6.