

Direct to CT/MRI Protocol

October 2014

TARGET: STROKESM PHASE II

Protocols for the transport of stroke patients by EMS directly to the imaging suite and bypassing the conventional ED triage and full assessment process have been associated with door-to-needle times of <30 minutes and substantial improvements in door-to-needle times reported by select centers. This is included as one of the Target: Stroke Phase II Best Practice Strategies. The key elements to implement such protocols involve EMS pre-hospital notification of a potential stroke patient with patient details, CT/MRI scanner being alerted and cleared prior to patient arrival, acquisition of history and potential medical contraindications during transport, patient transport by EMS directly to CT/MRI, and neurologic examination and intravenous tPA delivery on the CT/MRI table.

Protocol Overview

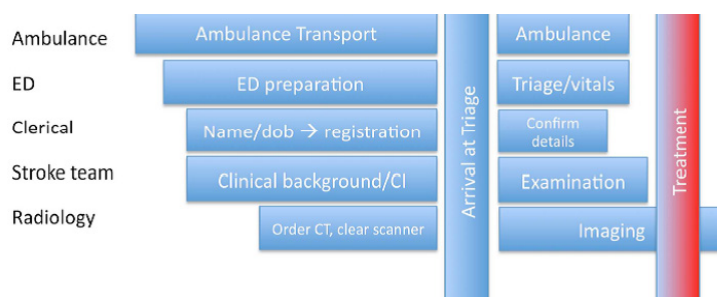
- Emergency Medicine Service pre-hospital notification with stroke patient details
- Intravenous line placed by EMS, in accordance with local practice.
- Pre-registration of patient by ED administrative staff
- Brain imaging ordered and scanner cleared prior to patient arrival
- Pre-retrieval of tPA 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

Prior to Patient Arrival

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 encounter
4. Intravenous line placement by EMS.
 5. When possible, EMS may obtain blood samples for laboratory testing en route to the ED, where they can immediately be given to the laboratory on arrival
 6. Activation of stroke team, including any ED members to wait for the patient at ED triage
 7. Where possible, acquire detailed past and present history over the phone during transport from patient, relatives, other eye-witnesses, ambulance crew, primary care physician, or other sources.
 8. Review any locally available past history, imaging, and laboratory data to assist in correct diagnosis and identify any potential contraindications to tPA
 9. Pre-register patient prior to ED arrival using information from field using name and DOB if provided from field or alias placeholder (eg John/Jane Doe) for later reconciliation
 10. Order CT/MRI in advance of patient arrival, clear scanner
 11. Retrieval of tPA, lines, and infusion pump, with or without pre-mixing as per local policy

Direct to CT/MRI Protocol Parallel Processes



(Figure courtesy of Bruce Campbell MD, Royal Melbourne Hospital)

TIME LOST IS BRAIN LOST.
Learn more at Stroke.org/TargetStroke.



**TARGET:
STROKE**

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/combatative, 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. Went, 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.
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