Management of Acute Stroke (BAT) & Thrombolytic Therapy

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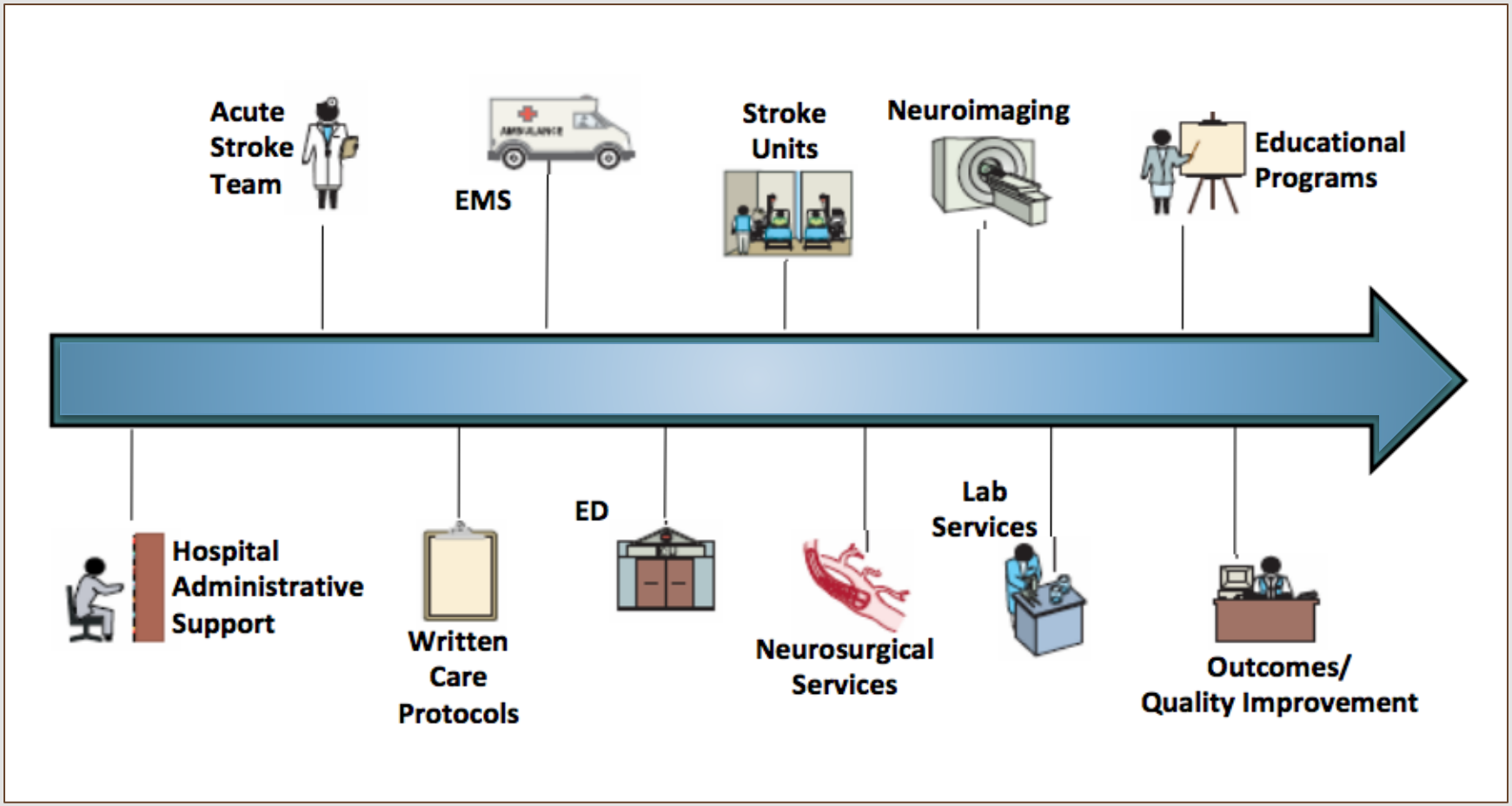
University Hospital is a **Comprehensive Stroke Center**, certified by the **Joint Commission** and the **NJ DOH**

We have the following components:



Comprehensive Stroke Centers provide:

Personnel (includes designated stroke nurses and interventional/endovascular physician(s)) **with Expertise in…**

- Critical care medicine
- Vascular neurology
- Vascular neurosurgery
- Vascular surgery
- Diagnostic radiology & neuroradiology
- Rehabilitation therapy
- Physical Medicine & Rehabilitation
- Swallowing assessment
- APN (dedicated to stroke)
- RT

Surgical and Neuro-interventional Therapies

- CEA
- Clipping of intracranial aneurysm
- Endovascular ablation of IAs/AVMs
- IA reperfusion therapy
- Endovascular Rx on vasospasm
- Placing intracranial pressure transducer
- Clipping intracranial aneurysm
- Placing ventriculostomy
- Hematoma removal/draining

Infrastructure

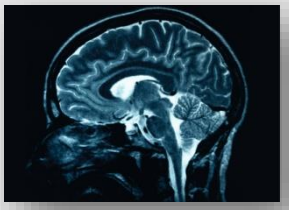
- Stroke unit
- ICU
- Around-the-clock interventional services
- Around-the-clock OR staffing
- Stroke surgery

Education/Research

- Community education and prevention
- Professional education
- Patient education

Diagnostic Techniques

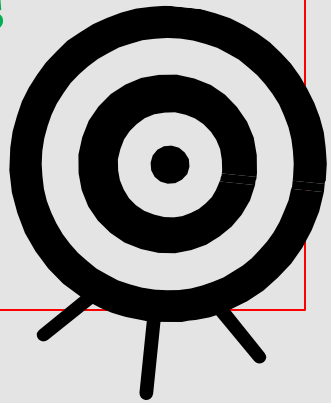
- MRI with Diffusion
- MRA/MRV
- CTA
- TCD
- Digital cerebral angiography
- Carotid duplex U/S
- Transesophageal echo



University Hospital
achieved
Advanced Stroke care Certification
as a
Joint Commission Comprehensive Stroke Center
in June 2015
and was recertified in 2017 and 2019.

Requirements:

Acute Stroke Policies and Protocols
Door-to-Needle times of <60 minutes
Achievement of Stroke Core Measures and Comprehensive Stroke Core Measures



Educational Objectives

- To **define the emergency management** of the patient presenting with signs and symptoms suggestive of acute stroke.
- To define **roles and responsibilities** of staff
- To establish **time goals** for assessment and treatment
- To **describe the process and flow of patient care** for acute stroke patients arriving via EMS to University Hospital
- To **define the treatment of the acute stroke patient with tissue plasminogen activator (tPA)**
- Policy Review
- To review the **Stroke Core Measures** and **Comprehensive Stroke Core Measures**

Time Goals

Door to Needle (DTN) = < 60 minutes

Optimal DTN ≤ 30 minutes

PATIENTS SHOULD BE TREATED WITH IVtPA WITHIN 3 HOURS OF WHEN PATIENT WAS LAST KNOWN TO BE WELL.

A SUBSET OF PATIENTS CAN HAVE TREATMENT STARTED WITHIN **4.5 HOURS** OF LAST KNOWN WELL.

ONCE THE PATIENT IS IN THE HOSPITAL:

- Time from patient arrival at ED, or if in-house discovery of symptoms, to notification of Brain Attack Team (BAT)……..……..≤15 min
- Time from arrival in ED or symptom discovery to CT scan……..……..……≤20 min
- Time from CT order to CT interpretation…….....≤45 min
- Time from arrival to completion of laboratory tests, EKG, and CXR, if ordered……...……..…..≤45 min
- Door-to-needle time for IV thrombolytic (t-PA) treatment……..……..….≤60 min
  - Secondary goal: Door to needle time of ≤45 minutes in ≥ 75% of patients and 50% of patients less than 30 minutes (this requires, faster imaging, reading, decision and tPA administration)
- Time from order of neurosurgical evaluation to onset of evaluation……..……..…...30 min
- Neurosurgical intervention…….....as clinically needed

Stroke is a Brain Attack

- **Early recognition and treatment is key**
- Time is critical to maintaining a healthy BRAIN
- 2,000,000 brain cells die every minute during a stroke
- Every minute lost without treatment increases the chance of death or disability
- Intravenous tissue plasminogen activator (tPA, Alteplase^{R}) is the only FDA approved treatment for acute ischemic stroke

Symptoms of Stroke

ALL symptoms are SUDDEN

- numbness or weakness of the face, arm, or leg – especially on one side of the body
- confusion, trouble speaking or understanding
- trouble seeing in one or both eyes
- trouble walking, dizziness, loss of balance or coordination
- severe headache with no known cause

Brain Attack Team (BAT)

Who is on the Brain Attack Team?

- Stroke Resident, Stroke Fellow, and Stroke Attending
- Stroke Advanced Practice Nurse
- Stroke Endovascular Fellow and Endovascular Attending

When to call BAT?

- If suspicion for acute stroke with Last Known Well (LKW) < 24 hours (additional parameters in ED)

How to call BAT?

- In UH:
  - Inpatients: Dial 1-1-1 and ask operator to activate BAT pager and Emergency Response Team (ERT). BAT team and ERT will immediately come to see the patient.
  - Outpatients (non-ED outpatient areas, halls, visitors): Dial 111 and ask operator to page Dr. Bandaid. Patient will be taken to ED.
- Outside of UH (DOC, ACC, Parking areas, Bergen Bldg, Cancer Center, etc.): Call 9-1-1 or 973-972-7000 and report time and location. EMS will take patient to ED.
- BAT group pager activated by REMCS as well as overhead page

Policies

- Process for the Initial Management of the Brain Attack Team (BAT) Patient: ***Suspected Acute Ischemic or Hemorrhagic Stroke***
  - Covers the first hour of management once a stroke is suspected (less than 24 hours since Last Known Well)
  - Covers both outpatients (ED) and inpatients
- Thrombolysis Policy for the Treatment of Acute Ischemic Stroke
  - Covers the administration of IV tPA, initial post-infusion management, and transfer to endovascular suite as needed
- These are **NOT** admission policies or admission order sets

What happens in a BAT?

- Acute Stroke suspected < 24 hours since last known to be normal (Last Known Well) N.B. This time guideline reflects new 2018 guidelines to <24 hours for cases with documented large vessel occlusion and viable brain tissue.
  - In ED, BAT is called for LKW ≤ 24 hours
  - On inpatient wards also , BAT is called if LKW ≤ 24 hours.
- Brain Attack Team notified by page and overhead intercom. For inpatients, ERT is also called by overhead page.
- BAT order set initiated by ED/primary physician
- Patient rapidly assessed by ED/primary physician and by BAT Team
- Patient placed on monitor, patient taken to CT for CT head by primary nurse and BAT Team. Two IVs started, blood work picked up by lab technician.
- Additional imaging as needed, as determined by BAT team: CT angiogram/CT perfusion
- Primary nurse performs/documents initial vital signs and neuro check, then BP q15 min x 1 hour
- Radiology ensures rapid access to CT, provides interpretation of studies
- Decision made if IV tPA will be given, and/or endovascular intervention
- If patient arrives by UH EMS, the process is *further streamlined*
  - EMS draws blood in the field
  - EMS takes patient directly to CT, after ED physician determines that the patient is clinically stable

Patients who are candidates for Mechanical Endovascular Reperfusion Therapy

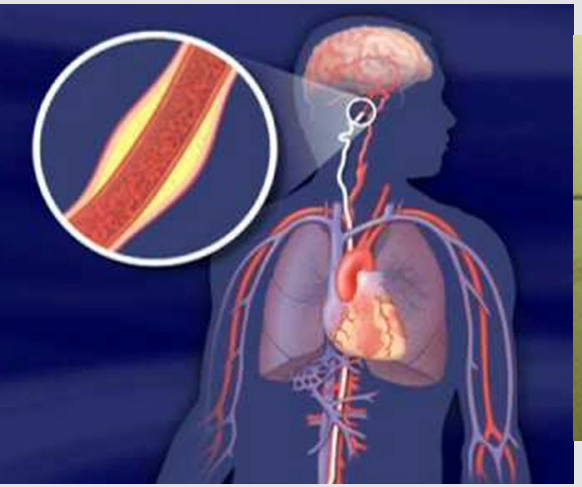
Time goals:

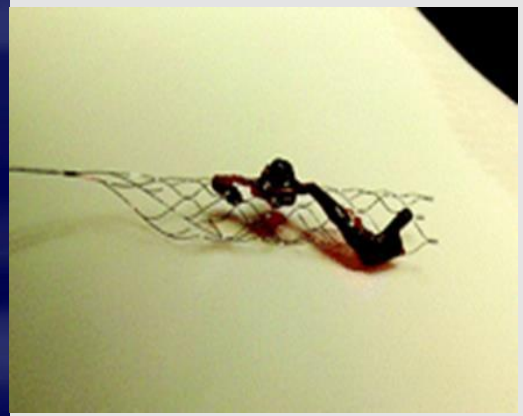
- Time from arrival to arterial puncture (Door to Puncture) ED patients :≤90 min
- Time from arrival to arterial puncture (Door to Puncture) transferred from OSH≤ 60 min
- Time from arrival to recanalization/revascularization ……≤120 min

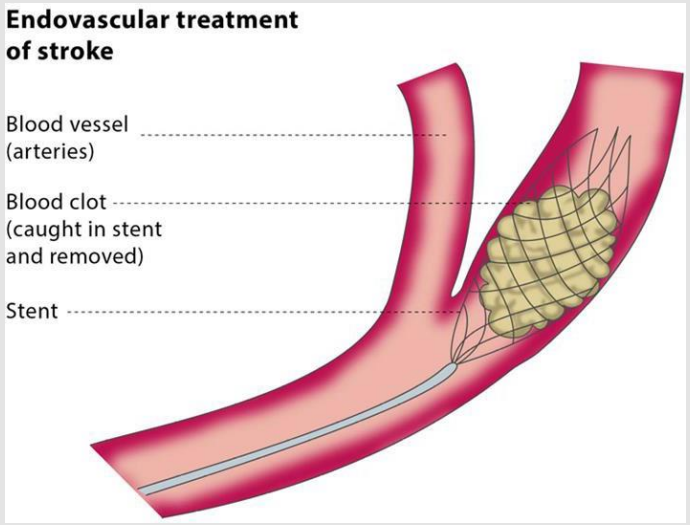
Time goals : To be eligible for GWTG Target Stroke Honor Roll Advanced therapy

Door to start of device (door to first Pass) ED patients : ≤ 60 minutes

Door to start of device (door to first Pass) transferred from OSH : ≤ 90 minutes







https://heart.irp.iqvia.com/measure.html?study_id=1388&physician_id=219308&study_rev_id=882

EPIC Order sets: search by typing "Stroke"

Suspect acute stroke <24 hours from "last known well" (LKW)?

- "Acute Stroke (BAT)" orders: **ED/primary MD orders** these at the same time as calling the BAT team
  - Order set has pre-checked orders for CT head, IV lines, bloodwork, vital signs and neuro checks, cardiac monitoring, oxygen

Decision is made to give tPA (if LKW ≤ 4.5 hours)?

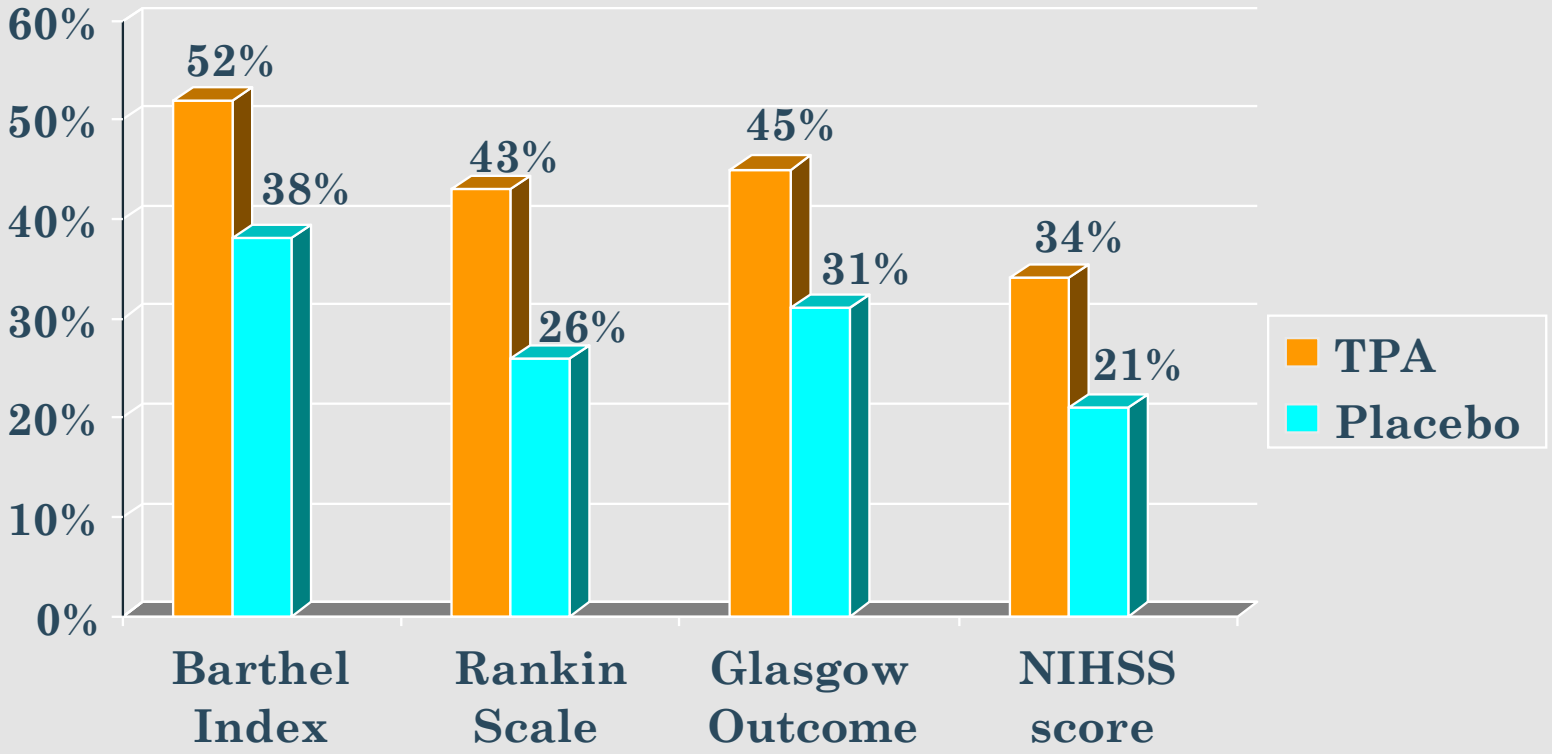
- "Stroke IV tPA Treatment" Orders: **BAT team (in ED)** / **Primary MD (in patient)** orders tPA upon recommendation by BAT team
  - Clickable link reviews Indications & Contraindications
  - Defines dosing and administration
  - Defines the management of hypertension for the tPA patient
  - Defines post tPA monitoring requirements

Patient is a tPA candidate, what next?

- Joint decision between ED/primary physician and BAT team after review of indications/contraindications
- BP is controlled as outlined in the order set (<180/105)
- BAT team in ED /Primary physician (in patient) orders IV tPA: 0.9 mg/kg, administered as bolus of 10% in one minute, and the remainder infused over on hour
- Primary nurse (if inpatient, ERT nurse) mixes and administers tPA
- BAT MD is at bedside for bolus of tPA, and the nurse and BAT MD *verbalize time of bolus*
- *The RN documents the tPA bolus dose and infusion dose and time in MAR and the BAT resident documents the tPA dose and time in BAT consult note.*
- If patient deemed a candidate for endovascular procedure, BAT team will arrange immediate procedure.
- Primary nurse continues neuro checks and BP monitoring as defined in the order set
- tPA is discontinued immediately and MD called stat if the patient has an acute neurologic deterioration, new headache, acute hypertension (>180/105), nausea or vomiting.
- Patient is admitted to the ICU. The "Stroke ICU Admission – post tPA order set" is utilized (discussed in 2nd half of this orientation) by the accepting team. This order set continues the important monitoring of the tPA patient.

NINDS TPA Stroke Trial

Excellent outcome at 3 months on all scales

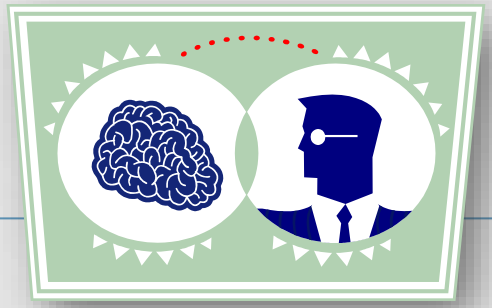


Global outcome statistic: OR=1.7, 50% v. 38%= 12% benefit

N Engl J Med 1995;333:1581-7

Safe, rapid treatment of acute stroke patient

- These policies define roles and responsibilities of all hospital personnel caring for the acute stroke patient.
- The goal is to treat appropriate patients with IV tPA, and in some cases with endovascular removal of clot, safely and improve outcomes.
- **These policies conform with Best Practices to meet Joint Commission standards for excellence in stroke care.**



Policies define responsibilities and work flow

- EMS
- Primary Nurse
  - ED: nurse is assigned.
  - Inpatient: Primary nurse & Emergency Response Team responder
- ED physician or primary physician
- Brain Attack Team: neurologists and APN as available
- Radiology technician, resident, attending
- Laboratory personnel
- Unit clerks, medical technicians

The Stroke Admission & Stroke Core Measures

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Joint Commission Core Measures for Stroke

- STK-1 VTE prophylaxis
- STK-2 Antithrombotic Therapy at Discharge
- STK-3 Anticoagulation for A-fib/A-flutter
- STK-4 Thrombolysis: Arrive in 2 hr, treat by 3 hr (tPA was discussed in 1st half of presentation)
- STK-5 Antithrombotic Therapy by day 2
- STK-6 Statin at discharge
- STK-8 Stroke Education
- STK-10 Assessed for Rehabilitation

Additional Quality Measures:

- Dysphagia Screen
- LDL documented
- Intensive statin therapy
- Smoking cessation

https://www.jointcommission.org/measurement/specification-manuals

Joint Commission *Comprehensive* Measures for Stroke

The following are the responsibility of the Stroke Team and Endovascular Team to implement and document (and will not be discussed further here):

- **CSTK-01** National Institutes of Health Stroke Scale (NIHSS Score Performed for Ischemic Stroke Patients)
- **CSTK-02** Modified Rankin Score (mRS) at 90 Days
- **CSTK-03** Severity Measurement Performed for SAH and ICH Patients (Overall Rate) within 6 hours of ED arrival and prior to any procedure
- **CSTK-04** Procoagulant Reversal Agent Initiation for Intracerebral Hemorrhage (ICH)
- **CSTK-05** Hemorrhagic Transformation (Overall Rate)
- **CSTK-06** Nimodipine Treatment Administered within 24 hours of ED arrival
- **CSTK-08** Thrombolysis in Cerebral Infarction (TICI Post-Treatment Reperfusion Grade)
- **CSTK-09** Arrival Time to Skin Puncture
- **CSTK-10** Modified Rankin Score (MRS at 90 days: Favorable Outcome)
- **CSTK-11** Timeliness of Reperfusion: Arrival time to TICI 2B or Higher
- **CSTK-12** Timeliness of Reperfusion: Skin Puncture to TICI 2B or Higher

https://www.jointcommission.org/measurement/specification-manuals

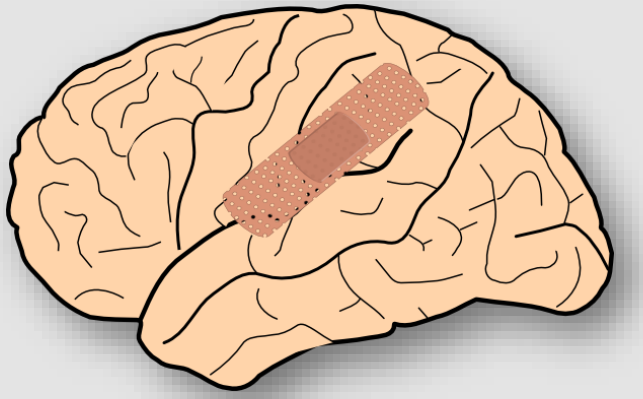
Stroke Admission & Discharge Order Sets

EPIC order sets:

- ICU Admission no tPA/Thrombectomy alone/Hemorrhagic stroke
- ICU Admission Post tPA with or without Thrombectomy
  - NEU IP STROKE PCU + FLOOR ADMISSION
  - NEU IP STROKE DISCHARGE

Note: All Neurosurgical Order Sets include Core Measure requirements.

Why use the Stroke Order Sets?



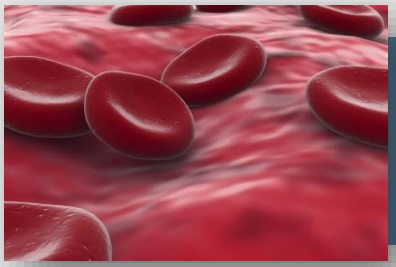
- Prevent peri-stroke complications
- Reduce risk of recurrent stroke
- Assist multidisciplinary team in stroke care
- Optimize compliance with the Joint Commission Core Measures

VTE Prophylaxis by Day 2

- Part of every Stroke Admission Orderset
- Stroke patients are high risk for VTE
- For acute hemorrhagic stroke patients, if chemical prophylaxis can not be used, venodyne boots are required
- Nurse placing the venodyne boots MUST document this in the electronic record

Dysphagia Screen

- All patients suspected of having an acute stroke have the swallow screen done by the primary nurse
- Usually completed in the ED and documented in EPIC
- If patient *fails*, the nurse informs the MD, the patient is made NPO including meds, and an SLP consult must be obtained
- A failed swallow screen cannot be repeated. ONE and DONE
- All medication/hydration orders until cleared by SLP will require an alternate route (NGT, IV, rectal)



Antithrombotic Therapy at Day 2 & Antithrombotic Therapy at Discharge

- All patients with an ischemic stroke must be given an antiplatelet agent ***by the end of day two***, unless contraindicated and contraindication documented. Choices:
  - Aspirin 81 mg or 325 mg daily
  - Clopidogrel (Plavix) 75 mg daily
  - Other antiplatelet agents as determined by stroke attending
- All patients with ischemic stroke must be ***discharged on an antiplatelet agent***, unless contraindicated
- Exceptions: Patients on anticoagulation for atrial fibrillation/atrial flutter, Patients with other contraindications
- Must document reason not given
- Must include in the AVS. Verbal instruction to take aspirin is not sufficient.

Anticoagulation for A-fib/A-flutter

- All patients with ischemic stroke who have paroxysmal or continuous atrial fibrillation or atrial flutter must be discharged on an anticoagulant.
- If contraindications for anticoagulation exist, reason for not prescribing must be documented

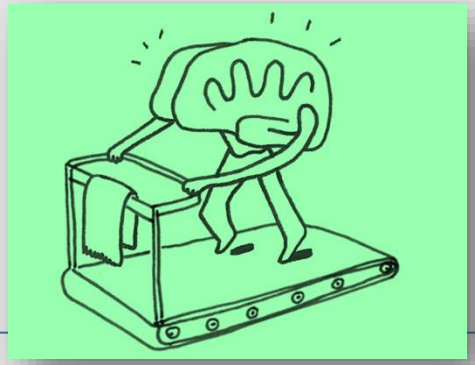
LDL Documented & Statin at Discharge

- All patients must have an LDL ordered and result documented by the end of day two.
- All patients must be discharged on a statin agent if:
  - LDL > 70; or
    - Patient was taking a statin leading up to admission

(Intensive statin dose is recommended unless contraindicated)

Intensive Statin Therapy

- Patients with cerebrovascular disease should be given intensive statin therapy
- **Atorvastatin 80 mg daily** (or equivalent alternate statin agent) is recommended.



Stroke Education Smoking Cessation

- Patients should have individualized and documented education on:
- "Stroke**SMART911"**:
  - **S**igns & symptoms of stroke
  - **M**edications and the reasons for taking them
  - Follow up **A**ppointments
  - **R**isk Factors for stroke
  - **T**ime is Brain! Call **9-1-1**
- Patients who smoke should have counseling on how to stop smoking

Assessed for Rehabilitation

- Order sets include consultation requests from Physical Therapy, Occupational Therapy, and Speech & Language Pathology
- PT/OT/SLP are in-house 6 days a week, and on call for the 7th day.
- PT/OT/SLP are part of the stroke multidisciplinary team and make recommendations regarding post-discharge rehab placement

Stroke patient discharge & follow up

- ONLY use stroke discharge order set
- All stroke patients must be seen as an outpatient within 10-12 weeks, optimally 4-6 weeks
- Please arrange appointment by calling x 2-2550/2-9000

The *American Heart Association* and *American Stroke Association* proudly recognize

University Hospital Newark, NJ

Get With The Guidelines – Stroke GOLD PLUS Achievement Award Hospital

These policies and procedures follow AHA Clinical Practice Guidelines:

- Guidelines for the Early Management of Patients with Acute Ischemic Stroke
- Guidelines for the Prevention of Stroke in Patients With Stroke and Transient Ischemic Attack
- Comprehensive Overview of Nursing and Interdisciplinary Rehabilitation Care of the Stroke Patient
- Guidelines for the Management of Spontaneous Intracerebral Hemorrhage
- Guidelines for the Management of Aneurysmal Subarachnoid Hemorrhage

Where to find Policies and Clinical Practice Guidelines

- When you click on the "Stroke Toolkit" icon on *Clinical Links*, the window below will open
- Clinical links : Found on every desktop computer in nursing stations at University Hospital
- Clinical links can also be accessed by logging in to EPIC : hyperspace bar

EPIC

Click here to submit an ATTESTATION