

Best Practices During an Interventional Acute Stroke Response

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UCLA ACUTE ISCHEMIC STROKE SOP

90 min door to needle

GOAL

Timely intervention of thrombotic or embolic occlusion of a cerebral artery

OVERVIEW

- Ischemic stroke is caused from lack of blood reaching a part of the brain, usually due to plaque narrowing or blocking blood vessels
- There are two types of ischemic strokes: thrombotic and embolic
- Thrombotic strokes occur when there is a blood clot in the artery going to the brain
- Embolic strokes occur when there is a blood clot elsewhere in the body, blocking blood flow to the brain
- The goal of acute treatment is to keep brain damage to a minimum

UCLA SOP

- **STROKE CODE ACTIVATION SYSTEM**
- **STROKE LEVEL 3**
- **PATIENT CARE**
- **ORDER OF EVENTS**
- **ONE CALL SYSTEM**
- **BLOOD PRESSURE/tPA/IV MEDICATIONS**
- **DOCUMENTATION**
- **Q&A**

Stroke Code Activation

Stroke code activation

LEVEL 1 (Patient displaying stroke symptoms)

- Patient coming to ED brought in by EMS or walk ins
- Inpatient, post procedure/surgery patients
- EMTs, RNs, Floor physicians, and ED physicians can all activate Level 1 assessment
- Stroke Team (Stroke service /Neuro IR Fellows) notified of potential stroke
- Stroke service will evaluate patient to determine if they are having a stroke
- Level 2 Code activated based on patient assessment

Stroke code activation

LEVEL 2 (possible interventional case - patient going to imaging)

- IR team paged to ensure room/tech/nurse/attending/fellow are available within 30 mins, if after hours.
- Keep a room available during working hours.
- Anesthesia aware and available and setting up in the angiography suite for patient arrival.
- Patient-pathway

Stroke code activation

LEVEL 3 (definite interventional case) prior to patient arrival

- Obtain stroke cart and place outside suite
- Open neuro procedure pack/open stroke kit and throw supplies
- Prepare heparinized saline bags: 2 in pressure bags, 1 hanging and 1 for table use (more than 2 pressure bags can be hung, check with Attending)
- Assist Fellow/Attending Physician with pulling other supplies
- Ensure anesthesia is aware of patient's arrival

Stroke Level 3

Patient care

Arrival in Angio Suite

- Obtain order and input patient name/data
- Standard IV Access
- Consent for procedure from patient, family, or attending physician for an emergent consent
- Check labs for Creatinine and Platelets above 50k
- EMR (EPIC)-ensure the following resources have access to charting
 - Anesthesiologist
 - Periop Care

Patient care

In the Angio Suite

- Immobilize patient's head and place arm and thigh restraints on as a safety precaution
- Blood pressure parameters should be discussed with attending and anesthesiologist
- Bilateral groin prep
- No foley necessary unless instructed by attending physician

Order of events

A. Patient on table

1. Restrain patient's head and extremities and prep patient
2. Check bilateral pedal pulses
3. Drape patient and materials on table
4. Set up flush and pressure bags

B. Keep log of the following times

1. In angio suite, start time, end time, and out of room time
2. Puncture time
3. On clot time
4. Device deployment

C. Procedure Completion

1. Check puncture site to ensure no hematoma
2. Check bilateral lower extremity pulses
3. Hand over report to receiving RN

Stroke Cart

Benchmark, Flowgate Balloon Guide,
VTK, Radial Access Catheters,
Distal Access Catheters

6/8 fr Shuttle Sheaths

Stroke Kit

Penumbra Supplies



Stroke Kit Item List

Quantity	Pulled	Description	Empac#	Exp.Date
2		1cc Luer Lock	309167	
1		3cc Luer Lock	513514	
1		10cc Luer Lock	513517	
2		20cc Luer Lock	513525	
2		60CC VacLock Syringe	583483	
1		High Pressure Tubing 60cm	99879	
3		Rotating Hemostatic Valve	50095	
5		3-way Stopcock	101122	
2		1-way Large Bore	105429	
1		038 Glide Wire	111474	
1		Benston Guidewire	112430	
1		6fr. Short sheath	104968	
1		8fr. Short sheath	104621	
1		5fr. Micropuncture Set	106633	
*		Before the Case:	*	
4		Heparinized Saline Flush Bags		
		Earliest Expiration Date		
		Please Initial		

Items chosen by Neuro IR Service for every case to be placed on sterile table prior to Patient arrival

SET UP

Pressure Bags

Closed Disposal System

Bowls with Syringes

Wire Bowl



Insider Information

Lead Aprons

- ❖ Case starts when patient arrives
- ❖ Lead should be worn by all staff, as MD will puncture within 5 mins of arrival
- ❖ Continue to prep as MD places sheath

Table Prep

- ❖ Fluid in bowls to prep catheters prior to patient arrival
- ❖ Always check with Attending physician on their preferences before appropriate supplies (depends on anatomy and type of stroke)

Patient Prep

- ❖ Prep closed disposal system (contrast/saline manifold) before pressure bags

Patient Immobilization

- ❖ Strap over knee/thighs critical, arms 2nd then legs if needed
- ❖ Coflex tape around head

Nursing care

One Call Transfer

- **What is it?**
 - An internal notification system used by outside emergency rooms to rapidly approve transfer and transportation of acute stroke patients requiring potential intervention within 60 minutes.
- **How does it work?**
 - A call is made from an outside hospital and the patient is accepted to UCLA and an internal page notification is sent to all the relevant teams and departments.
- **Where do patients go upon arrival?**
 - Patients are directly admitted to the neuro ICU and are brought to imaging within ten minutes of admission.

ED Patients Arrivals

- **EMS Arrivals**
 - Level ONE activated prior to patient arrival.
 - ED room available with appropriate staff, including the stroke team.
 - MRI and CT scanners are cleared in anticipation of patient arrival.
- **Walk-Ins**
 - Level ONE activated once patient has been triaged as a possible stroke.
 - Level TWO activated after the ER attending and stroke team have evaluated the patient.
- **Imaging**
 - Patients that are "cleared" are taken to MRI for initial imaging.

Acute Stroke (IV tPA)

Current Status of IV tPA:

up to 3hours post stroke >18 y/o

up to 4.5h if <85 y/o, no warfarin, NIHSS <25

Exclusions:

INR > 1.7, PT >15, Plts <100K, glu <50mg/dl

active internal bleeding, SAH, ICH, recent head surgery/trauma/stroke, brain tumor/AVM/Aneurysm, >1/3 MCA

Relative: pregnancy, recent GI/GU bleeding <21 d, Major surgery or trauma < 14d, Seizure, RIS

Management IV tPA with ICH

- Consider BP 90-140
- Consider tPA reversal (not proven)
 - Half life only 5 min
 - Stat fibrinogen
 - <100mg/dl then 0.15u/kg Cryo (one unit)
 - Repeat lab 30min
 - Stat platelets
 - <150K then 1 unit
 - <100K then 2 units
 - Amicar 5gms/20min

NURSING Alteplase (tPA) WORKSHEET**GOAL: Alteplase (tPA) started within 60 minutes of patient's arrival****NEUROLOGY/STROKE RESIDENTS *MUST USE* Alteplase (tPA) ELECTRONIC ORDER SETS IN CARECONNECT****Alteplase (tPA) Dosing Considerations**

Patient's Weight: _____kg
 Total Dose: _____mg (ml) (=0.9mg/kg)
 Discard Quantity (Waste): (100ml – total dose) _____ml
 Bolus Volume: (10% total dose) _____ml Time: _____
 (give over 1 [one] minute)
 Infusion Volume (90% total dose): _____ml Time Started: _____
 (give over 1 [one] hour)

*Maximum total dose = 90mg (90ml)***IMPORTANT:** Document in CareConnect the **actual** time the bolus was given and the infusion was started.**Preparing tPA**

for final concentration = 1mg/ml

1. Dissolve tPA: Spike bottle of 100ml sterile water. Insert and spike 100mg tPA bottle. Swirl (do not shake) until completely dissolved
2. Withdraw **WASTE** amount into 60ml syringe. *Attach Waste label to syringe.*
3. Withdraw **BOLUS DOSE** in 10ml syringe. *Attach Bolus Dose label to syringe.*
4. Spike tPA bottle with MRI primary tubing (MR PL 1056-F) & extension tubing (MX451FL). *Attach Infusion label to bottle.*
5. Prime tubing—being careful to **minimize waste.**
6. Insert tubing into pump and program pump for INFUSION DOSE
 - a. RATE=mg/hr=INFUSION DOSE
 - b. VTBI=INFUSION DOSE LESS 10ml (to allow for flush)
7. Hang 50ml NS bag with NS Flush label next to tPA bottle. Do not administer this flush until after tPA is complete.

Nursing Assessments

Once Alteplase (tPA) infusion has started:

Document neuro checks and vital signs:
 Every 15 minutes for 2 hours, then
 Every 30 minutes for 6 hours, then
 Every 60 minutes for 16 hours

Document neuro checks as above and more frequently for neuro changes

Notify Neurology Residents if SBP <90 or >180, DBP <60 or >105, HR <55 or >110 or change in neuro assessment.
 Document MD notification.

Alteplase (tPA) Time-Out Call Out Procedure

Call out time/dose of bolus infusion
 Call out time/dose of infusion

Document actual times given in Care Connect MAR

Repeat Callout Information during every patient hand-over or transfer during Alteplase (tPA) infusion

Nursing Considerations

Transport patient on MRI gurney

Use MRI Compatible Pump and Tubing

Bring IV Alteplase (tPA) to the MRI/CT scanner

Code Stroke packet to patient location

Check glucose if not completed by EMS prior to arrival

Anticipate possible antihypertensives

Anticipate possible transfer to interventional area

Use this worksheet for patient hand-over during transfer from ED to another treatment area

NEVER hang a second bottle of Alteplase (tPA)

Alteplase (tPA) Administration

- Alteplase (tPA) is started in the ED, if patient is a candidate.
- Handoff of care is given the IR RN at bedside to confirm Alteplase (tPA) dose, start time, and pump settings.

Blood Pressure Parameters (intra-procedure)

Based on IV Alteplase (tPA) administration

- Patient with IV tPA
 - Prior to procedure and with large vessel occlusion: keep SBP less than 180
 - Post recanalization: dependent on degree of recanalization. Must discuss with attending physician. Usually, the SBP range is 100 to 150.
- Patient NOT receiving IV Alteplase (tPA) IV
 - Prior to procedure and with large vessel occlusion: keep SBP less than 220
 - Post recanalization: depend on degree of recanalization. Must discuss with attending physician. Usually, the SBP range is 100 to 150.

Documentation (intra-procedure)

- Puncture time
- On-clot time
- Device Deployment
- Clot Retrieval

IV Medications

- Conscious Sedation
 - Fentanyl
 - Versed
- Blood Pressure
- tPA Reversal

Heparin and Antiplatelets

- Heparin:
 - 1mg protamine/100u heparin
 - Heparin half life about an hour
- Aspirin/Plavix
 - DDAVP 0.3ug/kg
 - 1 unit platelets
- G2b3a:
 - FFP 20ml/kg
 - Consider FVIIa
 - Platelets

Anticoagulants

- Warfarin
 - Vit K 10mg IV/10-30min
 - 4 factor PCC (Kcentra) 50u/kg
 - Or 4 units FFP
- Direct Thrombin Inhibitors/ Xa inhibitors
 - Dabigatran (Pradaxa): Praxbind 5gm IV
 - Apixaban/Rivaroxaban (Eliquis/ Xarelto): Kcentra 25-50u/kg
 - Andexanet is a reversal agent in trial (ANNEXA-4)

Post IR Procedure

Patient Pathways

- **CT SCAN:** Post IR procedure and prior to transfer to unit.
 - CT4 Scanner in the IR Suites
 - CT Scanner on the first floor
- **Neuro ICU:** Post IR procedure and CT scan
 - Bed control made aware of patient at beginning of procedure for bed.
 - Charge Nurse on unit notified of patient and bed assigned.
- **PACU:** Post IR procedure and CT scan
 - If there is no 6ICU bed available, patient will go to PACU.
 - PACU charge nurse made aware of patient.

Take Away Points

- ❖ One Call Transfer
- ❖ Stroke Protocol standardization
- ❖ On-call Neuro IR team readily available 24 hours

Q&A