ACUTE STROKE MANAGEMENT 2019 GUIDELINES:

TPA:

INDICATIONS:

- Symptoms suggestive of acute ischemic stroke with onset < 4.5 hours
- Wake up stroke > 4.5 hours from LKW with DWI positive FLAIR negative MRI *(New)*

EXCLUSION CRITERIA:

- History of prior intracranial hemorrhage (ICH, SAH or SDH)
- Known intracranial neoplasm
- Known intracranial *aneurysm (although recent studies showed safety with aneurysm < 10mm)*
- Known intracranial AVM
- History of prior stroke or trauma within past 3 months
- Known platelet count < 100,000
- Heparin use within 48h with elevated aPTT
- LMWH in therapeutic dose within 24h
- Warfarin use with INR > 1.7 or PT > 15
- NOAGs use within 48 hours with elevated factor Xa assay, PT or aPTT
- Suspected stroke due to infective endocarditis
- Known or suspected aortic arch dissection
- Intracranial neoplasms

RELATIVE EXCLUSION CRITERIA:

- BP > 185/110 -> It has to be lowered first
- Seizure at onset with post-ictal weakness -> deferred to evaluating clinician
- Pregnancy -> safety/harm not established
- History of recent GI bleeding within past 21 days
- History of recent MI within pat 3 months
- Known heavy burden microbleeds on prior imaging (> 10)

EXCLUSION CRITERIA FOR 3-4.5 HOUR WINDOW:

- Age > 80
- NOAG use even if labs are normal
- Warfarin use even if INR < 1.7
- NIHSS > 25

EXCLUSION CRITERIA FOR WAKE-UP STROKE WITH ONSET > 4.5 HOUR WITH MRI MISMATCH:

- Same as 3 - 4.5 hours criteria:
  - Age > 80
  - NOAG or Warfarin use even with normal labs
  - NIHSS > 25
- DW lesion > third MCA territory
- Planned thrombectomy

SPECIFIC SITUATIONS:

- Menstruation: tPA should be given, it may increase menstrual bleeding though
- Pregnancy with moderate or severe stroke: tPA should be given (there is risk of abortion or miscarriage)
- Patient is on dual antiplatelets: tPA should be given
- Extracranial dissection: tPA should be given
- Intracranial dissection: safety not established
- Brain aneurysm < 10 mm: tPA should be given
- Brain aneurysm > 10 mm: safety not established
- Brain AVM: safety not established
- Brain microbleeds < 10 spots: tPA should be given
- Brain microbleeds > 10 spots: tPA may carry a high risk of bleeding
- Recent MI < 3 months: tPA should be given
- Known intracardiac thrombus with moderate or severe stroke: tPA should be given
- Known intracardiac thrombus with mild stroke: safety not established
- Systemic malignancy with life expectancy > 6 months: tPA should be given
- Not sure if it is a Stroke mimic: tPA should be given rather than waiting for further workup

DO'S AND DON'T DO'S IN ACUTE STROKE ACTIVATION:

DO:

- Get CTA along with initial CT in thrombectomy candidates, as long as it is not going to markedly delay tPA.
- Admit patient to ICU or stroke unit after tPA

DON'T:

- Don't withhold tPA because of hypodensity seen on CT, as long as deficits are more than expected with the hypodensity
- Don't withhold tPA for patients who received prophylactic dose LMWH within past 24h
- Don't withhold tPA for patients with history of small number of microbleeds (< 10)
- Don't get an MRI to screen for microbleeds prior to tPA
- Don't withhold tPA for stroke patients with known sickle cell disease
- Don't give tPA to wake-up stroke outside the time window with penumbra, unless in clinical trial.
- Don't give abciximab to patients currently receiving tPA
- Don't delay tPA to monitor for further improvement
- Don't delay tPA to watch for improvement

QUESTIONS:

Q1: Should we reverse warfarin or heparin to give tPA ? No, don't reverse

Q2: What are the time goal for stroke treatment?

- Brain imaging within 20 minutes of arrival
- All patients DTN (door to needle) < 45 minutes
- At least 50% of patients DTN < 30 minutes

Q3: what if ED physician is not sure and don't have an available neurologist?

- Tele-neurology can be used, if not available then telephone consultation with neurologist on call.

Q4: What if I can't get consent for tPA? Patient is aphasic or confused and no family available?

- Treat with tPA as long as patient is eligible and at risk for having a disabling stroke

Q5: What is the role of ASPECTS in mechanical thrombectomy decision?

- Only for patients presenting within 6 hours, they must have ASPECTS > or = 6. Patients presenting after 6 hours, will need either CTP or MRI for decision making regardless of ASPECTS.

Summary of tPA Indications:

	Onset < 3 hours	Onset within 3 – 4.5 hours	Onset > 4.5 hours
Indications	Clinical signs of acute ischemic stroke	Clinical signs of acute ischemic stroke	Clinical signs of acute ischemic stroke Abnormal signal in DWI with no abnormal signal in FLAIR
Exclusions	o **Mild** non disabling stroke (or NIHSS 0-5) o History of prior **intracranial hemorrhage** (ICH, SAH or SDH) o History of prior **intracranial neoplasm, AVM or aneurysm** o History of prior **stroke or trauma** within past 3 months o Known **platelet count** < 100,000 o **Heparin** use within 48h with elevated aPTT o **LMWH** in therapeutic dose within 24h o **Warfarin** use with INR > 1.7 or PT > 15 o **NOAGs** within 48 hours with increased Xa, PT or aPTT o Suspected stroke due to **infective endocarditis** o **Intracranial neoplasms**	Same as <3 hour onset plus: o **Age > 80** *(relative contraindication, can be given if benefits outweigh risk of bleeding)* o **NOAG** use even if labs are normal o **Warfarin** use even if INR < 1.7 o **NIHSS > 25**	Same as 3-4.5 hour onset plus: o **DW lesion > third MCA territory** o **Planned thrombectomy** o Hemorrhage in MRI

Target BP:

tPA patients	Thrombectomy patients	Not tPA/thrombectomy patients
Before tPA: < 185/110	**Before procedure**: < 185/110	**Small vessel disease stroke**: no need for permissive hypertension
After tPA: < 180/105 for 24 hours	**After procedure**: < 180/105 (DAWN & ESCAPE used SBP < 140)	**Embolic stroke**: < 220/110 for 24 hours

Management of tPA Complications:

Management of intracranial bleeding after tPA:	Management of angioedema after tPA:
▪ Get CBC, PT, aPTT, fibrinogen level and type/cross match ▪ Cryoprecipitate 10 units over 30 minutes ▪ Tranexamic acid 1gm over 10 minutes or aminocaproic acid 4 gm over 1 hour	▪ If only lips and anterior tongue involved -> intubation may not be necessary ▪ If palate or pharynx are involved -> may require intubation ▪ Solumedrol 125 mg IV ▪ Diphenhydramine 50 mg IV ▪ Ranitidine 50 mg IV ▪ If not controlled -> use epinephrine SC (0.3 ml) or nebulizer (0.5 ml) ▪ Icatibant (selective bradykinin antagonist) may be used.