ACUTE STROKE MANAGEMENT

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Stroke Impact

- 3rd leading cause of death in western countries
- Leading cause of disability in US
- Approx 800,000 strokes per year in the US

What is a STROKE?

- A stroke occurs when the blood supply to part of your brain is interrupted or severely reduced, depriving brain tissue of oxygen and food. Within minutes, brain cells begin to die.
Stroke Cases

- 72 year old man presents to the hospital with sudden onset of inability to speak and R sided weakness.
- 24 yo female presents with left sided weakness after an argument with her boyfriend.
- 90 yo with alzheimers disease and old stroke presents with altered mental status and slurred speech.
- 63 yo man woke up in the morning with left sided weakness and R gaze preference
- 56yo F presents with R arm weakness with history of seizures, possible R arm shaking.

Is this a STROKE?????

- 1st consideration: Is this patient having a stroke or other mimic?
  - Mimics: seizures, conversion, brain tumor, abscess, encephalitis, multiple sclerosis, etc.
- 2nd consideration: Is this patient a tPA or intra arterial therapy candidate?
Important questions?

- Is this in fact a STROKE?
  - Sudden onset, focal deficit, risk factors
- Get an accurate history from witnesses/family
  - Most important is time of onset—last seen normal?
  - NINDS trial 0–3 hrs
  - ECASS 3 trial—3–4.5 hrs
- Medical history—afib, HTN, previous stroke, recent surgery
- Medicines—coumadin, xarelto, pradaxa

Stroke Treatment Goal

- “By restoring blood flow to the tissue at risk before it progresses to infarction, reperfusion therapies salvage ischemic penumbra, reduce final infarct volume, and ultimately result in better clinical outcomes.”
Time to Treatment in Ischemic Stroke

Pooled data from 6 randomized placebo-controlled trials of IV rt-PA. Treatment was started within 360 min of onset of stroke in 2775 patients randomly allocated to rt-PA or placebo.

Odds of a favorable 3-month outcome increased as onset to treatment decreased (p<0.005). Odds were 2.8 (95% CI 1.8-4.5) for 0-90 min, 1.6 (1.1-2.2) for 91-180 min, 1.4 (1.1-1.9) for 181-270 min, and 1.2 (0.9-1.5) for 271-360 min in favor of the rt-PA group.

The sooner that rt-PA is given to stroke patients, the greater the benefit, especially if started within 90 minutes of symptom onset.

Acute Stroke Evaluation and Treatment: 60 Minute or Less Protocol

- Door to MD ≤ 10 minutes: Patient complaint, vital signs, ECG
- ED Physician ≤ 15 minutes: Focused history and physical exam, laboratories, stroke team activation, transport for CT Scan (stroke protocol) Vital sign monitoring, neurologic checks, seizure and aspiration precautions
- CT Scan and Stroke Neurology Consult ≤ 20 minutes: Review history, physical exam, interpret CT Scan
- Treatment Decision and Initiate IV rt-PA infusion ≤ 15 minutes: per guideline based protocol

10 + 15 + 20 + 15 = 60 minutes
ECASS III trial

- Benefit with IV tPA 3–4.5 hrs
- Higher symptomatic ICH rate but same mortality.

ECASS III trial contraindications

- Age > 80
- History of prior stroke AND diabetes
- Any anticoagulant use prior to admission (even if INR <1.7)
- NIHSS >25
- CT findings involving more than 1/3 of the MCA territory (as evidenced by hypodensity, sulcal effacement or mass effect estimated by visual inspection orABC/2>100 cc)
**NINDS TPA Stroke Trial**

Excellent outcome at 3 months on all scales

![Barthel Index, Rankin Scale, Glasgow Outcome, NIHSS score chart]

- Barthel Index: TPA 62%, Placebo 21%
- Rankin Scale: TPA 38%, Placebo 34%
- Glasgow Outcome: TPA 43%, Placebo 45%
- NIHSS score: TPA 21%, Placebo 26%

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

**Post tPA order set**

- Monitor BP frequently, treat if SBP >185/115
- Bedrest
- Frequent Neuro checks
- No anticoagulants or antiplatelets
- No punctures
- CT brain 24 hrs, sooner if neuro changes
- Avoid sedation

tPA complication - Hemorrhage

- 6% intracerebral hemorrhage rate
- 45% of those fatal
Neuroimaging studies in Stroke

- CT brain/ MRI brain
- CT Angiogram/ MRA
- CT perfusion studies/ MRI DWI

Help to elucidate tissue at risk and already Dead tissue
Evaluation and removal of clot under direct visualisation.

Multiple studies and devices beginning over 20 yrs ago

Recanalization rates for IAT have been shown to be superior to those for IVT for major cerebrovascular occlusions, averaging 70% versus 34%.
**Endovascular Therapy Indications**

- Pts who are not a candidate for IV tPA
  - Contraindications – out of the window, recent surgery, stroke, etc.
- Determined large vessel occlusion on CTA or MRA – ICA, MCA, Basilar arteries
- Small infarct core on imaging studies (mismatch)
- NIH > 8–10
- Symptoms < 8 hrs

**Endovascular Options**

- Fibrinolysis – PROACT trial 1996 demonstrated benefit with IA urokinase – subseq meta analysis have confirmed results
- IA devices – new and improve technology
- Mechanical thrombectomy – stent and coil retrievers – SOLITAIRE device, MERCI
- Can bridge with IV tPA prior to EVT

**SOLITAIRE DEVICE**
**Stroke Supportive Care**

- ABC’s
- Keep Blood Pressure elevated up to 220/115 – maintain cerebral perfusion
- O2 > 94%
- Correct hypovolemia
- Treat elevated/low blood sugars
- Treat fevers
- Give aspirin 325mg

**Acute Stroke Treatment Future**

- Neuroprotective agents – trials failed thus far – attempt to save ischemic neurons in the brain from irreversible injury
- Improved technology for EVT devices
- Better education of public
- Reaching underserved areas

**IPR vs Home vs SNF**

**SENTIS trial and further analysis clearly shows IPR benefits**

doi:10.1136/neurintsurg-2014-011132
Comments on medication and stroke outcome in IPR

* Newer SSRI’s associated with greater improvements in FIM scores
* New anti nausea agents are favorable
* Dopamine agonists shown to help brain injured patients
* Amphetamines reduce death and dependence and improve motor and language function

Conroy B. et al. Arch phys med rehabil vol 86, suppl 2, Dec 2005

Early intervention spasticity management

Early Botox intervention
Spasticity medication intervention. (Baclofen, Tizanadine, Dantrium, Flexeril, Valium)

Hesse, S et al. Clin rehab 26(3) 237-245
Bakheit AM, Drugs aging (2012) 29:941-947

Thank you for your time!!