Use of tPA for Acute Stroke

- 1995: NINDS rt-PA Study Group NEJM paper
- Late 1990’s: Introduction of tPA into Emergency Department treatment regimen, and initiation of acute stroke response teams
- 2000-2011: Expansion of combination treatments and tPA to encompass longer time frames, more patients, and more varied types of interventions such as intra-arterial therapy.
Initial Indications for tPA

- Hyperacute stroke (< 3 hours from onset) with clear time of onset
- No CT evidence of intracranial hemorrhage
- Platelet count > 100,000
- INR < 1.7
- No severe bleeding recently
- No major surgery within past 14 days
Initial Indications for tPA, cont.

- Not too mild or rapidly improving
- Not too severe (NIHSS > 25)
- Not > 1/3 of hemisphere damaged on CT
- No heparin within 48 hours or elevated PTT
- No history of ICH
- SAH not suspected
- No recent puncture of non-compressible blood vessel (< 7 days)
Initial Indications for tPA, cont.

- Blood glucose < 2.7 mmol/L
- No significant head trauma within 3 months
- No brain tumor, AVM or aneurysm
- No seizure at onset of stroke
- No MI within past 3 months
- SBP < 185, DBP < 110 (or aggressive BP management prior to treatment with tPA)
Changes in Use of tPA

- Mild and severe strokes
- CT damage > 1/3 vascular territory
- Seizure at stroke onset
- > 3 hours after onset (up to 4.5 hours)
- Age > 80, and children
- Menstruation and pregnancy
- Carotid or vertebral dissection
Unresolved Situations for tPA

- Recent stroke (within 3 months)
- Recent myocardial infarction
- Aneurysm (treated vs. untreated)
  - Treated patients fared better (small n)
- Arteriovenous malformation
- Known cardiac emboli
- Recent surgery (major vs. minor; accessible vs. inaccessible sites)
- Extreme hyperglycemia (prior treatment?)
Challenging Cases and the Questions they Raise: Cases from my own experience

- What happens when the rules don’t apply?
Case 1: Exclusion and Regret

- A hypertensive woman in her late 50’s presented with fluctuating symptoms of pure motor paresis on the right. She was excluded for “rapid improvement,” but then relapsed, becoming severely hemiparetic and aphasic.

- Should we be “imaging the ischemic penumbra” to identify those at most risk?
Case 2: Treatment beyond 6 hours

- A man with ESRD and pre-morbid blindness in his left eye was referred to the ER by his ophthalmologist for acute CRAO in the right, 8 hours earlier. The CT showed no hemorrhage, but acute right thalamic stroke was evident. He indicated he would stop dialysis if he remained blind, and tPA successfully restored vision in the right eye.

- When is a gamble justified and who pays?
Case 3: Quality of Life

- A 90 year-old, non-ambulatory woman with severe dementia presents with acute stroke. Her family exaggerates her baseline capabilities, and pushes for tPA.

- When if ever does the clinician have the right to say NO? Who is responsible when the family distorts information in order to get treatment? When is giving tPA “over-zealous?”
Case 4: Embellishment

- A 42 year old man presents with complete numbness and paralysis of the left arm and leg. When his arm is dropped over his face, he always manages to avoid hitting himself. When he tries to lift the left leg, there is no downward pressure from the right heel. Sensory deficits split the forehead.

- Should such a person be offered tPA?
Case 5: Recent Warfarin Start

- A 70 year old man with known atrial fibrillation is 4 days into warfarin treatment when he presents with right hemiparesis and Broca’s aphasia. His INR is 1.6. He and his family understand the risks of intracranial hemorrhage and opt for tPA.

- Is a sub-therapeutic INR during initiation of therapy the same as one due to non-compliance or random fluctuation?
Other Topics Related to tPA

- Intra-arterial thrombolysis
- Advanced imaging techniques (Xe CT, DWI/ADC imaging, CTA)
- Combination therapy with tPA plus “neuroprotective” agents
- Mechanical clot disruption or extraction
- Therapeutic Transcranial Doppler
- Intracranial stenting