TPA Administration for Acute Ischemic Stroke

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June 23, 2009
Disclosure

- In the past three years I have received honoraria, advisor fees, or travel support from
  - Sanofi-BMS
  - Boehringer-Ingelheim
  - Roche
Telestroke – What is it?

- A division of Ontario Telemedicine Network
- Emergency telemedicine application
- Allows experienced stroke neurologist to review clinical presentation, visually assess in co-operation with ER physician, and review CT scan to assist in the decision making process
- Currently Pembroke, Sudbury, Sault St Marie, Timmins, North Bay, Peterborough, Lakeridge, Kenora
- 15 Stroke physicians 24/7 15 min
- 1000 patient celebration tomorrow noon!!!
Stroke

- Third commonest cause of death
- Commonest cause of persistent disability in adults
- Commoner than MI in females > 70
- Most feared disease
- Two basic types
  - Ischemic
  - Hemorrhagic
Combined Randomized rt-PA Stroke Trials

*Lancet* June 2004

Adjusted odds ratio with 95% confidence interval by stroke onset to treatment time (OTT) ITT population (N=2776)
ECASS III – 3.0 – 4.5 hrs

A Intention-to-Treat Population

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B Per-Protocol Population

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Identification of Acute Stroke

Abrupt onset
  Focal neurological deficit
  Conforms to a vascular territory
  May rapidly resolve and recur (stuttering stroke)

Definition changing:
  Original – clinical resolution in 24 hours
  Revision #1 resolution in one hour (Albers)
  Revision #2 Deficit resolves no MRI evidence of infarction
  Most literature uses original

Rationale: If > one hour – often see small infarcts despite full clinical reversal
Clinical Presentation

Motor

- **Motor signs**
  - Face
    - UMN facial droop
    - Nasolabial flattening
    - Corner of mouth doesn’t elevate
    - Eye closes
  - Arm
  - Leg

Reflexes unreliable except for Babinski
Clinical Presentation

Sensory

- Harder to evaluate
- Requires concentration and co-operation by patient
- Pin responses from both sides
- Touch from both sides
- Can determine inattention
Clinical Presentation

Speech

- Usually very easy to evaluate
- **Give instructions**
  - Simple
  - Ask for history
- **Evaluate responses**
  - Caution for single word answers
  - Look for fluent sentences
Clinical Presentation

Vision

Monocular (usually occurs alone)

Hemianopic

Left or right fields of each eye

Commonly reported as monocular /or

Commonly unaware of the deficit

Don’t accept patients statement of “normal vision”

Can be difficult to test (inattention)
Clinical Presentation

Others

- Diplopia
- Vertigo
- Ataxia
  - Gait
  - limb
- Confusion
- Dysarthria
- Inattention/neglect
- Harder to evaluate – telestroke neurologist may help
Other aspect of Examination

Consciousness
- Patients are usually conscious
- Communication problem usually due to dysphasia

Headache absent to mild
- Not commonly to be severe

Pain uncommon

A painful weak arm – not a stroke
Evaluation of Acute Stroke

- LA EMS
- 3 point evaluation
  - Facial weakness
  - Arm and leg weakness
  - Speech problem
- Right 78% of the time
- *It usually is easy!*
Assessment of the Stroke Patient

- Canadian Stroke Scale
  - Almost universally adopted for nursing evaluation

- NIH Stroke Scale
  - Widely used for clinical trials
  - Reliable reproducible
  - Widely recognized
  - Can be certified on-line
Absolute Exclusion Criteria - TPA

- CT signs of hemorrhage
- CT evidence of alternate structural pathology as cause
- Time of stroke unknown > 4.5 hr
- Active internal bleeding within two weeks
- Major surgery or trauma within 2 weeks
- Serious head injury within 3 months
- Pericarditis within 3 months
- INR > 1.7
- PTT > 40
- Platelet count less than 100,000
Small Acute Subdural Presenting As Arm Weakness in One Hour
Relative Exclusion Criteria

- Blood sugar < 3.0 or > 22.0
- Seizure at stroke onset (Todd's paralysis)
- Rapidly improving stroke
- LP or arterial puncture non-compressible site in previous week
- CT evidence of early infraction of >1/3 of hemisphere (edema or mass effect)
- Remote aneurysm, AVM, tumour
Stroke Mimics

- Migraine aura
- Seizure focal with post-ictal (Todd’s) paralysis
- Acute multiple sclerosis
- Tumour
- Intracerebral hemorrhage
- Subdural/epidural hematoma
- Malingering
- Confusion + orthopedic problems
Cost Effectiveness - US

- Extrapolate NINDS results to 1000 treated patients (e.g. CASES data)
- Shortened LOS: 12.4 vs. 10.3 days
- Discharge home vs. rehab: 48% vs. 36%
- Increase in-hospital costs: $1.7 M
- Decrease rehab costs: $1.4M
- Decrease nursing home: $4.8 M

Neurology 1998;50:883
Target Times

- Door to Doctor  15 min
- Door to Stroke Team Notification  20 min
- Door to CT Scan  30 min
- Door to needle  60 min
- Door to monitored bed  3 hours
Blood Pressure Management for Ischemic Stroke

- Blood pressure is commonly elevated
- Can be severe
  - 230/130 in a recent patient
- BP should be below 185/110 prior to administering TPA
- Maintained at this level
- No need to go much lower
Glucose Management for Ischemic Stroke

- High glucose correlates with adverse outcomes
- Keep NPO for 24 hours
- No IV glucose
- Treat elevated glucose
Temperature Management for Acute Ischemic Stroke

High temperatures are bad for damaged brain
For each degree C increases of 30% damage in animals
Hypothermia beneficial to stroke for animal models - unclear in humans
Swallowing in Acute Stroke

Commonly affected even if there are no symptoms
Aspiration leads to pneumonia
Swallowing screen and adherence to swallowing programs reduces pneumonia as complication
Gag reflex is not reliable
Activity level for Ischemic Stroke

Bed rest x 24 hours

until assessed by physio

Deficits are often not appreciated by patient or family

Don’t fall with TPA on board!
Post TPA - Angioedema

- 1.3% stroke TPA patients
- Usually on ACE inhibitors
- Painless unilateral swelling
tongue, lips, pharynx
ipsilateral to deficit
- Rx Benadryl, steroids
Special Cases

- Pregnancy – not a contraindication (consult obstetrician)
- Children – not a contraindication (stroke neurologist on call at Sick Kids)
Management of BP post TPA

- Similar to ischemic stroke
- Maintain systolic BP <185 mm Hg if necessary by labetalol (diastolic <110 mm Hg)
  - Pain control
  - Bladder
  - Reassurance
- Labetalol drip if require more than three IV
Post TPA Hemorrhage

- Intracerebral
  - Acute neurological deterioration (3 points on NIHSS)
  - BP abrupt elevation
  - Nausea
  - Headache
- Low threshold for CT
- Consult – telestroke physician, neurosurgeon
- Stop TPA, Control BP, FFP
TPA Hemorrhage

Extracerebral

Bruising, hematoma – local pressure

Internal

GU, GI, retroperitoneal

Standard measures

FFP

BP around 150
Time is Brain!

- Rt-PA is effective to 4.5 hours
- BUT
- Earlier is *always* better!
- < 1.5 hr  NNT 3-4 patients
- < 3.0 hr  NNT 6-8 patients
- < 4.5 hr  NNT ~ 15 patients