Management of Stroke:
Update 2007

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The speaker has no disclosures

Case 1

• A 67 year-old woman with a history of HTN presented to the ED after being found at work not moving her right side.
• Exam shows mutism, R face and arm plegia with decreased sensation in R arm as well as L gaze deviation and R homonymous hemianopsia.
• Her symptoms began at noon, it is now 4:30 p.m. There are no contraindications to tPA.

What treatment should you initiate?

A. IV t-PA
B. IV heparin
C. Antiplatelets
D. Mechanical Embolectomy
E. Intra-arterial t-PA
The 2007 Acute Stroke Timeline

- Time of onset= last time seen normal
  - 0-3 Hours: IV-tPA
  - 0-6 Hours: IA-tPA
  - 0-8 Hours: Mechanical Embolectomy
  - Greater than 8 hours: Anticoagulants or Antiplatelets

Merci® Retrieval System

Future Strategies

- New approaches to acute stroke therapy
  - 1. Open the Vessel
  - 2. Protect the Ischemic Tissue
Open the Vessel

- Desmoteplase
  - DIAS trial: 9 hour time window (Stroke 1/05)
  - Imaging techniques to expand or contract window for intervention
- Ultrasound-enhanced thrombolysis
  - With t-PA in 3 hour window (NEJM 11/04)
- Drip and Ship
  - IMS III trial

Hub and Spoke Model

Protect the Ischemic Tissue

- NXY-059
  - Free radical trapping compound
  - SAINT trial: 6 hour time window (NEJM 2/06)
  - Very few t-PA-associated hemorrhages
- Follow-up trial (SAINT II, NEJM 8/07)
  - Completely Negative
  - 18th failure in this field
Protect the Ischemic Tissue

- Hypothermia
- Tight Glucose Control
- Albumin
  - ALIAS trial (Stroke 2006)
  - 2g/kg 25% Albumin within 5 hour window
  - Two separate randomized trials ongoing

Case 2

- A 40 year-old man with no PMH comes to the ED after a 30 minute episode of aphasia and right arm weakness that has since resolved.
- The patient reports 5 days of neck pain after severe vomiting from a gastroenteritis
- Exam is normal

What is the likely etiology of his TIA?

A. Afib-related cardioembolic disease
B. PFO
C. Carotid artery dissection
D. Small vessel disease
E. Endocarditis-related septic emboli
Differential for Transient Focal Neurologic Deficit

- The Big Three
  - 1. Stroke/TIA
  - 2. Seizure
  - 3. Complicated Migraine

Risk of Future Stroke with TIA: ABCD² Score

- 7-day risk overall 8.6-10.5 percent
- Age
  - >60 = 1 point
- Blood Pressure
  - SBP>140 or DBP>90 = 1 point
- Clinical Features
  - Unilateral weakness = 2 points
  - Speech disturbance without weakness = 1 point
- Duration
  - >60 minutes = 2 points
  - 10-59 minutes = 1 point
- Diabetes = 1 point


ABCD² Score

- 2-day risk of stroke
  - Score 6-7: 8.1 percent (high risk)
  - Score 4-5: 4.1 percent (moderate risk)
  - Score 0-3: 1.0 percent (low risk)

Approach to Stroke Treatment

Acute Stroke Therapy?

No

Anticoagulants?

No

Antiplatelets

Shrinking Indications for Anticoagulation in Stroke
1. Atrial Fibrillation
2. Some other cardioembolic sources
   - Thrombus seen in heart
   - ?EF<35
   - ?PFO with associated Atrial Septal Aneurysm
3. Vertebral and carotid artery dissection
4. Rare hypercoagulable states: APLA

Cervical Artery Dissection
- Vertebral and Carotid Arteries
- Common etiology of stroke in young
- Pathophysiology
- Risk Factors
  - Most idiopathic
    • Vomiting, Coughing, Chiropractic
- Presentation: Neck Pain, HA
- Tx with anticoagulation
Case 3

- A 65 year-old man with a history of DM, HTN presents with 2 days of L sided binocular visual loss
- Examination shows left-sided homonymous hemianopia and is otherwise unremarkable.
- The patient is on ASA 81mg daily

Standard Large-Vessel Stroke Workup

- Cardioembolic: afib, clot in heart, paradoxical embolus
  - 1. Telenetry
  - 2. TEE with bubble study
- Aortic Arch
  - 2. TEE with bubble study
- Carotids
  - 3. Carotid Imaging (CTA, US, MRA, angio)
- Intracranial Vessels
  - 4. Intracranial Imaging (CTA, MRA, angio)

And evaluate stroke risk factors

TEE vs. TTE (Stroke 10/06)

- 231 consecutive TIA and stroke patients of unknown etiology underwent TTE and TEE
- 127 found to have a cardiac cause of emboli, 90 of which (71 percent) only seen on TEE
- 38 of 46 “major risk factors” only found on TEE (most left atrial thrombi)
- TEE superior to TTE for: LA appendage, R to L shunt, examination of aortic arch
**Atrial Fibrillation Detection**

- EKG
- 48 Hours of Telemetry
- 30 day event monitor?
  - 20% “hit rate” at UCSF in 2006

Eljovich E. 2007 Unpublished

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**Stroke workup is unrevealing. Your Treatment?**

A. Increase ASA to 325mg daily
B. Add Plavix
C. Stop ASA, start Plavix
D. Anticoagulate
E. Stop ASA, start Aggrenox
Approach to Stroke Treatment

Acute Stroke Therapy?

No

Anticoagulants?

No

Antiplatelets

Antiplatelet Options

• 1. ASA
  – 50mg to 1.5g equal efficacy long-term

• 2. Aggrenox
  – 25mg ASA/200mg ER Dipyridamole
    • ESPS-2, ESPRIT (Lancet 5/06)

• 3. Clopidogrel (Plavix)
  • MATCH (Lancet 7/04), FASTER (unpublished)

Antiplatelet Options

If on no antiplatelet medication
– Acute therapy: ASA
– Long-term therapy: Switch to Aggrenox (or Plavix if intolerant)

If already on ASA
– Acute and Long-term therapy: Switch to Aggrenox (or Plavix if intolerant)
– Note: There is no acute data for Aggrenox
Aggrenox vs. Plavix

- Aggrenox
  - Headache in first 2 weeks: 30% discontinue
  - Perhaps not compatible with cardiac antiplatelet goals or with unstable angina
  - Cannot be crushed in FT
- Plavix
  - Less evidence directly from stroke trials
  - Concerns regarding use with ASA
- Awaiting results from PROFESS trial (2007)

Other Acute Stroke Management

- Statins for (almost) all
  - SPARCL (NEJM 8/06), 80mg atorvastatin in stroke and TIA if LDL>100
- Permissive HTN
  - To at least 220/120 (unless IV t-PA): Mortality and morbidity increases if lower acutely
- Tight Glucose and Fever control
- Enoxaparin for DVT prophylaxis
  - PREVAIL trial (Lancet 2007)

Case 4

- A 52F presented after being found down (last normal 16 hours prior) with a massive R MCA infarction
Surgical Decompressive Hemicraniectomy

- Three randomized trials (Lancet 2007)
  - Survival: 78% vs. 29% (NNT=2)
  - mRS<4: 43% vs. 21% (NNT=4)
- Age less than 60
- Infarct more than 2/3 MCA territory
- Irrespective of hemisphere involved
- Early surgery: less than 48 hours from onset

Case 5

- A 68 year-old woman with a history only of HTN presents with daily episodes of right eye blindness that completely resolve after 3 to 15 minutes.
- Exam is normal including fundoscopy

What treatment should you initiate?

A. Aggressive Medical Management
B. Endarterectomy (CEA)
C. Carotid Stenting
When to Fix the Carotid?

- NASCET in early 1990s
  - Benefit of endarterectomy in patients with symptoms ipsilateral to 70-99% stenosis
    - Comparison: best medical management at the time
  - 50-69% symptomatic stenosis revascularization has limited benefit, especially in women
- In stroke management don’t miss carotid disease or atrial fibrillation

How to Fix the Carotid?

- Stenting +/- distal protection
  - SAPPHIRE (NEJM 10/04) in high-risk patients
  - Other small trials compare with NASCET data
  - Currently widely practiced: NeuroIR, vascular surgeons, BodyIR, Cardiologists
  - Unique risks: Hypotension, Bradycardia

Randomized Trial Results

- SPACE Trial (Lancet 10/06)
  - 1200 patients with recent stroke/TIA randomized to CEA vs. stenting
- EVA-3S (NEJM 10/06)
  - 527 patients with recent stroke/TIA randomized
  - Both failed to demonstrate non-inferiority
    - In EVA-3S, stenting associated with significantly more short-term stroke and death
My Current Approach

- Revascularize all patients with 70-99% symptomatic lesions
- Recommend CEA for all unless specific contraindication or extremely high-risk surgical candidates
  - Specifics: post-radiation, previous CEA with restenosis
  - High risk: age>80, active coronary disease, severe CHF
  - Utilize those surgeons and interventionalists with the most experience