UPDATE ON STROKE
2013

Jon Jui MD, MPH
CASE 1 STROKE
Case 1 Presentation

- 82 year old patient who was just seen in ED, admitted to ED OBS with eventual diagnosis TIA. Doing well, being DC when as she was being wheeled out of the ED when she was suddenly noted to have a profound left sided facial drop and profound left sided weakness of upper and lower leg.

- Patient with underlying AF with known inadequate anticoagulation
Case 1 Medications

- Thyroid
- Digoxin
- Albuterol
- Verapamil
- Coumadin
Case 1 Exam

- BP 124/56 HR 62 RR 11 O2 sat 100% Temp 36.6
- General: Alert,
- HEENT: nl
- Neck: Supple
- Chest: Clear
- Cardiac: Nl, No murmurs or gallops
- Abdomen: Soft non tender, No rebound, guarding, or organomegaly
- Back: No tenderness noted
- Ext: Nl, no edema, pulses intact
- Neuro:
  - Unable to speak
  - Left facial droop
  - Left motor weakness dense 1/5 LUE / LLE
Case 1 Labs

Chemistries (Chem-8)
  • Normal (Creatinine 0.9)
  • Troponin 0.02

CBC
  • WBC 5.5
  • HCT 30

Coagulation
  • APTT 28.6
  • INR 1.42
Case 1 CT scan

- Age-related volume loss and chronic white matter small vessel ischemic changes including age indeterminate but likely chronic lacunar infarct in the right subinsular white matter. **No intracranial hemorrhage.**
Case 1 CTA

• There is a **nonocclusive thrombus in the right middle cerebral artery bifurcation** measuring approximately 0.8-cm, with diminished opacification of the distal branches of the MCA.
ED Course

- Approximately **13:10** brought back from triage
- Initial assessment reveals facial droop and dense left sided hemiparesis
- Stroke team notified
- CT head ordered
- CTA head/neck ordered
- Notified by CT personnel patient "allergic to dye"
- No symptoms from patient noted.
- **13:14** Patient returns from CT
- **13:15** Stroke team at bedside NIH score 14
  - Labs show hypocalcemia, INR 1.53, negative urine, mild
ED Course (continued)

- **13:23** TPA Administered
- **13:27** TPA infusion started
- **1340 hours**: Marked improvement in LUE. Able to raise her arm without assistance
- EKG: a fib rate 72.
- **14:55** Patient did have recurrent left facial droop and repeat CT head was obtained to rule out TPA induced head bleed but this was not present on the CT scan.
- **15:16** Droop subsequently resolved.
<table>
<thead>
<tr>
<th>Date</th>
<th>Alteplase (aka ACTIVASE)</th>
<th>Amount</th>
<th>Route</th>
<th>Administration Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>05/04/20</td>
<td>IV bolus from continuous</td>
<td>4 mg</td>
<td>Intra venous</td>
<td>Bolus from Same Bag</td>
</tr>
<tr>
<td>13 1423</td>
<td>infusion 4 mg (0.9 mg/kg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10% push) remainder over</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>60 minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05/04/20</td>
<td>IV infusion 37 mg</td>
<td>mg</td>
<td>Intra venous</td>
<td>Given by Other</td>
</tr>
<tr>
<td>13 1328</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Case 1 Hospital Course

• On admission, initial NHISS was 1 with 1 point for extinction and inattention. The patient was brought to the floor for risk factor stratification. Was placed on therapeutic lovenox to bridge to a therapeutic INR of 2-3 which she achieved the day prior to her discharge.

• Also had a CT perfusion which was normal. LDL was found to be 93 and CTA head and neck without any significant stenosis of her anterior circulation and therefore LDL at goal of <100 without treatment with statin. HgbA1c found to be 5.1.
**Case 1 CTA with perfusion**

<table>
<thead>
<tr>
<th>CEREBRAL PERFUSION ANALYSIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTP: Relatively equal arrival times of contrast to each hemisphere.</td>
</tr>
<tr>
<td>MTT: Relatively equal transit duration of contrast within each hemisphere.</td>
</tr>
<tr>
<td>rCBV: Relatively equal/symmetric blood volumes in corresponding hemispheric regions.</td>
</tr>
<tr>
<td>rCBF: Relatively equal/symmetric blood flow in corresponding hemispheric regions.</td>
</tr>
<tr>
<td>Enhancement: No abnormal enhancement.</td>
</tr>
</tbody>
</table>
# OHSU Stroke Pathway v2011

## Clinical Pathway

**Neurological Vascular Event (suspected stroke)**

**January 2011**

### Outcome Goals
1. Rapid identification of vascular event
2. Create a team-oriented approach to efficient and timely evaluation and work-up in accordance to Brain Attack Coalition Guidelines

### Nurse Documentation
- Chart complaint: Stroke complaint
  - Document per Acute Stroke Practice Standards
- Cincinnati Prehospital Stroke Scale
- NPO, swallowing screen
- Associated symptoms, medications, allergies, vital signs including carotid monitoring
- Focused neuro examination

### Interventions

- **On arrival**
  - **ESI Triage level 1 or 2**
  - Cincinnati Stroke Scale
  - Initiate 180 mg IV (if does not delay CT) draw labs / POC CBC
  - Continue pulse oximetry
  - Oxygen to maintain SPO2 > 93%
  - Transport to CT – 60min to CT goal 25 minutes
  - Evaluate need for Rapid Response or Code Blue initiation

- **NeuroSocial Work for family support as needed**

### Diagnostics
- **POC Chem 7 w/HR**
- **POC CBC**
- **POC Tropinin**
- Head CT without contrast 12 lead EKG – goal 45 minutes of arrival – not to delay CT
- CBC or dt; BHS, PT
- Blood Bank tubular – marrow hold
- Chest x-ray if applicable (pneumonia, hypoxia)
- MR/CT or CTA if TIA or symptom resolution

### Physician (LRP)

- **Hold orders**
  - 2D LFT evaluation within 10 minutes of arrival
  - Notify Stroke Team for suspected acute stroke within 10 minutes of arrival
  - Notify Neurosurgery for CT showing intracranial hemorrhage
  - Notify Neurology resident on-call for symptoms onset > 24 hours

- **Medication**
  - Antihypertensives: Per Stroke Team Orders
  - IV Thrombolysis administered by Stroke Team physician
  - IV tPA per Stroke Team order

- **Code Status**
  - Determine Code Status, code intervention, review Advance Directives on FCLET form if present

- **Disposition**
  - DE – stroke-related, discharge urgent
  - TSH/FT4 – post-dose/acute administration, hospital (output, home dynamics), co-locate TIA
  - KO – FBS – confirm TIA with resolved deficits
  - Acute Stroke Unit (ASU) – stroke symptoms > 24 hours or non-acute stroke TIA lasting not complete
  - Consider only – may be admitted to any appropriate unit

### Special Considerations
- Eligibility for thrombolytic therapy – see Blood Pressure Management Guide on page 3
- See Acute Stroke Practice Standard for Emergency Department for 7 page detailed document
# Stroke Pathway: Outcome Goals

| **Outcomes/Goals** | 1. Rapid identification of vascular event  
| | 2. Create a team-oriented approach to efficient and timely evaluation and work-up in accordance to Brain Attack Coalition Guidelines |
| **NURSE documentation** | Chief complaint. Onset of symptoms. Document per Acute Stroke Practice Standards, Cincinnati Prehospital Stroke Scale, NPO, swallow screen, associated symptoms, medications, allergies, vital signs including cardiac monitoring. Focused neuro assessment. |
| **INTERVENTIONS** | ESI Triage level I or II  
| | Cincinnati Stroke Scale  
| | Initiate 18g IV (2 if does not delay CT) / draw labs / POC CBG  
| | Continuous pulse oximetry  
| | Oxygen to maintain SaO2 > 93%  
| | Transport to CT – door to CT goal **25 minutes**  
| | Evaluate need for Rapid Response or Code White initiation  
| | Notify Social Work for family support as needed |
| **DIAGNOSTICS** | POC Chem 8 w/H&H  
| | POC CBG  
| | POC Troponin  
| | Head CT without contrast  
| | 12 lead EKG – goal **45 minutes** of arrival – not to delay CT  
| | CBC w diff, INR, PT/PTT  
| | Blood Bank tubes – rainbow hold  
| | Chest x-ray if applicable (tachypnea, hypoxia)  
<p>| | MR/MRA or CT/CTA if TIA or symptom resolution |</p>
<table>
<thead>
<tr>
<th>PHYSICIAN (LIP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notifications</td>
</tr>
<tr>
<td>1. ED LIP evaluation within 10 minutes of arrival</td>
</tr>
<tr>
<td>2. Notify Stroke Team for suspected acute stroke within 10 minutes of arrival</td>
</tr>
<tr>
<td>3. Notify Neurosurgery for CT showing intracranial hemorrhage</td>
</tr>
<tr>
<td>4. Notify Neurology Resident on-call for symptom onset ≥24 hours</td>
</tr>
<tr>
<td>Medication</td>
</tr>
<tr>
<td>Antithrombolitics</td>
</tr>
<tr>
<td>Per Stroke Team Order</td>
</tr>
<tr>
<td>IV tPA bolus administered by Stroke Team physician. Infusion set up by ED RN per Stroke Team order.</td>
</tr>
<tr>
<td>Code Status</td>
</tr>
<tr>
<td>Determine Code Status, code intervention, review Advance Directives or POLST form if present</td>
</tr>
<tr>
<td>Disposition</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>IR – clot removal, stent placement</td>
</tr>
<tr>
<td>7NSICU – post-thrombolytic administration, unstable (airway, hemodynamics), crescendo TIA</td>
</tr>
<tr>
<td>ED OBS – probable TIA with resolved deficits</td>
</tr>
<tr>
<td>Acute Neuro Unit (10K) – stroke symptoms &gt;24 hours or non-crescendo TIA workup not complete</td>
</tr>
<tr>
<td>Comfort Care only – may be admitted to any appropriate unit</td>
</tr>
</tbody>
</table>
TIA Evaluation

- Routine Lab Tests
  - CBC
  - Coagulation
  - Chemistry

- Imaging
  - CTA/CT
  - MRI/MRA (MRI Diffusion with DWI preferred)

- Vascular Imaging
  - Carotid US

- Cardiac echo if clinically indicated
TPA
TPA : Exclusion Clinical

- Symptoms suggestive of SAH
- Persistent BP elevation (> 185 mmHg or diastolic > 110 mm Hg)
- Serum glucose < 50 mg/dL
- Active internal bleeding
- Active bleeding diathesis
TPA: Exclusion Historical

- Significant stroke or head trauma in previous 3 months
- Previous intracranial hemorrhage
- Intracranial neoplasm, AV malformation, or aneurysm
- Recent intracranial or intraspinal surgery
- Arterial puncture at a non compressible site in previous 7 days.
TPA : Exclusion CT

- Evidence of hemorrhage
- Evidence of multilobar infraction with hypodensity involving > 33% of cerebral hemisphere
TPA: Exclusions Hematologic

- Platelet count < 100,000 / mm³
- Current anticoagulant use with INR > 1.7 or PT > 15 seconds
- Heparin use within 48 hours or abnormally elevated PT
- Current use of a direct thrombin or factor Xa inhibitor with evidence of anticoagulant effect
Relative Exclusion Criteria

- Only minor or isolated neurological symptoms
- Spontaneous clearing of stroke symptoms
- Major surgery or serious trauma within previous 14 days
- GI or Urinary tract bleeding in previous 21 days
- Acute MI in previous 3 months
- Seizures at onset of stroke with post ictal neurological impairment
- Pregnancy
Additional Relative Exclusion criteria for treatment from 3 to 4.5 hours from symptom onset

- Age > 80 years
- Oral anticoagulant use regardless of INR
- Severe stroke (NIHSS score > 25)
- Combination of both previous ischemic stroke and diabetes.
IMAGING
CT, CTA, MRI/MRA
Controversy CT (routine) vs CTA

- CTA
  - Visualize clot in MCA
  - Better delineate potentially salvageable under perfused ischemic areas of brain
  - Adds only 10 minutes to study
CT Non Contrast

• Early signs of infarction on non contrast CT — The sensitivity of standard non contrast CT for brain ischemia increases after 24 hours.

• However, in a systematic review involving 15 studies where CT scans were performed within six hours of stroke onset, the prevalence of early CT signs of brain infarction was 61 percent (standard deviation +/- 21 percent).
CT Non Enhanced vs CTA

- For the detection of intracranial large vessel stenosis and occlusion, CTA in various studies had sensitivities of **92 to 100 percent** and specificities of **82 to 100 percent** when compared with conventional angiography.
- Recanalization rates for intravenous or intraarterial thrombolysis differ depending upon the site of arterial occlusion.
- CTA has become the standard of practice in some centers to triage patients between intravenous or intraarterial thrombolysis. It is also helpful in diagnosing stroke mimics.
M1, M2, M3 Circulation
CASE 2 STROKE
EMS History

- This lady drove herself to the Red Robin Restaurant and went inside to order her lunch. She was seated at a table at a booth when she was witnessed by the waitress to have a 1 minute syncopal episode. The patient woke and was unable to speak. The waitress called 911.

- The patient was attempting to speak on our arrival, however she was having a difficult time choosing the rightward, and her speech was slurred and jumbled. At times, she could be understood, and at other times, she could not be. She complained of a headache and said she could not walk. She would sometimes follow commands and at other times seemed confused. She continued her symptoms during our entire contact with her.

- Her symptoms were right arm and leg weakness, absent grip on the right and a positive Pronator drift on the right.
<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Call Received:</td>
<td>13:04:20</td>
</tr>
<tr>
<td>Time Dispatched:</td>
<td>13:04:31</td>
</tr>
<tr>
<td>Time Enroute:</td>
<td>13:04:37</td>
</tr>
<tr>
<td>Time at Scene:</td>
<td>13:08:00</td>
</tr>
<tr>
<td>Time at Pt Side:</td>
<td>13:10:00</td>
</tr>
<tr>
<td>Time Transporting:</td>
<td>13:21:00</td>
</tr>
<tr>
<td>Time Transport Completed:</td>
<td>13:23:00</td>
</tr>
<tr>
<td>Time Available:</td>
<td>13:48:00</td>
</tr>
</tbody>
</table>
Past Medical History

• History Obtained From: Patient
• History: Pacemaker. Atrial Fibrillation. Asthma
• Allergies: Not Known : Not known
• Medications:
• Advanced Directives: None
Physical Exam

Physical Findings

Head    Head: Unremarkable
Head Remarks: no trauma noted, patient related headache

Neck    Neck: Unremarkable
Neck Remarks: no jvd or trauma noted

Chest   Chest: Unremarkable
Chest Remarks: denied pain, pacemaker noted left chest

Abdomen Abdomen: Unremarkable Abdomen Remarks: soft

Back    Back: Unremarkable
Back Remarks: no trauma noted

Extremities    Extremities: Paralysis
EMS Narrative

- On arrival the patient was seated at the table. She appeared frightened. She was trying to speak and it was coming out jumbled at most times.
- She was treated and transported to PA and sent directly to CT. Care was turned over to the RN in CT.
<table>
<thead>
<tr>
<th>Time</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:07</td>
<td><strong>OXYGEN - 2.13430 LPM Nasal Cannula</strong></td>
</tr>
<tr>
<td>13:12</td>
<td><strong>Pupils - Normal (PERU, Left Pupil Size(mm): 5, Right Pupil Size(mm): 5.</strong></td>
</tr>
<tr>
<td>13:13</td>
<td><strong>Skin Assessment- Normal color. Warm temperature. Normal moisture. &lt;2 seconds capillary refill.</strong></td>
</tr>
<tr>
<td>13:15</td>
<td><strong>Los Angeles Stroke Scale- onset:13130 Minutes. Patient is 1 over 45y ears old. 0 History of Seizure. 1 New Onset Within 24 Hours. 1 Patient Ambulatory Prior To Onset. 1 Blood Glucose Between 60 And 400. 0 Facial Droop. 1 Grip Week Or Absent. 1 Arm Weakness.</strong></td>
</tr>
<tr>
<td>13:17</td>
<td><strong>Pulse Oximetry - 95 % on Room Air. NIBP</strong></td>
</tr>
<tr>
<td>Time</td>
<td>Procedure</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>13:18</td>
<td><strong>Blood Glucose- 114 mg/dL.</strong></td>
</tr>
<tr>
<td>13:19</td>
<td>Pulse Oximetry - 98 % on 02 . Initial Rhythm</td>
</tr>
<tr>
<td>13:21</td>
<td>Pulse Oximetry - 96 % on 02 . NIBP</td>
</tr>
</tbody>
</table>
Outcome

• TPA Administered
• Near complete resolution of her symptoms
CASE 3
CASE 3 EMS History

• Pt was at the golf driving range with a friend when he became unresponsive. The friend states he was hitting golf balls then went and sat down and was squeezing his hands and not responding to her. He then slumped from the bench to the ground. He was breathing normally but still not responding.
Case 3 EMS History (continued)

- Upon our arrival pt was lying supine on the ground and PFB E20 was on scene assessing him. Pt would open his eyes to verbal response and appeared to follow commands but did not verbally respond. On scene it appeared he was moving his extremities on the L better than the right. He did move his R arm when the IV was started but he could not squeeze with that hand. He was lifted to the gurney and transported C3 to the UH for a possible stroke.

- En route to the hospital he continued to move his L side but there was no voluntary movement to his R side. He continued to open his eyes when you said his name and when spoken to it appeared he wanted to speak but couldn't and would just sigh heavily instead.

- Upon arrival at the hospital he was opening is eyes more on his own but remained to have no voluntary movement of the R side of his body. He did have active reflex of his R foot.
Case 3 EMS Exam

- **Head** Head: Unremarkable unless otherwise noted
- Extremities
  - Right Arm: Paralysis
  - Left Arm: Weakness
  - Right Leg: Paralysis
  - Left Leg: Weakness
## EMS Times

<table>
<thead>
<tr>
<th>Dispatch</th>
<th>Times</th>
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</thead>
<tbody>
<tr>
<td>Call received</td>
<td>13:00:22</td>
</tr>
<tr>
<td>Call dispatched</td>
<td>13:00:33</td>
</tr>
<tr>
<td>Time enroute</td>
<td>13:01:09</td>
</tr>
<tr>
<td>Time at scene</td>
<td>13:07:44</td>
</tr>
<tr>
<td>Time patient side</td>
<td>13:09:00</td>
</tr>
<tr>
<td>Time Transporting</td>
<td>13:19:00</td>
</tr>
<tr>
<td>Time Transport complete</td>
<td>13:31:26</td>
</tr>
</tbody>
</table>
## Case 3 EMS Flow Sheet

<table>
<thead>
<tr>
<th>Time</th>
<th>Agency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0:00</td>
<td>Portland Fire Rescue</td>
<td>Blood Glucose - 84 mg/dL.</td>
</tr>
<tr>
<td>0:00</td>
<td>Portland Fire Rescue</td>
<td>Pulse Oximetry - 99% on Room Air</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rate: 108, Pulse Regularity: NotAssessed, Pulse Strength: NotAssessed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Respiration Depth: Normal, Respiration Effort: Normal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Respiration: 18, Respiration Depth: Normal, Respiration Effort: Normal</td>
</tr>
<tr>
<td>0:00</td>
<td>Portland Fire Rescue</td>
<td>EKG - Indication: ProtocoliStanding Order. Type: 4 Lead. Clinical Interpretation: Sinus</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tachycardia: Ectopy: PVC &lt; 6,</td>
</tr>
<tr>
<td>13:09</td>
<td>AMR</td>
<td>Glasgow Coma Scale - Eyes: 3, Verbal: 1, Motor: 6, Total: 10</td>
</tr>
<tr>
<td>13:09</td>
<td>AMR</td>
<td>Los Angeles Stroke Scale - Onset: 1300 Minutes, Patient is 1 over 45 years old, D History of Seizure, 1 New Onset Within 24 Hours, 1 Patient Ambulatory Prior To Onset, 1 Blood Glucose Between 60 And 400. 0 Facial Droop. 1 Grip Week Or Absent. 1 Arm Weakness.</td>
</tr>
<tr>
<td>Time</td>
<td>Activity</td>
<td>Details</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>13:10:00</td>
<td><strong>Portland Fire Rescue</strong></td>
<td><strong>EKG</strong> - <strong>Indication:</strong> ProtocoUStanding Order: Type:12 Lead, Clinical Interpretation: Sinus Tachycardia : Ectopy: PVC &lt;6 : Suspected STEMI: No STEMI : Elevation: No : Depression: No</td>
</tr>
<tr>
<td>13:10 AMR</td>
<td><strong>OXYGEN</strong> - 4 LPM Nasal Cannula, Result: Unchanged .</td>
<td></td>
</tr>
<tr>
<td>13:21:17</td>
<td><strong>AMR</strong></td>
<td><strong>Pulse Oximetry</strong> - 97 % on 02 . NIBP</td>
</tr>
<tr>
<td>13:28 AMR</td>
<td><strong>AMR</strong></td>
<td><strong>Blood Glucose</strong> - 71 mg/dL .</td>
</tr>
</tbody>
</table>
72 yo M p/w sudden onset aphasia, syncope and R sided paralysis, onset acutely at 1300 today. Pt was playing golf and while sitting on a bench, he suddenly fell to the side and was unresponsive. On the scene, pt unable to provide history as he cannot communicate. He was noted to have GCS 8, with complete R sided paralysis. CBG was 84. No family is available to give history, unknown meds, allergies
ED H&P

• 209/89 mmHg 36.7 °C 110 20 95 %

• Pt is aphasic, not following commands. See neuro exam. Protecting airway, opens eyes

• HENT:
  • Head: Normocephalic and atraumatic.
  • Eyes: Conjunctivae and EOM are normal. Pupils are equal, round, and reactive to light. Right eye exhibits no discharge. Left eye exhibits no discharge. No scleral icterus.
  • Cardiovascular: Normal rate and intact distal pulses. Exam reveals no gallop and no friction rub.
  • No murmur heard.
  • Pulmonary/Chest: Effort normal and breath sounds normal. No stridor. No respiratory distress. He has no wheezes. He has no rales. He exhibits no tenderness.
  • Abdominal: Soft. Bowel sounds are normal. He exhibits no distension and no mass. There is no tenderness. There is no rebound and no guarding.
  • Skin: Skin is warm and dry. No rash noted. No erythema. No pallor.
ED Neuro Exam

- NIHSS = 21
- Right hemiparesis
- Left gaze preference
- Moderate expressive aphasia
CTA Results

• *Cutoff of the left M2 branch* indicating thrombus and causing anterior left middle cerebral artery distribution ischemia.

• *Occlusion of the right internal carotid artery* with collateral flow filling the M1 and A1 segments.
ED Interventions

• After neuro exam was performed, pt was sent direct to CT within 5 minutes of arrival and stroke team was consulted. Stroke labs sent

• Stroke team recommends CT swift prime perfusion with CTA head and neck.

• Stroke team immediately came to the pts bedside at the CT scanner

• 06/17/2013 1350 labetalol (aka TRANDATE) IV injection 10 mg Given

• 2:14PM, TPA is being pushed by stroke neurology (1hr 14 minutes from symptom onset)
  • 06/17/2013 1412 alteplase (aka ACTIVASE) IV bolus from continuous infusion 8.1 mg 8.1 mg Intravenous Bolus from Same Bag
  • 06/17/2013 1413 alteplase (aka ACTIVASE) IV infusion 72.9 mg 72.9 mg Intravenous Given by_other
CASE 3 Immediate Hospital Course

- OHSU ED -> CTA perfusion, which demonstrated L MCA territory perfusion mismatch, L M2 vessel occlusion, and long segment R ICA occlusion from bifurcation -> intracranially. IV tPA bolus started at 14:14, finished infusion ~14:58. Immediately went from CT to Neuro-IR where he underwent diagnostic angiogram, no intervention attempted given distal M2 clot and risk of complications.

- Upon transfer to NSICU post-angio, patient was starting to verbalize and RUE strength had significantly improved. Admission exam was mute with minimal RUE movement. Patient denying pain. Daughter able to provide social history, but had limited knowledge of medical history and medications.
• 72 y/o male with h/o HTN, HLD, A fib on asa s/p ablation attempt who presented to ED on 6/17 with acute onset aphasia and right sided weakness.

• Onset was noted at 13:00 and pt received tPA 1hr 15min post-onset. CTA perfusion showed L MCA territory perfusion mismatch, L M2 occlusion, and long segment R ICA occlusion.

• Diagnostic angiogram was completed post-tPA, which revealed distal M2 clot and no intervention was attempted.

• Post-tPA, pt had improved speech and strength in RUE. 24hr post-tPA CT revealed no evidence of hemorrhage.
  • mRS = 3
Discharge Summary

• Etiology was thought likely to be cardioembolic 2/2 afib. Pt reports that he has felt himself go into a fib rhythm at least once since ablation procedure.

• Echo revealed dilated L atrium. On 6/19, patient was started on apixaban for anticoagulation. LDL was 79, with goal < 70, so atorvastatin 40mg was continued.

• Pt was enrolled in MAG recovery study during admission, outpatient infusion is scheduled for Monday, 6/24. Outpatient speech evaluation referral made, which patient will f/u with at Providence (for insurance reasons).
Discharge Summary

• Discharge exam: Alert, oriented to person, place, date. Moderate productive aphasia. Following commands. Some neglect on R side, but full strength in UE and LE bilaterally when this is overcome. Sensation intact throughout, no sensory extinction. Coordination: FTN and HTS intact bilaterally.
CONCLUSIONS FROM CASE STUDIES
Conclusions

• Compelling evidence of efficacy of TPA and other interventions if performed early (ideally within the first 2 hours post stroke)

• Stroke is much more complicated than simplistic “stroke”. Location of obstruction as well as the time of the stroke key to interventional therapy

• Greater use of CTA (including diffusion) in the initial assessment of stroke (with emphasis on mismatch perfusion mismatch)

• Some evidence of greater efficacy of combination (TPA and invasive therapy) in strokes with occlusion of M1 distribution.

• Role of induced hypothermia and other agents needs to be assessed.
CLOT BUSTERS MAY NOT BE BEST FOR MAJOR STROKE
IV tPA with endovascular therapy or no treatment with intracranial volume occlusions

• In the newly reported retrospective study, Gupta and colleagues compared IV tPA with endovascular therapy or no treatment in patients with intracranial large-volume occlusions using a novel strategy for assessing outcomes: measurement of final infarct volume.
Study Design

• The study included 203 consecutive patients with ILVOs treated between 2009 and 2011 at one of two Atlanta teaching hospitals: Emory University Hospital or Grady Memorial Hospital.

• All patients included in the analysis were treated within 6 hours of stroke onset, and patients with isolated extracranial occlusions were not included.
Outcomes

• In patients with anterior circulation intracranial large-vessel occlusions, median infarct volume was significantly smaller for those treated with intra-arterial therapy than those treated with either intravenous tissue plasminogen activator therapy or no reperfusion therapy, a study found.

• Note that the researchers found that patients with an NIH Stroke Scale (NIHSS) score of 14 or higher may be the best candidates for endovascular reperfusion therapy.
Outcomes

• In subgroup analysis, smaller infarct volumes in more proximal occlusions were noted in the endovascular intervention group compared with the other two groups combined, including internal carotid artery terminus (75 cm$^3$ for those receiving endovascular therapy versus 190 cm$^3$ for those receiving either IV tPA or no reperfusion therapy, $P<$0.001), M1 middle cerebral artery (39 versus 109 cm$^3$; $P=$0.004), and M2 middle cerebral artery (33 versus 59 cm$^3$; $P=$0.04) occlusions.

• When patients were stratified based on baseline NIHSS score, endovascular intervention was clearly superior to IV tPA or no treatment in patients with a score of 14 or higher in terms of reduced infarct volume (46 cm$^3$ with endovascular therapy versus 149 cm$^3$ with the other modalities; $P<$.001), the investigators wrote.
Conclusions / Summary

• Imaging evidence of an occlusion of a large artery should be considered necessary for inclusion into any future trial accessing emergency endovascular interventions for ischemic stroke.

• Patients with occlusions distal to the M1 segment of the middle cerebral artery should be excluded due to their better chance for benefit with IV tPA.

• Higher NIHSS score should be considered a predictor of increased likelihood of benefit for endovascular therapies.
THE END