Treating Mild and Rapidly Improving Stroke

May the (Telestroke) Force Be With You

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Objectives:

- Briefly describe the pathophysiology of a mild or rapidly improving stroke
- List the symptoms associated with a mild or rapidly improving stroke
- Discuss new guidelines relating to treatment of mild or rapidly improving strokes
- Describe the benefits of telestroke in the identification and treatment of mild or rapidly improving strokes
Case examples and pre-test

• An 80 year old Jedi knight presents to your ED at 10:00 AM today.
• Noted problems maintaining a good grip on his lightsaber this morning around 9:00 AM when he was sparring with his friend Yoda.
• Yoda states: Unusual word patterns Obi Wan Kenobi now has.
• Grip was firm and steady when he first picked up his light saber at 8:00 AM and his language was clear.
• On exam:
  – CT scan normal
  – No contraindications for alteplase
  – NIHSS 2
    • Minor right arm drift
    • Minor word finding difficulty
Does Obi Wan get treated?

• YES! – treat with alteplase
  – Time last known well = 8:00 AM
  – Mild stroke, disabling symptoms unchanged
  – Low risk

• NO! – admit and observe
  – Very mild stroke
  – Too great of a risk
  – The Force is strong with him so he won’t need treatment
Case examples and pre-test

• 50 year old pilot of the Millennium Falcon presents to your ED at 4:00 PM today.
• Reportedly had to turn over piloting of the Falcon to his co-pilot Chewbacca when he lost complete control of his right arm and could not speak for an hour. Through a Wookie interpreter you learn that his time last known well was 2:00 PM today when he left the pilot deck to check on the droids.
• On exam:
  – CT scan normal
  – Many lifestyle risk factors for stroke but no contraindications for alteplase
  – Symptoms rapidly improved from onset (initial NIHSS estimate 10)
  – NIHSS now 3
    • Minor right arm drift
    • Minor facial droop
    • Slight dysarthria
Does Han Solo get treated?

• YES! – treat with alteplase
  • Time last known well = 2:00 PM
  • Disabling symptoms continue though clearly improved
  • Low risk

• NO! – admit and observe
  • Rapidly improving stroke
  • Too great of a risk
  • Not sure if someone from a galaxy far, far, away would tolerate alteplase
Pathophysiology of Mild and Rapidly Improving Stroke

Always remember: your focus determines your reality.
Pathophysiology of Mild/Rapidly Improving Stroke: Normal Cerebral Circulation
Ischemic Stroke (85%) versus Hemorrhagic Stroke (15%):
Pathophysiology of Mild/Rapidly Improving Stroke: Embolus/Thrombus

Embolus (blood clot) in cerebral artery blocks blood flow to part of the brain.

Location of brain tissue death.

Brain.

Cerebral arteries within brain.

Direction of blood flow.

Blood clot breaks off (embolus) from plaque buildup in carotid (neck) artery.

Embolus blocking blood flow.

Brain tissue death.
Pathophysiology of Mild/Rapidly Improving Stroke: Sources of emboli/blockage
Mild Stroke

- The 6 definitions of minor stroke used in this study:
  - A. all patients with a score 0 or 1 on every baseline NIHSS score item, except level of consciousness items (items 1a to 1c), which must be 0;
  - B. all patients with a lacunar-like syndrome (presumed small-vessel occlusive disease) such as pure sensory syndrome, pure motor hemiparesis, sensorimotor syndrome, ataxic hemiparesis, and dysarthria-clumsy hand syndrome;
  - C. all patients with only motor deficits (can include dysarthria or ataxia) with or without sensory deficits. These patients can have only a combination of motor, coordination, and sensory deficits without any deficits in the spheres of language, level of consciousness, extinction or neglect, horizontal eye movements, or visual fields, deficits generally ascribed to larger territories of focal ischemia;

*Stroke*
2010; 41: 661-666
Mild Stroke

- D. all patients with baseline NIHSS in the lowest (least severe) quartile of severity (NIHSS ≤9), excluding all patients with aphasia, extinction, or neglect, or any points on the level-of-consciousness questions;
- E. all patients with baseline NIHSS in the lowest (least severe) quartile of severity (NIHSS ≤9); and
- F. all patients with baseline NIHSS ≤3.
Patients who present within an appropriate time frame with stroke symptoms that are mild or rapidly improving, but have a continued disabling neurological deficit will be treated with IV tPA.

Patients who present within an appropriate time frame with mild, nondisabling stroke symptoms should be strongly considered for IV tPA if their presentation is associated with a visualized vessel occlusion.
MRI: Minor vs Major Stroke
**Improvement to a mild stroke such that any remaining deficits can be considered disabling**

The following typically should be considered disabling deficits:

<table>
<thead>
<tr>
<th>Deficit Description</th>
<th>NIHSS Question</th>
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<tbody>
<tr>
<td>Complete hemianopsia (\geq 2) on the NIHSS question 3), or</td>
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<tr>
<td>Severe aphasia (\geq 2) on NIHSS question 9), or</td>
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<tr>
<td>Visual or sensory extinction (\geq 1) on NIHSS question 11), or</td>
<td>11</td>
</tr>
<tr>
<td>Any weakness limiting sustained effort against gravity (\geq 2) on NIHSS question 5 or 6), or</td>
<td>5 or 6</td>
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<tr>
<td>Any deficits that lead to a total NIHSS &gt;5, or</td>
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<td>Any remaining deficit considered potentially disabling in the view of the patient and the treating practitioner. Clinical judgment is required.</td>
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*Stroke* 2013; 44: 2500-2505
Rapidly Improving Stroke: Fibrinolysis

Summary of Hemostasis

- Platelet plug forms
- Stabilization by fibrin formation (clotting cascade)
- Extension of clot limited by: Natural anticoagulants
- Fibrinolysis
Rapidly Improving Stroke

Arterial Circulation of the Brain, Including Carotid Arteries

- Anterior Cerebral Artery
- Left Middle Cerebral Artery
- Anterior Communicating Artery
- Posterior Cerebral Artery
- Posterio Communicating Artery
- Internal Carotid Arteries
- Circle of Willis
- Right Middle Cerebral Artery
- Basilar Artery
- External Carotid Arteries
- Vertebral Arteries
- Common Carotid Arteries
Stroke Treatment Guidelines for Mild and Rapidly Improving Stroke

The Force Awakens!
• Table 10. Inclusion and Exclusion Characteristics of Patients With Ischemic Stroke Who Could Be Treated With IV rtPA Within 3 Hours From Symptom Onset

— Exclusion criteria

• Only minor or rapidly improving stroke symptoms (clearing spontaneously)
• Stroke Severity: Recommendations:
  
  – For patients with mild but disabling stroke symptoms, intravenous alteplase is indicated within 3 hours from symptom onset of ischemic stroke. There should be no exclusion for patients with mild but nonetheless disabling stroke symptoms in the opinion of the treating physician from treatment with intravenous alteplase because there is proven clinical benefit for those patients (Class I; Level of Evidence A).
• Rapidly Improving: Recommendations:

– Intravenous alteplase treatment is reasonable for patients who present with moderate to severe ischemic stroke and demonstrate early improvement but remain moderately impaired and potentially disabled in the judgment of the examiner (Class IIa; Level of Evidence A).

– Because time from onset of symptoms to treatment has such a powerful impact on outcome, delaying treatment with intravenous alteplase to monitor for further improvement is not recommended (Class III; Level of Evidence C).
Telestroke!

May the Force Be With You!
Telestroke:

- What is the telestroke service:
  - 24hr/365d – coverage for stroke codes
  - Stroke Neurology via telestroke
  - Regional Hospital/Allina Health telestroke code team
  - Bringing high level IV thrombolytic and interventional treatment decisions to the patient in the early minutes to limit the time to decision and focus the imaging plan

- Mobile video cart
- Web-based video conferencing provider
- Bringing the Stroke Neurologist and the regional hospital code team together in the process
Telestroke Guidance:

**Sudden onset** of any one of the following:
- Numbness or weakness in the face, arms or legs (particularly on one side of the body)
- Confusion or aphasia (difficulty speaking or understanding what others are saying)
- Difficulty walking, loss of balance or coordination
- Nonspecific visual complaints with partial, complete or bilateral visual field loss or double vision
- Sudden onset of continuous **vertigo** and **ANY of the following**
  - 65 years of age or older
  - Younger than 65 with risk factors (i.e. Smoking, diabetes, HTN, etc.)
  - Posterior neck pain in setting of recent manipulation or injury (suggesting dissection)
Telestroke Guidance:

- Large artery versus small artery
- Time frame and treatment choices:
  - Symptoms onset within 6 – 8 hours from time last known well or
  - Wake up stroke
- Newer imaging strategies with rapid interpretation within the clinical context
- Recognizing stroke mimics
- Recognizing unusual stroke presentations
Telestroke Guidance: (at Warp Speed!)

- Door to neurology consult – less than 10 min
- Door to CT – less than 10 min
- Door to needle (tPA) – less than 40 min
- Door to puncture – less than 120 min (from “Door #1”)
Telestroke Goals:

• Treat with tPA or IA therapy in ≥ 20% of all ischemic stroke discharges

• Keep symptomatic intracerebral hemorrhage rate <4%

• Minimize treatment of stroke mimics <5%
Putting it all together!

• Jedi Council! What does this all mean?
  – Early telestroke engagement to identify mild/rapidly improving strokes
  – Improved likelihood of treatment for mild/rapidly improving strokes
  – Increased percentage of ischemic strokes treated
  – ULTIMATELY: BETTER OUTCOMES for stroke patients!
Discussion:

• Treatment of minor or rapidly improving strokes
  – Less risk
  – Better outcomes
• Emergency department providers having discomfort in treating mild and rapidly improving strokes by
• Early recognition of stroke by EMS/Triage staff
• Community education
  – Stroke recognition
  – Time is Brain
QUESTIONS?
HELP YOU I CAN