tPA and Early Mobilization in Acute Stroke Rehabilitation

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Learning Objectives

By the end of this discussion, learners will be able to

● Understand what population tPA is used for and how long it effects the patient.
● Discuss current tPA bedrest recommendations, and the pros and cons of mobilizing patients earlier than the current 24-48h bedrest recommendations
● Discuss the importance of outcome measures in the acute care setting and have an understanding on what outcome measures are recommended by the APTA to use.
Mobility Guidelines

Lower level patients:
- Inc mobility with and without assistive device
- Inc activity tolerance & time out of bed
- Pt and family edu: orientation, positioning, cognitive awareness

Higher level patients:
- Inc ability to multi-task and higher level cognitive task
- High level balance and coordination, fall recovery strategies
- Promote improved endurance
- Community re-entry and education on return to work/driving
The Basics of tPA²

Tissue Plasminogen Activator
aka Alteplase or Activase

Used to treat ischemic stroke (w/in ~3hrs)

Thrombolytic agent, dissolves blood clots

Given through IV
Basics of tPA

Risks: hemorrhage, especially ICH\(^2\)

- 1995 National Institute of Neurological Disorders and Stroke trials: study with n=280 found ICH occurred in 6.4% pts

- 2003 Graham et al: Study with n = 2639 found symptomatic ICH rate 5.2%
tPA and Early Mobilization\textsuperscript{7,10}

Fear of precipitating worsening intracranial or systemic bleeding by mobilizing stroke patients too soon

- Effects of IV tPA wear off in 6-8 hours
- Most ICH develop within first 12 hours

Current Rehab Recommendations: Bedrest 24-48 hrs
Dubuisson et al 2017

20 cases of patients mobilized within 12 hours of tPA
6 hours bedrest
No adverse events reported
Arnold et al 2015

Prospective observational safety and feasibility study

Very early mobilization (PT/OT) w/in 24 hours post tPA

Premobilization safety checklist:
hemodynamic stability

Adverse safety events (changes in pt sx, vitals, bleeding complications)
Arnold et al 2015

RESULTS:

<table>
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<tr>
<th>18 Patients, 47 potential activities</th>
<th>Patient Mobilization</th>
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<tr>
<td>100% evaluated with safety checklist</td>
<td>100% sat EOB</td>
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<tr>
<td>89% (42/47) activities tolerated w/o adverse response</td>
<td>72.2% (13/18) stood EOB</td>
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<td>72.2% (13/18) mobilized w/o adverse effect</td>
<td>44% (8/18) mobilized to chair</td>
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<td>44% (8/18) ambulated</td>
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Adverse effects: 3 orthostatic, 1 transient hemiparesis, 1 dizzy
Davis et al, 2013

PT/OT 13-24 hours of tPA with safety screen: hemodynamic stability of patients
Mobilization: sitting, standing, chair transfer, and ambulation

RESULTS:

- 86% (70/81) activities had no adverse response
- 76% (23/30) mobilized w/o adverse response

Adverse events: 2 subjects “dizziness” (w/o drop in BP), 3 subjects DBP > 105, 1 subject HR > 100 bpm (resting HR 96 bpm), 1 transient hemiparesis (resolved w/in 1 hour)
Arnold et al, 2011

Retrospective review for analysis of functional mobility
  Data: age, gender, hospital LOS, vital signs during mobilization, National Institutes of Health Stroke Score (NIHSS), Barthel Index score, pain level, mobilization assistance, and any adverse response
10 patients PT/OT for EM 12-24 hours after tPA

RESULTS:
90.0% (9 of 10) no adverse response
Mean LOS 3.11 days for EM, 4.11 for control (not statistically significant)
Conclusions\textsuperscript{3,4,5,6}

Very early mobilization relatively safe/feasible in most patients

Adverse responses: minor, no sustained worsening of neurologic deficits

Detailed neurologic and vital sign monitoring

More study recommended
Based on psychometrics and clinical utility
Outcome Measures: Highly Recommended

- 6 minute walk
- 10 meter walk
- Dynamic Gait Index*
- Functional Reach
- Orpington Prognostic Scale
- Postural Assessment for Stroke Patients
- Timed Up and Go
Orpington Prognostic Scale

A. **Motor Deficit** (in arm)
   Lying supine, patient flexes shoulder to 90° and is given resistance.
   - 0.0=MRC grade 5 (normal power)
   - 0.4=MRC grade 4 (diminished power)
   - 0.8=MRC grade 3 (movement against gravity)
   - 1.2=MRC grade 1-2 (movement with gravity eliminated or trace)
   - 1.6=MRC grade 0 (no movement)

B. **Proprioception** (eyes closed; affected arm held overhead by therapist.)
   Locates affected thumb with opposite hand:
   - 0.0=Accurately
   - 0.4=Slight difficulty
   - 0.8=Sees thumb via arm
   - 1.2=Unable to find thumb

C. **Balance** (may use assistive device for walking portion only)
   - 0.0=Wals 10 feet without help
   - 0.4=Maintains standing position (unsupported for 1 min)
   - 0.8=Maintains sitting position (unsupported for 1 min)
   - 1.2=No sitting balance

D. **Cognition**
   Hodkinson’s Mental Test: Score one point for each correct answer.
   1. Age of patient
   2. Time (to the nearest hour)
      "I am going to give you an address, please remember it and I will ask you later: 42 West Street."
   3. Name of hospital
   4. Year
   5. Date of birth of patient
   6. Month
   7. A year of the Second World War (1939-45)
   8. Name of the President
   9. Count backwards (20-1)
   10. What is the address I asked you to remember:
       42 West Street
   
   0.0=Mental test score of 10
   0.4=Mental test score of 8-9
   0.8=Mental test score of 5-7
   1.2=Mental test score of 0-4

**TOTAL SCORE:** 1.6 + Motor + Proprioception + Balance + Cognition = __________

< 3.2 = Minor
≥ 3.2 and ≤ 5.2 = Moderate
> 5.2 = Major
Postural Assessment for Stroke Patients

Maintaining Posture
- Sitting without support
- Standing with support
- Standing without support
- Standing on nonparetic leg
- Standing on paretic leg

Changing Posture
- Supine to paretic side lateral
- Supine to nonparetic side lateral
- Supine to sitting up on the edge of mat
- Sitting on the edge of the mat to supine
- Sitting to standing up
- Standing up to sitting down
- Standing, picking up a pencil from the floor
Outcome Measures: Recommended

- 5 time sit to stand
- Action Research Arm Test
- Ashworth
- Assessment of Life Habits
- Berg Balance
- Box & Blocks Test
- Chedoke-McMaster Stroke Assessment
- Fugl-Meyer Assessment of Motor Performance
- Modified Rankin Scale
- NIH Stroke Scale
- Rivermead Motor Assessment
- Stroke Rehabilitation Assessment of Movement
- Tardieu Spasticity Scale
- Trunk Impairment Scale
- Wolf Motor Function Test
Outcome Measures: Unable to Recommend

- Brunnel Balance Test
- Functional Ambulation Categories
- Satisfaction with Life Scale
- Balance Evaluation Systems Test
- Goal Attainment Scale
- Hi Mat
- Semmes Weinstein Monofilaments
- Tinetti POMA
- Motricity Index
Outcome Measures: Not Recommended

- Chedoke Arm Hand Inventory
- Fugl-Meyer Sensory
- RPE
- Reintegration to Normal Living
- Trunk Control Test
- 9 Hole Peg Test
- Activities-Specific Balance Confidence
- Arm Motor Ability Test
- Assessment of Life Habits
- Canadian Occupational Performance
- Dynamometry
- Euro QOL
- Jebsen Taylor Functional Arm Test
- Modified Fatigue Impact Scale
- Motor Activity Log
- Nottingham Assessment of Somatosensation
- Rivermead Assessment of Somatosensory Performance
- Stroke Adapted Sickness Impact Scale - 30
- SF-36
- Stroke Impact Scale
- Stroke-Specific Quality of Life Scale
- VO2 Max
Questions?
References