

tPA and Early Mobilization in Acute Stroke Rehabilitation



Martha Kalisz

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 Guidelines⁹

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

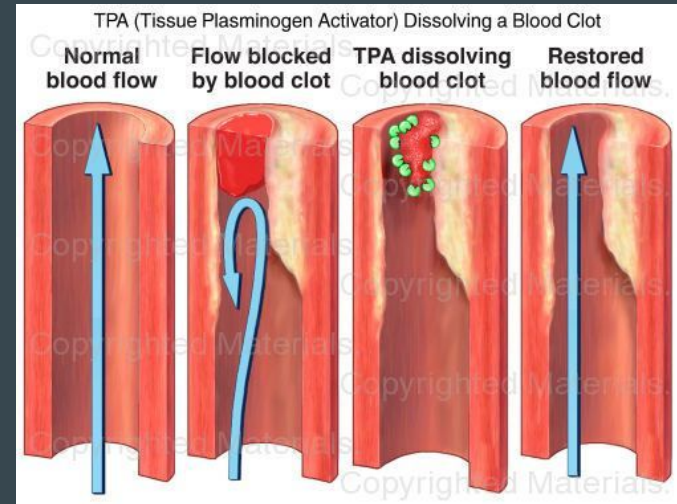
The Basics of tPA²

Tissue Plasminogen Activator
aka Alteplase or Activase

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

Thrombolytic agent, dissolves blood clots

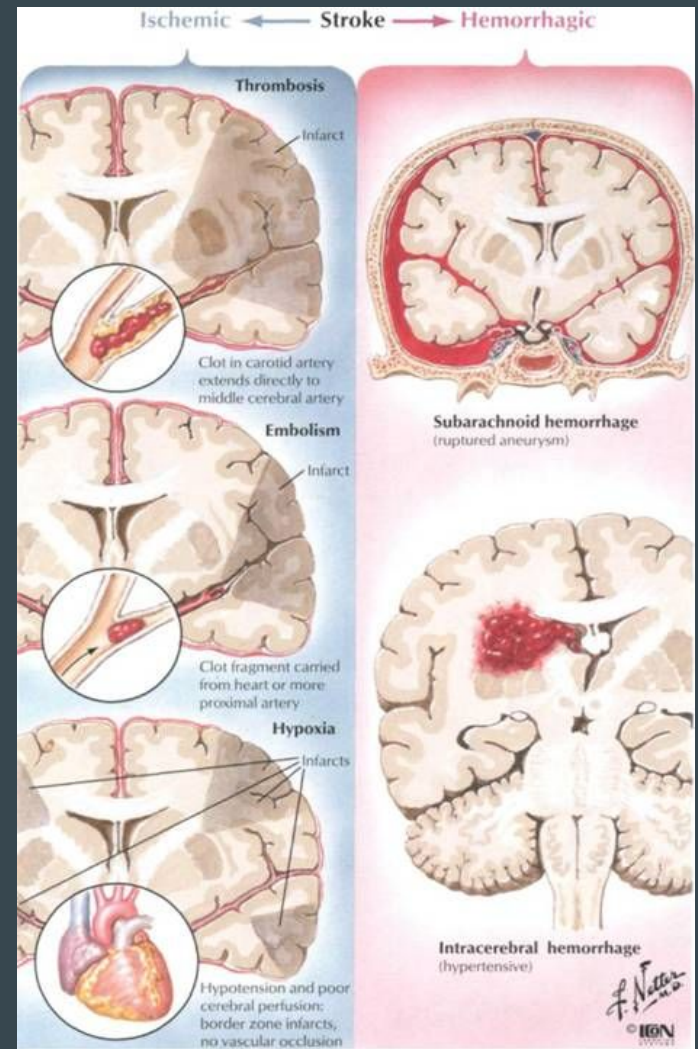
Given through IV



Basics of tPA

Risks: hemorrhage, especially ICH²

- 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^{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:

18 Patients, 47 potential activities	Patient Mobilization
100% evaluated with safety checklist	100% sat EOB
89% (42/47) activities tolerated w/o adverse response	72.2% (13/18) stood EOB
72.2% (13/18) mobilized w/o adverse effect	44% (8/18) mobilized to chair
	44% (8/18) ambulated

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^{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

StrokeEDGE

Academy of Neurologic Physical Therapy Outcome Measures Recommendations

- Based on psychometrics and clinical utility

Outcome Measures: Highly Recommended¹

- 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 Scale⁸

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=Finds thumb via arm

1.2=Unable to find thumb

C. **Balance** (may use assistive device for walking portion only)

0.0=Walks 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 Patients⁸

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: Recommended¹

- 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 Recommend¹

- Brunel 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 Recommended¹

- 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

1. Academy of Neurologic Physical Therapy. <http://neuropt.org/>. Published 2015. Accessed on April 1, 2017.
2. American Heart Association, Inc. Tissue Plasminogen Activator (tPA): What You Should Know. American Heart Association; 2008. http://www.strokeassociation.org/idc/groups/stroke-public/@wcm/@hcm/@gwtg/documents/downloadable/ucm_430859.pdf. Accessed on April 1, 2017
3. Arnold SM, Chavez OS, Dinkins MM, et al. Outcomes of patients receiving early mobilization less than 24 hours post-IV tPA infusion for acute ischemic stroke [abstract]. Poster presentation at 2011 American Physical Therapy Association Annual Conference, National Harbor, MD: American Physical Therapy Association; 2011.
4. Arnold SM, Dinkins M, Mooney LH, et al. Very early mobilization in stroke patients treated with intravenous recombinant tissue plasminogen activator. *J Stroke Cerebrovasc Dis.* 2015;24(6):1168-1173. <https://www.ncbi.nlm.nih.gov/pubmed/25869770>
5. Davis O, Mooney L, Dinkins M, et al. Early mobilization of ischemic stroke patients post intravenous tissue plasminogen activator [abstract]. *Stroke.* 2013;44:A121.
6. Dubuisson G, Lieberman A. Enhancing Patient Outcomes After Stroke: Acute Care and Beyond. Presentation at 2017 American Physical Therapy Association Combined Sections Meeting, San Antonio, TX: JFK Medical Center - Johnson Rehabilitation Institute, Edison NJ; 2017.
7. Graham, GD. Tissue plasminogen activator for acute ischemic stroke in clinical practice: a meta-analysis of safety data. *Stroke*, 34 (2003), pp. 2847–2850
8. Rehabilitation Measures Database: The Rehabilitation Clinician's Place to Find the Best Instruments to Screen Patients and Monitor Their Progress. Rehabilitation Institute of Chicago. <http://www.rehabmeasures.org/default.aspx>. Published 2010. Accessed on April 1, 2017.
9. Teasell R, Foley N, Hussein M, Cotoi A. Evidence Based Review of Stroke Rehabilitation: The Efficacy of Stroke Rehabilitation. 2016: Chapter 5. <http://www.ebrsr.com/evidence-review/5-efficacy-stroke-rehabilitation>. Accessed on April 1, 2017.
10. Tissue plasminogen activator for acute ischemic stroke. The National Institute of Neurological Disorders and Stroke rt-PA Stroke Study Group, *N Engl J Med*, 333 (1995), pp. 1581–1587