# Early Mobilization of Individuals with Acute Stroke after Receiving tPA

Jennifer Ford, OTD, OTR/L

Advent Health Shawnee Mission

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# Objectives

By the end of the presentation the audience will be able to:

1. Define early mobility
2. Discuss literature regarding early mobility after the use of tPA
3. Verbalize guidelines for early mobility after the use of tPA

# What is Early Mobility?

- Beginning activity at the point of physiological stabilization
  - **Considerations**
    - Mental status
    - Blood pressure and amount of vasopressors
    - Respiratory status
    - Renal replacement therapy
    - Intravenous sedation
  - **Why?**
    - Survival rate of critical illness
    - Physiological consequences of bedrest

Linke, C. et al. (2020). Early mobilization in the ICU: A collaborative, integrated approach. *Critical Care Explorations,* 2(4). doi:10.1097/CCE. 0000000000000090.

Lipshutz, A., & Groper, M. (2013). Acquired neuromuscular weakness and early mobilization in the intensive care unit. *Anesthesiology, 1*(118), 202-215.

Naito, Y, Kamiya, M., Morishima, N., & Ishikawa, T. (2020). Association between out-of-bed mobilization and complications in acute phase of severe stroke: A retrospective observation study. *Journal of Stroke and Cerebrovascular Diseases, 29*(10), 1-4. https://doi.org/10.1016/ j.jstrokecerebrovasdis. 2020.105112.

# Early Mobility and Patients Receiving tPA after Acute Ischemic Stroke

- In 1994 early mobilization was adopted for the care of individuals with stroke
- In 2004 the first RCT took place for individuals with stroke
- Currently ICU's vary in guidelines regarding mobility after tPA
  - Some 24 to 48 hours of bedrest prior to initiation and some none


Arnold, S., et al. (2015). Very early mobilization in stroke patients treated with with intravenous recombinant tissue plasminogen activator. *Journal of Stroke and Cerebrovascular Diseases, 6*(24), 1168-1173. http://dx.doi.org/10.1016/j.strokecerebrovasdis.2015.01.007.

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Olkowski, B. & Shah, S. (2017). Early mobilization in the neuro-ICU: How far can we go? *Neurocrit care, 27*, 141-150. doi: 10.1007/s112028-016-0338-7.

# What's stopping us?

- Concerns of intracranial or systemic bleeding
- Adverse outcomes: pallor, diaphoresis, changes in HR and blood pressure, orthostasis, intense anxiety, pain, dizziness, syncope, neurological changes
- Team Readiness
- Research


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# The Research: A Very Early Rehabilitation Trial (AVERT)

- **Objectives:**
  1. Does VEM reduce death and disability at 3 months post stroke?
  2. Does VEM reduce the number and severity of complications at 3 months post stroke?
  3. Does VEM improve quality of life at 12 months post stroke?
  4. Is VEM cost-effective?
- **Setting:** 56 hospitals in 5 countries
- **Participants:** Acute stroke admitted prior to 24 hours onset of symptoms (MD took special consideration when enrolling tPA pt to investigation)
- **Sample Size:** 2104 patients recruited from July 2006 through October 2014
- **Intervention:** RCT, VEM was delivered in 3 out of bed session per day versus the usual care group

Langhorn, P., Wu, O., Rodgers, H., Ashburn, A., & Bernhardt, J. (2017). A very early rehabilitation trial after stroke (AVERT): A phase III, multicenter, randomized controlled trial. *Health Technology Assessment, 21*(54), 1-119. doi:10.3310/hta21540.

# The Research: A Very Early Rehabilitation Trial (AVERT)

- **Phase 1**
  - Observational study
  - Demonstrated most individuals with stroke were inactive most of the time
  - Varied opinions of health care professionals regarding VEM
- **Phase II**
  - **Hypothesis:** VEM will be safe and feasible.
  - **Conclusion:** Safe and feasible indicating signals for improvement with recovery and likeliness of cost effectiveness

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# The Research: A Very Early Rehabilitation Trial (AVERT)

- **Phase III**
  - **Hypothesis:** VEM would improve functional outcome at 3 months, reduce immobility-related complications and accelerate walking recovery, improve quality of life at 12 months and be cost effective.
  - **Participants:** 2104 with 24% receiving tPA
  - **Method:** Vitals assessed at each stage of movement (head of bed greater than 70 degrees, sit edge of bed, sitting for 5 minutes, transfer to chair)
  - **Treatment Compliance:** VEM mobilized at a median of 18.5 hours UC at 23.5 hours
  - **Discussion:** VEM reduced favorable outcome at 3 months, safety concerns for elderly patients and patients with hemorrhagic stroke
  - **Conclusion:** No difference in complications between VEM group and standard care group, mobility at early phase of recovery may influence long-term outcomes, more practice may not always be better, frequency may be more important than other aspects of treatment

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# Research on Early Mobility of Patients who Received tPA

- **Abstract NS6:** Early Mobility Initiated at 12 Hours Post Thrombolytic Therapy for Stroke Increases Likelihood for Discharge to Home
  - **Purpose:** To assess patient safety and discharge outcomes of initiating early mobility after 12 hours of receiving tPA for stroke at primary stroke center.
  - **Methods:** Early Mobility Protocol was implemented within 24 hours of receiving tPA. 44 patients received tPA. Among the early mobility group there were no falls or adverse physiological events. Patients in early mobility were more likely to discharge home. No significant difference in length of stay.
  - **Conclusion:** Providing early mobility to patients post thrombolytic therapy between 12-24 hours does not cause an increase in adverse physiological events. It has a positive impact on patient discharges to home.

Gwilliam, J. & McNicholas, M. (2020). Abstract NS6: Early mobility initiated at 12 hours post thrombolytic therapy for stroke increases likelihood for discharge to home. *Stroke, 51*. https://doi.org/10.1161/str.51.suppl_NS6.

# Research on Early Mobility of Patients who Received tPA

- **Fatal and Nonfatal Events Within 14 Days after Early, Intensive Mobilization Poststroke**
  - **Objective:** Tertiary analysis from AVERT examined fatal and nonfatal serious adverse events at 14 days.
  - **Method:** Review of the AVERT trial. The primary early safety outcome was fatal serious adverse events at 14 days. The secondary outcomes were nonfatal serious adverse events classified as neurological, immobility-related and other.
  - **Results:** By 14 days, 48 had died in the VEM, 32 in the UC group. Stroke progression more common in VEM. Higher odds of death and intracerebral hemorrhage in 80+ group. No difference in nonfatal SAE's found.
  - **Conclusion:** Overall fatality at 14 days poststroke 3.8%, mortality adjusted for age and stroke severity increased with high dose, intensive training compared to UC. Stroke progression more commode in VEM.

Bernhardt, J., Borschmann, K., Collier, J., Thrift, A., Langhorn, P., Middleton, S., et al. (2021). Fatal and nonfatal events within 14 days after early, intensive mobilization poststroke. *American Academy of Neurology, 96*, e1156-e1166. https://doi.org/10.1212/ WNL.0000000000011106.

# Research on Early Mobility of Patients who Received tPA

- **Enhancing Patient Outcomes After Stroke: Acute Care and Beyond**
  - Presentation provided by Physical Therapists at JFK Medical Center in 2017
    - Report
      - **Participants:** over 20 cases of patients who received tPA mobilized under 12 hours
      - No adverse events reports

Lieberman, A. & Dubuisson, G. (2017). Enhancing patient outcomes after stroke: Acute care and beyond. Combined Sections Meeting, San Antonio, TX. JFK Medical Center, Johnson Rehabilitation Institute, Edison NJ.

# Understanding the Research

- Research is unclear as to when it is safe to mobilize a patient who has received tPA for ischemic stroke
- Small trials suggest feasibility of mobilization 12 hours after receiving tPA
- More recent hospital trials suggest safety with mobilization less than 12 hours
  - It is uncertain the length of time these patients were monitored (for example: 1 week, 3 months, 1 year)
- The largest known RCT AVERT reports frequency of mobilization over duration
- AVERT also reports stroke progression is more common with very early mobility


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Muhl, L., et al. (2014). Mobilization after thrombolysis (rtPA) within 24 hours of acute stroke: What factors influence inclusion of patient in A Very Early Rehabilitation Trial (AVERT). *BMC Neurology, 14*(163). doi:10.1186/s12883-014-0163-6.

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# Next Steps

- More research
- Very early mobility may be safe and feasible
- Mobility should be progressive and closely monitored
- Duration of task specific training and mobility should be low with a higher frequency
- MD should guide who is able to be mobilized between 12-24 hours of receiving tPA with consideration of the above guidelines


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# Potential Inclusion Criteria for Very Early Mobility

- Systolic blood pressure (SBP) 110-220
- Oxygen saturation of greater or equal to 92%
- Resting heart rate of 40-110 beat per minutes (b.p.m.)
- Temperature 38.5 degrees C. or greater
- At a minimum, patient must at least react to verbal commands

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# Stages of Very Early Mobility

- Monitor Vitals
- Raise bed to 70 degrees hip flexion, monitor vitals
- Sit edge of bed, monitor vitals
- Sit for 5 minutes, monitor vitals
- Transfer to chair, monitor vitals

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# Return patient to bed if . . .

- Clinical judgement suggests patient is not tolerating
- SBP less than 100 or greater than 230
- SBP decreased by 30
- HR greater than 120
- O2 sat less than 90

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# Questions

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