Subacute Rehabilitation Following An Hypoxic Ischemic Brain Injury Resulting In Severe Ataxia: A Case Report

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Background/Purpose

- Hypoxic/anoxic brain injuries result from global lack of oxygen to the brain from events such as drowning, choking, and cardiac or respiratory arrest.¹
- Certain areas of the brain have more devastating effects when deprived of oxygen as they have a higher metabolic activity and increased utilization of oxygen. One area in particular is the basal ganglia.²
- Anoxic brain injuries involving infarcts of the basal ganglia (containing globus pallidus) can result in involuntary movement disorders such as:
  - Myoclonic jerks
  - Ataxia
  - Atkinetic-rigid movements
  - Difficulties in learning new motor skills²
- Ataxic gait is characterized by:
  - Difficulties with inter- and intra-limb coordination
  - Decreased speed of ambulation
  - Irregular stepping pattern
  - Impaired postural stability
  - An increased risk of falls³
- The purpose of this case report is to provide physical therapy interventions that were utilized in an inpatient rehabilitation hospital setting for a patient who experienced a hypoxic brain injury.

Patient History

- Patient past medical history includes:
  - TBI (2009)
  - Unspecified neurodegenerative disorder
  - Epilepsy
  - Abdominal and lower extremity thrombosis
  - Factor V Leiden gene mutation
- 28-year-old male was independent with activities of daily living (ADLs) while living at a neurorehabilitative assisted-living facility when he experienced a witnessed choking episode leading to respiratory and cardiac arrest.
- Admitted into the intensive care unit (ICU) and intubated. Hypothermia protocol was initiated due to his poor rating on the Glasgow Coma Scale (GCS).
- Magnetic Resonance Imaging (MRI) was performed demonstrating bilateral acute globus pallidus infarcts consistent with an hypoxic ischemic brain injury
- Once medically stable, he was transferred to a subacute rehabilitation hospital to improve functional mobility deficits due to myoclonic tremors and severe ataxia.

Timeline of Events

The patient experienced a witnessed choking incident at his neurorehabilitative group home

- Admitted into acute care hospital within the ICU
- Therapeutic hypothermia protocol was initiated due to poor rating on the GCS
- MRI was taken demonstrating bilateral acute globus pallidus infarcts consistent with an hypoxic ischemic brain injury

- Admitted into an inpatient rehabilitation hospital
- LE findings: Trunk and LE Hypertonic
- Modified LE MMT 3 out of 5
- FIM scores: Rolling: 3
  - Supine->sit: 3
  - Sit->supine: 4
  - Sit->sitting: 1
- Stand->sit: 2
- Stand pivot
  - Transfer: 1 (+2nd person)
  - Ambulation: 1 (+2nd person)
  - Stairs: 0

Bed Mobility:
- Mod A - Max A
- Transfers: Total A - Max A
- Transitional Movement: Total A - Max A
- Standing and Sitting Balance: Min A
- Coordination: Min A

Functional Mobility:
- Mod A - Min A
- Gait Training (with music): N/A

Bed Mobility:
- Mod A - Max A
- Transfers: Total A - Max A
- Transitional Movement: Total A - Max A
- Standing and Sitting Balance: Mod A - Min A
- Coordination: Min A - SPV

Functional Mobility:
- Min A
- Gait Training (with music): Mod A of 1+ WC follow (~500 ft)

Bed Mobility:
- Min A - Mod A
- Transfers: Max A - Mod A
- Transitional Movement: Max A - Min A
- Standing and Sitting Balance: Mod A - Min A
- Coordination: Min A - SPV

Functional Mobility:
- Min A
- Gait Training (with music): Mod A of 1+ WC follow (~1,000 ft)

Bed Mobility:
- Min A - Mod A
- Transfers: Max A - Mod A
- Transitional Movement: Max A - Min A
- Standing and Sitting Balance: Mod A - Min A
- Coordination: Min A - SPV

Bed Mobility:
- Min A
- Gait Training (with music): Mod A of 1+ WC follow (~250-1,000 ft)

Last treatment session at the IRF
- Sent to acute care hospital for placement of PEG tube
- Official discharge FIM scores were not able to be assessed due to medical complications
- Experienced unforeseen complications within the acute care ICU which ultimately led to his passing

Patient Goals

Bed Mobility:
- Supine to sit with minimal assistance from the physical therapist.

Transfers:
- Sit to sit transfer with maximal assistance from the physical therapist.

Ambulation:
- Ambulate on level surfaces for a distance of 10 feet using parallel bars with maximal assistance from the physical therapist.

Balance:
- Maintain a position of unsupported long sit while performing dynamic sitting balance tasks with minimal assistance from the physical therapist.

Discussion/Outcome

- Improvements in functional mobility including bed mobility, transitional movements, performing transfers, and gait were noted throughout the first 20 days of therapy; the last few days of treatment were increasingly difficult due to significant fluctuations in his medical status.
- The patient was sent to an acute care hospital to receive a percutaneous endoscopic gastrostomy (PEG) tube.
- Unfortunately, the patient experienced unforeseen complications at the acute care hospital which ultimately resulted in his passing.

Interventions

Acknowledgements
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References

¹. Information from the National Institute of Neurological Disorders and Stroke (NINDS) available at https://www.ninds.nih.gov/DoIPubs/Institute/AboutUs/AboutUs.cfm

Image 1: The author acknowledges Matthew Somma, PT, DPT, CSCS for assistance with case report conceptualization, Ashley Armington, PT, DPT for supervision and assistance with treatment, the patient and his family for their participation.

Time Spent on Specific Interventions

- Functional Mobility
- Transitional Movements
- Gait Training
- Bed Mobility
- Transfer Training
- Ambulation