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Physiotherapy Management and Recovery Patterns in a 63-Year-Old Male with Right Cerebellar Ischemic Stroke: A Case Report

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ABSTRACT: This case presentation is of a 63 year old male who sustained an ischemic stroke of the right cerebellar hemisphere. It documents the main patient characteristics and clinical examination findings identified on initial assessment, as well as the challenges currently facing the patient and the interventions identified to address the patient's goals with outpatient physiotherapy. His outcomes related to the implemented interventions are identified and discussed.

I. INTRODUCTION

Cerebellar stroke is a cerebrovascular event that impacts the cerebellum specifically and account for 2.3% of overall strokes^[1]. Clinically, these individuals present with nonspecific symptoms such as dizziness, nausea, vomiting, unsteady gait, and headache as well as neurological signs such as dysarthria, ataxia, and nystagmus^[2]. Due to this diverse clinical presentation, cerebellar strokes often resemble other disorders. Therefore, there is a lack of research surrounding cerebellar stroke^[2].

Case of severe cerebellar stroke and further complications such as hemorrhages post-surgery, have been reported previously^[1]. The recovery journey for this patient was 10 months long (where she plateaued) and involved intense gait and balance re-education. She responded quite well and became able to use a u-step walker with minimal assist and steady to assist in transfers^[1].

The purpose of this case study is to give a brief overview of outpatient physical therapy assessment and management in an individual with a less severe cerebellar stroke. This will help provide some understanding of what rehabilitation in an outpatient setting may look for a patient with this relatively rare type of stroke. If there is anything interesting or challenging you met when diagnosing or managing this case, it's worth mentioning in the introduction.

Challenges to the patient observed in this study had dysarthria making it difficult to communicate with the patient as they were frequently unable to describe their feelings and desires. He was dealing with depression making it a challenge to motivate him during rehabilitation; however, as he improved physically so did his motivation.

II. PATIENT CHARACTERISTICS

The patient is a 63 year old male diagnosed 3 months ago with a right-side ischemic cerebellar stroke. The patient is right hand dominant. He currently smokes and prior to the stroke he had a history of hypertension. He was a retired assembly line factory worker prior to the accident. He lives at home in a bungalow with his spouse. The patient was referred to outpatient physiotherapy from a local rehabilitation hospital following discharge to improve independence, mobility, and performing activities of daily living.

III. EXAMINATION FINDINGS

During the history taking, the patient spoke about having difficulty keeping his balance for long durations and that everyday movements that he would normally perform felt "jerky". He mentioned having issues performing work around the house, specifically with reaching tasks such as loading the dishwasher and reaching dishes from the top shelf. He reported having no pain. Previously he was a very social individual but has since felt isolated



and depressed after his stroke. He is currently ambulating with a single-point cane, but wants to stop using the cane. He reported falling twice since the stroke. The patient identified goals including walking without a cane and being able to do tasks around the house such as loading the dishwasher and reaching for dishes in cupboards.

During the objective examination, the following had been noted:

- Coordination: finger to nose (observed dysmetria and intention tremor with right arm), pronation/supination-hand on thigh (observed intention tremor and a decrease in speed and accuracy on right side when performed unilaterally), toe tapping (negative), heel to knee (observed decrease in speed and accuracy on right side)
- Gait observation (with cane): patient had right knee hyperextension during stance phase, a wide base of support, prolonged double support time, decreased stance time on right leg accompanied by a shorter step length with left leg, an irregular cadence and stiff trunk. Patient also deviated to right as he walked.
- Range of Motion (ROM): within normal limits at all major upper and lower extremity joints
- Reflexes: biceps, triceps, patellar and achilles hyperreflexia (grade 4) on the right side
- Skin sensation: light touch, sharp-dull, temperature sensation all fully intact
- Myotomes/Dermatomes: normal
- Limb matching test: Unable to match right limb to left at elbow and wrist. Somewhat consistently able to match right to left with hip, knee and ankle.
- Strength: upper and lower extremity grade 4 on isometric MMT or higher
- Berg Balance Scale (BBS) score: 44/56
- Timed Up and GO (TUG): 22.2 seconds
- Activities-Specific Balance Confidence Scale (ABC): 77/100

IV. CLINICAL IMPRESSION

The 63 year old patient with right cerebellar infarct presented with an ataxic gait, as well as impaired balance, right-sided coordination (primarily in the upper limb), and right-sided proprioception (primarily in the upper limb) impacting mobility and activities of daily living. This is apparent through positive limb matching test, gait observation, the BERG score of 44/56^[3], a TUG time of 22.2 seconds^[4], and a ABC score of 77/100^[5].

Problem list

- Reduced balance
- Reduced coordination of right upper limb
- Dysdiadochokinesia
- Dysmetria
- Intention tremor of right upper limb
- Reduced proprioception primarily affecting the right upper limb
- Increased risk for falls and fear of falling
- Difficulties with mobility
- Ataxic gait
- Difficulties with activities of daily living
- Difficulty reaching overhead
- Difficulty loading dishwasher
- Dysarthria (slurred speech)

Intervention

Short-term goals:

1. Walk indoors (around the house) without a cane within 6 weeks.
2. To be able to complete less strenuous tasks around the house: loading dishwasher, cleaning, cooking within 6 weeks.

Long term goals:

1. Walk outdoors (20-30 minutes) without a cane 6 months from now.



2. To be able to complete more strenuous tasks around the house: reaching high cupboards, climbing ladder, yard work within 6 months.

Management program

Gait - To improve upon the patient's goals of walking independently without a cane, an intervention used was treadmill-based gait training. Treadmill-based gait training, without body weight support in this case, increases both walking speed and distance walked in stroke patients^[6]. Performing treadmill training was patient-centred and was provided to help improve his return to functional activities, and work on his goal of walking independently.

Balance - A main focus to improve the patient's balance was training the trunk. Exercises included supine bridging, curl ups, as well as the bird-dog exercise. An example of a functional exercise was the novel sit to stand movement using asymmetrical foot placement^[7]. The emphasis was on mobility and stability for balance, rather than simple internal perturbations such as weight shifting.^[8]

Motor function/coordination - In order to improve the patient's motor function and subsequently the performance of the patient's activities of daily living, task-specific training was used^[8]. It included meaningful tasks to the patient including: taking on/off clothespins from a cup, loading dishwasher, reaching overhead, picking up objects from floor, fine manual dexterity training using the Purdue Pegboard^[9].

The patient responded very well to the interventions mentioned above when reassessed 3 months following intervention initiation. The balance training exercises helped to increase his score on the BBS from 44 to 49/56. The TUG decreased from 22.2 seconds to 12.7 seconds, and the ABC Scale increased from 77/100 to 91/100 indicating the client is at a lower risk of falls and is more confident in their ability to avoid falls. The patient feels that he is more in control of his life, as he is able to perform more of his activities of daily living and able to walk independently.

Discharge plan and referrals

Patient has a good prognosis to achieve functional long term goals if he continues to complete his rehabilitation therapy. Patient will continue outpatient physiotherapy to further improve his gait (speed, distance, and gait mechanics) and functional tasks specific to the patient. Patient referred to Speech-Language Pathologist for management of dysarthria and a Psychotherapist for management of depression.

V. DISCUSSION

This case looks at a 63 year old patient with a history of an ischemic stroke of the right cerebellar hemisphere. He presented with balance impairments, decreased right sided coordination, and mobility deficits impacting his activities of daily living. Functional goals important to the patient were identified and an intervention plan was put in place to achieve these goals. The patient in this case scenario saw modest improvements in the functional goals. The improvement in his BERG score was clinically meaningful^[10], and functionally it was meaningful to the patient to be able to walk without an aid. The improvement of the ABC score also demonstrates that the patient is now at a lower risk of future falls (above cut-off score of 81.1)^[5]. The patient was apprehensive with walking at first. But after the treadmill training intervention, the patient felt more confident with their walking and began to wean off of the cane.

There are many instances of patients approximately the same age as this patient who sustain a cerebellar stroke. Many of them make a good recovery and are functionally independent, considering the 29 of 52 patients (with a mean age of 61 years) who are functionally independent upon discharge^[11]. This case study can give an outline of the outpatient rehabilitation process for such similar patients.

It is imperative for the Physical Therapist to focus on the patient's goals, and to create intervention tasks that are both functional and meaningful to the patient.

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