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From Movement to Improvement: A Case Study on Quality of Life in Parkinson's disease

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ABSTRACT: "MR. Y" was a 67-year-old patient with Parkinson's disease [1], a progressive, incurable disorder where dopamine level is decreased due to the death of the dopaminergic neurons in the substantia nigra and basal ganglia causing the patient to develop motor and non-motor symptoms. These symptoms included: freezing, slow initiation of movements with unwanted acceleration and difficultly stopping, shuffling gait, quiet and slow speech, resting tremor, decreased dexterity and facial expression, as well as confusion and rigidity[2]. This case will discuss Parkinson's and how to address symptoms with physical therapy in combination with medications as prescribe by the treating physician.

KEYWORDS: Parkinson's Disease, Physiotherapy, LSVT BIG Treatment

I. CLIENT CHARACTERISTICS

MR. Y was an elementary school principle and had been retired for seven years. He lived with his wife, a 51-year-old full-time elementary school teacher. Together they had seven children. His hobbies included playing the piano, gardening, yard work, grocery shopping and cooking. He also walked an estimated one-mile around his pool every morning, while dropping sticks into target areas.

MR. Y was diagnosed with Parkinson's two years ago. Mrs. Johnson initially noticed symptoms of right foot drop and bilateral hand tremors in her husband. He was initially referred to physical therapy (PT) for evaluation and treatment in need of assistance with transfers and gait, difficulty speaking which was secondary to pooling of saliva, drooling and diminished voice volume. He was occasionally incontinent due to inability to reach the bathroom in time.

MR. Y was initially given Sinement for his Parkinson's but was switched to Sinement CR with Calan SR due to increased blood pressure. MR. Y was being considered for new trial medication with Eldepryl and his primary physician wants to add Artane to his treatment plan. Mrs. Y heard about Lee Silverman Voice Therapy (LSVT) and was hoping it would help her husband.

II. EXAMINATION FINDINGS

Neuromuscular Systems Review

MR. Y was alert and oriented to place and time, indicating that his cognitive function was at an acceptable level. He had no history of falls. He reported on/off phenomena and a resting tremor that was worse in the morning. MR. Y's bradykinesia was a primary problem causing incontinence, preventing him from wanting to leave the house. He was also slow in his ADLs.

PROM was within normal limits (WNL) with the exception of:

- the Thomas test which was lacking 15º bilaterally
- SLR was 40º
- DF was -5º and +5º on his right and left side, respectfully

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AROM was limited in the axial and upper thoracic regions while hip and knee extension was -20º. MR. Y lacked shoulder elevation (-60º bilaterally) and ankle DF (-10º bilaterally). He had a kyphotic posture with a forward head. He also rose from a chair by pulling himself forward and walked with a mild degree of festinating gait without distinct right heel contact. Tone was grossly WNL but did exhibit resistance in many muscles groups to PROM on the first motion. The pendulum test for rigidity was included.

Cardiopulmonary health was relatively good for his age; he walked around his pool and had a multitude of hobbies. Due to MR. Y's foot drop, doing a stress test on a stationary bike was safer than on a treadmill. The therapist examined his rib cage compliance, chest wall mobility and thoracic expansion during this test[2]. Other options included: visual inspection of breathing patterns, ventilation parameters (respiratory rate, minute ventilation and inspiratory time) and vital signs (heart rate and blood pressure)[2].

MR. Y was examined for bruising and skin breakdown. His integumentary system was intact with no pressure ulcers and will be intact.

Short Term Goals:

1. To incorporate concepts of Lee Silverman Voice Treatment BIG, to improve postural set for gait, balance and independent transfers within six visits.
2. To increase core stability and strength through mirror training to reduce kyphotic posture to WNL of postural set within six visits, thus to reduce the risk for falls.
3. Increase range of motion and strength for bilateral dorsiflexion through active proprioceptive neuromuscular facilitation pattern exercises within normal limits, bilaterally, within six visits for improved foot clearance during the swing phase of gait.

III. CLINICAL HYPOTHESIS

Parkinson's disease is classified under practice pattern - Impaired motor function and sensory integrity associated with progressive central nervous system disorders within the Guide to PT Practice[3]. Parkinson's progresses slowly with about a five-year subclinical period. In a study done by Feigin and Eidelberg, 9% of patients became severely disabled or died within five years of diagnosis, 21% within 10 years, and 37% within 15 years when taking L-dopa[4]. Patients who are younger at the onset of Parkinson's or who are tremor-predominant typically have a better prognosis than those who do not. Those with postural instability and gait disturbances tend to have an even less favourable prognosis. Mortality is usually due to cardiovascular disease or pneumonia.[2] It is reported that 60% of patients with Parkinson's fall each year due to cognitive and attention deficits[5]. The treatment MR. Y participated in, including strengthening and gait and balance training, was chosen to help him practise the physical requirements of the tasks while also practising focusing on the task itself [5]. With these factors, MR. Y had a moderately good prognosis especially since he was taking L-dopa medications.

IV. INTERVENTION

Plan of Care

Management of the cardiopulmonary system included a treadmill-training regimen to build up endurance and promote a healthy cardiovascular system. Use of a treadmill provides an external cue to improve gait function in patients with PD[1]. Secondary outcomes included increased cadence and walking distance[1]. MR. Y underwent 15-minute treadmill training sessions three times per week for four weeks.

Management of the Musculoskeletal System and Neurological System included generalized strengthening, PROM, AROM, generalized stretching, as well as the Lee Silverman Voice Therapy BIG training. LSVT has been established as a treatment for speech and voice disorders in individuals with Parkinson's and has documented success[6]. LSVT uses intensive practice of high effort/large amplitude arm movements while focusing on sensory awareness of movement bigness[6]. Extensive practice in LSVT and feedback/knowledge of

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results to teach patients with Parkinson's the amount of effort needed to consistently project an appropriate volume of voice. LSVT is administered in a manner consistent with an exercise program, with most patients attending four sessions per week for a scheduled four weeks, totaling 16 visits.[6]

Weeks 1-4	Weeks 5-8
Treatment Days Monday Tuesday Thursday Friday	**Treatment Days** Monday Tuesday Thursday Friday
LSVT and LSVT BIG One hour	**Generalized Strengthening** 15 minutes
Treadmill Training 30 minutes	**Generalized Stretching** 15 minutes
PROM all extremities 15 minutes	**AROM** 10 minutes
General Strengthening 15 minutes	**Gait Training** 30 minutes
Strengthening will include PNF patterns in all extremities to facilitate full body involvement	*Generalized stretching and strengthening target the goal of total body movement and functional ability. Specific movements will be selected at the discretion of the Physical Therapist*

V. OUTCOMES

An all-inclusive outcome measure for Parkinson's is Movement Disorder Society-Unified Parkinson's Rating Scale (MDS-UPDRS)[7]. The rating scale for this measure is broken down into four different parts which include: non-motor experiences of daily living, motor experiences of daily living, motor examination and motor complications. Both the rater and the patient or caregiver fill it out. Most sections have a rating scale of zero to four, zero being no impairment/symptoms and four being severe impairment/symptoms while others are yes/no questions.

The Hoehn and Yahr Scale included in MDS-UPDRS assesses the five stages of Parkinson's in terms of amount of disability in a patient. Stage I is *unilateral involvement only with minimal or no functional impairment* and it progresses up to stage V which is *confinement to bed or wheelchair unless aided*.[8]MR. Y was at Stage II because he had not yet progressed to losing his balance or having impaired righting reflexes. However, he had bilateral involvement as seen in his speech abnormalities (soft voice and slurring), posture (kyphosis and forward head posture) and generalized slowness in performance of ADLs.

A quality of life outcome measure such as the Parkinson's Questionnaire (PDQ-39)[9] was used to evaluate bradykinesia on MR. Y's toileting complications. This measure looks at 39 items of eight domains: mobility, ADL, emotional well-being, stigma, social support, cognition, communication and bodily discomfort.[9] The multi-dimensional measure has good internal and test-retest reliability as well as good face and construct validity.[10]

VI. DISCUSSION

Parkinson's is a manageable disease (up to a point) when medication and physical therapy are utilized effectively. Medication helps to slow the progression of the disease and decrease the amplitude of the vast

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symptoms. Physical therapy can be used to keep patients active and functioning at a level much higher that what they would without any intervention and thus their quality of life can be greatly improved. The LSVT Loud and BIG protocols have been proven very effective in giving patients with Parkinson's more confidence in themselves due to clearer, louder volumes of voice and much larger, smoother movements without the freezing episodes which are prevalent with PD.

Multiple treatment outcome measures are used to follow these patients and chart their changes in a multitude of areas such as cognitive function, sleep patterns, physical function, sensation, fatigue and mental status. MR. Y had a good prognosis for physical therapy using all of these interventions because he also had the support of his family and church. However, since there is currently no cure for PD, the disease will eventually take his life so his family needed to be educated in what the disease entails and be prepared for the time when physical therapy and medication no longer slow the progressive killer.

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