PROGRESS IN DRUG DISCOVERY & BIOMEDICAL SCIENCE

HH PUBLISHER

Case Study

A case report on the efficacy of a short-term physiotherapy intervention strategy in the initial stages of Multiple Sclerosis

Article History

Received: 20 March 2022;

Received in Revised Form: 25 May 2022;

Accepted: 30 May 2022;

Available Online: 13 June 2022

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Abstract: Multiple sclerosis is a chronic autoimmune progressive disease of demyelination of the central nervous system with subsequent axonal damage. The symptoms are due to loss of oligodendrocytes, but CNS diseased effects are often controlled through rehabilitation. The goal of this study is to see if early physiotherapy rehabilitation combined with immunosuppressants can suppress and minimize symptoms while also slowing down the illness process from the first day of hospitalization to six weeks, which normally causes the patient's condition to deteriorate. The patient is required to follow the physiotherapy guidelines for a period of six weeks. Based on their symptoms, the patient's interventions were gradually increased each week. The functional independence measure (FIM) and the Short Form survey-12 were used to assess the patient's everyday quality of life in the first week and then again in the seventh week (SF-12).There is a variation in the value of outcome measures after the 7th re-assessment. The FIM level has risen from 3-moderate assistance with assistance to 6-modified independence without assistance. The SF-12 physical score improved significantly from 48.020307 to 56.57706, whereas the SF-12 mental score changed just slightly. Multiple sclerosis disease impairment is mostly caused by disease progression, but it can also be exacerbated by decreased physical activity, which causes muscle weakness, limited range of motion, and stiffness. Exercise and training have demonstrated improvement of the above-mentioned deteriorations in multiple sclerosis patients.

Keywords: Multiple sclerosis, exercise, rehabilitation, disability, intervention, spasticity

1. Introduction

Multiple sclerosis is a chronic, progressive disease that mainly affects young adults but can be diagnosed through 20 to 50 years of age according to NMSS, National Multiple Sclerosis Society. About 400,000 people in the United States and 2.5 million people worldwide have been diagnosed with multiple sclerosis. The diseased effect is very different. There is no known cure for this disease, but it can be well controlled with treatment and rehabilitation. Physical therapists help people with multiple sclerosis to regain and maintain general fitness, flexibility, and lead an active and productive quality of life[1]. There is a remarkable advance in the treatment of all forms of multiple sclerosis, especially the recurrent disease that has positively changed the long-term outlook for many patients. There was also a conceptual shift in our understanding of the immunopathology of MS, away from the pure T cell-mediated model to the understanding that B cells play an important role in the etiology. With the advent of highly effective drugs that require less frequent dosing, these options have become the preferred choices for tolerability and adherence. Many experts recommend this, as first-line therapy for many patients in the early stages of the disease before permanent disability is identified.

This article describes the effectiveness of early physiotherapy along with medical management of a patient with acute multiple sclerosis. The aim of this article describes effective short-term physiotherapy outpatient treatment for a duration of 6 weeks which improves the disability of multiple sclerosis patients by reducing their impairment on the early stage of rehabilitation[2].

Functional independence measure (FIM) and short-form survey-12 (SF-12, a health-related questionnaire) were used to evaluate the effective outcome measure of the patient following a course of physiotherapy treatment for 6 weeks from the day of hospitalization. Due to the immunomodulatory changes, it is difficult to quantify the progress of the patient with multiple sclerosis, but it is highly recommended to start with mild aerobic exercises, isometrics, range of motion exercises, neuromuscular facilitation exercises, proprioception exercises along with multidisciplinary rehabilitation team approach for a duration of initial 6 to 8 weeks[2,3].

2. Case Presentation

In this article, a 46-year-old woman came to the clinic with pain in the leg compartments on sides, malaise, visual impairment, frequent tingling, numbness in various parts of the body, and frequent instability with reported learning and planning issues. She recently lost her husband and wants to investigate further thereby she suffers from anxiety and depression. She doesn't have any comorbid conditions, and after the initial neurological physical evaluation is done, she

was referred to a neurologist, alongside neurologist evaluation and MRI (Magnetic Resonance Imaging) was done to confirm multiple sclerosis. Classical Charcot's triad (nystagmus / INO, internuclear ophthalmoplegia, intentional tremor, scanning speech) is observed in this patient with the most common clinical course, relapsing-remitting type. MS eventually enters a secondary progressive phase[4]. After we confirmed her diagnosis, she revealed that she experienced similar kinds of symptoms when she was 40 years old, the time when she lost her husband.

As per the recommendation of the neurologist, the patient was advised to have a short stay in the hospital where she was treated with steroid injections for a period of 3 to 5 days. The patient is also educated about short-term improvement with steroids and prolonged steroid medications that might lead to weight gain, osteoporosis, and type 2 diabetes and the patient confirmed that she understood completely.

Further after the hospital discharge, the patient was advised to take 8 weeks of physiotherapy sessions with 4 sessions per week in the outpatient department. During the first day of the visit, the patient is evaluated through neurological, physical, and functional examinations and evaluations and interventions were planned and explained to the patient.

3. Intervention

A physical therapist's primary role in helping a person with multiple sclerosis is optimizing his/her mobility, function, and quality of life with respect to the disease and improving overall health and wellness in every aspect of life. The patient performed 6 weeks of intervention every day under the supervision of a physiotherapist. Intervention includes strengthening, aerobic conditioning, flexibility exercises, coordination exercises, balance exercises, gait training using assistive devices, sensory training, functional training, bowel, and bladder control. Interventions gradually progressed up to the patient every week according to their symptoms[5–11,13]. After 6 weeks, patients were re-assessed using the outcome measures. The progression of intervention is described in Table 1 as follows,

Table 1. Clinical Intervention Programme

WEEKS	INTERVENTIONS
Week-1	Pain management: Electrotherapy- Ultrasound, TENS Hydrotherapy Orthotics Flexibility exercises: Stretching ROM (upper limb, lower limb) Sensory re-education

WEEKS	INTERVENTIONS
	Strengthening: Isometrics exercises Respiratory muscle training: Breathing exercises Chest mobility exercises
Week-2	Progressive resisted exercise: Modes of resistance training: body resistance, free weights, weight machines, resistance bands. Flexibility training Fatigue management 4 Ps: Pacing, planning, prioritizing, positioning, Task Simplification, Adaptive equipment/assistive devices, Environmental modifications, Strategic rest breaks.
Week-3	Aerobic training: Modes of Exercise - Swimming, stationary bike, walking, arm bike Flexibility training Coordination exercises: Frenkel's exercise
Week-4	Strengthening Functional training: Push/pull/lunge/bend Balance training: Single leg balance with eyes off should be progressed
Week-5	Balance training: Gait training: Using assistive devices such as crutch, walker
Week-6	Progression of strengthening exercises Flexibility training Balance exercise – heel walk, toe walking, etc.

4. Outcome Measures

Clinically used outcome measure is to check the decrease in progression of the disability and the effectiveness of the treatment[12]. Pre and post-assessments are done using functional independence measure, which is an instrument that measures disability in an individual with a variety of issues[14]. It includes measures of independence for self-care, i.e. sphincter control, transfers, locomotion, communication, and social cognition. The tool is used to assess a patient's level of disability as well as change in the patient's status in response to rehabilitation. And the quality of life is measured using sf-12 which is a health-related questionnaire consisting of 12 questions that measure eight health domains to assess physical and mental health[15]. After the 6 weeks of interventions, As per table no 2. post-assessments were done, and it has been shown there is a difference in the value of outcome measures.Scores through FIM and Health survey scale are documented as Table 2.

Table 2. Scores through FIM and Health Survey Scale

Outcome measure	Preintervention	Postintervention
FIM, Functional Independent Measure (in scales)	3-- Moderate Assistance (>= 50%): Helper-Modified Dependance	6-- Modified, Independence (Device): No Helper
SF-12, Quality of life measure	PCS-12 (Physical Score): 48.020307 MCS-12 (Mental Score): 59.04606	PCS-12 (Physical Score): 56.57706 MCS-12 (Mental Score): 60.75781

5. Conclusion

Multiple sclerosis disease impairment is primarily a consequence of disease progress, but it can be aggravated by reduced physical activity. Exercise has been shown to improve various aspects of the physiological profile of Multiple sclerosis patients and inactivity-related impairment can be alleviated by exercise as well. The patient will benefit from physiotherapy services in increasing the function of the upper as well as lower extremities, increasing balance, managing fatigue, optimizing gait pattern, and improving the patient's attitude towards the future delay and maintaining disability level than progressing and improvement as well in their quality of life and functional independence as per table 2. Whilst some studies have considered their leads in terms of disability levels, none have been made on progressive Multiple sclerosis.

To date, there has not been a printed review examining the evidence of physiotherapy for the rehabilitation of people with progressive Multiple sclerosis. This article will be the first consideration of it. In conclusion, the evidence within this report demonstrates that physiotherapy could also be effective in the rehabilitation of individuals with progressive MS.

Further investigation, with appropriately powered studies and consistency in outcome

measures among studies are required to strengthen this evidence-based study and to conduct a meta-analysis of the evidence.

6. Recommendations

This case study reveals the importance of short-term physiotherapy, which is highly recommended to implement physiotherapy intervention with many of early diagnosed multiple sclerosis patients to check its effectiveness, to analyze data and to generalize the results.

7. Limitation

Study done with a single patient. Only active exercise-based interventions are given predominantly. Investigator's thoughts may influence the study, termed as research bias. Outcomes may not be similar in similar types of patients. Generalization is not possible with a single case study.

Author Contributions: Collection of data and analysis of results, S. N.; Collection of data, A. P.; Screening of data, A. R.; Anaylysis the data and proof reading, K. B.

Acknowledgement: Authors thankful to Avalon University for their continuous support.

Conflicts of Interest: The authors declare no conflict of interest.

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