



Physical Rehabilitation in Transverse Myelitis: A Case Report

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Abstract

Transverse myelitis is basically inflammation of spinal cord which results in varying degree of symptoms like weakness in limbs, bowel bladder involvement, sensory deficits depending upon the lesion.

A 52-year-old female came to outpatient department of hospital with complain sudden weakness and feeling of heaviness in bilateral lower limbs with loss of sensations in both feet and was unable to walk without support. There was also a complaint of a cotton wool-like sensation in both feet. Patient came to the outpatient physiotherapy department with complaints of paraesthesia in the plantar aspect of feet, unable to walk independently, difficulty in maintaining balance while walking indoors and outdoors, difficulty in getting up from the chair, unable to get up from the floor. During the examination by a physiotherapist, it was found that the range of motion of all the joints for the upper and lower limbs were full passively whereas there was reduced muscle strength in bilateral lower extremity and trunk muscles. Berg balance score was 15/56 along with fatigue severity scale 51/63 The rehabilitation programme was of 1-1.5 hours per day under physiotherapist guidance for 6 weeks which comprised 6 days per week for the first three weeks and then it was reduced to 3 days per week for the last three weeks. The primary goal is to improve the functional capabilities and level of fatigue of the patient. The home-based treatment protocol was also designed on tailor made protocol and was modified according to the progression of the patient's ability. The progression in functional abilities and endurance were assessed initially in the first week then after every 2 weeks consequently during the rehabilitation programme.

Keywords- activities of daily living , functional training, muscle training, physiotherapy, spinal cord injury

Case Description

A lady of 52 years of age with a history of sudden weakness and feeling of heaviness in bilateral lower limbs with loss of sensations in both feet and was unable to walk without support. There was also a complaint of a cotton wool-like sensation in both feet. She was admitted to the hospital for 5 days and medically managed with intravenous steroids, analgesics and anti-viral medications. MRI findings confirmed acute transverse myelitis with visible lesions on her spinal cord. Reports are not available as they are with insurance company for claim settlement. After 5 days the patient was referred for physiotherapy. The patient came to the outpatient physiotherapy department with complaints of paresthesia in the plantar aspect of feet, unable to walk independently, difficulty in maintaining balance while walking indoors and outdoors, difficulty in getting up from a chair, unable to get up from the floor. Symptoms like low back

pain, tingling, and numbness subsided after medical management. There was a history of transverse myelitis for 1 year which was medically managed without any residual symptoms.

During the examination by a physiotherapist, it was found that the range of motion of all the joints for the upper and lower limbs was passively full. In contrast, there was reduced muscle strength in the bilateral lower extremity and trunk muscles. The strength of the bilateral upper limb was grade 5. The examination was focused on muscle strength, balance, functional assessments, gait, and endurance. (Table – 1 and Table – 5)

Table – 1 Lower Extremity Muscle Strength

Lower Extremity Muscle Group	Right	Left
Hip Flexors	3/5	3/5
Hip Extensors	3/5	2/5
Hip Adductors	3/5	3/5
Hip Abductors	3/5	2/5
Knee Flexors	4/5	3/5
Knee Extensors	3/5	3/5
Ankle Dorsiflexors	4/5	4/5
Ankle Plantar Flexors	4/5	4/5
Trunk Flexors	3/5	
Trunk extensors	3/5	

The results of muscle strength assessment suggested that patient had weakness of bilateral lower extremities, with greater weakness in left lower extremity than right. This reduced muscle strength may have reduced functional abilities and activity of daily living of the patient like walking, transfers, and maintaining balance. (Table – 2) Based on the complaints of the patient regarding tingling and feeling of heaviness, a sensory examination was conducted which did not show prominent findings. The patient didn't have any fecal or urinary incontinence. The patient presented with gait deviations like being unable to walk without support, difficulty in walking along a straight path, walking with a wide base of support with hyperextension of the knees, and a significant reduction in endurance and speed. The prognosis of the patient was fair related to the findings gathered on taking certain outcomes and looking at the strength of muscles. Given the nature of transvers myelitis (TM), progression to the plateau of symptoms and recovery is unknown and different for each patient. [1]

Table – 2 International Classification of Functioning, Disability and Health (ICF) framework for Patient with Transverse Myelitis

Body Structure/ Function	Activity Limitation	Participation Restriction
Reduced muscle strength	Needs assistance while getting up from bed & chair	Unable to go out of home to meet people
Reduced balance	Unable to stand & do Activity of daily living	Unable to go shopping or buying grocery/ vegetables & go to temple
Reduced endurance	Unable to walk Unable to use stairs	Unable to indulge in leisure independently activities in the house and outside
Environmental Factors		Personal Factors
<i>Facilitators</i>	<ul style="list-style-type: none"> Supportive family Home modifications like Handrails in bathroom and western toilet, kitchen 	
<i>Barriers</i>	<ul style="list-style-type: none"> Very motivational Understanding about the disease 	
<i>Facilitators</i>	<ul style="list-style-type: none"> Stairs at home Uneven surface around home Location of home 	
<i>Barriers</i>	<ul style="list-style-type: none"> Stress about what others think for cane usage Recurrent transverse myelitis 	

Rehabilitation Programme

Written informed consent was obtained from the patient prior to starting of rehabilitation programme. The rehabilitation programme was of 1-1.5 hours per day under physical therapist guidance for 6 weeks which comprised of 6 days per week for the first 3 weeks and then it was reduced to 3 days (i.e. alternate days) per week for the last 3 weeks. (Table – 3) The primary goal of physiotherapy is to improve the functional capabilities and level of fatigue of the patient. The dosage of therapeutic exercise varied according to the fatigue level of the patient during the physiotherapy session. The therapeutic exercise included strengthening, endurance training, balance and gait training. The home-based treatment protocol was also advised for the patient which was modified according to the progression of the patient's ability. (Table – 4) The progression in functional abilities and endurance were assessed using the following outcome measures which were taken initially in the first week then after 2 weeks, after 4 weeks and after 6 weeks consequently during the

rehabilitation programme. The dosage for some of the exercises performed is not specified and progressed according to the tolerance level of the patient because of fluctuations in fatigue level.

Table – 3 Supervised Physiotherapy Intervention for patient with transverse myelitis

Weeks	Intervention	Intensity
1st and 2nd week	SLR in supine lying with minimal support	5-7 reps/session
	Hip abduction in side-lying with minimal support	5-7 reps/session
	Hip flexion in high sitting	10-12 reps/session
	Knee extension exercise in high sitting	10-12 reps/session
	Trunk curl-ups and extension with assistance	5-10 reps/session
	Sit to-stand activity from suitable height with hand support	10 reps/session with rest
	Standing in the parallel bar(supported) with visual Feedback	as tolerated by the patient
3rd and 4th week	Gait training in a parallel bar with support	as tolerated by the patient
	SLR in supine lying with 5 seconds hold	10-15 reps/session
	Hip abduction in side lying with 5 seconds hold	10-15 reps/session
	Hip Flexion in high sitting with 500gm weight	10-12 reps/session
	Knee extension in high sitting with 500gm weight	10-12 reps/session
	Trunk curl ups with minimal assistance	10-12 reps/session
	Prone on elbow with 5 seconds hold	5-7 reps/session
	Sit to stand from chair/low plinth with rest	10-15 reps/session

	Standing with minimal support	as tolerated by patient
	Ball throwing and kicking activity in standing with minimal support	as tolerated by patient
	Walking out of the parallel bar and on an even surface with minimal support	at least for 5-7 minutes
	Marching holding handrails with one hand	10-15 reps/session
	Cycling with back support	as tolerated by patient
5th and 6th week	SLR in standing with 500gm weight	15-20 reps/session
	Hip abduction in standing with 500gm weight	15-20 reps/session
	Hip extension in standing with support	10-12 reps/session
	Sit to stand from low stool	15-20 reps/session
	Squatting activity with rest in between	10-12 reps/session
	Walking on even surface without assistance	as tolerated by patient
	Walking on uneven surface, slope walking and community walking with supervision	as tolerated by patient
	Cycling with back support with rest in between	10-12 minutes/session
	Ball throwing and kicking activity without assistance and reach outs in standing	as tolerated by patient
	Stairs ascending and descending	as tolerated by patient

Table – 4 Home Exercise Programme (HEP) for Patient with Transverse Myelitis

Weeks	Home Exercise Programme
1st and 2nd week	Bridging

	Hip and Knee ROM exercise
	Sit to stand activity from chair
	Standing with Support
3rd and 4th week	Trunk, hip and knee strengthening exercise
	Standing with minimal assistance against platform or hand railings
	Sit to stand from sofa or bed
	Walking with support of hand railing

*Intensity for HEP was based on tolerance level of the patient and also fatigue.

Outcomes

Patient progression in an objective manner after full rehabilitation is summarized in the table – 5. On the whole patient demonstrated increased muscle strength and endurance and also ease in her activities of daily living.

Table – 5 Progression of Patient with Transverse Myelitis on various Outcome Measures

Outcome Measure	Initially	After 2 weeks	After 4 weeks	After 6 weeks
Berg Balance Scale [10]	15	39	50	56
Functional Ambulation Classification [11]	1	3	4	5
Fatigue Severity Scale [12]	51	46	32	23
Dynamic Gait Index [13]	NT	NT	13	20
Spinal Cord Independence Measure 3 (SCIM 3) [14]	74	75	91	98

* NT – not tested

Based on the subjective assessment patient reported that there was significant improvement in her independence in performing activity of daily living like dressing, bathing, cleaning and washing utensils in standing, cooking, stair

ascending and descending and also in her fatigue level at the end of her day even after performing all her routine tasks and walking.

Discussion

Acute transverse myelitis (ATM) is a neurological syndrome due to inflammation of the spinal cord and symptoms may vary depending upon the level of involvement. It is characterized by acute or sub-acute motor, sensory, and autonomic (bladder, bowel, and sexual) spinal cord dysfunction. The clinical signs are caused by an interruption in ascending and descending neuroanatomical pathways in the transverse plane of the spinal cord, and a resulting sensory level is characteristic of the syndrome. [2, 9] The degree of disability in patients with transverse myelitis depends on the level of involvement in spinal segments. High doses of intravenous corticosteroids such as prednisone, cyclophosphamide, and plasma exchange are therapeutic options in the medical treatment of ATM. [3,4] The aim of rehabilitation is increasing strength, and endurance, improving coordination and balance with gait retraining, and preventing secondary complications like chest infections, contractures, atrophy, bed sores, etc.

This case report is based on evidence based rehabilitation of patient with transverse myelitis with subjective and objective outcomes and plan of care. As there are limited literature review demonstrating further rehabilitation for this condition but the available research work focuses

on activity based and impairment based rehabilitation. Physiotherapy need to incorporate activity based rehabilitation along with strengthening, passive and active range of motion exercises, endurance exercise and neuromuscular re-education. [5] Since this case was reported in India where there is importance of sitting on the floor and on low stool for activities of daily living like bathing, toileting and also for religious practices imbued this activity as treatment strategy for overall rehabilitation. For an instance when we are more focused towards functional based training it is important to transfer the task in different context and environment to achieve our goal more efficiently and helping individual to gain independence. The treatment protocol in this case is specifically tailored according to the activity limitations and participation restrictions area of the patient as mentioned in the International classification of functioning matrix structured as per patient needs. Fatigue is a common symptom reported in most of the patients and a predictor of quality of life. [6] It is also an important factor which can lead to further limitations in day to day activities and participation focus on fatigue management and energy conservation techniques at home and during rehabilitation is also addressed. We emphasized on the transition of these therapeutic exercise to be useful in routine functioning of the patient and relevant in tasks of daily living. However, the goal of physiotherapy is to optimize the neurological recovery and functions of day to day activity of the patient. [7, 8] The major aim of our rehabilitation was to orient our patient back to community with underlying residual neurological symptoms and gain independence. In the process of training an individual to gain maximum independence we need to consider the entire motor and sensory component along with biomechanical properties of muscles, environmental context along with primary and secondary impairments and also various other compensatory and restorative facets.

Conclusion

This case report demonstrates the benefits of physiotherapy in patients with transverse myelitis. It also illustrates the importance of activity based rehabilitation along with strength and endurance training. However, more research is needed to obtain long term benefits of physiotherapy in patients with transverse myelitis.

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