



Case report

Physiotherapy management of a 23-year old adult with guillain-barre syndrome (GBS)

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ABSTRACT

Guillain-Barre Syndrome (GBS) is polyradiculoneuropathy, which happens when part of the peripheral nervous system is attacked by the body's immune system. This attack can cause impairment of sensation, motor function insufficiency, and extreme pain in damaged areas, resulting in dysfunction hampering the upper and lower limbs. Physical therapy can promote rehabilitation and allow people with Guillain-Barre syndrome to remain as involved as possible in their work, home and social lives. Physiotherapy can help individuals improve their ability and help to get them back to the level they used to be. A 23-year-old male presented with serious gastrointestinal illness and severe weakness at the hospital with symptoms of impairment related to upper and lower limb movement. He felt the fatigue, tingling and numbness in both his upper and lower limbs. The weakness in the upper and lower extremities was more advanced in subsequent days. His subsequent impairment and incoordination in his upper and lower extremities left him unable to do any job and was hospitalized by a member of his family. The patient was diagnosed with Guillain-Barre syndrome (GBS). Physical therapy is an important component of GBS rehabilitation and management. Long-term physiotherapy, rehabilitation and the design of specialized program and active patient engagement are needed. Their proper use can help a patient alleviate discomfort, improve strength and stamina, and avoid secondary complications and damage to muscles and joints by overuse, while improving balance and mobility. Significant improvement was seen in the patient performance post physiotherapy. Patient was able to perform ADLs on his own.

Keywords: Guillain-Barre Syndrome, Polyneuropathy, Nerve Conduction Study, Rehabilitation.

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INTRODUCTION

Guillain-Barre Syndrome (GBS) is polyradiculoneuropathy, according to the World Health Organization, which happens when part of the peripheral nervous system is attacked by the body's immune system. This attack can cause impairment of sensation, motor function insufficiency, and extreme pain in damaged areas, resulting in dysfunction hampering the upper and lower limbs [1]. It is a peripheral neuropathy characterized by muscle weakness that is immune-mediated and gradually progressive. Immune responses depend on microbial factors and host factors. The presence of antibodies, resulting in inflammation and demyelination cascades, leads to T cells and complements being activated. Demyelination reduces nerve conduction velocity and slows down the propagation of impulses along the axons [2]. Usually, bacterial or viral infection, vaccine, or surgery are followed by GBS. Acute medical care is included in early treatment, as this syndrome could escalate to a life-threatening occurrence [1,3].

Physical therapy can promote rehabilitation and allow people with Guillain-Barre syndrome to remain as involved as possible

in their work, home and social lives. Physiotherapy can help individuals improve their ability and help to get them back to the level they used to be [4,5]. Physiotherapist have several roles in ICU and acute care settings. This is to prevent demobilization contractures and other adverse effects depending on the patient's characteristics by positioning, splinting, and passive range of motion exercises. It is also possible to consult physiotherapists to perform cardiopulmonary intervention and determine the development of the condition. The focus of treatment moves to preferential training focused on completion of functional tasks as peaks of symptom development and patients transition from intensive care to recovery [1].

Patient information

A 23-year-old male presented with serious gastrointestinal illness and severe weakness at the hospital with symptoms of impairment related to upper and lower limb movement. He felt fatigue, tingling and numbness in both his upper and lower limbs. The weakness in the upper and lower extremities was more advanced in subsequent days. His subsequent impairment and incoordination in his

upper and lower extremities left him incapable to do further job.

Clinical findings

On General examination, Patient was conscious, cooperative and well oriented to time, place and person. He was comfortable in supine and sitting position, pulse rate was 75 beats/min and respiratory rate was 20 breaths/min. Blood pressure was 120/80 mmHg and SpO₂ was 97% in radial artery. Chest was bilaterally clear and s1 s2 heart sound was heard. The patient pain was dull aching pain after activity and during activity he has sharp shooting pain that was 5/10 at rest on the VAS scale and 7/10 in the place of weight bearing position. The pain is present in feet, back and thighs. The pain aggravates while walking and relieves at rest. The patients sleep is disturbed due to pain. On neurological evaluation, the patient was aware and focused with preserved speech and memory, pupils equally receptive to light. He had an intact cranial nerve. On both the upper and lower extremities, his sensation was preserved. Reflexes were reduced. At a low level (1+), still present. Knee jerk was lost. He had an intact cranial nerve. On both the upper and lower extremities, his sensation was preserved.

Range of Motion

He has bilateral rigidity in both upper and lower extremities. By slight rigidity of the cog-wheel type and muscle spasm all passive motions are restricted. Movements are restricted to some degree at almost all joints. Below movements are very restricted.

Table 1. Range of motion

	Right (PROM)	Left (PROM)
Shoulder Abduction	67/175 degree	65/175 degree
Hip Flexion	55/110 degree	58/110 degree
Ankle Dorsiflexion	8/20 degree	6/20 degree

Manual Muscle Testing

He has been able to execute all movements in gravity assisted plane but in all muscle groups he has general weakness. Due to the following muscles, the main functional weaknesses are

Table 2. Manual Muscle Testing

Muscles	Right	Left
Shoulder Abductors	2+	2+
Hip Extensors	2+	2+
Knee Flexors	2+	2+
Ankle Plantar Flexors	2+	2+

Gait

He was not able to stand on two feet independently. He had difficulty in maintaining balance.

Investigations

Electrophysiological investigations, Nerve conduction study (NCS) was carried out. Using standard techniques of supramaximal percutaneous stimulation and surface recordings nerve conduction studies were performed. NCS done in four limbs. F wave studies included there is absent of F wave in B/L median, ulnar, peroneal and tibial.

Diagnosis

He is in the sub-acute stage of Guillain-Barre Syndrome recovery. As a result, there are difficulties with balance and

coordination. Upper extremity coordination and shoulder ROM limitations prevent him from getting dressed independently.

Table 3. Motor Nerve Conduction Velocity (Upper and Lowerlimb)

Nerve	Stimulation Site	Duration (Ms)	Latency Difference (Ms)	Ncv(M/S)
Rt. Peroneal	Ankle	8.75	4.58	35.87
	Knee	8.44	15.73	
Lt. Peroneal	Ankle	10.83	3.85	39.82
	Knee	10.10	14.90	
Rt. Tibial	Ankle	11.15	6.88	39.50
	Knee	11.04	18.02	
Lt. Tibial	Ankle	12.40	5.42	35.80
	Knee	11.56	17.71	
Rt. Median	Wrist	11.88	3.75	42.64
	Elbow	13.02	8.44	
Lt. Median	Wrist	12.29	2.71	45.77
	Elbow	12.40	7.08	
Rt. Ulnar	Wrist	14.06	1.25	
	Elbow	11.15	7.81	
Lt. Ulnar	Wrist	12.50	1.25	
	Elbow	10.83	6.98	

Table 4. Sensory Nerve Conduction Velocity (Upper and Lowerlimb)

Nerve	Stimulation Site	Duration (Ms)	Latency Difference (Ms)	Ncv (M/S)
Rt. Sural	Mid-Calf	2.04	3.21	43.61
Lt. Sural	Mid-Calf	2.63	3.04	46.05
Rt. Median	Wrist	2.50	2.17	46.08
Lt. Median	Wrist	1.83	2.67	44.94
Rt. Ulnar	Wrist	1.00	2.83	42.40
Lt. Ulnar	Wrist	2.29	1.92	46.88

Outcome Measures

VAS- Pre 7/10 Post 4/10. Guillain-Barré syndrome (GBS) Disability Score- Pre 4/6 Post 2/6.

Therapeutic intervention

Our short-term goal was to increase muscle strength and mobility, to reduce muscle stiffness, spasm and pain, retrain normal patterns of movement, improving posture while sitting, standing and supine, reduce secondary complications such as chest infection and muscle contractures, increased ability to relax, to enhance functional abilities, increase independence.

Long term goal was maintenance of range of motion at all joints, maintenance of muscle properties, support to the limbs, balance training, gait training, promoting everyday tasks and independence, Improving everyday living habits and quality of life. The physical therapy proposal to GBS such as range of movement exercises, flexibility, gait conditioning, endurance and functional tasks will consist of the physiotherapy approach to GBS to steadily increase outcome data and minimize the risk of fatigue.

Treatment included maintaining joint range of motion (passive, active, active assisted), maintenance of the patient's posture and alignment, providing ankle-foot orthosis to prevent plantar contractures, strengthening different muscle group, improving flexibility with a progressive ambulation programme.

Acute phase (week 1- week 4)

In acute phase important role of physiotherapist was respiratory care. So, in acute phase chest physiotherapy technique like breathing exercise, postural drainage, external tracheal stimulation was given to maintain good bronchial hygiene. Passive movement was started to all joint to reduce weakness along with joint approximation.

Phase of rehabilitation (week 4 – week 20)

Passive movements were given at least three times a day across the full range of motion, particularly on the hip, shoulder, wrist, ankle, feet. Effleurage massage was given to lower limb for maintenance of circulation. To avoid pressure sores, the 2-hour change in patient position from supine to side-lying. In the early stages for wrist/hands and for ankles resting splints were given. He also complained of extreme pain, which was handled with the use of TENS, and other modalities to relieve pain. At this stage, patient blood pressure was monitored to check whether sudden drops occur because it causes swelling in the ankles and hands. The patient's abdominal muscles were weak, so he needed an abdominal corset. The shoulder joint depends specifically on the muscles surrounding it. Getting into a good sitting position was necessary. So with the aid of a towel or cushion, we brought the patient into a sitting position to stabilize the lumbar spine. Continuous sitting with a curved spine can cause minor damage to the upper spine joints, contributing to backache. Supporting the middle and top of the spine as well as the arms was similarly significant. It helps to rehabilitate not only the peripheral muscles but also the associated nerves by stretching the arms, including the hands, legs, feet and body.

Functional tasks of daily living that involves exercises. These activities involved walking, sitting continuously, turning over and going up and down in bed, putting on clothes and taking them off. Such practices help to return the client to normal life.

The proprioceptive neuromuscular facilitation (PNF) was given it helps in gaining motor function and increased motor control. It was necessary to observe the posture as it can be influenced by muscle weakness. Nagging and providing the patient with advice about posture is also an important task. As the patient progresses, isometric and isotonic exercises can be used in strengthening exercises, while endurance training includes gradually increasing the intensity and length of physical tasks such as walking or climbing up stairs. Regular stretching sessions were given to the patients.

On-going treatment (after week 20)

Parallel bar gait & balance training Progression to balance on unstable surfaces, to facilitate safe and efficient ambulation.

Follow up and outcome

Reassessment 12 weeks Post-Treatment

Present condition: Approximately 6 months ago, he was diagnosed with GBS and his symptoms from his initial diagnosis began to stabilize during therapy, which helped his development. His

recovery program consisted of therapy sessions twice a day lasting 30-60 minutes. In order to ensure improvement, basic muscular strength, ROM and balance tests were reported every 2 weeks. After 12 weeks of treatment, a complete reassessment was performed.

DISCUSSION

About 25% to 30% of the patients with GBS require mechanical ventilation at some time during their illness^[6]. Acute GBS is characterized by a sudden decline in a patient's control over most major muscle groups, including breathing muscles. Patients begin to recover motor function gradually in the sub-acute process, but residual fatigue, discomfort, respiratory symptoms, and reduced range of motion can seriously impair their ability to engage in their normal daily activities^[7,8]. Early rehabilitation intervention ensures medical stability, appropriate treatment and preventive measures to minimise long term complications. Specific problems include deep venous thrombosis prevention, complications of immobility, dysautonomia, de-afferent pain syndromes, muscle pain and fatigue. Longer-term issues include psychosocial adjustment, return to work and driving, and resumption of the role within the family and community^[9,10]. The deficiencies of the patient contributed to an inability to participate in his usual social life and perform basic daily living duties such as getting ready. This sudden loss of function can be unsettling for GBS patients. The majority of patients with GBS are completely healed^[11]. Therefore, physical therapy has a greater ability to enhance the quality of life of your patients by reassuring the patient and concentrating care on functional activity. Based on its aims and the ICF model, the intervention program was created for patients. Strength, aerobics, balance, mobility, practical training and an early focus on pain control were included in the patient program. GBS symptoms started to decline after patients began therapy and he made substantial changes in his overall function. A decline in rest discomfort, enhanced upper and lower extremity ROM, greater flexibility of static and dynamic postures, increased motivation and the ability to walk without mobility assistance are some of the progressions achieved by the patient. Increasing functional capabilities for patients has allowed him to return to work at a higher capacity, engage in leisure activities, and independently complete ADL. Outside his house, he uses a 4-wheeled walker, has some balance issues when walking without a mobility aid and experiences mild-moderate movement discomfort. To lower the energy cost of using a 4-wheeled walker, he will benefit from a quad cane mobility aid. There is a strong chance that his functional skills will keep improving based on his growth, and eventually he can hit the stage that he will return to his lifestyle before developing GBS^{[12][13]}.

CONCLUSION

Physical therapy is an important component of GBS rehabilitation and management. Long-term physiotherapy, rehabilitation and the design of specialized programmes and active

patient engagement are needed. Their proper use can help a patient alleviate discomfort, improve strength and stamina, and avoid secondary complications and damage to muscles and joints by overuse, while improving balance and mobility. In this area, there is a strict need for RCT in order to determine the need for physiotherapy in GBS, the impact of exercises on improving functional performance to improve patient exercise protocols and to make them independent of their functional status and ADL

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