CASE REPORT

Intensive rehabilitation model in Guillain-Barre syndrome: a case report

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ABSTRACT

There is little information in the medical literature on the rehabilitation of patients with Guillain-Barre Syndrome (GBS). There are clinical studies that demonstrate the effectiveness of a rehabilitation program using an interdisciplinary team, but without well-defined protocols and only performed on an outpatient basis. This case report aims to describe the evolution of a patient with GBS during the intensive multidisciplinary inpatient rehabilitation program, discussing the therapeutic possibilities for rehabilitation of the disease.

Keywords: Guillain-Barre Syndrome/rehabilitation, Paresis, Quadriplegia, Robotics

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INTRODUCTION

The Guillain-Barré syndrome (GBS) is an immune-mediated disease that affects the peripheral nerves.[1] It presents as a symmetrically ascending paralysis, with progressive weakness of limbs, decreased tendon reflexes, sensory disability and respiratory insufficiency, which may lead to the need for mechanical ventilation in 25% of cases.[2] The disease has a mean incidence of 1.3 cases per 100,000 inhabitants per year, affecting more men than women.[3] It occurs in individuals between 50 and 74 years of age, but may reach all ethnicities and age ranges of both sexes.[4]

The cause of SGB has not yet been identified, however, its relationship with acute diseases caused by viruses and bacteria has been observed, the most common being cytomegalovirus, Campylobacter jejuni, and Epstein Barr Virus, among others.[4] The most common etiologic agent is Campylobacter jejuni, corresponding to 41% of the cases, identified in association with other symptoms of the disease, being preceded by diarrhea in most cases.[3]

There are two main types of SGB: the acute inflammatory demyelinating polyneuropathy and the acute motor axonal neuropathy, which is purely motor.[1]

The onset of motor weakness is rapid and may last from days to weeks until the demyelination is stabilized; after that, there is a recovery stage that can last up to 2 years, coinciding with the remyelination and regeneration of axons.[5]

The treatments for GBS in its acute phase are plasmapheresis and intravenous immunoglobulin (IVIg), with the IVIg method applied intravenously, being more accessible and safer than plasmapheresis, which requires dialysis to remove antibodies from the patient's blood in exchange for serum albumin.[5]

The physical rehabilitation treatment of SGB must be performed by a multidisciplinary team, to minimize the effects of the disease and to promote the independence and autonomy of the patient.[2]

CASE REPORT

The proposal of this case report is to demonstrate the quantitative and qualitative effects of an intensive, multi-professional, focused rehabilitation strategy on a patient with secondary quadriparesis Guillain-Barré Syndrome. The subject of this case is a male patient, 42 years of age, born and residing in Sorocaba/SP, an operator of precision machinery. In April 2015, he presented with diarrhea and myalgia. After a week with those symptoms, he started feeling weakness in the left lower limb and difficulty to walk, but still retained sensitivity. He was admitted to a secondary hospital after 24 hours, where cerebrospinal fluid was collected and the diagnosis of Guillain-Barré was given.

That same day, his clinical presentation worsened, with overall strength loss from the neck down, however, still with preserved sensitivity, and no dyspnea or dysphagia. He received intravenous immunoglobulin for six days and was hospitalized in the ward for eleven days, with no need for intensive care. A neurological evaluation was made after the acute phase, with an electroneuromyography, which identified a pattern of axonal involvement of the disease, of severe intensity, compromising all four limbs.

After hospital discharge, he started a rehabilitation plan in the community characterized by motor physiotherapy three times a week. On September 26, 2015, 5 months after stable clinical presentation, he was admitted to a quaternary hospital for rehabilitation, in an intensive inpatient therapy program, following a multi-professional care model.

Upon admission he was hypotrophic, with flaccid tonus in all four limbs, preserved range of motion, decreased overall muscle strength, but more severe proximally, degree 3 in hips and shoulders, 2 in knees and elbows, and 1 in ankles and hands. He presented preserved sensitivity and proprioception and an absence of deep tendon reflexes. As regards postural changes, he could assume the supine and prone positions with the help of the upper limbs and, in the sitting position, he had regular control of the trunk.

In the functional assessment, he showed complete dependence for eating, personal hygiene, bathing, and dressing, transfers and locomotion in wheelchairs, and preserved sphincter continence but, beyond using a bedpan, he needed aid from third parties to move and transfer to the toilet.

He was not working, not participating in domestic activities, had reduced using the computer and going on family outings, presenting an idle routine restricted to the home. His initial score for the Functional Independence Measure (FIM) was 50 (Chart 1).

The patient remained hospitalized in the Rehabilitation Center for a period of 8 weeks, where he participated in an intensive rehabilitation program, fulfilling a schedule of activities with physiotherapy sessions twice a day (12 hours/week), occupational therapy daily (5 hours/week), robotics therapy twice a week (2 hours/week), and physical conditioning 3 times a week (4 hours/week), in addition to psychological support (1 hour and 30 minutes/week).

This inpatient therapy included stretches of the lower limbs, transfer training with slide board, orthostatism assisted by a slide board, stand-in table, and parallel bars (PB) with ankle brace splint, postural changes such as ventral decubitus (VD) with a wedge, right and left lateral decubitus, rolling; strengthening of trunk and abdominal muscles while sitting, VD, and combined with FES, in addition to using a cycle ergometer for the upper and lower limbs.

In occupational therapy, he received training and guidelines for eating: lifting the silverware (first the spoon, and then the fork) to the mouth with the use of adaptation (replaces the grip pain) and training to lift a cup to the mouth, using a supinator strap. Drills and guidelines for bathing: using sponge with elastic or in the form of a glove and soap in a pantyhose to minimize the risk of falling. He was advised about the environmental adaptation of the bathroom. Drills and guidelines for the instrumental activities of daily living, such as using the computer (using the mouse and typing), with adaptation.

As supplementary therapies, with the aid of robotics technology, the patient underwent 23 sessions on the InMotion robotics platform, alternating left and right upper limbs and focusing on shoulder and elbow movements or on wrist and forearm, to promote gains in muscle strength, to encourage gains in the active range of motion, and to reduce the use of postural compensation during day-to-day activities. In order to achieve the proposed goals, protocols were used for active and resistance movements. Therapy was also performed in the Armeo Spring Exoskeleton for the right upper limb, to stimulate active movement of that limb by improving the range of movement of the shoulder and elbow, in addition to reducing the compensations. Studies show that the use of exoskeletons in the rehabilitation of patients can bring satisfactory results, with important functional gains in an individualized training.[6]

The physical conditioning consisted of aerobic training done on an ergometric bicycle, with horizontal load 1, at speeds of 12 to 15 km/h for a duration of 15 minutes; on the ergometer for upper limbs, with a no-load speed of 25 km/h initially, evolving to medium load, for a duration of 20 minutes, Borg 11-13. Initial heart rate (HR): from 68 bpm to 92 bpm,

Chart 1. Functional Independence Measure (FIM)

FIM	09/26/2015 (initial)	11/20/2015 (final)
Eating	1	3
Personal hygiene	1	2
Bathing	1	2
Dressing Upper Body	1	2
Dressing Lower Body	1	1
Toileting	1	1
Bladder Management	5	5
Bowel Management	5	5
Transfers from bed, chair, wheelchair	2	5
Transfers from toilet	1	2
Transfers from bath	1	3
Locomotion (gait/wheelchair)	1	5 (WC)
Stairs	1	1
Comprehension	7	7
Expression	7	7
Social interaction	6	7
Problem Solving	1	3
Memory	7	7
Total	50	68

HR training: from 92 bpm to 112 bpm, and HR recovery: from 72 bpm to 80 BPM. The resistance training consisted of elastic band rowing, forward pulldowns (5kg), reverse bench flyes (with no load), bench flyes (20kg), supine machine (without load).

In the physiotherapy, he showed improvement of trunk control without associating the scapular waist, strength gain and improvement in the coordination of upper limbs, managing to maintain orthostatism at the stand-in table and standing frame with no signs or symptoms of orthostatic hypotension and, when in PB, he managed to remain upright and to remove his hands alternately, demonstrating enough strength to complete the step.

In the robotic therapies, when comparing the protocols for the assessment and reassessment, increased control of movements in all directions was noted, along with a functional gain in isometric muscle resistance for holding the limb against external force, as well as improved strength to overcome the resistance imposed by the equipment. Postural compensation decreased during the sessions and doubled the amount of shoulder muscle strength for performing bilateral movements of abduction, adduction, flexion, and extension. The right upper limb continued to be stronger than the left, which continued to have greater coordination. The patient presented great performance when using the resources, managing to gradually increase the difficulty of the games played, to decrease the time of completion of the task, and to increase his grip strength.

He remained dependent for dressing the lower body and for using the toilet. However, he did improve his eating function, even though he did not cut his food). He went to maximum dependence for personal hygiene (washing the hands). He presented improvement in bathing, evolving to moderate dependence (he does not wash below the knee and needs help to dry). In dressing the upper body, he evolved to moderate dependence (he manages to undress and dress the upper limbs). He showed significant improvement in positioning, sitting, and postural compensation, which reflected in his performance in the activities. He presented improvement in range of motion and strength during active bilateral movement of the shoulder and elbow. In the left upper limb, he presented good evolution regarding the active movement of the wrist and fingers, however still with little strength to grip objects. In the right upper limb, he presented greatly increased grip strength, but with difficulty in moving the wrist. He came to transfer with the board and to prepare the device, in addition to using the wheelchair for locomotion, pushing it by himself for at least 50 meters. He showed significant improvements in independence in the basic activities of daily living, in addition to showing potential in other trainings undertaken to extend his participation in activities instrumental to daily life. The final FIM was 68.

DISCUSSION

The treatment of GBS is primarily one of rehabilitation due to the impossibility of intervention in the course of the disease, therefore it should be aimed at preventing deformities and expanding the functional capabilities of the patient to acquire greater independence for the basic and instrumental activities of daily living.

According to the current systematic review, any treatment must be planned based on a multidisciplinary action in which the recovery of locomotion is done simultaneously with educational, psychological, and vocational assistance.[2]

Articles were found in the literature where rehabilitation programs lasted 12 weeks. However, they were in an outpatient regimen, with weekly sessions of 1 hour, divided into two blocks of thirty minutes of physiotherapy, occupational and psychological therapy, showing motor and functional improvement of patients, with average gain of 3 points in their FIM.[7] However, no articles were found reporting an intensive inpatient rehabilitation program. Furthermore, an increase was observed of 18 points in the patient's FIM at the end of the inpatient rehabilitation program.

As for physical conditioning, there was a study that recruited patients with SGB and severe fatigue, applying a training with 3 weekly sessions of 30 minutes cycling, that resulted in decreased fatigue, increases in VO2 max and motivation, and improvement in depression and anxiety scores. For this, a similar program of aerobic cycling activity was applied, combined with resistance exercises, which yielded significant strength gains in the quadriceps and pectoral and dorsal muscles, in addition to an improvement in the patients' cardiorespiratory conditioning.[8]

Thus, it is worth mentioning the record of success of the intensive multi-professional rehabilitation program during 8 weeks of hospitalization, with daily sessions of physical and occupational therapy, physical conditioning three times per week, and psychological therapy twice a week, observing important functional, motor, and motivational improvements of the patient.

Focused intensive multi-professional training can play a fundamental role in the prognostic improvement of these patients. The association with robotics therapy can perhaps optimize the results by providing a larger number of repetitions in the movements performed and individualized supplementary and functional drills, acting as an important method of neurorehabilitation.[9]

The case described is inspiring, so that studies with a greater number of patients and focusing on an inpatient rehabilitation program can be carried out.

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