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[CASE REPORT]

Near Normal Functional Recovery in a Toddler with GBS – A Case Report

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ABSTRACT :

This study was conducted on a 14-month-old male child in the acute stage of Guillain Barre Syndrome (GBS) for 1.5 months. Physiotherapy was given for 1.5 months, 5 days a week, of 1 half-hour sessions per day with rest periods between sessions. Physiotherapy intervention includes passive–active exercise, PNF, Supine, sit-to-stand, weight-bearing exercise, abdominal and back extensor strengthening, gait training, and play activities. Outcomes used before and after the intervention were functional manual muscle testing (MMT) and gross motor function measurement (GMFM) to analyse the effects of physiotherapy intervention. This study concluded a significant improvement in the patient's motor functions and functional recovery after physiotherapy treatment.

Key Words: *GBS, Functional Recovery, Exercises*

Introduction

Guillain-Barre syndrome (GBS) is the most common cause of acute flaccid paralysis in childhood with or without sensory deficit. It is an acute onset inflammatory polyneuropathy characterized by rapidly progressive, symmetric, ascending weakness with areflexia in a previously normal child. It is considered a rare neurological disease of autoimmune origin with a low incidence among children [1].

The annual incidence of GBS is 0.3–1.3 cases per 100,000 persons[1]. The incidence of GBS in the world is unspecified, but it is known that for every 10 years of increasing age, there is a 20% increase in the risk of developing GBS[2]. GBS can occur at any age but is rare in children under the age of 2 years. Adults are affected more commonly than children. The incidence in children is lower, with estimates between 0.4 and 1.3 cases per 100,000 per year [3].

There was a diffuse weakness in all four extremities. Weakness typically progresses over hours to a few days. The lower limbs were more severely involved than the upper limbs, and distal extremities were affected more than the proximal extremities [4].

Sejvar JJ et al.[5] reported that the age-specific GBS rate increased from 0.62 cases per 100,000 person-years among 0- to 9-year-olds to 2.66 cases per 100,000 person-years among 80- to 89-year-olds. The prognosis for childhood GBS is generally excellent. Older studies in children report full recovery within 6 to 12 months, with most of those who do not fully recover having only mild disabilities (4). Loveness et al.[6] reported that about 85% of patients with GBS fully recover within several months to a year. In many cases, increased fatigue can remain for years after fully recovering muscle strength and function [7].

Very few cases of GBS are found in the literature in children under eighteen months. Reporting herewith is a case of a male patient, aged 14 months, with a diagnosis of Guillain-Barré Syndrome with rapidly developing motor weakness progresses within a few hours without any sensory involvement and recovery in 1.5 months and equally fast.

Case Report

14 A 14-month-old boy diagnosed with GBS was admitted to the hospital with complaints of inability to move his B/L Upper limb & lower limb, inability to roll on both sides, inability to sit, and difficulty in breathing in the last 1 week. The mother reported that

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the child had a history of fever 3 days before this incident. The next day, while playing, he suddenly fell and could not get up from the floor and move his B/L upper limb & lower limb. The patient was reported to the physiotherapy department after 1 week. His mother reported that he was a full-term baby born after completion of 9 months with expected vaginal delivery, cried immediately after birth, and had a birth weight of 2 kg at the time of birth. He had no history of NICU stay, and breastfeeding was started immediately after birth. He had no history of trauma, fever, jaundice, or convulsions after birth. All his gross motor, fine motor, personal social, and language milestones were achieved at normal age. His primitive reflexes were integrated according to his age.

During the neurological examination, the patient was attentive and oriented. Sensory examination revealed normal superficial, deep, and cortical sensations. Motor examination revealed hypotonia in B/L shoulder, elbow, and wrist muscles in the Upper limb and B/L hip, knee, and ankle muscles in the lower limb. On reflex testing, superficial and deep reflexes were absent B/L. Functional MMT grading is mentioned in Table 1.

Table 1- Assessment of Functional manual muscle testing (8) in different positions at different time points

Position – Prone	**Grade**		
Activity	**07/08/23**	**21/08/23**	**14/09/23**
NK Swimming	No function	Functional	Functional
OK Rolling from Supine with rotation	No function	Functional	Functional
PK Reciprocal crawling	No function	Non-Functional	Functional
QK Modified four-point kneeling	No function	Functional	Functional
RK Reciprocal creeping	No function	Functional	Functional
Position-Supine			
NK Hand to feet	No function	Functional	Functional
OK Supine to prone with rotation	No function	Functional	Functional
	No function		
Position-Sitting			
NK Pull to sit	No function	Functional	Functional
OK Sitting with a propped arm	No function	Functional	Functional
PK Sitting without arm support- unsustained	No function	Weak Functional	Functional
QK Dynamic sitting without arm support-sustained	No function	Nonfunctional	Functional
Position-Standing			
NK Supported Standing	No function	Non-Functional	Functional
2. Pull to Stand with support	No function	No function	Functional
3. Side-step cruising	No function	No function	Functional
4. Controlled lowering with support	No function	No function	Functional
5. Stands without support	No function	No function	Functional
6. Stands from the modified squat	No function	No function	Functional
7. Walk alone	No function	No function	Functional
8. Squatting	No function	No function	Weak Functional

***Functional MMT grades (8):**

(Functional- Normal for age or only slight impairment or delay. Weak Functional - Moderate impairment or delay that affects activity pattern, base of support, or control against gravity or decreases functional exploration. Non-functional - With severe impairments or delay, the activity pattern has only elements of correct muscular activity. No Function - Can not do activity)

Table 2- Evaluation of Gross motor function at different time points by using GMFM (9)

Dimensions	Date		
	Pre treatment 07/08/23	**2 Weeks Post treatment (21/08/23)**	**1.5 Months Post treatment (14/09/23)**
1. Lying & rolling	7/51	38/51	51/51
2. Sitting	0/60	39/60	58/60
3. Crawling & Kneeling	0/42	17/42	39/42
4. Standing	0/39	2/39	34/39
5. Walking, Running & Jumping	0/72	2/72	33/70
Total Score	13	186	382
Total Percentage	13/5= 2.6 %	186/5=37.2 %	382/5= 76.4%

(GMFM- Gross Motor Function Measure)

Intervention:

As the patient was in the hospital, physiotherapy was given during the acute stage; after discharge, exercises were continued at home as suggested by the therapist. Physiotherapy was given 5 days a week for about 1 and a half hours, with rest periods between sessions. Physiotherapy exercise includes progressing from passive to active assisted, active and resisted exercise. Weight-bearing exercises mat activities included rolling, Supine to prone, and Supine to sit exercises. After 1 week, task-oriented exercise, balance and coordination exercise, abdominal strengthening, gait training, and play activities were added to the treatment.

Table 3- The Physiotherapeutic Intervention by Goals and Impairments

Problem list	GOALS	TREATMENT ADMINISTERED
Unable to move his B/L UL and LL	1. To improve the Strength of B/L UL and LL from grade 0 to grade 3 within the next month	1 PROM exercises progress to active assisted & active ROM [10] 2 PNF exercises [11]
Unable to Roll on both sides	1. To Improve Rolling On both sides within the next 7 days	1. Mat exercises Rolling on both sides [11]
Unable to Supine to sit	2. To improve Supine to sitting within the next 15 days	1. Forearm weight bearing 2. Quadripod 3. Abdominal Curls [12] 4. NDT Supine to sit
Unable to sit with support	1. To improve Sitting with support within 15 days	1. NDT sitting 2. Abdominal curls 3. Back extensor strengthening [12]
Unable to sit to stand with support	1. To improve sit-to-stand with support within 3 weeks	1. Sit to stand [13] 2. Squats 3. Lunges
Unable to walk with support	1. To initiate walking with support within 3 weeks	1. Antigravity muscle strengthening 2. Body weight supported treadmill training [14] 3. Gait training with minimal pelvic support assistance. Stepping forward and reach outs [13]

*PROM- Passive Range of Motion, PNF- Proprioceptive Neuromuscular Facilitation, NDT- Neurodevelopmental Technique

Discussion:

A 14-month-old boy with GBS reported in this case report showed fast recovery, reaching pre-disease condition in a short period. Guillain-Barre Syndrome (GBS) is characterized by progressive motor weakness of limbs and areflexia. Rajlaxmi et al.[11] concluded that exercise intervention is recommended according to the stage of disease & a good functional motor recovery is seen following physiotherapy intervention. Exercise programs for rehabilitating patients with peripheral neuropathies are focused on symptomatic treatment, with very few studies in the literature about the type of exercise programs and their effect on strengthening and endurance[15]. There needs to be more evidence on the effectiveness of physiotherapy management on GBS. A present case study is projected toward the rehabilitation of patients with GBS.

In the present study, the exercise program primarily focused on rolling on both sides, and several neurophysiologic principles of PNF were applied to enhance the task. The therapist uses visual, verbal, and tactile techniques to cue and initially assist & then resist the neck, trunk, or extremities to promote a maximal response from muscle groups used during rolling. These cues enhance the quality of the skilled motion and move the patient toward functional gains. Verbal cues were described with each rolling variant and suggestions for visual and tactile cues to enhance overflow or irradiation [16].

Passive range of motion (PROM) and positioning to prevent contractures/pressure ulcers and PNF to facilitate the Neuromuscular system. PROM is performed twice daily for all joints of UL & LL[10]. PNF is thought to facilitate Proprioceptive neuromuscular systems through diagonal patterns of motion and was used to reintroduce functional motions and improve proprioception. During the acute phase, the PNF exercises were performed as PROM until the GBS symptoms ceased and a gradual return of function began. Facilitation techniques aimed to boost neural activity and initiate a motor response. Techniques that were used to progress from grade 0 to 1. Quick Stretch- The stretch results in a relatively brief contraction of the agonist muscle and a brief inhibition of the antagonist muscle. It has an impact by stimulating the primary endings of muscle spindles, which results in monosynaptic reflex facilitation of the muscle[17]. Weight-bearing exercises were given in side lying forearm weight bearing, forearm weight bearing in prone on the wedge, and quadruped. Static weight-bearing exercises are commonly used to stimulate antigravity muscle strength, improve bone mineral density, normalize muscle tone, and improve fine motor function [18].

NDT supine to sitting (Passive progresses to active assisted and active according to the patient) was given to improve sitting from a supine position. NDT sitting to improve sitting with support was given. NDT uses afferent input to re educate the patient's internal reference systems, giving them more movement choices and greater movement efficiency [19]. To improve independent sitting core strengthening, back extensor strengthening was given. Good core & back extensor strength improves Supine to sit & propped arm sitting.

NDT sit-to-stand, squats, and lunges help to improve sit-to-stand and antigravity muscle strength. According to Chaovalit S. et al., moderate-quality evidence suggests that sit-to-stand exercise programs can improve sit-to-stand performance. This improvement was likely due to repetitive practice, consistent with the principles of motor learning and task-specific training[20]. Body weight-supported treadmill training was given to elicit and improve the stepping movement, and the child attempted to walk on a slowly moving treadmill with close monitoring and support. Author Muhammad DG et al. suggested that treadmill training may favor proprioceptive feedback, leading to adjustments for adequate postural balance and functional performance [14].

Goal-oriented mobility training was given to children to improve their mobility from indoor to outdoor settings, supported by author Kunde et al.[21]

Conclusion:

With a rare age of onset of GBS, this 14-month-old baby showed near-normal functional recovery within 1.5 months of inpatient physiotherapy treatment.

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