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PHYSIOTHERAPY MANAGEMENT OF AIDP GUILLAIN-BARRÉ SYNDROME VARIANT IN A TERTIARY HOSPITAL IN SOUTH-WEST NIGERIA: A CASE REPORT

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ABSTRACT

Guillain-Barré Syndrome (GBS) is an acute neurological condition marked by swift muscular weakening, with the most prevalent form being the Acute Inflammatory Demyelinating Polyradiculoneuropathy (AIDP) variety. This case report provides a comprehensive account of the physiotherapy treatment of a 35-year-old patient diagnosed with Acute Inflammatory Demyelinating Polyneuropathy (AIDP) in a tertiary hospital in South-West Nigeria. After contracting a gastrointestinal infection, the patient developed a gradual loss of strength in their limbs and paralysis of the facial muscles on both sides of the face. The diagnostic assessments verified Acute Inflammatory Demyelinating Polyneuropathy (AIDP), and the treatment consisted of intravenous immunoglobulin (IVIg), plasmapheresis, and a planned physiotherapy program. During a period of four weeks, the patient demonstrated notable enhancements in muscle strength, functional autonomy, and pain levels. This case emphasizes the significance of initiating physiotherapy early and maintaining a consistent approach. It also demonstrates the potential of customized rehabilitation programs to improve recovery in settings with limited resources.

KEYWORDS: Guillain-Barré Syndrome, Acute Inflammatory Demyelinating Polyradiculoneuropathy, AIDP, physiotherapy management, immunomodulatory therapy

INTRODUCTION

Guillain-Barré Syndrome (GBS) is a neurological condition that develops quickly and is marked by muscle weakness and, in severe instances, paralysis. GBS includes multiple variations, one of which is the Acute Inflammatory Demyelinating Polyradiculoneuropathy (AIDP). Acute inflammatory demyelinating polyneuropathy (AIDP) is the predominant kind of Guillain-Barré syndrome (GBS) observed in Western nations. It is characterized by the degeneration of the protective covering of peripheral nerves, resulting in impairments in both motor and sensory functions [1]. The worldwide prevalence of GBS is estimated to be around 1-2 cases per 100,000 individuals per year, with variations depending on geographical location and population characteristics [2]. There is a lack of detailed

epidemiological data on GBS in Africa, particularly in Nigeria. However, existing studies indicate an increasing incidence of GBS, which can be partly attributed to better diagnostic capabilities and increased awareness among healthcare professionals [3, 4].

Physiotherapy is essential for managing GBS, since it helps promote functional recovery and reduce problems that might arise from prolonged immobility. Physiotherapeutic therapies aim to preserve joint mobility, prevent contractures, and improve muscular strength as the patient advances through the stages of the disease [5]. Physiotherapy plays a vital role in the acute, plateau, and recovery stages of GBS, aiming to maximize outcomes and provide comprehensive patient care [6]. This case study investigates the physiotherapy treatment of a patient diagnosed with the acute inflammatory demyelinating polyneuropathy (AIDP) type of Guillain-Barré Syndrome (GBS) in a tertiary hospital located in South-West Nigeria. The article focuses on the therapeutic strategies used, the problems faced, and the outcomes attained, so adding to the small amount of literature on GBS management in Nigeria. This example highlights the need of timely and regular physiotherapy intervention in the comprehensive care of GBS, promoting the need for more organized and situation-specific methods in settings with limited resources.

DIAGNOSIS, MANAGEMENT AND PROGNOSIS

The diagnosis of Guillain-Barré Syndrome (GBS) generally entails a clinical assessment, supplemented by electrophysiological investigations and examination of cerebrospinal fluid (CSF). GBS is clinically defined by the sudden appearance of symmetrical muscle weakness, lack of reflexes, and sensory abnormalities. This is typically preceded by a previous infection [7]. Electrophysiological investigations commonly uncover characteristics of demyelination, such as extended distal motor latencies and conduction blockage, specifically in the AIDP type [8]. CSF examination typically reveals increased protein levels alongside a normal white blood cell count, a phenomenon referred to as albumin cytologic dissociation [9]. The treatment of GBS includes providing supportive care and administering particular immunomodulatory medications. Intravenous immunoglobulin (IVIg) and plasma exchange (PE) are the primary therapeutic interventions, which have been demonstrated to reduce the duration of the sickness and enhance the overall results [10]. Supportive care encompasses the activities of closely observing and assessing the functioning of the respiratory system, effectively addressing any issues related to the autonomic nervous system, and implementing physiotherapy techniques to preserve the flexibility of joints and the power of muscles [4]. The prognosis of Guillain-Barré Syndrome (GBS) is variable, with some patients experiencing substantial recovery. However, the extent and rate of recovery can be affected by factors such as the patient's age, the severity of their first symptoms, and the timing of treatment commencement [11]. According to Leonhard et al., (2019), around 20% of patients may suffer from long-term incapacity, while approximately 5% may die due to complications like respiratory failure or infections [4]. Timely detection and prompt treatments are crucial in enhancing the outlook and decreasing the incidence of illness and death linked to GBS.

OUTCOME MEASURES

There are several outcome measures that can be used in the management of GBS. The outcome measures used in this study include Guillain-Barré Syndrome Disability Score, Functional Independent Measure for overall functional status of the patient, Manual Muscle Testing (MMT) for muscle strength, and the Verbal Rating Scale (VRS) for assessing the level of pain. The Guillain-Barré Syndrome (GBS) disability score is a widely accepted scoring system to assess the functional status of patients with GBS.

The lowest score is 0 while the highest score is 6. Score of 6 means that the patient is dead, score of 5 means that the patient requires assisted ventilation for at least part of the day, score of 4 means that patient is Bedridden or chair bound, score of 3 means that patient is able to walk 10m across an open space with help. Score of 2 means that the patient is able to walk 10m or more without assistance but unable to run, score of 1 means that there is minor symptoms and the patient is capable of running, while score of 0 means a healthy patient state. The manual muscle testing scale is a scale of 0 to 5. 0 is the lowest score which means no muscle contraction while 5 is the highest score which means normal muscle strength against gravity and maximum resistance. The VRS is a scale of 0 to 3. Number 0 means no pain while number 3 denotes maximum pain. The Functional Independence Measure (FIM) consists of 18 items categorized into six domains: self-care, sphincter control, transfers, locomotion, communication, and social cognition. The first 4 domains are motor functions, the last 2 are cognitive functions. Each item is scored 1-7, with 1 for total dependence and 7 for complete independence. FIM scores range from 18 to 126, with motor function scores from 13 to 91, and cognitive function scores from 5 to 35.

CASE PRESENTATION

Subjective History

The patient, apparently healthy until 5 weeks ago (June 9, 2024), when he noticed difficulty climbing stairs due to left lower limb weakness, which progressed to involve the right lower limb by the following morning. Bilateral lower limb weakness caused his knees to buckle while walking. Over the next day, the weakness spread to encompass the entire lower limbs and then both upper limbs, resulting in complete inability to walk.

There is no history of neck or back pain, trauma, seizures, canned food ingestion, or recent immunizations. There's history of respiratory distress, facial muscle weakness and diplegia in the patient. The onset of symptoms followed a one-day episode of watery stool (5 days before muscle weakness began). He was initially evaluated at Ede Central Hospital, underwent tests, and was subsequently referred to Osho Brain and Spine Centre Osogbo, Nigeria for further evaluation. An MRI scan of the brain and spine at ABUAD Teaching Hospital, Ado Ekiti, Nigeria showed no abnormalities. He was then admitted to our facility Obafemi Awolowo University Teaching Hospital, Nigeria (OAUTHC), initially to the A&E department and later transferred to the ICU (June 13, 2024).

The patient has reported difficulty swallowing and breathing over the next 4 days. He has a history of somatoform disorder (1yr ago). He is then referred for neurophysiotherapy review and management.

Objective Examination

Vitals: Vital signs were measured on each session before the therapy and after the therapy. The vital signs on the first day of therapy ranged between (Blood Pressure: 133/88 mmHg, Temperature: 32.8°C, Pulse Rate: 63bpm, and SpO2: 97%, Respiratory Rate: 20cpm, with 3L/min of supplemental oxygen). PCV: 48% Platelet: 174,000/cmm, WBC: 4500/cmm, INR: 0.9

On observation: Patient was met in Low- Fowler's position, on supplemental O_2(3L/min) via nasal cannula. IV-line insitu on left median cubital vein with a dose of IV immunoglobulin running. Patient is afebrile, acyanosed, anicteric, and in no obvious respiratory or painful distress.

There was significant facial diplegia, pseudobulbar palsy, and bilateral ptosis. Visual and auditory functions were preserved.

Investigations and provisional diagnosis: Lumber puncture were done and cerebrospinal fluid (CSF) revealed albuminocytological dissociation with elevated protein and normal cell count levels and nerve conduction study resulted in reduced nerve conduction. AIDP variant was confirmed. Patient has been on 8 doses of IVIG (30g) and three plasmaphereses since admission (4 weeks ago)

Physical Diagnosis: Facial Diplegia, Quadriparesis and Reduced Functional Ability secondary to Guillain-Barré Syndrome (AIDP variant)

The short-term goals were fixed to prevent pulmonary complications, optimize cardiopulmonary functions, prevent atelectasis, improve muscle power in bilateral UL, LL and trunk, improve hand grip, improve oxygen saturation, enhance airway clearance, improve facial muscle strength, preserve the physiological properties of the muscles and joints, and long-term goal was to train the patient as wheel chair independent, standing re-education and walking re-education.

METHODS

Assessment (UL/LL)

UL LL

- AROM: Limited and pain free bilaterally for both UL & LL

- PROM: Full and painful across all UL joints bilaterally (VRS 3) / Full and pain free bilaterally (LL).

- Sensation: Intact bilaterally for both UL & LL

- Muscle Bulk: Preserved bilaterally for both UL & LL

- Muscle Tone: Hypotonia bilaterally for both UL & LL

- Swelling/Atrophy/Spasticity: Absent bilaterally for both UL & LL

- Grip Strength: Poor bilaterally (UL).

- Pain on Palpation: Present bilaterally for both UL & LL (VRS 3)

- GMP: 1+/5 bilaterally (UL) / 1/5 bilaterally (LL)

- TA Tightness/Clonicity: Absent bilaterally (LL)

Outcome Measures:

1. The vital signs (pulse rate, blood pressure, respiratory rate, and oxygen saturation) were noted before and after the therapy, each day from baseline to 4 weeks follow-up as a primary outcome measure.

Table 1 *(Vitals of the AIDP patient.)*

Vitals	Initial Assesment	Week 1	Week 2	Week 3	Week 4
Pulse Rate	63-70bpm	100-110bpm	90-95bpm	70-80bpm	83-88bpm
Oxygen Saturation	95-100% 3L of supp Oxygen	95-98% 4L of supp Oxygen	95-100% 2L of supp Oxygen	94-99% Weaned off supp Oxygen	96-100% Weaned off supp Oxygen
Blood Pressure	133/88mmHg	150/90mmHg to 145/90mmHg	130/80mmhg to 125/80mmHg	125/80mmHg to 125/70 mmHg	125/80mmHg to 125/70 mmHg
Respiratory Rate	20cpm	25cpm	22cpm	21cpm	19cpm
Temperature	32.8ºC	37.5ºC	37.2ºC	36.8ºC	36.7ºC

2. Muscle power of all UL & LL were graded using MMT

The manual muscle testing scale (MMT) is a scale of 0 to 5. 0 is the lowest score which means no muscle contraction while 5 is the highest score which means normal muscle strength against gravity and maximum resistance.

Table 2 *(Muscle power of AIDP patient.)*

Muscle power (MMT)	Initial Assesment	Week 1	Week 2	Week 3	Week 4
Shoulder Flexors	1	1	1+	2	2

Shoulder Extensors	1	1	1+	2	2
Shoulder Abductors	1+	1+	1+	2	3-
Shoulder Adductors	1+	1+	1+	2	3-
Elbow Flexors	2-	2-	2	2+	3
Elbow Extensors	2-	2-	2	2+	3
Wrist Flexors	1	1	1	2	3-
Wrist Extensors	1	1	1	2	3-
Hip Flexors	1	1	1	2	2+
Hip Extensors	1	1	1	2	2+
Hip Abductors	1	1	1	2	2+
Hip Adductors	1	1	1	2	2+
Knee flexors	0	0	1	2	3-
Knee Extensors	0	0	1	2	3-
Ankle Dorsiflexors	0	0	1	2	3-

Ankle Plantarflexors	0	0	1	2	3

3. Functional status & pain was graded by GBS disability score, FIM score and VRS

Table 3 *(GBS, FIM Score & VRS.)*

Functional Status & Pain	Initial Assessment	Week 1	Week 2	Week 3	Week 4
GBS Disability scale	5	5	5	4	4
FIM Score (/126)	55	60	60	65	70
FIM Motor sub score (/91)	20	25	25	30	35
FIM Cognitive sub score (/35)	35	35	35	35	35
Pain (VRS)	3	3	2	2	1

Interventions:

Because of the negative temporary effect exercise can have on a GBS patient, patient can experience fatigue. The patient was treated 1hr per day for 4 weeks (60 mins per day and 7 days a week. Total of 420 minutes weekly).

Week 1: After assessing the patient, priority was given to preventing complications such as deep vein thrombosis (DVT) and pressure ulcers. Passive movements were initiated for both upper and lower limbs, along with cervical mobilization exercises. TED stockings were fitted and an air bed was prescribed. Repositioning occurred every 4 hours, while the patient remained on 3 litters of supplemental oxygen with 100% SpO2. Patient education was provided to explain the prognosis and engage in a therapist-patient-cantered approach.

Chest physiotherapy included percussion, shaking, and vibration. Attention was also given to pain reduction. By the 4th day, due to facial diplegia affecting specific (muscles Occipitofrontalis is, procerus, bilateral masseter, buccinator, levator labii superioris, zygomaticus major, Orbicularis Oris, Risorius, platysma), electrical stimulation using a TENS machine began for the facial muscles (Frequency - 150Hz, Duration - 15 mins, Pulse width - 150µs, Intensity - 2.5mA, Mode - Burst; parameters were gradually

reduced). The motor point for electrode placement was around the stylomastoid foramen where the facial nerve is superficial. The positive electrode was applied to the affected facial muscle group.

No loss of taste, sensory, or motor function of the tongue in the patient, indicating intact Glossopharyngeal, Trigeminal, and Hypoglossal nerves. Throughout the week, the patient experienced ongoing respiratory distress due to Guillain-Barré syndrome affecting the respiratory system

Week 2: After initiating tactile stimulation and gentle massage, including soft tissue massage (STM) with Olfen gels for painful areas, foot care and myofascial release targeted foot trigger points. Three days later, electrical muscle stimulation (EMS) began for all muscle groups in both upper and lower limbs, continuing through the following week with parameters set at Frequency - 180Hz, Duration - 15 mins, Pulse width - 300µs, Intensity - 4.5mA, Mode - Burst, Synchronous. Intercoastal muscle stretches and diaphragmatic breathing exercises were incorporated. With stable vital signs, plans were made to transfer the patient from the ICU to an in-patient ward.

Week 3: The patient showed significant improvement and was successfully weaned off supplemental oxygen. Progressive mobilization began with transitioning from lying to long sitting. By the end of the week, the patient advanced to high sitting while performing pendulum exercises with both lower limbs. Weight-bearing exercises for the upper limbs were initiated during high sitting.

However, weak trunk muscles necessitated early-week 4 sitting re-education. The treatment plan also included incentive spirometry to enhance lung expansion and a hand medicine ball for improving grip strength.

Week 4: The patient began lying on bed undergoing free active exercises, auto assisted exercises which progressed to sitting out of bed, starting with 10 minutes on the first day and gradually increasing the duration. By the 5th day, the patient could sit for an hour out of bed. Rhythmic stabilization exercises were performed in high sitting. The caregiver was instructed to obtain a backslab for support.

On the 6th day, with maximum support, the patient attempted standing for 30 seconds, though trunk muscles remained weak at this stage. There was notable improvement in lower limb muscles (MMT 0 to 3-). Coordination exercises suchs as hand to mouth, nose and ear was also included. The physiotherapy exercises were focused on enhancing muscle strength, mobility, and achieving functional independence.

CASE SUMMARY

Previously healthy, the patient started having problems climbing stairs due to left lower leg weakness. This weakness progressed to patient right lower limb and both upper limbs, causing patient's inability to walk. After a few loose bowel motions, debilitation quickly progressed. The patient denied any history of neck or back pain, physical injury, seizures, canned food digestion, or recent vaccination. The patient had respiratory difficulties, facial paralysis, and diplegia. Initial and subsequent MRIs at a local medical center found no abnormalities. Lumbar puncture was conducted after admission to OAUTHC. Cerebrospinal fluid protein levels were elevated and cell count was normal. This fits the diagnosis of Acute Inflammatory Demyelinating Polyradiculoneuropathy (AIDP), a form of GBS.

After being transported to the ICU, the patient had facial paralysis on both sides and trouble moving his face. Both eyelids drooped, but the patient could see and hear. Plasmapheresis and intravenous immunoglobulin (IVIg) therapy were used to suppress the autoimmune reaction. Neurophysiotherapy

prescribed air beds and monitored TED stocking use to prevent deep vein thrombosis and pressure sores. A structured program of passive and active exercises, electrical muscle stimulation, and breathing exercises improved joint mobility, cardiovascular fitness, and muscular strength. The patient's vital signs, muscle strength, and independence improved after four weeks. Increased Functional Independence Measure (FIM) scores and lower VRS pain levels showed this.

This case emphasizes the importance of early and regular physiotherapy for GBS. It also encourages research that stresses multidisciplinary approaches to improve patient outcomes [12]. The patient's recovery was considerably improved by immunomodulatory and physiotherapy, as previously reported [13].

DISCUSSION

The neurological condition Guillain-Barré Syndrome (GBS) requires prompt diagnosis and treatment to enhance patient outcomes. This case report describes the physiotherapy treatment of a South-West Nigerian tertiary hospital patient with Acute Inflammatory Demyelinating Polyradiculoneuropathy (AIDP) Guillain-Barré Syndrome (GBS). Guillain-Barré Syndrome (GBS) symptoms including rapidly developing limb weakness and facial muscle paralysis are typical. Previous infections often cause immune reactions in GBS [14].

Initial treatment included immunomodulatory treatments including intravenous immunoglobulin (IVIg) and plasmapheresis, which have been thoroughly investigated and shown to reduce peripheral nerve autoimmune infestation [15]. Multiple studies have shown that these drugs reduce disease severity and hasten recovery, underscoring their importance in GBS management [15]. The patient had intense physiotherapy to prevent further complications, preserve joint and muscle function, and increase functional ability.

The acute phase of GBS physiotherapy begins with passive movements and respiratory exercises, while the recovery phase includes progressive mobilization and strength training. These methods emphasize personalized rehabilitation. Preventing deep vein thrombosis and pressure ulcers, which can slow rehabilitation, is essential [17]. Electrical muscle stimulation (EMS) and other methods to increase muscle strength and prevent muscle atrophy are indicated for Guillain-Barré syndrome (GBS) patients [18].

The four-week intervention improved the patient's muscle strength, functional autonomy, and pain levels, suggesting full physiotherapy is effective. Previous study has shown that early physiotherapy improves GBS patients' long-term prognosis [6]. The progressive reduction of supplementary oxygen and successful transfer from the intensive care unit to the general ward demonstrate the multidisciplinary approach's efficacy in treating severe GBS.

This case also shows how difficult it is to obtain advanced diagnostic and therapeutic equipment in resource-limited countries like Nigeria. Despite these limits, structured and context-specific physiotherapy regimens improved patient outcomes in this case. It also stresses the need for continued research and healthcare infrastructure funding to treat complex neurological diseases like GBS in developing nations.

This case report provides valuable information on managing AIDP with physiotherapy in a low-resource context. It adds to the evidence that interdisciplinary GBS care works. The declaration stresses

early intervention, personalized rehabilitation programs, and cooperative healthcare to maximize GBS recovery and function. Additional research is needed to evaluate the long-term effects of these measures and how to improve care in comparable settings.

CONCLUSION

Within the context of a limited in resources environment in Nigeria, this case report shows the significant role that comprehensive physiotherapy plays in the care of Acute Inflammatory Demyelinating Polyradiculoneuropathy (AIDP), which is a form of Guillain-Barré Syndrome (GBS). A multidisciplinary approach that incorporates early and consistent physiotherapeutic interventions with immunomodulatory medications has shown to be helpful, as evidenced by the patient's significant increases in muscle strength, functional independence, and overall health by the patient. Despite the difficulties that are connected with having limited resources, the remarkable outcomes that were achieved in this case highlight the potential for individualized rehabilitation programs to contribute to the improvement of recovery and quality of life for patients suffering from GBS. Because of this, it is more important than ever to maintain research efforts and make investments in healthcare infrastructure in order to aid with the management of complicated neurological disorders in developing nations.

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