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Acute Inflammatory Demyelinating Polyneuropathy and Physical Therapy Management in Acute Care: A Case Study

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ACUTE INFLAMMATORY DEMYELINATING POLYNEUROPATHY AND PHYSICAL THERAPY MANAGEMENT IN ACUTE CARE: A CASE STUDY

by

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This Scholarly Project, submitted by Kaley Stotz in partial fulfillment of the requirements for the Degree of Doctor of Physical Therapy from the University of North Dakota, has been read by the Advisor and Chairperson of Physical Therapy under whom the work has been done and is hereby approved.

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ABSTRACT

Background. Acute inflammatory demyelinating polyneuropathy (AIDP) is the most prevalent variation of Guillain-Barre Syndrome. It is a neurological disorder in which the immune system attacks the peripheral nervous system resulting in demyelination and subsequent ineffective nerve transmission. Currently there is a lack of evidence supporting the most effective early physical therapy treatment interventions. **Purpose.** The purpose of this case study is to present the early physical therapy intervention provided in the acute care setting for a patient with AIDP. **Description**. This case study describes a five-day inpatient physical therapy management of a 37-year-old male who was diagnosed with AIDP. The patient presented with profound overall body weakness and paresthesia in all extremities, resulting in limited functional mobility. **Intervention.** Treatment focused greatly on functional mobility, such as transfer and gait training, with a substantial educational component. Lower extremity and core strengthening exercises were also included with close monitoring for overexertion. **Outcomes.** Following physical therapy intervention, the patient required less assistance for functional mobility, shown by an increase of 4.24 on the Acute Measure for Post-Acute Care (AM-PAC) 6-clicks assessment. **Discussion**. The patient demonstrated the ability to tolerate intensive, multidisciplinary therapy in the acute care setting, qualifying him to receive inpatient rehabilitation. Although the patient demonstrated favorable outcomes, further research is needed to determine the most effective treatment interventions to facilitate return to function.

CHAPTER I

BACKGROUND AND PURPOSE

Guillain-Barre syndrome (GBS) is a neurological disorder in which the immune system attacks the peripheral nervous system (PNS) resulting in demyelination.[1] This syndrome is rather uncommon, with incidence ranging from 0.6 to 4 per 100,000 people worldwide.[2] In a healthy individual, antibodies and white blood cells are used to protect the body by attacking microorganisms such as bacteria and viruses. In GBS, these antibodies mistakenly attack healthy nerve tissue.[1] Although the etiology remains unknown, some studies suggest nearly 70% of individuals diagnosed with GBS report a recent respiratory or gastrointestinal infection preceding their diagnosis.[3] While several variations of the syndrome have been identified, acute inflammatory demyelinating polyneuropathy (AIDP) accounts for approximately 80% of cases in North America and Europe.[3] In AIDP, the myelin surrounding the nerve fiber is damaged resulting in inefficient nerve conduction.[3]

Various hypotheses have been proposed to explain the pathogenesis of GBS. One suggested theory is molecular mimicry.[3] According to this theory, immunogenic molecules called epitopes appear similar to or mimic molecules of the PNS. Entry of a microbe into a person triggers the immune system to attack it. Since the nerve components look similar to epitopes, the immune system also attacks the peripheral nerves.[3] Despite the uncertainty of the pathogenesis, the mutual theme involves an underlying autoimmune mechanism resulting in PNS demyelination.

A rapid and unexpected onset of weakness or paralysis is a hallmark symptom of GBS.[1] This widespread weakness often causes significant impairments in walking ability, stair climbing, and other activities of daily living prompting the patient to seek immediate medical attention. In approximately 20-30% of patients, weakness of the diaphragm and other respiratory muscles will necessitate the use of a ventilator.[3,4] The National Institute of Neurological Disorders and Stroke (NINDS) developed diagnostic criteria for GBS in 1978.[5] This was later modified in 1990 by Asbury and Cornblath and is the most widely used criteria for diagnosis of GBS in clinical practice (Table 1).[3,5] The clinical presentation of GBS typically involves rapid and progressive muscle weakness, tingling sensation in distal extremities, difficulty walking, increased fatigue, and pain.[3] An increase in cerebrospinal fluid protein without an elevation in white blood cells has been shown to be a strong predictor of GBS as well.[3] Physicians gather information from clinical presentation and laboratory values to establish a diagnosis and implement a plan of care.

Table 1. Diagnostic Criteria of GBS

	Clinical Features
Required for diagnosis	Progressive weakness in both arms and legs Areflexia or hyporeflexia (generalized or in weak limbs)
Strongly supporting the diagnosis	Progression of symptoms over days to 4 weeks Relative symmetry of symptoms Mild sensory symptoms or signs Cranial nerve involvement, especially facial diplegia Recovery beginning 2-4 weeks after progression ceases Autonomic dysfunction Preceding upper respiratory or gastrointestinal illness Absence of fever

With no accepted cure, GBS presents an ongoing challenge for medical professionals to provide optimal care and facilitate recovery. Intravenous immunoglobulin (IVIg) and plasma exchange (PE) are two medical treatment interventions that are effective in preventing further immune-related nerve damage.[3] Early initiation of IVIg or PE has been confirmed to be beneficial and crucial in optimizing recovery, especially in patients with rapid progressive weakness.[6] Despite similar efficacy, IVIg is more widely used for the treatment of GBS due to its higher availability, lack of required specialized equipment to administer, and relatively reduced risk for adverse effects.[7,8] There is no evidence that combination therapy, such as providing IVIg following PE, is more effective or associated with better outcomes in the short or long-term, compared to the standard recommended therapy.[8] Physical therapy, occupational therapy, speech-language pathology, respiratory therapy and nursing services are all used in the acute stage of GBS to prevent and treat complications related to weakness, immobility, pain and respiratory insufficiency.

The majority of patients with GBS have a rapid progressive course reaching maximum disability within 2 weeks after onset.[9] This is followed by a plateau phase of varying duration lasting from days to months, after which they start to recover.[9] Research has shown approximately 80% of patients with GBS are able to walk independently six months after onset of symptoms.[9] Waalgard et al[10] developed a clinical prognostic model for early predictions of outcomes in GBS. It was established that older age, preceding diarrhea, and a low Medical Research Council (MRC) score at hospital admission, and at 1 week, were each associated with being unable to walk independently at 4 weeks, 3 months, and 6 months.[10,11] Patients with GBS who require ventilator support also have a less favorable prognosis for neurological recovery, longer hospitalization, and higher mortality.[4] Although the majority of GBS cases are said to

reach complete recovery, minor residual deficits are detected on evaluation in 65% of patients.[2] The most common residual deficits are reduced muscle strength sensory signs, fatigue, and pain.[2,3]

Physical therapy (PT) is a fundamental aspect of recovery and management of GBS. The principle goals of PT in the recovery of GBS are to help the patient achieve optimal muscle use at a tolerable pain level as nerve supply returns.[12] This may include utilizing supportive equipment and other functional adaptations to help patients with enduring impairments resume activities that resemble their previous lifestyle.[12] Physical therapy does not facilitate nerve repair, rather it helps the patient learn optimal use of muscles, as the nerves heal and innervation improves.[12] In a systematic review, Khan and Amatya[13] conclude that there is satisfactory evidence to support the use of physical therapy in reducing fatigue, improving function and quality of life in patients with GBS. It is essential to help patients move on their own as soon as possible in order to help reduce the progression of disuse atrophy and other associated complications.

Despite the lack of knowledge regarding etiology and cure of GBC, it is evident an effort needs to be made to intervene in the acute stage to minimize complications and ultimately improve outcomes. There is a gap in literature concerning the effects of physical therapy interventions received by individuals with GBS in the acute stage. While the majority of individuals with GBS experience a full recovery within one year of diagnosis, there is a lack of evidence supporting the most effective early treatment interventions to facilitate timely return to prior level of function.[2] Therefore, the purpose of this case study is to analyze the quality of physical therapy in the recovery of a patient diagnosed with GBS in the acute care setting.

Investigation into all aspects of care will aid in identification of strengths and limitations that will guide future care and optimize outcomes.

CHAPTER II

CASE DESCRIPTION

The patient was a 37-year-old male with no significant medical history. He valued spending time with his wife, one-year-old son, and labrador retriever in their suburban home. Work was a priority to the patient as he was employed as vice president of sales at a large company. Of note, chart review signified chewing tobacco dependence and habitual alcohol use as an existing problem. Medical record denoted a body mass index of 31, classifying the patient as obese[14], with a weight of 230 pounds and height of 6 feet. He was prescribed an epinephrine autoinjector (0.3mL) as needed to contest an allergy to bee stings. No other medications were prescribed.

The patient presented to the emergency department with general body weakness, more profound in the lower extremities, resulting in inability to stand or walk. This severe level of weakness prevented him from being able to get out of bed. Consequently, emergency medical services were called to transport him to the emergency room for evaluation. He reported feeling numbness in his hands and feet and onset of progressing weakness commencing two days prior. He further described his symptoms as feeling clumsy and unstable, in which bending his knees increased apprehension. He also discussed the inability to reach away from his body to grab objects and dress himself independently due to feeling weak. Patient denied having any pain.

Examination was performed by the physician along with imaging and laboratory tests to make a medical diagnosis. Initial examination showed the following impairments: high blood pressure, decreased strength, paresthesia in all extremities, and absence of the patellar reflex

bilaterally. Cranial nerves 2-12 and sensation to both light touch and pain were intact in all extremities. The patient underwent a magnetic resonance imaging (MRI) of his head, cervical, thoracic, and lumbar spine with and without contrast. Each of these image studies was interpreted and concluded to be unremarkable. Complete blood count with differential, basic metabolic panel, and urinalysis results were all within normal limits. The patient also underwent a lumbar puncture which revealed an elevated protein level in the spinal fluid with a normal white blood cell (WBC) count. The physician considered the clinical presentation, image studies, and lab results to diagnosis the patient with AIDP due to close correlation with diagnosis criteria.[3,5] The patient was admitted to the hospital due to difficulty maintaining activities of daily living (ADL) and further neurological evaluation and intervention.

On the first day of admission to the hospital, IVIg was started to manage symptoms associated with the diagnosis of AIDP. A standard dosage of 0.4g per kg body weight was to be administered in the hospital for 5 consecutive days.[3] The effect of this form of treatment, postulated based on clinical observations, is a reduction in demyelination and axonal injury with subsequent hastening of clinical recovery.[7] Physical therapy orders to evaluate and treat weakness were provided by the physician and set to begin the day after admission to the hospital. The initial physical therapy examination was performed in the patient's hospital room. Upon arrival, the patient was reclined in bed and visiting with his wife who was present and supportive throughout the examination. He was eager to participate in therapy and motivated to begin rehabilitation.

A brief review of systems was completed to determine appropriateness for physical therapy. Impairments to the neuromuscular and musculoskeletal systems was prominent as a direct result of AIDP. The neuromuscular system was affected by damaged nerve fibers resulting

in inefficient nerve transmission. This has a significant impact on the musculoskeletal system by impeding muscle function. Although AIDP has been shown to have an adverse effect on pulmonary function, the patient did not require the use of a ventilator nor supplemental oxygen. Oxygen saturation on room air was 95%, heart rate was 96 beats per minute, and blood pressure was 146/94 mm Hg. Of note, in the cardiopulmonary system, blood pressure is classified to be in the hypertensive range and should be monitored.[15] There was no clear negative effect to the integumentary system due to this diagnosis.

After taking a brief history, the patient was deemed to be an appropriate candidate to receive physical therapy. This was established due to the patient's agreement of services, stable vital signs, and anticipated improvement in function with therapy. The patient engaged in meaningful conversation with the therapist and answered questions appropriately, validating cognitive status. An examination plan was developed to evaluate the patient's neuromuscular and musculoskeletal system. This would involve range of motion (ROM), strength, sensation, balance and mobility. The results from these assessments will be used to construct an appropriate plan of care.

Examination

The patient was receiving IVIg treatment in his antecubital fossa with 10 minutes remaining upon arrival for physical therapy examination. While this was finishing, subjective information was gathered. His wife helped answer questions regarding their home environment, where he resided with his wife and one-year-old son. They describe living in a house with one small threshold to enter the home with no railing on either side. Inside the home, an additional 15 steps with one railing were required to reach the upstairs bedroom in which the patient slept. Prior to the patient's onset of symptoms, he was independent in all ADLs and mobility without

the use of an assistive device or support personnel. In addition to his career as a vice president in sales, he served as a caretaker for his son. The parents of the patient lived in a nearby town and were able to stay at the patient's home to help care for his son while in the hospital. The primary goal of the patient was to be able to care and provide for his wife and son.

Evaluation was based on techniques outlined in the textbook by O'Sullivan and Schmitz, Physical Rehabilitation.[16] The patient underwent gross ROM, sensory, strength, and mobility testing. Active range of motion and sensory testing was assessed in a supine position. Bilateral hip flexion, knee flexion and extension, and ankle dorsiflexion and plantarflexion were within normal limits (WNL). The patient conveyed persistence in paresthesia, though sensation was intact to light touch in each extremity. This was assessed grossly by having the patient close his eyes and decipher if light touch was being applied to his left or right extremity. This was repeated numerous times for upper and lower extremities with no errors. He then transferred from lying supine in bed to sitting edge of bed. Minimal assistance of one person (MIA x1) was required at the trunk when transitioning from supine to long sitting. From here, he was able to scoot from long sitting to sitting at the edge of bed with no assistance. There was no loss of balance while sitting unsupported at edge of bed with hands in his lap for one minute. All gross manual muscle tests (MMT) were performed in a seated position. No difference in strength was noted between right and left lower extremities (Table 2).

Table 2. Initial Manual Muscle Test Grades

	Right	Left
Hip Flexion	3/5	3/5
Knee Extension	3+/5	3+/5
Knee Flexion	3+/5	3+/5
Ankle Dorsiflexion	4/5	4/5

Following assessment of strength, the decision was made to defer standing and ambulation. This verdict was made due to the lack of availability of specialized equipment in the hospital room and patient apprehension. Evaluation shifted toward assessment of functional mobility, specifically bed mobility. Table 3 outlines required assistance for the performed evaluated mobility tasks. Following assessment of functional mobility, the patient reported an increase in fatigue.

Table 3. Initial Assistance with Mobility

Transfer	Assistance
Supine to Sidelying - bilateral (Rolling)	Independent
Supine to Sit	MIA x 1
Sit to Supine	MIA x 1
Sit to Stand	Not tested
Scoot in Sitting	Independent

Evaluation and Diagnosis

At the end of the examination, the Acute Measure for Post-Acute Care (AM-PAC) 6-clicks score was determined. This functional assessment was used to evaluate basic mobility and assistance. It is used to provide a transparent measure of patients' capabilities in functional areas important to physical therapy, and other disciplines in the acute care setting.[17] Six tasks are assessed and given a score based off the required level of assistance (Table 4). To ensure standardization, the "unable" category correlates with dependent assistance, "a lot" corresponds with moderate to maximum assistance, "a little" is related to supervision to minimum assistance, and "none" indicates the patient is able to perform the activity with modified independence or independence.[17] The patient received a raw score of 11, which was converted to a standardized score of 33.86 by the electronic medical record system. This score indicated a 72.57%

impairment and classified the patient in the limited movement category. This suggests the patient may have a lot of difficulty or is unable to get out of bed, to stand for several minutes and/or walk short distances. Of note, not all activities assessed were directly observed. Scores can be provided by either direct observation or estimation of patients' capabilities on the basis of clinical judgement.[17] One study determined the AM-PAC 6-clicks to have good internal consistency reliability (r=0.96) and suggested a minimal detectable change of 4.72 with a 90% confidence interval.[17] This study also determined validity (r=.65) by correlating AM-PAC 6-clicks score with scores on subscales of the Functional Independence Measure (FIM).[17]

Table 4. Initial AMPAC 6-Click Score

Mobility	Assistance
Turning over in bed	3 – a little
Sitting down and standing up from chair with arms	2 – a lot
Moving from lying on back to sitting on the side of the bed	3 – a little
Moving to and from bed to chair	1 – unable
To walk in hospital room	1 – unable
Climbing 3-5 steps with a railing	1 – unable

Findings from the initial examination can be applied to the International Classification of Functioning (Appendix 1). This enablement model can be used in order to distinguish how the patient's health condition relates to his impairments. Furthermore it identifies personal and environmental facilitators and barriers to rehabilitation. The initial examination revealed a global decrease in strength, leading to significant impairments in functional mobility. Findings from the examination were used to develop a problem list which include: impaired mobility, weakness, paresthesia, and decreased perceived endurance. It was determined the patient would not be

appropriate to discharge home following the initial evaluation due to the inability to complete ADLs and functional mobility independently.

Prognosis and Plan of Care

The expectation for discharge from the hospital was five days. This was anticipated due to the five day course of IVIg treatments. Short-term goals that were hypothesized to be met over the patient's hospital stay were established (Table 5). The disease course of AIDP and the expected length of recovery was discussed with the patient and his family. Prognosis for this patient was determined to be relatively good. This was decided due to the patient's young age, absence of preceding diarrhea or illness, and lack of necessity for a ventilator. However, an inpatient rehabilitation stay following discharge from the hospital was recommended, as frequent and intense therapy would benefit the patient based on his current functional status. The patient and family were in agreement with the recommendation of an inpatient rehabilitation stay to meet long-term rehabilitation goals.

Table 5. Short-Term Goals Established at Evaluation

Short-Term Goals ***To be met in 5 days***
Following PT intervention, the patient will be able to transfer to and from supine to sit with supervision allowing him to get in and out of bed.
Following PT intervention, the patient will be able to transfer to and from sit to stand with contact guard assist allowing patient greater independence with mobility.
Following PT intervention, the patient will be able to ambulate 50 feet with the use of a 2-wheeled walker and moderate assistance of one person to allow patient to walk short distances within his home.

The patient was appropriate for a physical therapy intervention program after evaluation the examination. Intervention would involve increasing functional mobility, strength and endurance. This overall plan took into account both patient and PT goals, with the intention to prepare the patient to transition to inpatient rehabilitation and eventually return home.

CHAPTER III

INTERVENTION

The patient was seen daily for physical therapy for 1.5 hours over the five-day hospital stay course. This included a 45-minute session in the morning and afternoon. A timeline of treatment interventions are outlined in Appendix 2. Coordination was made with the nursing staff to ensure IVIg treatment did not interfere with scheduled therapy. In addition to physical therapy, the patient was being seen for 1.5 hours of occupational therapy daily. Following the initial examination, it was deemed appropriate the patient would benefit from intensive therapy at an inpatient rehabilitation facility. Therefore, a total of three hours of therapy was completed daily in acute care to demonstrate patient tolerance to intensive rehabilitation. To qualify for an inpatient rehabilitation stay, the patient must require three hours of multitherapy disciplines five days per week.[18] In addition, the patient is expected to actively participate in, and benefit significantly from, the intense rehabilitation therapy program.[18] Literature has shown that multidisciplinary high-intensity rehabilitation is more effective than unidisciplinary rehabilitation for reducing motor disability and participation restrictions, especially when provided up to 12 months after the initial onset of GBS symptoms.[13]

The interventions selected for the patient focused greatly on functional mobility, such as transfer and gait training with a substantial educational component. Lower extremity and core strengthening exercises were also included in the patient's interventions. A systematic review by Simatos et al[19] analyzed the effects of exercise on patients with GBS. The study established that various types of exercise programs improved outcomes including functional mobility,

cardiopulmonary function, isokinetic muscle strength, work rate and reduced fatigue.[19] It was concluded that rehabilitation is recommended both at the early stage to decrease disability and the later stage for reconditioning.[19]

Transfer Training

Transfer training included bed mobility, sit to and from stand, and sliding board transfers. Initially, the patient was able to roll from supine to sidelying with standby assist (SBA) and a high level of verbal cuing. Instructions included proper log rolling technique and handrail use for assistance. The patient was able to scoot to the head of bed with SBA and verbal instructions for bridging. Through the course of care, verbal cues required for bed mobility was decreased. Demonstration and verbal cues for proper utilization of a transfer board were provided. At first the patient required contact guard assist of two people for this transfer. Over time, he learned how to weight shift laterally to place the board under his buttock independently, however contact guard was continually used throughout the transfer for safety.

Figure 1. QuickMove [20]

Sit to/from stand transfer was completed with a variety of equipment, the first being the QuickMove (Figure 1).[20] This device facilitates standing by having a bar the patient can use to help pull themselves to standing. Adjustable lower leg support braces enhance the sense of security. Once standing, seat pads can be folded down to provide additional support, whether as an extra layer of support or to use as a seat while transferring. The patient required moderate assistance of two to complete this transfer. This transfer was repeated five times to enhance strength and motor control. Despite verbal cuing, the patient was not able to control the eccentric descent of the transfer. This proved to be very effortful for the patient. The following day, this

transfer was completed using the parallel bars with minimal assistance of two. The patient's knees were blocked by the therapist for safety. Verbal cues were provided to scoot forward in his chair and bring his feet back before starting to ascend. The patient had better success when pushing up from the wheelchair rather than pulling up from the parallel bars.

Gait Training

Gait training was an integral component of intervention throughout the plan of care to support functional mobility. Standing endurance and weight shifting are requisite activities required for ambulation. One the first day of treatment, the patient was able to stand for 90-120 seconds with bilateral upper extremity support before onset of trunk and lower extremity fatigue. Before initiation of ambulation, multiplanar weight shifting was performed. Initially gait was performed in 20 foot bouts with the use of the QuickMove and wheelchair follow. The patient required moderate assistance of one person along with supportive personnel to propel the equipment. Following a 20 foot bout of ambulation, the patient reported feeling tired. He required a five minute rest to recover before ambulating another bout of 20 feet. Gait was observed to be ataxic with verbal and manual cues required for a heelstrike. Ambulation was also executed using the parallel bars with the use of Zero-G gait trainer harness system at the following session. The patient was able to ambulate with more of a natural gait pattern and reported feeling more secure as he was apprehensive that his knee would buckle. Repeated bouts of 25 foot distances were completed while a decreased heel strike was again observed while placing a moderate amount of weigh through his upper extremities on the parallel bars.

Strengthening Exercises

Along with functional mobility, strengthening exercises targeting the lower extremities and core were incorporated throughout treatment (Table 6). Care was coordinated closely with

occupational therapy where it was decided they would primarily target upper extremity strengthening and functional activities.

Table 6. Lower Extremity and Core Strength Exercises

Exercise
Ankle Pumps
Heel Slides
Straight Leg Raises
Bridging
Isometric quad contractions
Isometric gluteal contractions
Seated marching
Short arc quad
Sidelying hip abduction
Sidelying clamshells
Prone hip extension with knee flexion
Prone knee flexion
Unsupported seated weight shifting

Strengthening exercises were completed in conjunction with functional mobility at each therapy session. The number of repetitions, sets, and rest between sets were established based upon the patients fatigue level. The patient was monitored for prolonged post exercise weakness, delay onset muscle soreness, and increase in paresthesia at each session as this may be a sign of overexertion.[13]

Education

Patient education was a fundamental component of therapy during the acute stage of AIDP. Education was individualized based on the patient needs, education level, life role, environmental barriers and social support. The patient was highly concerned if he would be able to independently walk and care for his family. The temporal course of AIDP and prognosis were introduced to address these concerns. Another educational component was safety. The patient was highly autonomous and would therefore use momentum to complete a task, putting himself at a risk for a fall. The patient was also educated on self-monitoring his fatigue levels. Though

highly motivated to perform in therapy, the importance of overexertion was integrated. Lastly, discharge disposition based on clinical presentation, prognosis, and social support were delivered.

CHAPTER IV

OUTCOMES

The outcomes for the patient were favorable considering the acute stage of the disease process. Objective and subjective measurements were used to judge the effectiveness of physical therapy. Objective measurements included amount of assistance required for functional mobility while subjective report included patient self-perceived performance.

The AMPAC 6-clicks functional mobility assessment was completed at the initial physical therapy examination and again prior to discharge (Table 7). The patient received an initial raw score of 11which increased to 14 by the time the patient was discharged from acute care to an inpatient rehabilitation facility. The raw score of 14 is equivalent to the standardized score of 38.10, indicating 61.29% impairment. Using data from the AMPAC 6-clicks shows an 11% reduction in disability over the episode of care. Although not objectively measured, the patient was able to increase the load of strength exercises with less reported fatigue. In addition, overall the patient subjectively reported feeling stronger every day.

Table 7. Initial and Discharge AMPAC 6-Clicks Score

Mobility	Initial	Discharge
Turning over in bed	3 – a little	4 - none
Sitting down and standing up from chair with arms	2 – a lot	2 - a lot
Moving from lying on back to sitting on the side of the bed	3 – a little	3 – a little
Moving to and from bed to chair	1 – unable	2 – a lot
To walk in hospital room	1 – unable	2 – a lot
Climbing 3-5 steps with a railing	1 – unable	1 - unable

While no short-term goals were met over the episode of care, the patient continually made progress toward meeting those goals. The patient progressed from requiring minimal assist to standby assist for a supine to sit transfer, moderate assist of two to minimal assist of two for a sit to stand transfer, and progressed from not being able to ambulate at all to 25 foot ambulation using the parallel bars and a ceiling lift with minimal assist of one. Unmet short-term goals and the patient's long-term goals will be assessed and revised in inpatient rehabilitation following discharge.

The patient had no ill effects from the intervention as each activity was tolerated well. There were no complaints of pain, however some fatigue following therapy sessions was noted by the patient. Patient response to each therapy session was considered at the following session to select intervention intensity. Compliance was good as the patient was very motivated to participate in therapy and return to his prior level of function. Overall, the patient and his wife were satisfied with the care and treatment he received in acute care. They were pleased with the progression he was making and were looking forward to continuing recovery in inpatient rehabilitation.

CHAPTER V

DISCUSSION

Acute Inflammatory Demyelinating Polyneuropathy is a neurological disorder characterized by demyelination to peripheral nerves and nerve roots, with potentially chronic implications.[21] Physical therapy is a key component of the multidisciplinary team providing care to individuals with AIDP with a focus on improving mobility and functional independence. This case report provided the opportunity to document the outcomes of physical therapy interventions for a patient in the acute stage of AIDP. Although goals were not met by discharge, gains in functional mobility were made. This shows the use of functionally-based interventions during PT management to be beneficial. A principle objective through this episode of care was to demonstrate that the patient would be able to tolerate and benefit from intense therapy, qualifying him for inpatient rehabilitation. This was achieved through participation of three hours of physical therapy and occupational therapy every day in acute care.

Exercise intensity was closely monitored during intervention. Although patients with GBS usually recover with muscle re-innervation, it has been shown that overworking partially denervated muscles can cause further damage, including loss of functioning motor units.[22] Furthermore, having a decreased number of motor units has been linked to central fatigue.[22] Recent research has indicated central fatigue could potentially be the cause of chronic fatigue that patients experience many years after GBS.[22,23] It is imperative to be cautious and avoid over-exercising diseased motor units.

Though impossible to distinguish between advances in functional mobility secondary to medical management and disease course versus physical therapy, treatment did not cause harm to the patient. Physical therapy management can have a preemptive approach through the prevention of secondary complications including deep vein thrombosis, skin breakdown and contractures in acute care. In addition, physical therapy can assist in the prevention of deconditioning from immobilization contributing to enhanced outcomes.

Reflective Practice

Following review of literature and analyzing the episode of care, there are components that may have enhanced care. Literature search revealed the high prevalence of neuropathic and musculoskeletal pain associated with AIDP.[21] Although the patient did not report any pain, it is important to ask about new symptoms to ensure comfort and quality care.

The patient was being cared for by a multidisciplinary team addressing all aspects of care which was shown through documentation in an electronic medical record. However, regular assessment of vital signs should have been completed at each session rather than only at evaluation. Individuals with AIDP are at risk for automatic and pulmonary dysfunction, especially in the acute phase of the diease.[21] Tachycardia and rapid changes in blood pressure can be a dangerous consequence, therefore essential to monitor throughout. In addition, the risk of secondary pulmonary impairments such as decreased ventilation, gas exchange, and secretion clearance due to weakness of the muscles of respiration.[21] This patient was being seen by respiratory therapy, however chart review of pulmonary function should have been completed to ensure safety during intervention and used to help guide treatment.

A challenge throughout treatment was establishing a balance between participation and fatigue. Though subjective report was used to monitor fatigue and guide treatment, no standard

outcome assessment was utilized to record his response to activity. The Borg Scale of Perceived Exertion is a patient-reported relative scale ranging from “no exertion” (6) to “maximal exertion” (20). This measure should have been utilized during activity to measure functional recovery, help the patient identify activity limitations, and guide patient education.

The episode of care for this patient was effective in the eyes of the therapist and patient. Although we cannot differentiate between what might be natural progression and recovery, this case study demonstrates acute care physical therapy did not worsen his symptoms. There remains a need for further research to determine the most effective therapeutic interventions for AIDP in the acute stage. This will allow for a better understanding of the impact physical therapy in acute care will play on the long-term prognosis and outcomes.

APPENDIX 1

INTERNATTIONAL CLASSIFICATION OF FUNCTIONING

HEALTH CONDITION
Guillain-Barre Syndrome Acute Inflammatory Demyelinating Polyneuropathy

BODY STRUCTURES/FUNCTION (IMPAIRMENTS)
1. Body structure Impairments - Peripheral nerve involvement of upper and lower extremities **2. Body function Impairments** - Upper and lower extremity weakness - Impaired sensation in bilateral hands and feet - Fatigue - Incoordination - Gait abnormalities

ACTIVITY (TASKS)	
Abilities	**Limitations**
- Intact cognitive ability - Able to sit unsupported - Able to complete bed mobility with minimal assist - Able to complete seated activities	- Unable to stand or walk independently - Unable to climb steps - Unable to rise from a chair - ADL's such as washing, dressing, shopping, meal preparation

PARTICIPATION	
Abilities	**Restrictions**
- Able to converse with family and medical staff allowing meaningful conversation - Able to make work accommodations via phone	- Limited ability to return to work - Unable to care for one-year old child - Decreased quality of life

ENVIRONMENTAL			
Personal (internal)		**Environmental (External)**	
Facilitators	**Barriers**	**Facilitators**	**Barriers**
- 37 years-old - Male - High motivation - Successful career	- Alcohol dependence - Tobacco use - Obese - Anxiety/stress regarding current condition	- Family support - Support of third-party payer for interdisciplinary inpatient rehabilitation - Elevator at workplace	- Multi-level home - Stress of family regarding finances and illness - Winter condition – slippery environment - No assistive device at home

APPENDIX 2

TREATMENT INTERVENTION TIMELINE

Day	AM	PM	Billing
One	Initial Physical Therapy Evaluation		Mod Complex Eval x1 {97162}
Two	Transfer training Bed mobility, scooting Supine bilateral LE and core strengthening Ankle Pumps x 10 reps Heel slides x 10 reps Straight Leg raises x 8 reps Bridging x 5 reps	Gait with QuickMove 20 feet x 2 reps 5 minute rest between Transfer Training Sit to stand x 4 reps Standing Tolerance 60-90 seconds x 4 reps Weight shifting x 10 reps Core Strengthening Unsupported seated weight shifting 60 sec x 2 reps	Therapeutic Exercise x1 {97110} Therapeutic Activity x2 {97530} Gait Training x1 {97116}
Three	Transfer Training Sit to stand with parallel bars x 4 reps Standing Tolerance 30-60 seconds x 4 reps Seated bilateral LE strengthening Quad sets x 10 reps Marching x 10 reps Glute sets x 10 reps	Transfer Training Sliding board transfer Bilateral LE strengthening Quad sets x 10 reps Straight leg raise x 10 reps Bridging x 10 reps Short-arc quad x 10 reps Clamshells x 10 reps Hip abduction x 10 reps Prone hip extension x 10 reps Prone hamstring curl x 10 rep	Therapeutic Exercise x2 {97110} Therapeutic Activity x2 {97530}
Four	Gait Training 12 feet x 1, 15 feet x 2 Parallel bars and lift Transfer Training Sit to stand in parallel bars x 4 reps	Transfer Training Sliding board transfer Supine to/from sit Bilateral LE and core strengthening Short arc quads x 8 reps Bridging x 8 reps Hip abduction x 8 reps Heel slides x 8 reps Seated weight shift x 60 sec	Gait training x2 {97116} Therapeutic Exercise x2 {97110}
Five	Discharge to Inpatient Rehabilitation		

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