5-2020

A Case Report: Factors Influencing the Care of a Critically Ill Patient in the ICU Following Medical Management of a Benign Parasagittal Meningioma

Lucas Keller

A Case Report: Factors Influencing the Care of a Critically Ill Patient in the ICU Following Medical Management of a Benign Parasagittal Meningioma

by

Lucas Keller
Bachelor of General Studies with an Emphasis in Health Sciences
Minor in Psychology
University of North Dakota, 2019

A Scholarly Project Submitted to the Graduate Faculty of the

Department of Physical Therapy

School of Medicine

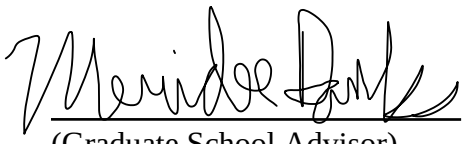
University of North Dakota

in partial fulfillment of the requirements for the degree of

Doctor of Physical Therapy

Grand Forks, North Dakota
May 2020

This Scholarly Project, submitted by Lucas Keller 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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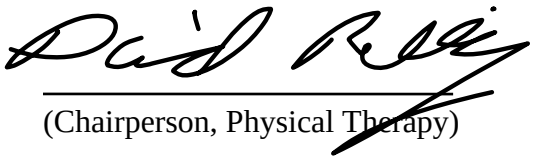

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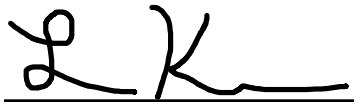
Signature 

Date 9/3/20

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ACKNOWLEDGEMENTS

I would like to thank my clinical instructor, Amber McLaughlin DPT, that was present for this case. She gave me independence to learn while maintaining an appropriate amount of guidance that pushed me to grow. She helped me to develop an appreciation for practicing in acute care.

Thank you, Meridee Danks PT, DPT, NCS for her guidance throughout this scholarly project. I could not have completed this project without her support and advice.

I would also like to thank my classmates (Brian Illing, Cassidy Stienessen, Lauren McIntosh, and Winter Monette) for their peer reviews and for all the time spent pushing me to become a better writer and future physical therapist.

I would also like to thank the rest of the UND PT faculty for keeping a high standard of education through the uncertain times of the COVID-19 pandemic. They made a truly tough and sudden transition very smooth.

Lastly, I would like to thank my family and close friends for their support through my education. I would not be where I am today without you.

ABSTRACT

Background and Purpose. Primary brain tumors will affect 23,890 adults in the US in 2020. Many of these patients will require an intensive care unit (ICU) if resection is the chosen course of treatment. Early mobility has been shown to reduce negative effect of ICU stays in patient ability and long-term outcomes. **Case Description.** This report describes the 4-week inpatient physical therapy management of a 69-year-old female who is 6 months post left cerebrovascular accident (CVA) and presented to the ICU with shortness of breath, severe continuous frontal headaches, and a reduction of regained strength from her CVA in her right extremities. Upon further investigation, vasogenic edema caused by a benign parasagittal meningioma was found. The purpose of this article is to describe the physical therapy driven interventions, and the outcomes found in the patient. **Intervention.** Interventions included following a post-craniotomy protocol and an early-mobility protocol which for this patient focused on upright self-supported sitting and gross movement motion. The patient was also educated and trained on bed mobility and posture correction. **Outcomes.** Following physical therapy intervention, the patient displayed an increase in right extremity strength and range of motion, increase in independence in bed mobility and sitting balance, and decreases in overall symptoms. **Discussion**. Rationale for treatment pre and post-surgery was based on study findings and clinical reasoning from clinical instructors on reducing ICU acquired weakness and strengthening muscle weakness. Treatments were progressed with patient response and clinical findings. The case was not without limitations, these were reflected upon.

CHAPTER I

INTRODUCTION

Primary brain tumors will affect an estimated 23,890 adults in the United States in 2020. Meningiomas are observed to be the most common primary brain tumors presently known, accounting for 33.8%. These tumors are a cancerous growth that arises from the meninges which serve as a protective and nourishing cover for the brain and spinal cord. Often, vasogenic edema will be found in concurrence with these tumors. Meningiomas can be either benign or malignant, meaning that it has the ability to spread to other systems. Benign tumors account for 53.5% of all meningiomas and are seen significantly more in the female, African American, and older (65+) populations of patients.[1]

When the cancerous growth enlarges inside the cranium, it alongside the increased pressure from possible vasogenic edema will eventually contact the skull causing pressure to be exerted onto the cerebral cortex. Due to the compression of the brain tissue, signs and symptoms may vary depending on the location of the mass in the meninges. However, commonly seen signs and symptoms include severe headaches, memory loss, extremity function and strength loss, changes in the five main senses, and/or seizures. Many meningiomas are benign and asymptomatic and thus can be monitored as long as no issues arise. Medical intervention is swiftly initiated once the patient experiences signs and symptoms inhibiting their function and/or quality of life. The treatment typically done for the benign tumor is brain decompression and maximal surgical resection through a craniotomy.[2] Prognostically, there is a high level of incidence

of motor dysfunction with varying degree in patients with primary brain tumor removal. This dysfunction leads to a long path of rehabilitation, beginning in an acute setting (ICU) and depending on severity, ending in long-term acute rehab and outpatient neurologic therapy.[3] If untreated this motor dysfunction will lead to chronic disability and a lower quality of life for the patient.

Briefly, literature was reviewed to locate evidence-based and appropriate physical therapy examination and evaluation procedures for the critically ill as well as post-op ICU patient. The focus of the review was on the assessment of gross and core motor function/strength in neurological patients (specifically for cerebrovascular accidents but can be applied), supplemented by cranial nerve testing. In their text *Physical Rehabilitation,* O'Sullivan, Schmitz and Fulk[4] review neurological examination procedures focusing on gross motor function and movement initiation paired with an emphasis on core stability. They also lay out a standard assessment for cranial nerve functioning to rule in or out any involvement of the related structures.

Literature was also reviewed for precautions following a craniotomy and patient interventions directed towards critically ill as well as neurologic based pathologies. Depending on severity of symptoms post-surgery, a patient may be ordered to bed level activity or strict bedrest for up to two weeks keeping their head positioned at 30 degrees of elevation. In ICU patients that are post-craniotomy, the intensity of interventions must be lowered following the positioning and activity order precautions.[5] Kayambu et al,[6] in a systematic review, voiced the importance of early mobility in the ICU setting for critically ill and post-operative patients. They found that early mobility provided by skilled therapists, especially in vented and sedated patients, can optimize functional gains

and reduce time of hospitalization during the patient care episode. Intensity of interventions is based on patient function and ability, ranging from simple passive range of motion (PROM) and repositioning in bed to walking and stair negotiation. The avoidance of static positioning and facilitation of upright postures was the key to reducing overall deconditioning.[7] In the ICU a medical interdisciplinary team approach has been adopted as it has shown better ability for patient-centered care and eliminating unnecessary redundancy for the patient.[8] The goal of ICU therapy is to maximize activity tolerance and functional ability thus setting patients up for strong rehabilitation potential and further growth in a rehabilitation setting.

The objective for this case report is to follow the four-week inpatient physical therapy management, including one-week pre and three weeks post-surgical intervention, of a 69-year-old female diagnosed with a benign parasagittal tumor and vasogenic edema. This diagnosis required surgical and rehabilitative management. Laid out in the following text is the clinical decision making that took place in order to appropriately and effectively complete examination and evaluation, provide treatment, and build rapport during rehab with the patient. This report will cover the patient's status and impairments explained using enablement framework, physical therapy's role and effectiveness in the ICU setting, as well as the factors that went into the clinical decision making in regard to this patient. The case will also provide a self-reflection of the therapy provided, to better enhance the interventions for patients in future practice.

CHAPTER II

CASE DESCRIPTION

The patient is a 69-year-old Caucasian female who was diagnosed with a benign parasagittal parietal meningioma that was found after one week of being in the ICU for her symptoms. She had previously suffered a left cerebrovascular accident (CVA) in March, six months prior to this hospital admission. Following this CVA after medical intervention, she underwent therapy in a long-term acute rehabilitation center. Here she reported she was able to regain much of her strength and active range of motion (AROM) that was lost due to the CVA. The therapy team was unable to obtain medical records objectively reporting how much strength and function she lost and then regained in rehab. However, the patient stated that she had made good progress but currently presented with roughly half of what she regained in rehab. The patient reported she was independent performing ADLs but required moderate to maximum assistance varying on the activity. She still received help from facility staff for mobility outside of her bed during her rehab due to her being too weak to accommodate her high body mass index (BMI) which was in the range of 40-49 kg/m^2, or extreme class III obesity.[9]

In the previous two months prior to the current hospital admission, the patient noted a slow decline in her overall condition. She began experiencing decreases in her regained strength and the functional mobility of her right extremities, a decrease in her overall bed mobility, and decreased cognitive abilities/memory. Other signs and

symptoms noted by the patient included increased shortness of breath (SOB) and often had severe headaches in the frontal area and crown of her head. With increasing severity of symptoms, this was a concern to her and her husband. They brought her to the hospital where the patient was admitted due to her signs and symptoms and referred to physical therapy (PT) for evaluation and treatment of functional deficits. During her first week of admittance, the patient underwent a functional magnetic resonance image (fMRI) of her brain where a benign parasagittal meningioma was found under the crown of her skull as well as vasogenic edema. This tumor was approximately five cm by six cm in size.

The neurosurgeon did not comment as to how long the patient may have had this tumor but did hypothesized the decrease in function was due to the increase in cerebral pressure from the mass and edema causing a depression of the neuromuscular system. Surgical removal of the tumor with brain decompression was the agreed upon intervention by her, her family, and her medical team. The patient was seen by PT before and after surgical resection.

Outside of the neurological involvement of the patient's CVA and newly diagnosed meningioma, there were other physical barriers. The patient has a past medical history (PMH) of anxiety, depression, asthma, fibromyalgia, GERD, hyperlipidemia, stage one hypertension, chronic kidney stones, left total knee arthroplasty, stage III chronic kidney disease, supplemental oxygen dependency (2 liters), and chronic congestive heart failure. This paints the picture of a patient that falls well within what Griffiths and Hall[10] describe being "critically ill" in the ICU and being at a high risk for physical deconditioning. They found that these patients are increasingly likely to

experience a high level of physical deconditioning which can be linked to worsening symptoms and further deterioration of their existing conditions.[6,10]

The patient and her husband were both retired, she was a former elementary school teacher. This patient was never the most active individual and had a slightly higher BMI, however her BMI is self-reported as increasing largely since she suffered her CVA. With her history of neurological deficits, she presented with a knowledge of what to expect with rehabilitation. She came determined, enthusiastic for improvement, and had a high work-ethic. The patient had many family members in the local area along with her husband that were very supportive and willing to do anything to help. The patient and the patient's family's main goal was for her to come to a level of function that would allow for them to care for and transport her in/out of their one-story home that had just one step to enter.

This patient was seen in the ICU specifically for her symptoms related to her newly diagnosed tumor. However, for the purpose of PT, both the tumor and her previous CVA were taken into account as both are playing a role in her current mobility condition. Physical Therapy's focus was placed heavily on gross movements and overall mobility status/upright sitting independence.

Examination, Evaluation, and Diagnosis

O'Sullivan, Schmitz and Fulk's evaluation technique included a brief chart review along with additional history, observation, functional assessments, and gross motor function testing. Cranial nerves were also tested following a standardized assessment protocol.[4] Vitals assessment was also done at the beginning and during every therapy session by obtaining blood pressure, Sp02, and heart rate readings.

The patient was evaluated three times in the ICU. At the time of admittance, post-neurosurgery, and at discharge. Admission and discharge being the only formal evaluations. This was important because PT and the neurosurgeon wanted to see if there was an effect from relieving intracranial pressure and the removal of her brain mass, as well as the outcomes of therapy. Post-surgery evaluation was not able to be done until five days post-surgery due to patient sedation from brain surgery. The main goal of PT care was to improve the patient's strength and improve functional mobility to discharge her out of acute care and to a long-term rehab setting that would be much more intensive and specific in her neurological recovery. For primary brain tumors, rehabilitation time will vary depending on patient ability, but due to the complexity of this patient she can expect to be in rehab longer than the average individual. To see these improvements the multiple assessments provided valuable information.

The results of the patient's cranial nerve testing were unremarkable in pre and post-surgery, so no further assessment was pursued. The patient was oriented to person, place, time and circumstance at evaluation. Gross motor function assessment of the extremities was done under the supervision of the acting clinical instructor (CI). The patient, in upright sitting at the edge of the bed (EOB) for the upper extremity and supine for the lower extremity, was asked to go through her full available motions in multiple gross planes (flexion, abduction, extension) with both extremities. The non-standardized grading system can be found in Table 1.

Core stability, as recommended by O'Sullivan, Schmitz and Fulk[4], was objectively measured on the patient's ability to sit self-supported at the EOB for an amount of time without needing assistance or support from the therapists. For gross

motor function and core stability results see Table 2. The therapists also assessed the patient's functional ability in bed mobility pre and post-surgery (see Table 3).

Table 1. Grading Scale

Grade	Interpretation
5	Full ROM and speed with no trouble of initiation
4	Full ROM and reduced speed with slowed initiation
3	Partial ROM (>50% expected) and reduced initiation
2	Limited ROM (<50% expected) and reduced initiation
1	Muscle twitches and reduced initiation

Table 2. Gross Motor Function

Measurement	Pre-Surgery	Post-Surgery
Upper Extremity Gross Function	R – 1/5 L – 4/5	R – 2/5 L – 4/5
Lower Extremity Gross Function	R – 3/5 L – 4/5	R – 3/5 L – 4/5
Core Stability Assessment	1-minute Poor +	2-minutes Fair -

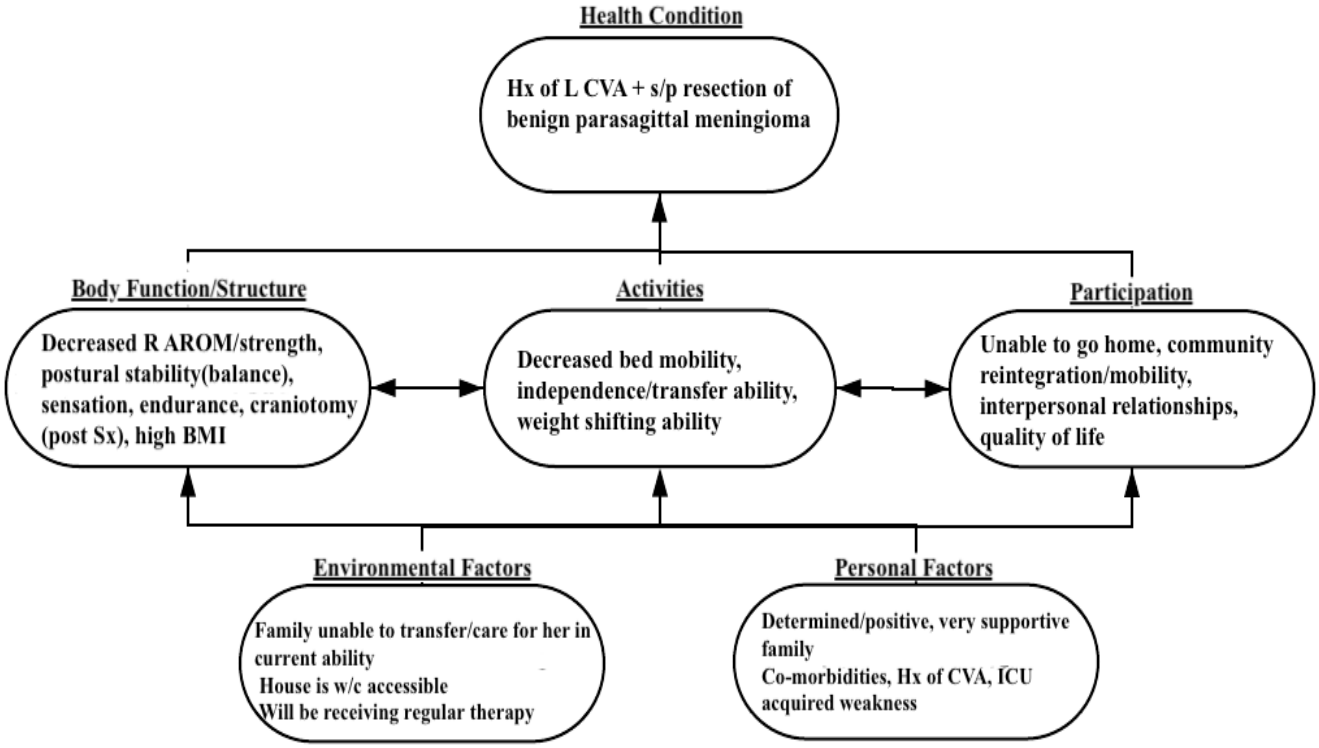
Table 3. Bed Mobility Assessment

Mobility/Transfer	Pre/Post-Surgery
Turn/Roll Right	Moderate assist x1
Turn/Roll Left	Max assist x2
Supine-to-EOB	Max assist x2
EOB-to-Supine	Moderate assist x1
Supine Repositioning	Maximum assist x1

The CI for this case had a strong stance on looking at patients as a whole, using clinical framework to look at this patient with their impairments and activity limitations. This framework could then be used to formulate a PT diagnosis. For this case the International Classification of Functioning, Disability and Health (ICF) framework was used (see Figure 1). This framework is one that is used as an enablement model to look at what the patient can do, what body functions and structures can be improved, and what

factors they have to assist them rather than focusing solely on their disability.[11] This school of thought keeps in mind the common goal of improving her overall function, dependence level, and activity tolerance. Using this framework can allow for therapy to lead directly to the specific patient's needs, making rehab as efficient as possible.

Figure 1. ICF Framework



This patient presented with decreased strength, endurance, and postural stability resulting in decreased independence, functional mobility and activity tolerance. Activity tolerance was assessed with vitals and patient reported fatigue levels. The patient never had any issues with blood pressure or heart rate but did occasionally need to stop exercise due to Sp02 levels. Without exercise she would stay at a level of 98% Sp02. The patient's levels would be monitored throughout the session and whenever it began to get below 92% exercise would be stopped and the patient would be coached through pursed lip breathing. Exercise would proceed once the Sp02 levels were consistently above 95%.

With limited treatment time in the ICU it was determined by the therapy staff to focus on her gross movement using AROM, and core stability by sitting on the EOB working to hold herself up independently. These abilities were seen to be most important in order to discharge her to a rehab setting as soon as able.

Prognosis

The patient was in the ICU and seen by PT over a four-week course once daily. The patient had a lengthy PMH as well as a very high BMI which were limiters to her rehab. Despite this she was a very determined and enthusiastic patient that was focused on improving and getting home. Along with this she had a very supportive family that held her accountable and did a lot of work with her outside of therapy. Having suffered a CVA shortly before this new diagnosis, both were taken into account when determining her rehab prognosis. Wise, Clivas and Sattelmayer[12] report that patients can show functional improvements up to five years following a CVA. The patient should be able to participate in rehab and regain recently lost function and still have room to improve from her prior CVA and brain tumor. Accounting for all of her personal and environmental factors, positive and negative, the patient was subjectively given by PT an initial prognosis in the ICU of fair plus for rehab potential.

There are many other factors that may also contribute to prognosis following an ICU stay. Schandl et al[13] found that a large determinant of long-term disability following an ICU stay is the patient's educational level. This bodes well for the patient in this case as she graduated college and was an educator herself. On top of this she was already educated of the rehab process allowing her experience of the process. This is another factor playing a role in how successful this patient will be in reaching her therapy goals.

The Boston Six-Click is a functional assessment score that looks at six domains. Three domains fall within basic mobility and three under daily activities rating the patient as either 1-unable or 4-independent. Jette et al[14] found in their study that a patient's Six-Click score in the ICU upon admission had predictive validity of 82% for their discharge location and an internal consistency reliability of 91%. They showed that a score of 18+ correlated to a discharge home without additional services. This patient scored an 8 on admission. The therapy staff was confident in the fact that the patient would be requiring further rehabilitation before being able to return home and her score would confirm it. The patient and her family were very aware of this situation and were ready to work and start the journey to get the patient back home. After four-weeks, the patient was discharged to a local acute rehab facility where she would continue in therapy.

CHAPTER III

INTERVENTIONS AND PLAN OF CARE

The patient was seen by PT five times a week with time of treatment varying (15 minutes to 45 minutes) depending on patient's daily tolerance and fatigue levels. The patient also received treatments from respiratory and occupational therapy (RT & OT) as well as speech language pathologists (SLP) during her hospitalization. Due to the patient's activity tolerance, this was an important aspect to be aware of. Manthous and Hollingshead[8] report that nonmedical management and communication skills in the ICU can single-handedly be a deciding factor in the level of care perceived by the patient. With patient fatigue and energy being a valuable resource, it is important to establish a culture of continuous improvement with an open line of communication, clinician flexibility and even collaboration for co-treatments if necessary.[6, 8] With so many moving parts and the high energy pace of the ICU it is not difficult to have different domains of the therapy team schedule the same patient at the same time. Appropriate communication skills can avoid this. Generally, the therapy disciplines would communicate and those that would be more taxing to the patients would be scheduled to work with patients earlier in the day when they could best tolerate increased physical demands, saving therapies with less exertion for later in the day.

The patient was diagnosed with her tumor shortly after being admitted and did not receive surgery until a week after admittance. In the week awaiting surgery, AROM,

functional mobility training, active sitting on EOB and patient education comprised the plan of care. The patient was educated on techniques in bed mobility such as log rolling and decreasing base of support in order to turn, reposition and sit up easier. Therapeutic exercise focused on mobility and strengthening of proximal gross movements first and then working to distal movements. Therapy staff would work to do three sets of 10 exercises throughout her sitting EOB rest breaks. The movement directions for each joint can be found in Table 4. The patient was encouraged to complete AROM and if unable was assisted by the therapist in initiation and achieving full range. The patient, while sitting EOB, was also directed on weight shifting side to side, instructed on healthy posture (chin tucks/scapular retraction) and how to maintain it, and working on self-supported sitting and core stability.

Table 4. ROM Movements

Joint	Movement
Shoulder	Flexion /Abduction/Extension
Elbow/Wrist	Flexion/Extension
Hip	Flexion/Abduction
Knee	Flexion/Extension
Ankle	Plantarflexion/Dorsiflexion

The patient was intubated and sedated post-surgery (the second week) which took roughly a week to be extubated and wean off, during this she was less able to participate in therapy and tolerated less amounts of activity. The patient was not keen on the idea of having therapists work with her while being sedated. However, the research established a firm need for early mobility of any intensity as early as possible.[6,10,15] With the patient

being a former teacher, she was very trusting in academia and evidence-based practice. Curtis and White[16] discuss tactics for appropriate education/decision-making in critically ill patients. They discuss the importance of tailoring patient education in the form of the patient's preference. In this case, PT used family centered values and trust in literature to present evidence to the whole family. In this way the family was able to comprehend the evidence together to make a decision they were comfortable with, which was early mobility.

As a PT, or any medical professional for that matter, there is a duty to the patient to provide evidence-based research to help the patient make informed decisions regarding their condition and treatment. The American Physical Therapy Association (APTA) specifically states the need for this directly in their *Code of Ethics* under but not limited to principle 3b and 4a.[17] Following the APTAs code of ethics and using a family approach for patient-centered care allowed us to efficiently and effectively relay the importance of early mobility.

The second week in the ICU was the patient's first week post-surgery. She was intubated and sedated from the surgery to reduce risk of damaging her incision and healing bone flap from the craniotomy. The patient was on bed rest orders from her neurosurgeon for a week in order to allow her surgical site and brain tissue to heal.[5] Early mobility was initiated but exercise was limited to ROM that could be done without a change of bed position. To get an idea of how to progress treatments with the patient and be as efficient as possible, the facilities standard protocol for activity & ambulation for invasive and non-invasive patients was followed (see Appendix A). The hospital system this patient care occurred in, has a rather aggressive approach with vent mobility to get

patients moving as much and as early as medically appropriate. The facility's policy encourages bed level activity to the highest degree even if it is just PROM.[15] This policy aligns well with the literature and thus this patient was taken through three sets of 10 repetitions of PROM, encouraging patient participation. No billing was done for this unskilled therapy as it was student provided therapy, allowing for student educational purposes of following the patient. Otherwise this unskilled therapy could be taught to family or the nursing staff to be completed throughout the day.

Towards the end of her second week, the patient was weaned off sedation and was cleared for increased activity and upright sitting by the neurosurgeon but was still vented per medical request. This increase in upright sitting required skilled vent mobility. This vent mobility requires a team effort. This team could be comprised of a mix of PTs, OTs, RTs, SLPs and the RNs. This teamwork requires excellent communication to ensure patient safety and optimal outcomes.

In patients who have been ventilated, once they pass their weaning trial and get extubated there are guidelines and precautions to take with the first movements post-extubation.[15] If the patient responds well upon being extubated, the plan of care can continue as normal. The patient was extubated a week after her date of surgery, she responded well.

The third and fourth week the patient was allowed to further increase her activity levels per the neurosurgeon. PT focused most on sitting EOB which focused on having the patient sit self-supported and shift her own weight in all directions, taking breaks by leaning back on therapist support. PT also continued functional mobility training and AROM/AAROM to attempt to regain strength and mobility. This AROM/AAROM was

completed as the patient took breaks sitting EOB and rested on therapist support. Each session PT emphasized and encouraged the patient to do more of her own muscle contraction receiving decreased therapist assistance. The exercises were done three sets of 10 repetitions. The functional mobility training was done by having the patient work on the bed mobility described in the examination process but with slightly less assistance to encourage more independence by the patient.

Throughout her treatment, involvement of her family was done as much as possible. They were educated on how to perform varying degrees of ROM with the patient. With this PT also educated on the importance of participating in as much activity as tolerable to maximize outcomes.[6] The family was instructed to complete ROM with the same repetitions and sets as done with PT as well as how to progress throughout the intensity of the ROM while in the ICU. Each session the patient would do three sets of 10 repetitions of each movement to her maximal level of ability. Once the patient weaned off her sedation and was able to participate, AAROM/AROM was completed utilizing assistance by the therapist/family as the patient fatigued.

CHAPTER IV

OUTCOMES

The patient was discharged from the hospital after 29 days of admittance to a long-term acute rehab facility. During hospitalization, the goal was to keep the patient as active as possible to minimize any deconditioning effects that could deteriorate her condition more. Early mobilization and avoidance of prolonged static positioning has provided statistically significant data that it can effectively fight these effects.[6,10] Overall the patient tolerated therapy well while only on a few occasions needed to briefly pause exercise to be coached on pursed lip breathing and breathing with exercise to raise and maintain Sp02 above 92%. She was very pleasant and driven in her recovery and had positive outcomes. She had a great desire to work and get herself better. Patient fatigue was a barrier necessary to keep in mind, but never a cause bad enough for cessation of therapy. She also displayed no compliance issues. In fact, PT witnessed the patient working outside of therapy with her family on numerous occasions.

Table 5. Gross Motor Function

Measurement	Discharge
Upper Extremity Gross Function	R – 3/5 L – 4/5
Lower Extremity Gross Function	R – 4/5 L – 4/5
Core Stability Assessment	9-minutes Good -

Table 6. Bed Mobility Assessment

Turn/Roll Right	Minimum assist x1
Turn/Roll Left	Moderate assist x1
Supine-to-EOB	Moderate assist x1
EOB-to-Supine	Minimum assist x1
Supine Repositioning	Modified Independent

The patient was not discharged from PT as she received continuing therapy in her long-term acute rehab. However, one last evaluation was done by inpatient PT before she discharged from the hospital. The patient displayed positive progress in the evaluations from admission to discharge. The patient received a score of 9 on the Boston 6-click assessment, indicating she would require further therapy and services upon leaving the ICU.[13] The patient reported satisfaction with therapy on multiple occasions.

CHAPTER V

DISCUSSION

This section will focus on the clinical decision-making done during this patient care as well as analysis of the patient's outcomes. According to Kisner and Colby,[18] clinicians must have knowledge pertinent to the situation, ability to integrate clinical findings, and an understanding of the patient's goals in order to have good clinical judgement. Physical therapist (PTs) have a vast knowledge of acute care and neurological rehab pertinent to this case. The patient was referred for PT evaluation and treatment by the practicing medical doctor due to her decreased mobility. She had a problem list that falls directly under the PT scope of practice and was available for daily therapy, was medically appropriate for mobilization, and was determined with good family support. All these factors led to the acceptance of the patient in PT.

Based on the examination procedures used, it allowed for specificity of interventions to the outcome measures which align with important daily function.[6,7] Overall the patient was not back to functional levels upon her discharge from the ICU. The patient and the therapists understood she would require continuing neurological rehabilitation upon leaving ICU care. However, PT did appreciate functional improvements in the patient's gross motor function, bed mobility and overall independence specifically on her CVA affected extremities. The recuperation of the patient's abilities following surgery correlates well with the hypothesis of the

neurosurgeon discussed in Chapter II. The patient's results also align well with those found in literature regarding early mobility initiation in the ICU.[6,7,10] Since the patient made such gains, it allowed her a better starting point to begin her long-term acute rehab. This allowed greater efficiency and theoretically a shorter overall rehab duration. Another positive factor allowing for positive results was the patient's education level and experience in rehab. Patient's with higher education levels typically show better results following an ICU stay with deconditioning effects.[13] This fact along with the patient's experience in rehab allowed for easy comprehension of patient education improving outcomes.

Reflective Practice

The patient had improvements in ability but there were still limitations in this case that require reflection. First and foremost, the author being a student with, at the time, very limited acute care experience. The need for multiple objective outcomes with established backgrounds is understood far better following the completion of this patient episode than before the experience. To meet this need, the Fugle-Meyer assessment for stroke patients could have been a good option to measure function. This would have been especially appropriate had therapy obtained results of the Fugle-Meyer from rehab therapists prior to the patient's ICU admission as it has excellent interrater reliability (R=96%).[19] This would allow for reliable assessment of the patient's ability to really understand where she was at and the possible effects of her tumor.

Secondly, as I proceeded through this clinical experience, I quickly discovered the increased importance of mental health on the patient's quality of life as well as functional outcomes. I observed the way declining mental health can affect not only a patient's

mood but activity tolerance and strength. This is not a one-way street either, declining physical condition will also greatly affect quality of life and mental health. Taking this into account, I see the importance of monitoring the patient's mental health as well as their physical. To do this I could have effectively used a screen such as the Short Form-36. This tool has excellent reliability in specifically patient's that have been diagnosed with brain tumors.[20] This reliability allows many disciplines and clinicians to use it so that the patient can effectively be monitored in an interdisciplinary setting. It is a good idea to monitor this aspect to get ahead of it and address it specifically before it compounds and negatively affects the patient's physical ability.

Lastly, the only negative thing observed during this patient care was repetitiveness of the treatments. This was slightly limited due to patient ability, but creativity in treatments is necessary to keep patients involved and satisfied with therapy. Overall, further experience in acute care will greatly improve my ability to practice in the setting. A lifelong education will solidify the ability by researching and learning up to date interventions, effective communication techniques and examination procedures. This case was success in enhancing my understanding and ability to participate in a patient's care in the acute care setting.

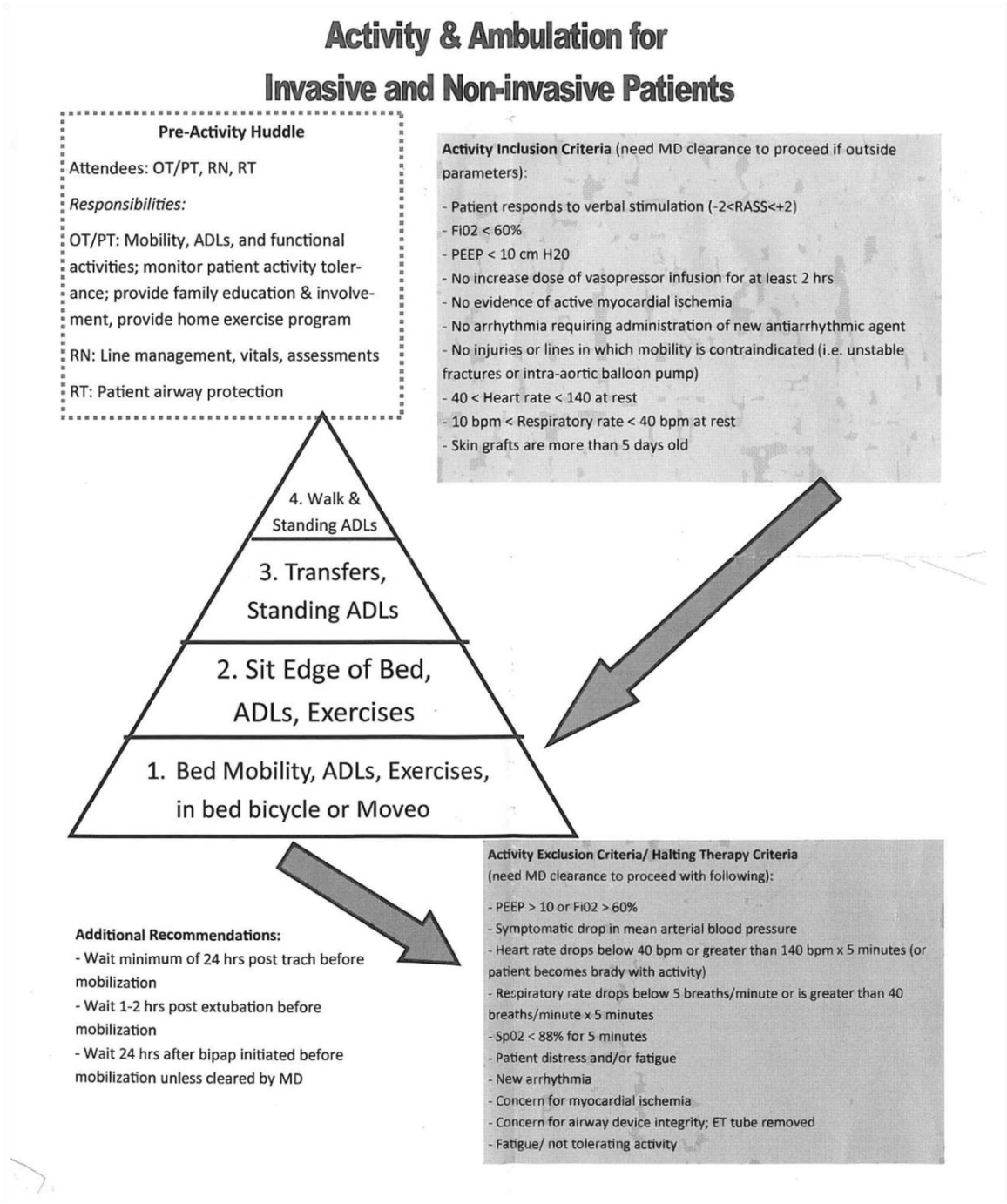
CONCLUSION

Overall, the patient and family were satisfied with Physical Therapy in the ICU. The improvement in ability from admission to discharge was viewed as a success to all involved. This case provided a greater understanding and demonstrated positive functional outcomes of a critically ill patient in the ICU that underwent an early mobility protocol for PT treatment. There will always be need for further research to better

understand early mobility effects. This research could be aimed at differentiating protocols for specific diagnoses and ability levels allowing for specific and effective treatment in all circumstances.

APPENDIX

Appendix A


Activity & Ambulation for
Invasive and Non-invasive Patients
Pre-Activity Huddle
Attendees: OT/PT, RN, RT
Responsibilities:
OT/PT: Mobility, ADLs, and functional activities; monitor patient activity tolerance; provide family education & involvement, provide home exercise program
RN: Line management, vitals, assessments
RT: Patient airway protection
Activity Inclusion Criteria (need MD clearance to proceed if outside parameters):
- Patient responds to verbal stimulation (-2<RASS<+2)
- Fi02 < 60%
- PEEP < 10 cm H20
- No increase dose of vasopressor infusion for at least 2 hrs
- No evidence of active myocardial ischemia
- No arrhythmia requiring administration of new antiarrhythmic agent
- No injuries or lines in which mobility is contraindicated (i.e. unstable fractures or intra-aortic balloon pump)
- 40 < Heart rate < 140 at rest
- 10 bpm < Respiratory rate < 40 bpm at rest
- Skin grafts are more than 5 days old
4. Walk & Standing ADLs
3. Transfers, Standing ADLs
2. Sit Edge of Bed, ADLs, Exercises
1. Bed Mobility, ADLs, Exercises, in bed bicycle or Moveo
Additional Recommendations:
- Wait minimum of 24 hrs post trach before mobilization
- Wait 1-2 hrs post extubation before mobilization
- Wait 24 hrs after bipap initiated before mobilization unless cleared by MD
Activity Exclusion Criteria/ Halting Therapy Criteria
(need MD clearance to proceed with following):
- PEEP > 10 or Fi02 > 60%
- Symptomatic drop in mean arterial blood pressure
- Heart rate drops below 40 bpm or greater than 140 bpm x 5 minutes (or patient becomes brady with activity)
- Respiratory rate drops below 5 breaths/minute or is greater than 40 breaths/minute x 5 minutes
- Sp02 < 88% for 5 minutes
- Patient distress and/or fatigue
- New arrhythmia
- Concern for myocardial ischemia
- Concern for airway device integrity; ET tube removed
- Fatigue/ not tolerating activity

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