

Neurocognitive Engagement Therapy in Treatment of a Patient with Severe Cognitive Impairment

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CASE REPORT

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ABSTRACT

Background and Purpose: Effective rehabilitation management of patients with cognitive impairment presents challenge to clinicians. Cognitive deficits affecting attention, memory, language, visuospatial abilities, executive functioning, and reasoning/insight have been reported to reduce the chances of successful rehab outcomes compared to cognitively intact individuals [2,3]. As the geriatric population continues to swell, the incidence of neurocognitive impairment has been reported to affect up to 64% of those receiving inpatient rehab services [4]. Dissemination of rehabilitation strategies that provide the ability for those with cognitive impairment to successfully rehab is imperative.

Keywords: rehabilitation management; cognitive impairment; transfer mobility

CASE DESCRIPTION

An 87-year-old female patient was treated conservatively with c-collar and inpatient subacute rehabilitation after sustaining a superior endplate fracture of T1 due to a mechanical fall at her assisted living facility. During her hospitalization she required 1:1 supervision and frequent reorientation. Her cognitive function was assessed with the Functional Assessment Staging Tool (6a) and the Montreal Cognitive Assessment (8/30) correlating with severe cognitive impairment. Treatment goals were to return to a supervision level of mobility for transfers and ambulation with a rolling walker so she could safely return to her assisted living facility. Interventions included utilization of enhanced gait training, therapeutic exercise, therapeutic activity, and neuromuscular reeducation. Enhancements were made through the use of Neurocognitive Engagement Therapy techniques [9].

OUTCOMES

Improvement in strength, balance, transfer mobility, and gait.

DISCUSSION

Because evidence is emerging in the literature supporting treatment enhancements for patients with cognitive impairment, it is important to disseminate success stories to continue to debunk the old perceptions that geriatric patients with cognitive impairment cannot benefit



from rehabilitation [22]. Physical therapists need to have a greater understanding of neurocognitive impairment so that correct and effective management strategies can be chosen to achieve person-centered goals. Realistic expectations and the use of enhanced interventions can reduce patient and clinician frustration and improve outcomes. Additional investigation is needed to support these conclusions.

BACKGROUND AND PURPOSE

Rehabilitation for geriatric patients is a successful intervention to improve function [1]. However, rehabilitation for geriatric patients with cognitive impairment has historically been questioned due to the impact on attention, memory, language, visuospatial abilities, executive functioning, and reasoning/insight [2,3]. The incidence of cognitive impairment (2.0 per 100 persons) continues to be significant in the population of patients requiring short-term rehab despite a declining trend in the literature [4,5].

Therefore identification of effective physical therapy interventions for the rehabilitation of patients with cognitive impairment still remains critical. Several studies have been completed and suggest interventions such as environmental modification, spaced retrieval, and person-centered care better engage patients. However, there is insufficient evidence to support what is best practice for the rehabilitation of this patient population [6,7]. The systemic review and meta-analysis completed by Bachmann et al, could only conclude specialized rehabilitation programs designed for older adults could lead to optimal functional recovery [1]. The analysis was unable to identify the defining characteristics of what the specialized program would contain. A recent systematic review by Scott et al, was able to identify that individual physical interventions demonstrated improved physical function versus the use of group activities, but the components of the individual sessions continue to be elusive [8].

Neurocognitive Engagement Therapy (NET) is an intervention that was developed by clinicians in a skilled

nursing environment to address the challenges that cognitive impairment presents to the rehabilitation process [9]. Initial research completed on NET suggests the incorporation of dementia care best practices into the therapy process is effective and improves outcomes for patients with neurocognitive impairment, even patients with moderate to severe cognitive decline [9]. The purpose of this case report is to demonstrate the use of NET in clinical practice as an effective intervention for physical rehabilitation therapists.

CASE DESCRIPTION

Patient History and Systems Review

The patient is an 87-year-old female with a superior endplate fracture of T1 following a fall in her assisted living facility. She did not require surgical intervention in the acute care setting and was placed in a cervical collar for four weeks. During her acute care episode, she was agitated and required direct supervision of hospital staff at all times to maintain her safety. She was referred to physical therapy in a short-term rehabilitation setting with orders to evaluate and treat her functional decline due to hospitalization for a fall with fracture.

The patient's past medical history was significant for dementia, atrial fibrillation, pacemaker placement, hypertension, osteoarthritis, prior lower thoracic and lumbar vertebral fractures from a motor vehicle accident in which she also sustained a subarachnoid and subdural hemorrhage one year prior to the current injury.

Prior to the fall, she lived in an assisted living environment and was able to walk with a front wheeled walker in the community with supervision of staff for safety. She was able to transfer independently. Her goal for physical therapy was to regain functional ambulation and transfers and return to the assisted living facility.

NET interventions were incorporated into her care in the short-term rehabilitation setting due to her severe cognitive decline as indicated in her Functional Assessment Staging Tool (FAST) score of 6.2 and Montreal Cognitive Assessment (MoCA) score of 8/30.

The FAST is a reliable and valid tool to assess functional deterioration in Alzheimer's disease. The FAST contains 7 stages with the first being stage 1 (no functional decline) to stage 7 (patient is unable to hold up head) [10]. The Montreal Cognitive Assessment (MoCA) assesses attention/concentration, executive functioning, memory, language, calculation, and orientation. A score of 25 or lower (from a maximum of 30) signifies significant cognitive impairment [11].

Examination

The patient completed a traditional evaluation in the skilled nursing subacute rehabilitation setting with several significant findings. Active range of motion in all extremities was within functional limits. Strength assessment completed using manual muscle testing was 4-/5 throughout bilateral lower extremities. The patient reported no pain and cardiopulmonary response to activity was stable. Cognition demonstrated continued severe impairment, as she exhibited perseveration of being "in jail" as well as safety deficits and tendency towards agitation. Functionally transfers from sit to stand required minimum assist of 1 and ambulation was completed using a front wheeled walker 75 feet with minimum assistance. Gait deviations noted with discontinuous steps, deficits in turning and decreased velocity. Timed up and go (TUG) was utilized and completed in 30 seconds reflecting a high fall risk. The TUG is a valid and reliable measure, in people with Alzheimer's disease reliability is high (ICC = .985-.988) [12].

Construct validity has been shown by correlating TUG scores to the Barthel Index (Pearson $r = -.79$) [13]. The MDC is 4.09 seconds in patients with Alzheimer's [14]. The patient's Modified Barthel Score (MBI) was 38/100 reflecting severe dependence predictive of the patient not returning home and being dependent in mobility and selfcare. Internal consistency reliability coefficient for the MBI is documented to be 0.90 [15].

Due to the demonstrated impairments in strength, balance, and cognition, the patient was a candidate for the use of NET interventions to reach the patient and family goal for improvement in functional mobility that would allow return to the assisted living setting. TUG scores were assessed weekly and the MBI was reassessed at discharge to determine effective use of NET interventions in this case.

Intervention

NET interventions are based on person-centered care principles and implemented through a variety of techniques that result in tailoring rehabilitation therapy to the specific capabilities, interests, and preferences of the individual [9]. Table 1 provides a description of the interventions included in the NET model. Daily the therapist would log what interventions were used and the level of engagement using The Pittsburgh Rehabilitation Participation Scale. The Pittsburgh Rehabilitation Participation Scale is a reliable tool (intraclass correlation coefficient ICC=.96 for physical therapists) to rate patient engagement during therapy sessions [16]. The scale is based upon a Likert scale ranging from 1 (no participation in any part of the session or the patient refused) to 6 (full patient participation in the entire session including all its parts). Table 2 reflects the NET interventions that were used daily during the patient's course of rehabilitation. The patient's length of stay in the rehabilitation setting was 25 days with 13 PT treatment days. During PT sessions traditional interventions (lower extremity progressive strengthening exercise, dynamic balance activities, and gait training) were used in each session to address the patient's impairments. Additionally familiar functional activities were developed based on the patient's life story and adaptations were made to the environment and communication during sessions to enhance patient engagement.

Session length daily was 45 minutes except for three days when the patient was seen for 60 minutes, 35 minutes, and 25 minutes.

OUTCOMES

Outcome measures and functional reporting were reassessed weekly. Table 3 represents the weekly changes noted. The patient demonstrated improvement weekly in all functional areas as well as in the TUG. The TUG improvement was greater than the MDC of 4.09 seconds and represents real changes in the patient's balance. The MBI was reassessed at discharge and also improved by 29 points to 67/100. This is reflective of moderate dependence predictive that when living alone the patient would require a number of community services to cope on a daily basis. This was a significant predictive change from evaluation baseline and sufficient for the patient to reach her goal of returning to the assisted living facility [15].

DISCUSSION

Cognitive impairment presents challenges in the rehabilitation process not only for patient success, but for clinicians' self-efficacy. Clinicians are motivated to utilize interventions that are successful and assist patients to reach goals. The patient described in this case report is not uncommon in today's practice. Utilization of techniques by physical therapists that have been documented to be effective by other healthcare providers such as nurses and occupational therapists makes sense.

Occupational therapy has described the use of person centered care, adaptations to the environment, and the best friend approach in communication as successful strategies to interact and engage patients with cognitive impairment [17,18]. Nursing as well has published reports that support the use of life story to enhance clinical care [19]. Several authors call for additional research to provide evidence describing what interventions lead to successful outcomes for patients' with dementia [20,21] [25,26]. Dissemination of successful interventions such as NET are critical to advancing the care for patients with cognitive impairment. On a humanistic level, patients with cognitive impairment served by rehabilitation professionals deserve and should demand access to the most effective techniques to address functional needs throughout the course of

disease. Encouraging continued examination of interventions to develop additional evidence that will culminate in best practices for the rehabilitative care of patients with cognitive impairment is crucial in clinical practice. In this documented patient case, the simple use of alterations to the environment, such as elimination of stimulation from a busy rehab gym for the quiet of the patient's room, is effective to increase engagement. Additionally, teaching therapists basic communication enhancements that compensate for deficits in cognitive processing are skills that many clinicians have not mastered through their professional education but can be taught through continuing education. However, continued work is needed to improve physical therapy education ensuring exposure to cognitive impairment during training experiences. Employers as well need to identify the skill sets of staff providing interventions to patients with cognitive impairment and provide advanced learning opportunities to improve care.

Patients with cognitive impairment can be rehabilitated, as this case documents, if therapists are willing to go beyond traditional interventions to find success. Further studies are needed to determine if NET strategies can be the foundation for successful rehabilitative care of patients with cognitive impairment.

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PEER REVIEW

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TABLES AND FIGURES

Table 1: NET intervention descriptions and suggested cognitive levels [7,17,19,20,21,23,24,25,26,27,28,29,30].

Traditional Therapy	MOCA \geq 22	Person Centered Care (PCC) [19]	Focusing on the process of caregiving versus an exclusively task-oriented approach. Successful PCC is deeply rooted in a knowledge, understanding and respect for the unique characteristics of the individual.
NET	MOCA = 8-21	Life Story [23]	Recording aspects of a person's past and present life, and then using this information to benefit the person in his/her present situation.
		Interdisciplinary Team (IDT) Collaboration [24]	An ongoing process that includes shared assessments, treatment planning, implementation of care and regular review and revision to insure optimal outcomes.
		Pain Management [25]	Due to changes in perception and processing the neurobiology of pain is affected; assessment of pain requires observational skills and tools designed for cognitive deficits; pain and behavioral interventions provide benefits in the treatment of pain.
		Family and Caregiver Education [17,26]	A dementia capable workforce requires effective education; Families require effective dementia education to reduce stress.
		Spaced Retrieval [7]	Spaced retrieval is a technique using repetitive retrieval to strengthen cognitive and motor skills in mild to moderate stages of dementia.
		Communication Skills [27]	Evidenced based interventions are utilized to enhance communication with patients with ADRD such as using touch, eye contact, and the resident's name; reduction of speech rate, etc.
		Environmental Alterations [20]	Use of environmental changes to enhance function and manage behavioral expressions such as ambient music, aromatherapy, visually complex environments, bright light therapy, etc.
		Familiar Functional Activities [21]	Life story, interests and preferences of the individual are used to select familiar enjoyable activities that can be incorporated into therapy.
		Behavior Management [28, 29]	Behaviors in those with ASRD can stem from unmet needs, environmental overload, and interactions of individual, caregiver, and environmental factors. Strategies to address needs are beneficial nonpharmacologic techniques for behavior management.
		Montessori for Dementia Principles [30]	The principles include task breakdown, guided repetition, and progression from simple to complex using activities that enable patients to practice.

Table 2: Daily Treatment Interventions and Engagement Ratings.

Treatment Intervention	Day	Day	Day	Day	Day	Day	Day	Day	Day	Day	Day	Day	Day
Traditional Treatment	◆	◆		◆	◆		◆	◆	◆	◆	◆	◆	◆
Familiar Functional Activity			◆			◆			◆	◆	◆	◆	◆
Environmental Adaptations				◆	◆				◆	◆	◆	◆	◆
Communication Strategies	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Pittsburgh Rehabilitation Participation Scale	3	4	2	4	2	2	4	5	5	5	5	5	5
Session Length (in minutes)	60	45	45	45	35	25	45	45	45	45	45	45	45

Table 3 : Weekly/Case Changes in Objective Measures.

Assessment Area	Evaluation	Week 1	Week 2	Week 3	Discharge
Lower Extremity Strength	4-/5	4-/5	4-/5	4/5	4/5
FAST	6.2				6.2
MoCA	8/30				8/30
Transfer Status	Minimum Assist	Contact Guard	Stand By Assist	Stand By Assist	Supervision
Gait Status	75 feet with front wheeled walker (FWW) and minimum assist	225 feet with FWW and contact guard	200 feet with FWW and contact guard	300 feet with FWW and stand by assist	200 feet with FWW and stand by assist
TUG	30 seconds with FWW	24 seconds with FWW	30 seconds with FWW	20 seconds with FWW	20 seconds with FWW
MBI	38/100				67/100