Improving Functional Independence with Rehabilitation Following a Metastatic Melanoma Brain Tumor Resection: A Case Report

Benjamin Sherr, BS
University of New England Department of Physical Therapy, Portland, Maine

Background: Melanoma is a cancer that begins in the melanocytes. Melanomas can occur anywhere on the skin, but are more likely to start in the trunk for men and the legs for women. In 2014, an estimated 76,180 new melanomas will be diagnosed (about 43,890 in men and 32,210 in women). An estimated 7,910 people are expected to die of melanoma (about 6,470 men and 3,420 women). Each year about 100,000 people in the United States are diagnosed with brain metastases. 2 One of the most common primary tumors to spread to the brain is melanoma. 2 In nearly 50 percent of people with melanoma that has metastasized, the disease can be found in the brain. 2 Melanoma will commonly spread to nearby lymph nodes (50-75%), lungs (70-87%), liver (54-77%), and bone (23-48%). 1 Once melanoma has spread to distant sites, it is in stage IV. Patients who have a stage IV cancer have a 5-year survival rate of 15% to 20%, and a 10-year survival of 10% to 15%. 4 Treatment in stage IV may include surgical excision, chemotherapy, immunotherapy, and/or radiation therapy. 5 Neurosurgeons use brain-mapping techniques to avoid injury to sites of language, motor, and sensory function during surgery. 6 Patients who have surgery to remove a brain tumor will benefit from rehabilitation during the acute phase to help improve functional outcomes.

History: A 67-year-old male with a one year history of melanoma complained of headaches 1-2 weeks prior to admission to an acute cancer hospital with left sided hemiparesis and dysarthria. A head CT scan revealed an intracranial hematomas and a lesion suspicious for metastasis within the right parietal lobe. A right parietal craniotomy, evacuation of the hematoma and resection of the brain tumor were performed and the pathology revealed metastatic melanoma.

Examination: The patient propelled the wheelchair 50 feet with max assist for direction. Max assist for a sprint pivot transfer from the bed to and from the wheelchair. Verbal and tactile cues were needed to help perform a sprint pivot transfer. The Function Independence Measure (FIM) is an 18-item test on seven point scale that was used to measure progression of functional independence.

Interventions: Balance training, functional mobility, gait training, manual therapy, neuromuscular re-education, orthotic training, patient/caregiver training, therapeutic exercise, transfer/wheelchair training focused on decreasing impairments and activity limitations throughout the plan of care. Functional mobility: Bed mobility techniques, toilet transfers, wheelchair propulsion over even and uneven surfaces, transfers, donning/louwen/upper body clothing all were completed to improve independence of functional mobility. Gait training: Weight shifting activities in parallel bars, stepping strategies, standing perturbations at hips in anterior, posterior and lateral directions. Lite gait partial body weight support training using a treadmill to work on proper gait pattern, proper weight shifting. Ambulation in parallel bars with minimal assist and max verbal cues was achieved.

Therapeutic exercise: LLE strengthening and ROM to facilitate hip adduction, abduction, flexion, extension, internal and external rotation, knee extension and flexion. Nu-step bicycle riding with both LLEs to help strengthen and facilitate use of the LLE. Neuromuscular re-education: Neurosensitization techniques during sitting and standing to facilitate LLE and UE. Mirror training in sitting, standing, and ambulation to improve alignment and gait quality.Mirror therapy activities using UE to help facilitate use of the LLE. Neuromuscular electrical stimulation (NMES) to Lo quads and hamstrings in side-lying with skateboard to facilitate LLE ROM. Orthotic training: Donning of Give-Much slings. Donning of multi-pectus boot while in bed to keep L ankle in neutral, avoiding plantarflexion contracture.

Outcomes: Functional Independence Measure (FIM) scores from Admission to Discharge

Discussion: The patient received 18, 60-75 minute physical therapy sessions over a span of 21 days while in the inpatient rehabilitation unit. This case study utilized many essential rehabilitation interventions to improve functional mobility and self-care. The FIM is a standardized functional outcome measure that was used effectively in this case report to measure the improvement in functional mobility and self-care. Following the removal of the brain tumor, this patient benefited from intense acute rehabilitation while in inpatient rehab unit to improve upon functional outcomes and become less dependent in performing ADL’s. The rehabilitation team including physical therapy, occupational therapy, speech language pathology, and other health professionals took a multi-disciplinary approach to achieve these desirable outcomes. The patient stated he was satisfied with his overall improvement in functional independence and self care upon discharge to a skilled nursing facility.

Acknowledgements: Benjamin Sherr, PT, DPT, EdD, for assistance with design and data collection.