

Patterns of Hand Grip Strength and Detection of Strength Loss in Patients Undergoing Bone Marrow Transplantation: A Feasibility Study

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Sayre and Shannon Dorcy completed the data collection. Sayre provided statistical support. All authors contributed to the conceptualization and design, analysis, and manuscript preparation.

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Purpose/Objectives: To determine the feasibility of measuring hand grip strength (HGS) daily in a population of recipients of bone marrow transplantation (BMT), to describe changes in strength measured by HGS, and to describe relationships between laboratory values (hematocrit, hemoglobin, and absolute neutrophil count) and HGS.

Design: Prospective, longitudinal, repeated measures, within subject.

Setting: Inpatient units at the University of Washington Medical Center in Seattle.

Sample: 33 patients admitted in preparation for BMT or for complications from BMT.

Methods: HGS measured on admission and daily.

Main Research Variables: HGS, absolute neutrophil count, hemoglobin, and hematocrit.

Findings: Participants found HGS testing to be relatively easy. Average time to complete testing was 7.2 minutes (SD = 1.95). Nineteen experienced 20% or greater decline in HGS during hospitalization, with nine experiencing decline during the conditioning phase. Age, gender, and hemoglobin correlated with HGS. Strength loss was more likely in those undergoing allogeneic compared to autologous BMT.

Conclusions: A majority of patients experienced strength decline during BMT, with a subgroup declining during conditioning. A positive relationship existed between HGS and hemoglobin and hematocrit in participants admitted for conditioning for BMT.

Implications for Nursing: Weakness increases risk for falls. Patients may experience as much as 50% strength loss during the course of hospitalization for BMT. Strength loss occurs in the conditioning phase for some patients.

Patients hospitalized for oncologic diagnoses are at increased risk of sustaining a fall compared with other hospitalized patients on medical-surgical units (6.3 versus 3.1 per 1,000 patient days) and are more likely to be injured if they do fall (Fischer et al., 2005). The etiology for this increased risk of falling is not clearly understood, but may be related to generalized weakness, sarcopenia, sensory and balance impairments, and/or medications (Morishita et al., 2015). Lower-extremity muscle weakness is a well-known risk factor for falls (Oliver, Healey, & Haines, 2010) and, although new-onset weakness is often a consequence of hospitalization for treatment of acute and/or life-threatening illness, objective assessment of muscle strength is not standard of care in hospitals. This is despite the availability of validated, performance-based measures of strength, particularly dynamometry (Beseler et al., 2014; Bohannon, Magasi, Bubela, Wang, & Gershon, 2012).