

# Orthostatic Vital Signs Algorithm

## Decreasing falls in patients undergoing blood and marrow transplantation or treatment with cellular immunotherapy

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**BACKGROUND:** Falls experienced by patients undergoing blood and marrow transplantation or treatment with cellular immunotherapy (BMT-CI) may result in injury or death. An algorithm was developed using the patient fall circumstances identified in a chart analysis from 2016.

**OBJECTIVES:** This study aimed to determine if the Moffitt BMT-CI Orthostatic Vital Signs Algorithm could decrease inpatient falls.

**METHODS:** A pre-/post-test program evaluation was conducted for one year pre- and postimplementation of the algorithm on newly admitted inpatients. Adherence rate of nurses using the algorithm was monitored.

**FINDINGS:** Overall falls decreased from 5.38% to 3.44%, with zero falls or injuries related to orthostasis for newly admitted patients. Adherence of nurses using the algorithm increased from 60% to 93%. The fall rate has been sustained less than baseline with 100% adherence, and the algorithm has been adopted as standard of practice.

### KEYWORDS

fall prevention; blood and marrow transplantation; cellular immunotherapy; falls

### DIGITAL OBJECT IDENTIFIER

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**FOR PATIENTS UNDERGOING BLOOD AND MARROW TRANSPLANTATION** or treatment with cellular immunotherapy (BMT-CI), falls are a serious risk. Serious injury or death from a fall may be attributed to low platelets and comorbidities (Ueki et al., 2014). Identifying patients at risk for falls is challenging, particularly in the BMT-CI population. Unanticipated physiologic falls are defined as unexpected falls associated with a medical condition, such as orthostatic hypotension, hypoglycemia, or seizures, that cannot be predicted by a fall risk scale (Quigley et al., 2006). Unanticipated physiologic falls occur frequently in the BMT-CI population, which is a high-risk group (Wildes et al., 2015).

### Background

Each year, between 700,000 and one million patients fall in hospitals (Butcher, 2013). Falls in hospitalized patients can lead to increased morbidity and mortality, poor quality of life, longer hospital stays, and increased resource use (Kuhlenschmidt et al., 2016; Ueki et al., 2014). Patients with cancer not only have standard at-risk factors for falls, but also have unique risk factors that may be related to their cancer treatment (Henderson, 2009; Kuhlenschmidt et al., 2016). Fall risk scales and surveillance tools are often used, but they are not able to predict all falls, particularly in patients with cancer (Wildes et al., 2015). A retrospective study by Henderson (2009) used the Morse Fall Assessment Tool in patients undergoing BMT to show characteristics related to fall outcomes. The study showed that a history of falls, secondary diagnosis, muscle weakness, and laboratory results (e.g., platelet, blood urea nitrogen, glucose, phosphorous levels) were related to falls. Unexpectedly, fevers were not related to falls (Henderson, 2009).

A retrospective study by Ueki et al. (2014) of patients who underwent an allogeneic hematopoietic stem cell transplantation reported that 45% of patients had experienced at least one fall, including near-miss episodes. Of these falls, pre-engraftment falls comprised 29% and post-engraftment falls 71%. Pre-engraftment falls were more associated with dizziness, whereas post-engraftment falls were more associated with muscle weakness (Ueki et al., 2014).