

# Risk Analysis of Falls in Patients Undergoing Allogeneic Hematopoietic Stem Cell Transplantation

Satoko Ueki, RN, Kazuhiro Ikegame, MD, PhD, Mariko Kozawa, RN, Junko Miyamoto, RN, Reiko Mori, MA, and Hiroyasu Ogawa, MD, PhD

To identify fall risks in patients undergoing hematopoietic stem cell transplantation (HSCT), the authors reviewed retrospective data on inpatients from April 2010 to March 2011. Among 77 HSCT patient records reviewed, the authors found that 35 patients had experienced at least one fall, including near-miss episodes (fallers). The main location of the falls was a corridor, and the main activity at the time of the fall was going to the toilet. To investigate fall risks along the HSCT time trajectory, the authors divided the time into pre- and postengraftment periods and investigated the unique characteristics of each.

Satoko Ueki, RN, is a nurse in the stem cell transplantation unit, Kazuhiro Ikegame, MD, PhD, is a physician in the Department of Hematology, Mariko Kozawa, RN, and Junko Miyamoto, RN, are both nurses in the Division of Nursing, Reiko Mori, MA, is a clinical psychologist in the Department of Clinical Psychology, and Hiroyasu Ogawa, MD, PhD, is a professor in the Department of Hematology, all at the Hyogo College of Medicine at Nishinomiya, Japan. The authors take full responsibility for the content of the article. The authors did not receive honoraria for this work. No financial relationships relevant to the content of this article have been disclosed by the authors or editorial staff. Ikegame can be reached at [kame@hyo-med.ac.jp](mailto:kame@hyo-med.ac.jp), with copy to editor at [CJONEditor@ons.org](mailto:CJONEditor@ons.org).

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Patient falls in hospital settings are common, with published rates ranging from 2–20 falls per 1,000 patient days (Fischer et al., 2005; Healey, Monro, Cockram, Adams, & Heseltine, 2004), and can lead to increased morbidity and mortality (Fischer et al., 2005). Injury rates from inpatient falls range from 25%–45% (Fischer et al., 2005; Hitchcock et al., 2004), and the risk of serious injury is as high as 10% (Grenier-Sennelier, Lombard, Jeny-Loeper, Maillet-Gouret, & Minvielle, 2002). Patient falls, particularly in the setting of hematopoietic stem cell transplantation (HSCT) units, may result in severe or fatal outcomes related to low platelet count or other health conditions. Despite various efforts to prevent falls (DiBardino, Cohen, & Didwania, 2012), they remain a major problem in safety management in acute care settings, such as HSCT

units. Although analyses of fall risks have been conducted in other fields (Abujudeh, Kaewlai, Shah, & Thrall, 2011; Titler, Shever, Kanak, Picone, & Qin, 2011; Weinberg et al., 2011), studies of falls in HSCT units are scarce. In the current study, the authors aim to describe the characteristics of falls along the HSCT timeline. To know causative mechanisms of falls along a clinical course and to identify patients at high risk for falls enables the prediction of fall episodes and may have beneficial implications for oncology nursing practice.

## Methods

### Medical Chart-Based Review

The retrospective study involved 77 patients who underwent an allogeneic HSCT on the HSCT unit at Hyogo College of Medicine in Japan from April 2010 to

March 2011. Information on the following variables was extracted from each patient's medical chart: (a) age and gender, (b) fall incident, (c) location and circumstances surrounding each incident, (d) date of the fall and medications used at that time, (e) time of the fall, (f) cause of the fall, (g) score on the Functional Independence Measure (FIM) (Forrest et al., 2012; Kwan, Kaplan, Hudson-McKinney, Redman-Bentley, & Rosario, 2012), (h) patient's response to the fall, and (i) result of the Picture-Frustration (P-F) Study (Rosenzweig, 1945). The study was approved by the institutional review board of the Hyogo College of Medicine.

### Functional Independence Measure Score

The FIM measures cognitive function, ability to communicate, mobility, and self-care skills (Forrest et al., 2012; Kwan et al., 2012). Some studies have identified a positive association between the FIM score and risk of falls (Saverino, Benevolo, Ottonello, Zsirai, & Sessarego, 2006; Teasell, McRae, Foley, & Bhardwaj 2002; Zdobysz, Boradia, Ennis, & Miller, 2005). In the authors' institution, FIM scores are assessed weekly by physiotherapists during the period of admission. The FIM score of fallers was defined as the score of the day or nearest to the day of the fall. The FIM scores of nonfallers in the pre- and postengraftment periods were represented by the minimum score in each period. Two or more incidents of falls in the same patients were counted as separate episodes.

### Picture-Frustration Study

The P-F Study was originally designed to measure reactive aggressive behavior