

# Engraftment Syndrome in Hematopoietic Stem Cell Transplantations

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Hematopoietic stem cell transplantation (HSCT) is an increasingly common treatment option for malignant and nonmalignant diseases, but it has significant associated morbidity and mortality. Nurses caring for HSCT recipients must be aware of all potential complications, including engraftment syndrome (ES). Previous nursing literature has included little information on this syndrome, which often presents with noninfectious fever, skin rash, and pulmonary infiltrates, and ES may be fatal if left unidentified and treatment is not initiated promptly. Reports of the risk factors, incidence, clinical manifestations, diagnosis, treatment, and outcomes have much variation, likely from a lack of definite diagnostic criteria and inconsistency in the terminology associated with ES. The purpose of this article is to provide an overview of ES and the implications for nursing practice and research.

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Key words: stem cell transplantation; bone marrow transplantation; engraftment syndrome

Digital Object Identifier: 10.1188/14.CJON.349-354

Each year, more than 50,000 hematopoietic stem cell transplantations (HSCTs) occur worldwide (Gratwohl et al., 2010), and about 15,000 bone marrow or umbilical cord blood transplantations occur in the United States (Pasquini & Wang, 2011). HSCTs are used to cure or treat malignancies (e.g., multiple myeloma, lymphoma, leukemia, neuroblastoma, germ cell cancer) as well as nonmalignant disorders (e.g., aplastic anemia, immune deficiencies) (Gratwohl et al., 2010; Pasquini & Wang, 2011). Stem cells for the transplantation may be harvested from the patient (autologous), an identical twin (syngeneic), or a related or unrelated donor (allogeneic) and may be extracted from bone marrow, peripheral blood, or cord blood. For the purposes of the current article, HSCT will be used to describe allogeneic or autologous transplantations from bone marrow, peripheral blood, or cord blood.

HSCTs are complex and have significant associated morbidity and mortality. Complications of HSCT may occur because of treatment-related toxicity, immunosuppression, donor-mediated toxicity, recipient-mediated toxicity, or relapse of the malignancy (Scott, Morgan, Durrant, & Boots, 2002). Although the majority of transplantation recipients are monitored at an

outpatient facility or inpatient oncology unit, life-threatening complications may necessitate admission to an intensive care unit. The overall rate of admission to intensive care units is 16% in all HSCT recipients (Afessa & Azoulay, 2010), but the rate is as high as 57% in adult recipients of allogeneic cord blood transplantations (Naeem et al., 2006). HSCT recipients are at risk of death from the primary malignancy, but many deaths are caused by complications of the transplantation. In patients who received HSCT in the United States in 2008 and 2009, 27% of deaths in autologous recipients and 67% of deaths in unrelated donor allogeneic recipients were caused by complications of the transplantation, such as graft-versus-host disease (GVHD), infection, and organ failure (Pasquini & Wang, 2011).

To provide high-quality care to HSCT recipients, nurses must be aware of the pathophysiology, clinical manifestations, and treatment of complications associated with transplantations. Nurses must be vigilant about assessing for signs and symptoms associated with complications and intervene as appropriate to ensure optimal clinical outcomes. GVHD and infection are common complications of HSCT that may result in morbidity and mortality (Pasquini & Wang, 2011), and resources are available for nurses to learn about those complications. In contrast, very