

Reduced-Intensity Conditioning Allogeneic Stem Cell Transplantation in Pediatric Patients and Subsequent Supportive Care

Catherine Barrell, RN, MSN, PNP-BC, Danielle Dietzen, RN, MSN, CPNP, Zhezhen Jin, PhD, Sharon Pinchefskey, RN, MSN, CPNP, Kristen Petrillo, RN, BSN, and Prakash Satwani, MD

Myeloablative conditioning (MAC) followed by allogeneic hematopoietic stem cell transplantation (AlloHSCT) is a well-established treatment for a variety of malignant and nonmalignant diseases in children and adults (Thomas, 1983). The backbone of these regimens consists of cytotoxic high-dose chemotherapy and/or total body irradiation, which are associated with a 20%–40% incidence of transplantation-related mortality (TRM). The majority of transplantation-related deaths tend to occur in the first 100 days following MAC-AlloHSCT (Satwani et al., 2008). Along with high rates of mortality, MAC-AlloHSCT also is associated with a high incidence of acute morbidities. These regimen-related toxicities include severe mucositis (requiring opioid patient-controlled analgesia [PCA] and total parenteral nutrition [TPN]), infections, and veno-occlusive disease, all of which can require transfer to a pediatric intensive care unit (PICU) (DeLeve, Shulman, & McDonald, 2002). Avritscher, Cooksley, and Elting (2004) reported that patients with mucositis are more likely to develop infections, require PCA, and experience significant weight loss. A study by Socie et al. (1999) revealed the consequences of these toxicities when the authors reported that, although 6,691 patients achieved long-term survival two years after MAC-AlloHSCT, 375 patients died of secondary complications such as graft-versus-host disease (GVHD), infections, secondary malignancy, and organ failure 6–10 years post-treatment.

The development of nonmyeloablative conditioning was initially designed to treat patients aged 60 years and older with poor performance status, organ dysfunction, or extensive prior therapy (Barker et al., 2003). Nonmyeloablative conditioning regimens are defined

Purpose/Objectives: To determine if children undergoing reduced-intensity conditioning allogeneic hematopoietic stem cell transplantation (RIC-AlloHSCT) have lower incidence of acute toxicities and, subsequently, require less supportive care than is required with myeloablative conditioning (MAC)-AlloHSCT. An additional purpose is to examine later outcomes by comparing 100-day transplantation-related mortality (TRM).

Design: Retrospective chart and electronic medical records review.

Setting: A pediatric care center in the northeastern United States.

Sample: 86 patients who underwent AlloHSCT from January 2004 through March 2008.

Methods: Charts were retrospectively reviewed. The comparison between groups was done by t test (continuous variables) and chi-square test (categorical variables). The logistic regressions, Kaplan-Meier product-limit estimator, log rank test, and Cox proportional hazards model were used.

Main Research Variables: Days requiring total parenteral nutrition (TPN), patient-controlled analgesia (PCA), incidence of mucositis, days with fevers, number of infections, transfers to pediatric intensive care unit (PICU), blood product infusions, and 100-day TRM, all for 30 days post-transplantation.

Findings: When comparing pediatric patients undergoing RIC-AlloHSCT ($n = 43$) versus MAC-AlloHSCT ($n = 43$) in the first 30 days post-transplantation, a statistically significant decreased incidence was noted for mucositis, infections, transfers to PICU, days on TPN and PCA, and days with fever, as well as 100-day TRM.

Conclusions: For pediatric patients, RIC-AlloHSCT is associated with significantly lower acute post-transplantation toxicities and TRM than MAC-AlloHSCT.

Implications for Nursing: For nurses to correctly educate their patients and family members, and to aid nurses in anticipating patient's needs, an understanding of the potential different acute toxicities and supportive care between pediatric patients undergoing RIC- versus MAC-AlloHSCT is vital.