

# Graft-Versus-Host Disease: Review and Nursing Implications

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Hematopoietic stem cell transplantation (HSCT) has become a standard treatment option in the management of a variety of hematologic malignancies and also is indicated in a number of other malignant and nonmalignant disease states (Saria & Gosselin-Acomb, 2007). Advances in this treatment modality have produced therapies designed to control, or even cure, specific hematologic diseases. The goal of allogeneic HSCT is to rescue and restore function of the hematopoietic system after high-dose chemotherapy with or without total body irradiation. Despite decades of improvement in care and recipient quality of life, allogeneic stem cell transplantation continues to produce significant, long-term complications. Specifically, the process of allogeneic HSCT can initiate a cascade of autoimmune events known as graft-versus-host disease (GVHD). In GVHD, the new donor immune system recognizes antigen-presenting cells (APCs) in the host (i.e., patient) as foreign, thus producing an inflammatory response (Neumann, 2004). GVHD can be divided into two types, acute and chronic. Collectively, acute and chronic GVHD (cGVHD) continue to cause significant morbidity and mortality in patients undergoing HSCT.

## Acute Graft-Versus-Host Disease

Acute GVHD (aGVHD) is characterized by the time of onset postallogeneic transplantation. It occurs after stem cell engraftment and from 7–100 days after transplant. The most important predisposing factor for aGVHD development is the degree of major histocompatibility complex mismatch between the donor and recipient (Beatty et al., 1985). Other risk factors for aGVHD development include patient and donor age (Kollman et al., 2001; Weisdorf et al., 1991), source and dose of hematopoietic stem cells (Cutler et al., 2001; Przepioroka et al., 1999), and intensity of the preparative regimen (Couriel, Saliba, et al., 2004). An estimated 30%–40% of human leukocyte antigen- (HLA-) identical transplant recipients develop aGVHD. Stem cell recipients with one antigen mismatch have a 60%–80% risk of developing aGVHD (Flowers, Kansu, & Sullivan, 1999).

## Pathophysiology

The pathophysiology of aGVHD involves a complex inflammatory response, regulated by the release of various cytokines. An initial development of an inflammatory environment results from host tissue damage from the preparative chemotherapy and radiotherapy regimen. The damaged tissues secrete inflammatory cytokines, interleukin-1, and tumor necrosis factor alpha. Donor and recipient APCs and additional inflammatory cytokines trigger the activation of donor-derived T cells. The activated donor T cells mediate the cytotoxic response against target host cells, which leads to the clinical manifestations of aGVHD (Ferrara, Cooke, & Teshima, 2003; Hill et al., 1997; Hill & Ferrara, 2000). Mortality associated with aGVHD is directly

related to the severity and extent of organ involvement (Flowers et al., 1999).

## Manifestations

Manifestations of aGVHD are observed most often in the target organs of the skin, gastrointestinal tract, and liver. The most frequently involved site of aGVHD is the skin, where observed symptoms include a sometimes painful, pruritic, and maculopapular rash. The rash initially affects the palms of the hands and soles of the feet, with progression to the trunk, chest, and upper back. Gastrointestinal symptoms of aGVHD include diarrhea with or without anorexia, nausea, and emesis. Progression of those symptoms can lead to gastrointestinal bleeding and ileus formation. In addition, aGVHD of the liver manifests as hyperbilirubinemia

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