Graft Failure Following Allogeneic Blood and Marrow Transplant: Evidence-Based Nursing Case Study Review

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Despite the advances made since the earliest days of transplant therapy, graft failure following allogeneic blood and marrow transplant is still a life-threatening complication. This article reviews the science of graft failure and uses a case study presentation to address how an oncology nursing staff was motivated by a patient's experience of graft failure. An evidence-based literature review was undertaken to answer three relevant clinical questions: (a) What factors contribute to graft failure in patients receiving allogeneic hematopoietic stem cell transplants? (b) What interventions are appropriate for these patients? and (c) How can this information assist nursing staff in providing improved care for these patients? An example of the table of evidence is provided.

When a patient requires a hematopoietic stem cell transplant, engraftment of the donor cells must occur for the transplant to be successful. Engraftment results when the infused donor marrow, cord blood, or peripheral blood stem cells begin to grow and reproduce in the host's marrow. Engraftment can be defined as the first of three consecutive days with an absolute neutrophil count higher than 500 cells/mcl but also, more practically, as the first day that a patient's peripheral blood neutrophil count is sustained at or above 500 x 10^6/L (Wolff, 2002). If engraftment does not occur or is not sustained over time, the patient is said to have experienced graft failure (DeVita, Hellman, & Rosenberg, 2001).

No consistent definition of graft failure is found in the literature. Terminology used to describe problems with engraftment includes delayed engraftment, graft failure, primary graft failure, graft rejection, secondary graft failure, graft dysfunction, and failure to engraft. Primary graft failure, graft failure, or failure to engraft are synonymous terms meaning that the defined number of neutrophils has not been achieved by 21 or 28 days after the transplant. Graft dysfunction, or secondary or late graft failure, occurs when donor engraftment takes place initially but is unable to be sustained (Mehta et al., 1997). The marrow may or may not then be repopulated with cells from the host. Graft failure that results from immunocompetent host cells' action on donor cells, with disease reoccurrence, is called graft rejection (DeVita et al., 2001).

Despite the advances made since the earliest days of transplant therapy, graft failure following allogeneic blood and marrow transplant is still a life-threatening complication. Currently, primary graft failure rates average less than 5% for patients transplanted to treat hematologic malignancies and 10%–20% in transplant recipients with hereditary, nonmalignant hematologic diseases such as severe aplastic anemia or thalassemia (Wolff, 2002). Morbidity and mortality rates are elevated and may be as high as 80% for patients who fail to engraft, mainly because of persistent pancytopenia that can result in infection or hemorrhage (Davies et al., 2000; DeVita et al., 2001; Van Hennik et al., 2000).

One Unit's Experience With Graft Failure

Mrs. C, a 39-year-old married woman, was treated successfully with vincristine, methotrexate, mechlorethamine, and prednisone and mediastinal radiation at the age of 28 for stage IIIB Hodgkin disease. Eight years later, she developed a secondary malignancy: acute myeloid leukemia (AML). Induction chemotherapy consisting of idarubicin and cytarabine, followed by consolidation with high-dose cytarabine alone, resulted in a complete remission for three years. Upon relapse, Mrs. C received salvage chemotherapy, again with idarubicin and cytarabine, but her disease progressed. Further treatment with fludarabine and cytarabine was complicated by multiple infections, including *Pseudomonas* bacterial pneumonia and positive cytomegalovirus (CMV) blood cultures, for which she received ganciclovir. Because neither of her two brothers was a match for her, a human leukocyte antigen- (HLA-) matched unrelated donor was found through the National

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