

"BMT, A Challenge in Nursing Management"

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INTRODUCTION

The modern era of Bone Marrow Transplantation (BMT) began in the late 1950s when patients in the terminal phase of leukemia received lethal doses of total body irradiation followed by infusion of bone marrow. Few survived until complete hematopoietic recovery, and many died from complications of BMT such as Graft Versus Host Disease (GVHD), bacterial and fungal infection, or bleeding.

Over the past 20 years, BMT has evolved from a "last ditch" experimental treatment modality to the treatment of choice for many diseases, both non-malignant (e.g., severe aplastic anemia, severe combined immune deficiency syndrome, thalassemia, osteoporosis, inborn metabolic disorders) and malignant (e.g., acute myelogenous, leukemia, non-Hodgkin's lymphoma, Hodgkin's disease, Burkitt's lymphoma, myelodysplastic syndrome, multiple myeloma neuroblastoma, Ewing's sarcoma, and cancers of the breast, ovary, testes, lung, and brain).

TYPES OF BMT

(Bone Marrow Transplantation)

A BMT can be autologous or allogeneic. With an autologous BMT, patients serve as their own donor. With an allogeneic BMT, patients receive bone marrow from another individual. The marrow donor can be related or unrelated to the patients. If related, the donor can be the patient's identical twin (syngeneic BMT) or an HLA-matched family member, preferably a sibling. If

unrelated, the donor can be an HLA-matched individual outside the family, usually located through the National

"Caring for a patient undergoing BMT does not end when he or she is discharged from the in-patient unit."

Marrow Donor Program (NMDP) registry, which is one of several computerized marrow registries listing the tissue type of potential bone marrow donors. Mismatched BMT indicates that the donor is not fully compatible with the patient.

A peripheral blood stem cell transplantation (PBSCT) is similar to a BMT. BMT involves harvesting bone marrow from within the bone. Stem cells are harvested from the peripheral blood using a process called apheresis. While PBSCTs can be allogeneic or autologous, the majority of PBSCTs are autologous.

PROCEDURE

(The Bone Marrow Transplantation)

The infusion of bone marrow is performed in the patient's room. The day of transplantation is referred to as Day 0. The bone marrow usually is infused by gravity through a central catheter, although depending on the volume; it may be directly pushed through the catheter. The marrow recipient may be premedicated with any or all of the following agents: anti-anxiety, antihistamine, nonaspirin antipyretic, corticosteroid, and diuretic. Pre-hydration also may be required. Emergency medications (e.g., epinephrine, hydrocortisone, diphenhydramine), oxygen and suction are readily available should the patient experience an acute untoward effect during the infusion. The duration of the marrow infusion depends on

the volume of the infusion and on the medical condition of the recipient.

Nursing management during the infusion includes (1) monitoring vital signs and oxygen saturation, (2) assessing for side effects and (3) providing reassurance to the patient and family.

Bone marrow cells require 12-28 days to migrate to the empty marrow cavities of the bones and begin the process of hematopoiesis. During this critical time of profound immuno-suppression, the patient is at greatest risk for developing acute side effects and complications associated with the BMT process. Astute medical and nursing assessment is imperative to detect the earliest signs and symptoms of the concurrent, interrelated multiorgan complications that often occur in a BMT recipient. One complication of treatment may cause or exacerbate another. For example, multi-antibiotic and antifungal therapy administered to treat infection in a neutropenic BMT recipient may cause or exacerbate kidney dysfunction, or cyclosporine administered for acute GVHD may cause or exacerbate hepatic dysfunction.

NURSING MANAGEMENT

As the field of Bone Marrow Transplantation has evolved, so too has BMT nursing which has become one of the most challenging of nursing specialties, its roles have become more complex and have expanded enormously in recent years.

The traditional major concern of attending to the acute care needs of patients has become increasingly difficult. BMT patients are generally young, but span the age range from infancy to the middle years of life. Thus skill in managing pediatric, adolescent and adult fields of nursing are prerequisites. BMT nurses are fre-



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quently called upon to provide the highly technical critical care services needed to manage the problems of nutritional support, electrolyte and fluid management apalsia, sepsis, severe graft-versus-host-disease transfusion management, and vital organ failure.

In recent years the introduction of computerized information systems to the clinical setting have required mastery of Automated data system skills. Within the Oncology Nursing Society (ONS) a Special Interest Group (SIG) has developed focusing solely on the concerns of BMT Nurses. These concerns include efforts to the developed national standards of BMT nursing care especially with respect to management of mycositis skin care, indwelling venous catheter care and isolation procedures.

The role of nursing in Patient and Family education has also expanded patients and their families require orientation to the treatment modalities and to the specific objectives in the plan of care. Although many patients have been under the care of an Oncology treatment team before referral, Few have a good understanding of what is to be undertaken.

Specific issues that require emphasis in patient orientation include a prolonged hospitalization with some type of Isolation. The attendant loss of control associated with the restriction of being in a hospital environment, the unique problems of graft-versus-host-disease and the need for months of isolation from the general public, even after recovery of marrow function to avoid contagious illness until the slower recovery of Cellular Immunity occurs. Teaching self-care-tasks especially with respect to exercise, nutrition, and care of indwelling catheters to encourage the patient to exercise as much control over his/her care, is very important. For patients newly referred to the transplant center :

Orientation to the patient and outpatient units is important to enable them to utilize optimally the hospital's resources. A greater emphasis on the psychological needs of patients and

families has also emerged.

Nurses play an increasingly pivotal role in the recognition of patient's psychosocial needs and are called on to ensure that appropriate resources are directed to dealing with problems that arise. Patients who do not reside in the same community as the transplant centre are especially in need of psychosocial resources since their network of family and friends is unable to be physically present during much of the BMT experience.

Change in family roles are universal concerns for patients and significant others. The primary Nurse or case manager must be adapt at utilizing the services of social workers, psychiatric liaison Nurses, child life specialists occupational therapies etc. Follow-up care is becoming increasingly important, as these are more and more long term survivors.

During the first year after transplant the patient and primary care team must be vigilant for the possible occurrence of chronic graft-versus-host-disease infections.

Obstructive airway disease and recurrence (if transplanted for maligning) ovarian failure, which requires hormonal replacement, is a concern for adult women. Issues regarding sexuality are frequent concerns for both men and women. For children, growth and development must be monitored to detect pituitary, thyroid or adrenal insufficiency.

Reintegration in to employment and former family social roles emerge as an increasingly important task for patient as the acute illness recedes in to the background.

Awareness of these "late" concerns and assisting patients and families in dealing with these issues of survivorship have become important roles for nursing

CONCLUSION

1. With Autologous BMT, these is no such concern for graft rejection or

the need for immunosuppression and thus a panoply of preparative regimens have been and continue to be explored, the major objective is to develop combinations of drugs and/or Radiotherapy with additive or synergistic antitumour activity and toxicities.

Use of cyclosporine or total lymphoid irradiation has provided better Immunosuppression without the added mortality from toxicity.

2. Beattyetal (1985) has shown the importance of HLA identity between the host and the donor in determining the outcome of allogeneic BMT. As the number of HLA, antigens not shared by both donor and recipient increases, the rate and severity of GVHD increase the risk for delayed engraftment or non engraftment increases and the rate of survival disease donor lymphocytes preset in blood transfusions.

An equally important advance in the control of infection was the recognition that fever during neutropenic was usually due to infection, and that the use of empiric broad-spectrum-treating the infection than waiting until the infection was documented by culture.

3. Autologous bone marrow transplantation (BMT) may be an attractive alternative to allogeneic transplantation in the treatment of acute non-lymphocytic leukemia (ANLL).
4. Bone marrow purging may become a significant intervention, even more so with the trend toward use of greater numbers of stem cell for reconstitution (such as peripheral blood stem cells.)

The number of patients receiving bone marrow or peripheral blood stem cell transplantation is increasing steadily.

