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Commentary

Hematopoietic Cell Transplantation and their Types of Advantages

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1. Description

Hematopoietic Cell Transplantation (HCT) is the intravenous infusion of hematopoietic stem and progenitor cells designed to establish marrow and immune function in patients with a variety of acquired and inherited malignant and nonmalignant disorders. HSCT involves the intravenous infusion of hematopoietic stem cells in order to reestablish blood cell production in patients whose bone marrow or immune system is damaged or defective. Over the past half century, this technique has been used with increasing frequency to treat numerous malignant and nonmalignant diseases. Cells for HSCT may be obtained from the patient himself or herself (autologous transplant) or from another person, such as a sibling or unrelated donor (allogeneic transplant) or an identical twin (syngeneic transplant). Cell sources include bone marrow; peripheral blood; umbilical cord blood; or, rarely, fetal liver.

Transplantation of Hematopoietic Stem Cells (HSCT) has become the standard of care for many patients with defined congenital or acquired disorders of the hematopoietic system or with chemo radio or immune sensitive malignancies. Over the last two decades, HSCT has seen rapid expansion and a constant evolution in technology use. Novel indications are currently in evaluation. Bone marrow is supplemented as stem cell source by peripheral blood or cord blood. More than 14 million typed volunteer donors or cord blood units from the many registries worldwide provide stem cells for patients without family donors. Novel conditioning regimens with lower intensity have expanded the use of HSCT to older patients or to those with co morbidities

Hematopoietic stem cell transplants, including peripheral blood, bone marrow, and cord blood transplants are used most often to treat cancers affecting the blood or immune system. There are two main types of stem cell transplant: autologous and allogeneic. Autologous stem cells come from the person who will be receiving the transplant and are mainly used to treat leukemia's, lymphomas, and multiple myeloma as well as other cancers such as testicular cancer and neuroblastoma. Autologous stem cell transplants are also used to treat certain childhood cancers. An advantage of autologous transplantation, the rein fused stem cells are derived from the patient's own bone marrow and collected from the peripheral blood. These cells do not cause Graft Versus Host Disease (GVHD), and thus, autologous transplantation is associated with less morbidity and mortality than is allogeneic Bone Marrow Transplant (BMT) and increases the age limit and the number of patients who can undergo the procedure.

Allogeneic stem cells come from another individual. They can be from a matched related or unrelated donor or a donor without a complete match. Allogeneic stem cells are most commonly used to treat leukemia's, lymphomas or non-malignant inherited disorders. The donor stem cells make their own immune cells, which could help kill any cancer cells that remain after high dose treatment. This is called the graft versus cancer or graft versus tumor effect. The transplant provides the advantage of a graft *vs.* cancer effect but occurs with the potential risk of graft *vs.* host disease. The need to balance these two outcomes makes this a more complicated procedure. Other advantages are that the donor can often be asked to donate more stem cells or even white blood cells if needed, and stem cells from healthy donors are free of cancer cells.