

Overview of Hematopoietic Stem Cell Transplantation in Taiwan and Worldwide

唐季祿

台大醫院內科部

The first bone marrow transplantation (BMT) was performed in 1957 by Dr. E. D. Thomas, who later received a Nobel Prize in 1990 for his pioneering research. In 1973, the first unrelated donor BMT was performed, and in 1988, the first umbilical cord blood transplant. Today, more than 70 malignant and non-malignant diseases can be treated with hematopoietic stem cell transplantation (HSCT) with disease-free survival reaching 90% in patients with optimal conditions, and more than 50,000 patients worldwide are transplanted annually with increasing frequency. In January 2013, the Worldwide Network for Blood and Marrow Transplantation (WBMT) announced achievement of 1-million HSCT, marked one major milestone in medical history.

In Taiwan, BMT started since 1983 and the cumulative number had reached 4,500 cases and every year >400 in 16 HSCT centers. About 2/3 received allogeneic HSCT while the other 1/3 patients used autologous HSCT. The stem cell sources of the graft were derived from peripheral blood in 70%, BM in 21% and cord blood in 2%. The major indications were: acute myelogenous leukemia (28%), lymphoma (22%) and acute lymphoblastic leukemia (14%). The number of chronic myeloid leukemia has decreased since 2003. The conditioning regimens were mainly myeloablative (90%); nevertheless, non-myeloablative or reduced-intensity conditioning regimens became more common since 2005. Disease relapse or progression remains the major cause of death, followed by graft-versus-host disease (GVHD) and infection. Patients receiving allo-PBSCT had faster recovery of the neutrophil and platelet counts without definite long-term survival advantage. This is related to higher incidence and severity of chronic GVHD compared to BMT. Recent randomized trial preferred use of BMT in standard leukemia and aplastic anemia.

The program of unrelated donor donation has facilitated more than 1,000 HSCT in Taiwan with improved outcome in recent years. This was related to the advances in: better donor selection with high-resolution HLA typing, transplant performed in early disease status, use of rabbit anti-thymocyte globulin (ATG) or Tacrolimus in preventing GVHD and regular monitoring of CMV/EBV viral load with preemptive therapy. For poor risk patients who did not have matched related or unrelated donors, use of alternative donors (mismatched family donors or cord blood, even haplo-mismatched donors) can be safely performed using novel GVHD prophylaxis to overcome the HLA barrier. In the future, more patients are expected to be treated by HSCT with use of alternative donors (cord blood, haploidentical family donor). Incorporation of molecular, genetic, and immunotherapeutic techniques will further change the clinical practice of HSCT to improve long-term outcome and quality of life of HSCT patients.