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Umbilical cord blood transplantation: Challenges and future directions

Amir Hamdi

University of Texas MD Anderson Cancer Center, USA

Allogeneic stem cell transplantation is potentially curative for patients with malignant and nonmalignant diseases. However, only 25-30% of patients can receive transplantation from an HLA-matched sibling donor. Umbilical cord blood (UCB) has rapidly become a valuable alternative stem cell source for patients who do not have an HLA-matched related donor. UCB transplantation has several advantages of easy procurement, no risk to donor, immediate availability, low risk of transmitting infections, and lower risk for acute and chronic GVHD despite major human leukocyte antigen disparity. A disadvantage of UCB transplantation is the low cell content of UCB which may delay engraftment and limit the UCB transplantation to generally low weight recipients and children. Delayed immune reconstitution is the significant challenge in UCB transplantation and is associated with infectious morbidity and mortality. The current clinical and biological research aims to improve engraftment and reduce transplantation-related mortality following UCB transplantation. The new strategies and novel developments in UCB transplantation include ex vivo expansion of UCB cells, enhancing homing of UCB cells, double UCB transplantation, direct intra bone marrow injection, reduced-intensity conditioning UCB transplantation, co-transplantation of UCB and mesenchymal stem cells, and co-transplantation of UCB and haploidentical donor cells. These approaches are expected to improve engraftment and immune reconstitution and to allow UCB transplantation for a wide spectrum of patients

Biography

Hamdi received his M.D. degree from Tabriz University of Medical Sciences in Iran. He was a research scientist in Hematology, Oncology and Stem Cell Transplantation Research Center in Tehran and participated in several research projects. He is currently a research fellow in the Department of Stem Cell Transplantation and Cellular Therapy at The University of Texas MD Anderson Cancer Center. He is a member of several national and international scientific societies. He has published several papers related to neurology, hematology, oncology and stem cell transplantation; and serves as a reviewer for many prestigious journals

ahamdi@gmail.com