

Review Article

Haploidentical Hematopoietic Stem-Cell Transplantation in Adults

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Haploidentical hematopoietic stem-cell transplantation is an alternative transplant strategy for patients without an HLA-matched donor. Still, only half of patients who might benefit from transplantation are able to find an HLA-matched related or unrelated donor. Haploidentical donor is readily available for many patients in need of immediate stem-cell transplantation. Historical experience with haploidentical stem-cell transplantation has been characterised by a high rejection rate, graft-versus-host disease, and transplant-related mortality. Important advances have been made in this field during the last 20 years. Many drawbacks of haploidentical transplants such as graft failure and significant GVHD have been overcome due to the development of new extensive T cell depletion methods with mega dose stem-cell administration. However, prolonged immune deficiency and an increased relapse rate remain unresolved problems of T cell depletion. New approaches such as partial ex vivo or in vivo alloreactive T cell depletion and posttransplant cell therapy will allow to improve immune reconstitution in haploidentical transplants. Results of unmanipulated stem-cell transplantation with using ATG and combined immunosuppression in mismatched/haploidentical transplant setting are promising. This paper focuses on recent advances in haploidentical hematopoietic stem-cell transplantation for hematologic malignancies.

1. Introduction

Hematopoietic stem-cell transplantation (HSCT) offers a curative treatment for many patients with malignant and nonmalignant hematologic disorders. As the probability of finding an HLA identical sibling donor is only 25% to 30%, attention has been focused on the use of alternative donors, either from unrelated adult donors, umbilical cord blood, or partially matched related donors. Currently, the chance of finding a matched unrelated donor varies from 60%–70% for Caucasians to less than 10% for ethnic minorities [1, 2]. Further drawbacks for a patient who urgently needs a stem-cell transplantation are the time interval from initiating an unrelated donor search to the identification of an appropriate donor of about 4 months [3], the considerable costs of high-resolution HLA typing, registry, and banking

expenditures, and the absence of donor registries in many countries worldwide. Unrelated cord blood has become a new promising stem-cell source due to its faster availability, tolerance of 1-2 HLA mismatches out of 6, lower incidence and severity of acute graft-versus-host disease (GVHD), and lack of risk to the donor. However, the limited unit size, high incidence of posttransplant infections, and slow immune recovery are obstacles to its broader application especially in adult patients [4, 5]. Haploidentical related donor transplantation has been developed to address limitations in allogeneic transplant donor availability. Virtually all patients have a one haplotype-mismatched donor. In addition to immediate availability, haploidentical donors have several advantages such as (a) ability to select the best donor on the basis of age, sex, and infectious disease status, (b) optimal graft composition, and (c) prompt access to