HLA Typing and Hematopoietic Stem Cell Transplantation Outcome: Review

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Abstract

For many patients suffering from hematologic diseases, hematopoietic stem cell transplantation (HSCT) is a curative procedure. The plan is to use healthy hematopoietic stem cells from an HLA-compatible donor to replace the patient's immune and hematopoietic systems. For HSCT to be successful, genetic differences between the donor and recipient, particularly at HLA loci are crucial. Acute and chronic graft - versus - host diseases (GVHD) continue to be major causes of morbidity and mortality after HSCT despite improvements in genetic characterisation, immuno-suppressive medications, and supportive treatment. Along with genetic differences and GVHD, the source of the stem cells, conditioning regimens, and infection problems are linked to the success of HSC. Other donor-related factors, such as gender, age, and the presence or absence of cytomegalovirus (CMV) antibodies. HSCT outcomes may also be influenced by and ABO incompatibility, whose individual contributions have been investigated with varying degrees of success.

Keywords: Hematopoietic; Stem Cell; Transplantation

Introduction

e reactivation of CMV illness is still a significant source of morbidity and mortality despite preventative therapy. e development of reduced intensity conditioning (RIC) regimens has led to an increase in the number of people over 50 who undergo HSCT. Because of the regeneration potential of hematopoietic stem cells (HSC) and potential comorbidities, older related suitable donors are also accepted, and recent research have shown that donor age may be a risk factor for acute and chronic GVHD. Currently, ABO incompatibility is present in between 30 and 50 percent of HSCT procedures [1].

Although it is commonly known that ABO incompatibility raises the risk of hemolytic responses, recent research indicates that it has no impact on the results of HSCT. In this study, the effects of donor characteristics such age, gender, CMV status, cell source, ABO compatibility, and donor type (matched) were assessed. at the Hospital de Clinicas in Porto Alegre, southern Brazil, on the results of HSCT in a cohort of 347 patients who underwent transplantation. We were interested in learning whether these traits may be used to predict outcomes in this Latin American cohort of patients who underwent single-center transplants [2].

Methodical Aspects

Retrospective evaluations were performed on 347 patients who underwent allogeneic HSCT at a single location between January 1994 and December 2012. Acute and chronic GVHD, disease-free survival (DFS), and overall survival were all connected with the donor and recipient ages, gender, CMV status, ABO compatibility, type of donor (matched related and matched unrelated), and patient's disease status (OS). At the time of the procedure, each patient provided written informed permission, and the local ethics committee authorised the study. Refractory disease, a second or more remission from a cancerous condition, or a diagnosis of a benign condition more than a year old were all considered to have advanced disease status at HSCT [3]. Up until the year 2000, poor resolution DNA-based typing of HLA Class I (A, B, C) and Class II (DQ and DR) of patients and associated donors was used. Since 2005, unrelated donor HSCT procedures have been carried out in this facility. High resolution HLA typing was done for 6/6 matches up until 2008 and 8/8 or 10/10 matches after that. Peripheral granulocyte counts over 500/-L for three straight days were considered to be engraftment. When engraftment was not achieved in patients who survived more than 28 days following transplantation, it was referred to as a primary engraftment failure or rejection. Day 100 following the operation saw a calculation of the engraftment failure rate [4].

Impact of HLA-A and HLA-B Mismatches

Laminar high efficiency particulate air (HEPA) filters were used to keep all patients in a secure setting. All patients received standard prophylactic doses of acyclovir, fluconazole, and sulfamethoxazole along with trimethoprim. Weekly CMV monitoring was done via antigenemia assaying after 2005 and qualitative DNA-polymerase chain reaction (PCR) up until that point [5]. After two consecutive positive PCR results or one positive cell in the antigenemia assay, preventive 10 mg/kg ganciclovir was started. All blood components underwent irradiation and filtration. According to the guidelines issued by the hospital transfusion committee, minimum values were established to initiate platelet and red blood cell transfusions to maintain platelet counts above 20 109/L and haemoglobin levels above 7 g/dL, respectively [6]. Broad-spectrum antibiotics were used to treat neutropenic fever, according to base on our microbiological sensitivity profile and the Infection Dis- eases Society of America (IDSA) Guidelines for our hospital protocols Patients' and donors' characteristics are shown as frequencies for categorical variables and as medians and ranges for continuous variables [7]. e OS was the main outcome measure, and the incidence of acute and chronic GVHD, DFS,

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and transplant-related mortality served as secondary endpoints (TRM).

e number and severity of organ involvement were used to stage