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Consequences of ABO incompatibility in allogeneic hematopoietic stem cell transplantation (allo-HSCT)

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Abstract

Background: ABO incompatibility between donor and recipient is currently considered one of the risk factors for immune-mediated complications, which can influence the outcome of allogeneic hematopoietic stem cell transplantation (allo-SCT).

Patients and methods: We analyzed 140 consecutive allo-HSCT recipients. 124 patients had HLA-compatible donors (39 related and 85 unrelated) and 16 patients had haploidentical donors. Fifty-nine of the donor–recipient pairs were ABO-identical, while 34 had minor incompatibility, 35 major incompatibility, and 12 bi-directional incompatibility. Seventy-eight patients received bone marrow (BM), 46 peripheral blood stem cells (PBSC), and 16 stem cells from both sources. Conventional myeloablative conditioning was used in 64 patients and non–myeloablative regimens in 78 patients. In both groups the same regimen of graft-versus-host disease (GVHD) prophylaxis was administered. In major ABO incompatibility SCT donor stem cells were depleted of RBC (6% hydroxyethyl starch sedimentation), in cases of minor incompatibility donor incompatible plasma was removed, and in cases of bidirectional incompatibility both methods were used.

Results: In all the study groups, we observed no cases of acute hemolysis after PBSC transfusion and only 2 cases after BM transfusion. Engraftment of leukocytes, neutrophils, and platelets was not altered in any of the groups ($p=0.45$). Delayed RBC engraftment was more frequent in patients with ABO-incompatible SCTs ($p=0.04$). There were 4 cases of delayed hemolysis. Incidence and severity of GVHD was higher in the ABO-incompatible allo-SCT group ($p=0.005$).

Conclusions: ABO incompatibility between donor and recipient can cause acute and delayed hemolysis and it is a risk factor in the development of GVHD. It can delay RBC engraftment, but has no influence on other cell lines. Adequate prophylactic measures allow us to keep the incidence of acute hemolysis low.

Keywords: ABO incompatibility, PBSC, GVHD, engraftment