Comments on: Alloimmunization screening after transfusion of red blood cells in a prospective study

Laércio de Melo

External Quality Control Program in Immunohematology, Associação Brasileira de Hematologia, Hemoterapia e Terapia Celular - ABHH

A red blood cell (RBC) transfusion is a large-scale intravenous introduction of foreign tissue; this procedure provides a valuable opportunity to study human immunologic response to foreign antigens. Patients receiving RBC transfusions are at risk of forming alloantibodies against donor RBC antigens. The risk of alloimmunization is clinically important, but little is known about the factors governing this risk. In a novel mathematical model for RBC alloimmunization (Stochastic model, a random process) that excluded patients with sickle cell disease (SCD), it was calculated that approximately 13% of the transfusion recipient population are responders and at risk of forming RBC alloantibodies (the risk of forming alloantibodies is not the same as the incidence of alloantibodies)[1,2]. The incidence of anti-RBC antibodies is not insignificant and varies widely according to the disease of the patient, history of transfusion, pregnancy and the antigen frequencies of patients versus donors in a geographic location. It is estimated at 1-2 percent in the general hospital population, 5 percent or more in multi-transfused patients and multiparous women and 20 percent or more in patients with transfusion-dependent diseases (e.g. sickle cell anemia, thalassemia, etc.)[3].

Clinically, RBC alloimmunization can result in delays in patient care, hemolytic transfusion reactions, hemolytic disease of the fetus and newborn and possibly increased morbidity following organ transplantation[4,5]. Anti-RBC antibody titers frequently drop below detectable levels, allowing units to be transfused with incompatible RBCs resulting in the restimulation of memory cells and an increase in antibody titers.

With longer life expectancy and technological developments, the number of chronic degenerative diseases and more complex chirurgical procedures are increasing along with requests for more blood transfusions which consequently increase the probability of repeat transfusions. Many antibodies may not be detected at the time of a new transfusion event and so the transfusion recipient will be at risk for delayed hemolytic transfusion reactions.

Given the clinical consequences, several retrospective studies have attempted to elucidate clinical and patient variables to help identify patients at increased risk for RBC alloimmunization.

As the majority of studies report on the rate of alloimmunization in chronically transfused patients[6], Santos at al., in a retrospective study published in the *Revista Brasileira de Hematologia e Hemoterapia* (RBHH), demonstrated the importance of considering the incidence of clinically relevant antibodies in patients transfused in emergency situations[7]. This issue of the RBHH includes an original and prospective analysis of patients in surgical and clinical emergency services - Alloimmunization screening after transfusion of red blood cells in a prospective study[8].

The results demonstrated a high rate of alloimmunization within six months of the procedure (15/143 - 10.49%) in patients transfused with packed red blood cells; the titers of these antibodies decreased and disappeared within 15 months of transfusion in 60% of the alloimmunized individuals. Anti-K alloantibodies and those directed against antigens of the Rh system were the most common; the highest titer was 1:32 (anti-K) and there was an evident correlation with the number of transfusions. Due to the high incidence of RBC alloantibodies of clinical importance in patients transfused in surgical and clinical emergency services, the authors proposed to extend phenotyping of C, c, E, e and K antigens to all patients with planned surgeries or with acute clinical events that do not need emergency transfusions.

This theme is controversial because preventing the formation of RBC antibodies is not practical for most patients and for many cases alloimmunization is not a serious problem. In addition, blood banking services face challenges with increased financial pressures amidst a growing demand. These financial pressures oblige modern blood banks to focus on improving efficiency. Thus, it is important to emphasize that donor phenotyping, when it is routinely performed using automated micro-assay techniques, often leads to a reduction in costs and a higher quality procedure. In the future the use of automated templates for large-scale phenotyping/genotyping will substantially increase transfusion safety[9]. The author's proposal was realistic and will allow the prevention of RBC alloimmunization to be expanded

Conflict-of-interest disclosure:
The authors declare no competing financial interest

Submitted: 5/11/2012
Accepted: 5/12/2012

Corresponding author:
Laércio de Melo
Programa Externo de Controle de Qualidade em Imuno-hematologia
Rua dos Otoni, 296 – sl / 202-204,
Santa Efigênia
30150-270 Belo Horizonte, MG, Brazil
laercio@imunohematologia.com.br

www.rbhh.org or www.scielo.br/rbhh

DOI: 10.5581/1516-8484.20120044

one step further as phenotyping is already essential in women of child bearing age, for some patients at risk of serious hemolytic transfusion reactions and for patients with chronic transfusion requirements, e.g. patients with sickle cell anemia.

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