Transfusion and Apheresis Science 52 (2015) 345–349

Contents lists available at ScienceDirect

Transfusion and Apheresis Science

journal homepage: www.elsevier.com/locate/transci

Red cell alloimmunisation in oncology patients: A study from eastern India

Supriya Dhar *, Sabita Basu

Department of Transfusion Medicine, Tata Medical Center, Kolkata, India

ARTICLE INFO

Article history:
Received 7 November 2014
Received in revised form 15 February 2015
Accepted 28 February 2015

Keywords:
Alloimmunisation
Antibody screen
HSCT

ABSTRACT

Background: Red cell alloimmunisation is an important complication in multi-transfused patients with haematologic and surgical malignancies. Antibody screening with identification is necessary to ensure transfusion safety. Data on the prevalence of alloimmunisation in oncology patients is limited. In this study we assessed multitransfused haematology–oncology patients for red cell alloimmunisation. This was a retrospective analysis undertaken to assess the alloantibody prevalence and determine the antibody specificity.

Materials and method: Retrospective analysis of antibody screening data was done for haematopoietic stem cell transplant (HSCT) patients as well as surgical oncology patients, from April 2013 to May 2014. This included the antibody screening done prior to surgery, antibody screening prior to HSCT and any antibody screening performed for these patients at cross match. Antibody screening was done using the three cell panel (surgiscreen) and if positive, further identification performed using the 11 cell panel (Resolve Panel A). If the antibody screen (three cell panel) was positive, an autocontrol was performed using reverse diluent (Ortho Biovue System) card. Patients with autoantibodies were excluded from this study.

Result and discussion: Our overall red cell alloimmunisation rate was 2.5%. Alloimmunisation rate among HSCT transplant patients was 1.6% as compared to the 2.4% in patients with solid organ malignancies. Keeping in view the low alloimmunisation rate, the justification of repeating antibody screening 72 hours post transfusion in this category of patients needs to be re-assessed.

1. Introduction

Patients with haematologic and solid tumour malignancies are often transfusion dependent owing to intense marrow suppression either due to chemotherapy or due to the disease process itself. Red cell alloimmunisation is one of the major complications of repeated blood transfusions and is due to the genetic disparity between the donor and the recipient [1,2].

Alloantibodies can have important clinical consequences including acute and delayed haemolytic transfusion reactions and haemolytic disease of the newborn. In the blood bank, several units have to be cross matched to identify a compatible unit, thereby resulting in delays in the release of red cell (RBC) units and increased costs. Hence antibody screening with identification is necessary to ensure transfusion safety and ready availability of blood.

Immunisation may be influenced by the number and frequency of transfusions received as well as the recipient sex, age, and underlying disease [1]. Clinically significant red cell alloantibodies develop in more than 30% of multi-transfused patients. Several authors found that RBC alloimmunisation mainly occurs after the first few transfusions [1,3,4].The reported prevalence of alloimmunisation in multi-transfused

* Corresponding author. Department of Transfusion Medicine, Tata Medical Center, 14 Main Arterial Road (EW), New Town, Rajarhat, Kolkata, West Bengal 700156, India. Tel.: + 9051525203; fax: 66057578.
E-mail address: dhardrsupriya@gmail.com (S. Dhar).

http://dx.doi.org/10.1016/j.transci.2015.02.019
1473-0502/

patients in India however is relatively low and varies from 3 to 10% [5,6].

In India there is abundant data on red cell alloimmunisation in multi-transfused thalassaemia patients. However there are limited studies describing red cell alloimmunisation in multi-transfused oncology patients. In the western world, studies in leukaemia patients undergoing chemotherapy show a low rate of alloimmunisation. This has been attributed to the impairment of their immune status, either due to the malignancy itself [7–9] or due to intensive chemotherapy which results in reduced or complete unresponsiveness to incompatible transfusions [10–12].

In this study we assessed multi-transfused haematology–oncology patients for red cell alloimmunisation. Ours is a tertiary care cancer hospital in eastern India, providing services exclusively to cancer patients. This was a retrospective analysis undertaken to assess the alloantibody prevalence and to determine the antibody specificity.

2. Materials and methods

At our blood center, blood group and antibody screen is done in all surgical oncology patients prior to surgery as a part of pre-surgical evaluation. In haemopoietic stem cell transplant (HSCT) patients, it is performed as a part of the pre-transplant evaluation. When a RBC request is received, a repeat antibody screen is performed only if the previous antibody screen was done more than 72 hours ago, with a history of transfusion in the intervening period. In this study, we retrospectively analysed our antibody screening data for these two patient categories, from April 2013 to May 2014. This included the antibody screening done prior to surgery, antibody screening prior to HSCT and any antibody screening performed for these patients at cross match, during this 14 month period. The surgical oncology patients included those from gynaecology, gastroenterology, head and neck, and urology. Haemopoietic stem cell transplant patients included both autologous and allogenic transplants. For HSCT patients, blood group, donor–patient cross match, antibody screening and iso-agglutinin titre (as necessary) is performed pre-transplant.

Antibody screening is done using the three cell panel (surgiscreen) and if positive, further identification is performed using the 11 cell panel (Resolve Panel A). Additional techniques like enzyme method were not used for identification purpose. The AHG cross match is performed using the anti-IgG-C3d polyspecific card (Ortho Biovue system). If the antibody screen (three cell panel) was positive, an autocontrol was performed using reverse diluent (Ortho Biovue System) card. Patients with autoantibodies were not included in this study.

Patient age, sex, transfusion history (type and number of components) and previous pregnancy details were noted when available, as the information could not be obtained in all cases.

Ethical guidelines: Written consent for transfusion, as well as for pre-transfusion evaluation of the blood sample was taken for all the patients.

3. Result

During this 14 month period, 495 surgical oncology patients underwent antibody screening, five of them were positive for autoantibodies and were excluded from the study. Twelve patients (2.4%) had a positive antibody screen of the remaining 490 patients. Their age ranged from 9 years to 76 years, with 328 (67%) females and 162 (33%) males. Table 1 shows the clinical diagnosis of the surgical oncology patients with positive antibody screen. Out of the twelve patients with positive antibody screen, two had a positive screen at presentation (first evaluation in the blood bank). One was a male patient with thyroid cancer who was multiply transfused (eight RBC units) before he reported to us. The other case was a female patient with cervical cancer. She had history of six RBC transfusions and also a previous pregnancy, hence the exact cause of alloimmunisation could not be ascertained. The remaining ten cases had an initial negative antibody screen but subsequently developed alloantibodies on receiving transfusions at our center. However of these ten patients, two patients did give a history of previous transfusion (2–4 RBC units); even though the initial antibody screen was negative. The RBC transfusions received by these twelve patients at our center ranged from 4 to 16 RBC units with a median of 8 units. Antibody formation first occurred after a median of 6 RBC had been transfused. All patients received buffy coat depleted RBC units and the RBC and platelet products used were irradiated.

Table 1
Clinical diagnosis among the 12 surgical oncology patients with a positive antibody screen.

Diagnosis	n (%)
Squamous cell carcinoma exo cervix	2 (17%)
Thyroid cancer	2 (17%)
Ovarian cancer	2 (17%)
Endometrial cancer	1 (8%)
Stomach cancer	1 (8%)
Prostate adeno carcinoma	1 (8%)
Carcinoma of alveolus	1 (8%)
Carcinoma gall bladder	1 (8%)
Adenocarcinoma of colon	1 (8%)

On analysing the antibody specificity, ten patients had a single alloantibody and two had multiple alloantibodies. The alloantibodies identified were anti-E, anti-Fy^b, anti-Le^a and anti-Le^b. The commonest alloantibody was anti-Le^a which was identified in 5/12 (41.6%) of patients. Among the patients with multiple alloantibodies, one had initially a single alloantibody (anti-E) and subsequently developed multiple alloantibodies after receiving one RBC transfusion. The other patient was found to have multiple alloantibodies at his initial presentation with us. The specificity of multiple antibodies could not be identified as we did not have additional testing panels. Table 2 shows the antibody profile among the surgical oncology patients. It was not difficult to find compatible RBC units in the patients with a single alloantibody. But for the two patients with multiple alloantibodies, the best matched RBC unit was issued as we could not definitely identify the antibodies. All the other patients with alloantibodies were transfused antigen negative, cross match compatible RBC units.

Among these alloimmunised patients, we encountered two patients with Le^a alloantibody, where shortly afterwards the antibody was no longer detectable. One of them became negative after 1 month and the other after 3 months.