

**Red Cell Alloimmunisation in Multitransfused Cancer Patients in a Tertiary Care Hospital in Northern India.**Dr. Kajal Khajuria¹, Dr. Vijay Sawhney², Dr. Meena Sidhu³¹Postgraduate Department of Transfusion Medicine, GMC Jammu.²Professor & Head Department of Transfusion Medicine, GMC Jammu.³Associate Professor Department of Transfusion Medicine, GMC Jammu.**Correspondence Author:** Dr. Vijay Sawhney, Professor & Head Department of Transfusion Medicine, GMC Jammu, India.**Conflicts of Interest:** Nil**Abstract**

Background: Alloantibody formation against red cell antigen is a common complication of transfusion therapy. Data on the prevalence of alloimmunization in oncology patients is limited. In this study, we determine the frequency of alloantibodies in multitransfused cancer patients.

Aims and Objective: The main aim of this study was to determine the prevalence of red cell alloimmunization of oncology patients who receive multiple transfusions.

Material And Methods:

A prospective study which includes the antibody screening done prior to transfusion at the time of crossmatch. Antibody screening was done using 3 cell panel and if positive further identification performed using 11 cell panel. This study was done over a period of one year from jan 2016 to jan 2017 in the department of transfusion medicine in Govt. Medical college, jammu which is a tertiary care hospital in Northern India.

Results: In total, 450 patients from oncology department who received multiple transfusions were included in the study. Out of these 450 patients, 5 patients were found to have alloantibodies. The overall prevalence of RBC alloimmunization was 1.1%. Females had higher alloimmunization rate than males.

Conclusion: Incidence of RBCs alloimmunization increases with the number of transfusions and the number of donor exposures to the recipient.

Keywords: Alloimmunization, Cancer, Alloantibodies, Screening.

Introduction:

The transfusion of blood and components has become an integral part of patient management in modern medicine. As a result, the blood transfusion services play an important role and are responsible for ensuring sufficient quality and safe blood supply. Blood transfusion support is vital to the management of patients with hematological disorders and malignancies. Many such patients require blood transfusion during their illness or may be for the lifetime (1).

Red blood cell transfusion is a life saving therapy for complications of anemia and treatment of the symptoms and signs of hypoxia. However, the risk of RBC alloimmunization is always a concern for patients receiving RBC transfusions. Alloimmunization occurs because of red cells antigenic differences between donor and recipient or between mother and fetus. As no two humans, except identical twins, have the same genetic makeup, blood transfusion exposes the patient to numerous “foreign” antigens. These foreign antigens are potential immunogens which can lead to the development of

antibodies in the recipient within days , weeks or months after a transfusion (2).

Cancer patients commonly develop significant anemia of chronic disease (ACD). Anemia in patients with malignancy might be due to the disease process itself or due to myelosuppressive therapy. Transfusions are therefore often offered to patients with all types of cancer as symptomatic palliation when they develop severe anemia (3,4). The requirement of transfusion with blood may vary from patient to patient. Some require numerous units of blood for the bone marrow to recover while others only require fairly small number of transfusions for the surgical removal of tumor burden (5). Therefore Red cell alloimmunization is one of the important detrimental effects that occur with repeated transfusions of allogenic blood (6). Other risk factors for red cell alloimmunization include female sex, a history of pregnancy, underlying disease and racial differences between recipient and blood donors.

Alloantibodies can lead to serious clinical consequences and problems like obtaining properly and timely matched blood for these patients. Identifying such high risk group will be possible target for extending matching (7).

Methods:

A Prospective study was conducted in the department of transfusion medicine of Govt. medical college which is a tertiary care hospital. This study was conducted during Jan 2016 to Jan 2017. Firstly, antibody screening was done using 3 cell panels. The patients included in this study were cancer patients who had received atleast 5 transfusions. The samples with positive antibody screening were tested for antibody identification using commercial 11 red cell panel (Orthoclinical diagnostic, Biovue, USA). Blood grouping and antibody screening were performed manually on semi-automated orthoBiovue system. An autocontrol using the patient's cell and serum

was tested in parallel with each screen to exclude presence of autoantibodies.

Results:

A total of 450 patients with malignant disorders and who had received multiple transfusions were randomly selected.

Demographic details of the patient:

1. Gender:

Male: 150

Female: 300

2. Age group:

<20: 50

20-40: 150

40-60: 120

60-80: 130

3. ABO distribution:

O: 200

A: 120

B: 80

AB: 50

4. Rh group distribution:

+ve: 350

-ve: 100

Out of these 450 patients, the antibody screen was positive in 5 patients. Patients with only autoantibodies were excluded from the study. Females (60%) had higher rate of alloimmunization than males (40%). The highest number of alloimmunized patients belongs to hematology/oncology group.

Specificities of alloantibodies:

| S.No | Antibody(ies) | No. of patients | Percentage (%) |
|------|---------------|-----------------|----------------|
| 1. | Anti-E | 2 | 40 |
| 2. | Anti-C+E | 1 | 20 |
| 3. | Anti-C | 1 | 20 |
| 4. | Anti-K | 1 | 20 |

The overall prevalence of alloimmunization was 1.1% with anti-E the most common, followed by anti c + E and anti-K.

Discussion:

RBC alloimmunization results from the antigenic disparity of red cells between donor and recipient or between mother and fetus. In present study, the overall alloimmunization rate was 1.1% which was low when compared with a study done by Thakral et al. who reported prevalence of 3.4% (8). This difference could be due to varied study population. In a similar study in Tehran, prevalence of alloimmunization reported was 0.97% which was comparable to our study (9). Female patients had higher rate of alloimmunization than male in our study.

Inflammation in patients can also be a leading factor for alloimmunization and further studies are required in this regard which may contribute in a high standard of such patient care. Trivial variation in frequency of alloantibodies to RBCs may be due to multiple reasons. Few factors that might be responsible for the disparity in results include patient population being studied, the transfusion protocols being followed, sensitivity of the test methods and the proficiency of the laboratory employees. Slightly lower prevalence in our patients may be explained by previous reports showing that cancer patients have lower rates of alloimmunization to RBC antigens because they are immunosuppressed and may not manifest any evidence of prior alloimmunization. (1,10).

A positive and statistically significant relation was found between the presence of alloantibodies and number of transfusions (11). Similar results were found in a study conducted in Iran, showing higher red cells alloimmunization in patients who received more units of blood (12). A study conducted in Karachi Pakistan also revealed that red cell alloantibodies were mainly from Rhesus and Kell system (11). The most suitable explanation for this could be that in developing country like ours proper management is not readily available in cases following potential sensitization events such as abortions and pregnancies in Rh negative female and majority of our study population were female. Moreover genetic factors and ethnicities effect the development of alloantibodies, which might have influenced the higher incidence of developing anti Rh antibodies observed in this study. Our study should however stimulate more work in our community to highlight the blood groups that have the potential for alloantibody formation.

Conclusion:

1. RBC allo-antibodies may cause difficulty in obtaining compatible, antigen- negative RBCs blood in multi-transfused patients.
2. Multiple transfused patients should be screened against red cell alloantibodies, as the presence of these antibodies can lead to an inadequate hemoglobin level escalation as well as to transfusion reactions.

We recommend including antibody screening test in routine pretransfusion testing protocol atleast for the patients who are at higher risk of alloimmunization and require long term transfusion dependence. This test may not be cost effective for all the patients currently in our country. However, it will definitely add significant value in blood safety. We also recommend obtaining an RBC antigen phenotype on all patients at high risk of

alloimmunization before the start of transfusion support and if feasible, providing leukodepleted blood.

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