Frequency of Alloimmunization in Multi Transfused Patients

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Two hundred (200) subjects requiring regular blood transfusion were analyzed to detect the antibody and its specification. The investigation included peripheral smear, Direct antiglobuline test (DAT), Indirect antiglobuline test (IAT), antibody screening in all cases and antibody identification where the antibody was detected. The DAT was negative in all cases. IAT become positive in six cases and nine cases were found to be positive with Maxi Screen (three panel cells).

Key words: Alloimmunization, multitransfused, frequency

Transfusion support is vital to the management of patients with hematological disorders and malignancies. Many such patients require blood transfusion during the course of their illness[1]. Blood transfusion is a risky operation as it is potentially dangerous form of therapy. Some persons can accept the blood transfusion of other persons without any side effects, while others, transfusion may lead to serious reactions[2].

Blood components have antigenic properties, after exposure to an antigen; an immune response confers immunity against that antigen. Antibodies and sensitized cell are produced that have the ability to recognize, react with and kill that antigen. Specific responses take two forms that usually develop in parallel, humoral immunity via B-lymphocytes, and cell mediated or cellular immunity via T lymphocytes[3].

Red cell (RBC) Alloimmunization due to transfusion or pregnancy, like humoral immune responses in general, result in long lived memory lymphocytes. Although circulating antibody level may decline over time to undetectable levels, re-exposure can cause a rapid anamnestic response[4].

Following repetitive antigenic exposure the antibody level rises rapidly within 48 - 72 hours of the transfusion and reaches a peak at 7-10 days[5]. The antibodies, which are typically IgG, sensitize the transfused red cell in the patient's circulation and may cause destruction of these cells, an event known as delayed haemolytic transfusion reaction (DHTR). A classic description of a delayed haemolytic transfusion reaction includes the triad of fever, hyperbilirubinaemia, and anaemia 3-10 days post–transfusion[6]. More often there is serological evidence of alloimmunization (positive direct and/or indirect antiglobuline test without evidence of red cell destruction. Such findings have been termed delayed serological transfusion reactions (DSTR) [7,8].

Transfusion dependent children suffering from Thalassaemia, Sickle cell disease, haemophilia and aplastic anaemia are at high risk of developing alloantibodies[9]. Alloimmunization and delayed haemolytic transfusion reactions are consequences of transfusion that could be avoided in multitransfused patients. Whether antigen matching is proven to be efficacious, patients requiring repeated transfusions will continue to require special effort from the blood center and transfusion services[8].

Material and methods:

Total of 200 transfusion dependent subjects with known diagnosis were selected. Among these 140 subjects were thalassaemics, 20 haemophilics, 20 cases of diagnosed patients of aplastic anaemia and 20 patients with chronic renal failure undergoing haemodialysis. All were thoroughly interviewed and clinically examined especially for anaemia, jaundice, hepatosplenomegaly and lymphadenopathy. The relevant information regarding age, sex, address, family history, age at diagnosis, age at 1st transfusion, duration of transfusion, total number of transfusions were properly recorded.7.0 ml of venous blood was collected from each of the subjects through a clean venipuncture and distributed in the following manner.

1. 2.0ml blood was mixed with EDTA to a final concentration of 1.5mg/ml and used for direct antiglobulin test.
2. 3.0ml blood was transferred into serial tubes and allowed to clot. Clear serum was separated into a sterile cryotube and preserved at 20^0C for indirect antiglobulin test, antibody detection and antibody identification.

Results

Two hundred multitransfused patients from different transfusion centers, hospitals were screened to see the pattern of frequency of alloimmunization.

Table: Pattern of antibody detection by DAT, IAT and Maxi Screen.

Patients group	Total	DAT	IAT	Maxi Screen
Thalassaemia	140	-	5(3.6%)	8(5.7%)
Haemophilia	20	-	-	-
Chronic renal failure	20	-	1(5 %)	1(5%)
Aplastic anaemia	20	-	-	-
Total	200	0	6(3%)	9(4.5%)

This include DAT (0%), IAT 6/200 (3%), antibody detection by Maxi Screen 9/200 (4.5%) antibody positivity. Out of these 9 cases detected 8/140 (5.7%) were thalassaemic patients and 1/20 (5%) chronic renal failure patients.

Discussion

The prevalence of antibodies in chronic transfusion dependent patients in western world has been known for long time; in Pakistan the data is quite limited.

The antibodies found in this study to be associated with increasing number of transfusions and severity of sign/symptoms e.g. pallor, splenomegaly and jaundice. Ordinarily IAT using group O +ve cells does not detect all the antibodies and is frequently negative. We recommend proper cells on which all the antigens are present, should be used for performing IAT. Once IAT is positive further identification of antibodies by panel cells is important. The use standard cross match comprising of saline, albumin and coomb's phase, is important for the detection of incomplete antibodies.

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