Original Research Article

Antibody Screening and Identification among Voluntary Blood Donors at RBTC of North India

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Abstract:

Introduction;

The purpose of antibody screening is to detect red cell antibodies other than anti A & anti B in the human serum. There are called unexpected antibodies. These are found only in 0.3-2% of general population. The development of these antibodies can complicate transfusion therapy and result in difficulties in cross match of blood. This study is aimed at assessing the frequency and type of unexpected red cell antibodies in the voluntary blood donors.

Methods:

The results of 17864 Antibody screening tests carried on voluntary blood donors from Jan. 2017 to Dec. 2017 were complied and analysed.

Results:

A total of 17864 samples were screened for the presence of unexpected antibodies. Antibody screening was positive in 7 donors (0.03%). (Table-1 Fig.-2) In the serum of 4 (57.1%) donors autoantibodies were identified, 2 (28.5%) revealed auto antibodies, while 1 (14.2%) had non-specific antibodies. The most common alloantibody identified being Anti E (50%). (Fig.-1)

Conclusion:

Since clinically significant antibodies are detected in voluntary blood donors, antibody screening and if required identification is the need of hour for provision of safe blood transfusion.

Key Words:

Autoantibodies, alloantibodies, irregular red cell antibodies.

Introduction:

There are two types of antibodies that are of concern in blood banking. One are naturally occurring and others are immune mediated. RBC antibodies are considered naturally occurring when they are found in the serum of individuals who have never been previously exposed to RBC Antigen, by transfusion, injection or pregnancy. Naturally occurring Anti A and Anti B antibodies are routinely detected in human serum. There are two types of irregular red cell antibodies; alloantibodies and autoantibodies. Alloantibody is produced against the antigen that is lacking, whereas autoanibody is produced to an antigen that is present. Such irregular alloantibodies/ auto antibodies can be encountered in healthy blood donors who are either transfused previously or in mutliparous females.[1]

The National blood policy, India, 2007 (National Aids control organization, Ministry of Health and family Welfare), has laid down the guidelines for the screening of donated blood for the presence of irregular red cell antibodies.[2] The incidence of transfusion reactions due to irregular red cell antibodies in donor blood is rarely seen. However, the presence of such antibodies can occasionally cause severe transfusion reactions if a large amount of plasma or whole blood is transfused as in the cases of massive transfusions or in pediatric population. Only PRBCs should be preferably transfused when irregular red cell antibodies are found. For safe blood transfusion blood donors are tested not only for infectious markers but also for irregular antibodies for safe and compatible blood transfusion, especially for previously alloimmunised individuals.

Aim;

To study the prevalence and type of irregular red cell antibodies among the blood donors who donated at our centre.

Material and Methods:

This retrospective study was conducted in the Department of Transfusion Medicine, Govt. Medical College & Rajindra Hospital Patiala. The data of antibody screening among the blood donors who donated blood according to the Directorate General of Health Services criteria at our centre from January 2017 to December 2017 was analysed for the presence of irregular RBC antibodies. Universal precautions were taken during sample collection and processing testing. As per the departmental protocol donor blood samples were collected at the time of blood donation in EDTA for blood grouping and antibody screening. Blood grouping was performed on fully automated immunohematology system (Galileo: Immuncor Inc. Norcross GA, USA), using commercially available antiseras.

Antibody screening was performed using a commercial panel by capture R technique on fully automated system. The screening cell panels covered most antigens against which clinically significant antibodies are formed. In case of positive antibody screening further tests were performed to precisely characterize the unexpected antibodies and to determine their specificities in case of Alloantibodies. Antibody identification was performed using different cell panels from (Immucor Inc. Norcross GA USA) by capture technique.[4]

Results

A total number of 17864 donors donated blood at our centre during the study. Of these, 7 (0.03%) were positive for antibody screening. In the serum of 4 donors (57.1%) alloantibodies were identified, 2 (28.5%) revealed autoantibodies, while 1 (14.2%) had non specific antibodies (Table-1 &

Fig.1). The most common alloantibody identified being Anti E (50%); others being Anti D (25%) and Anti M (25%) (Fig.2).

Fig. - 1
Specificity and frequencies of irregular antibodies in blood donors
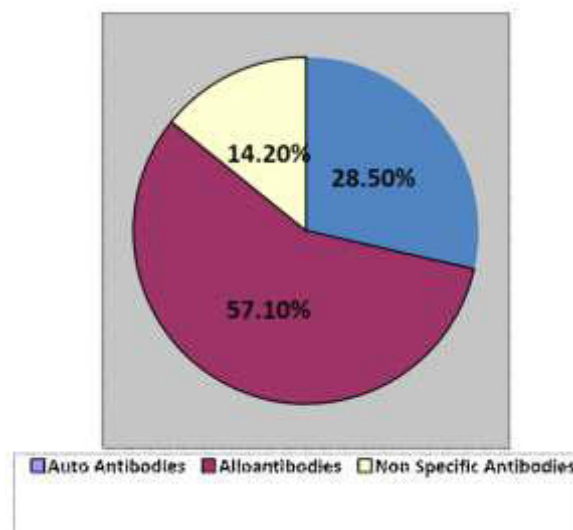
Fig.-2
Specificity of Alloantibodies in blood donors
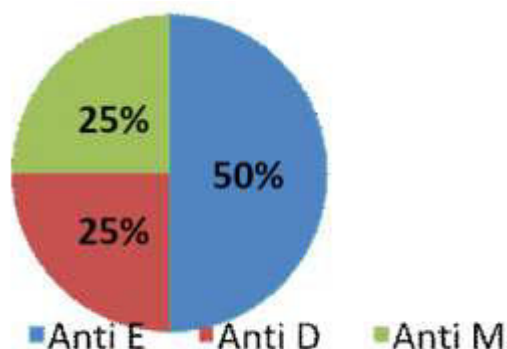
Discussion:

There are a few studies for incidence/ prevalence of irregular red blood cell antibodies in healthy donors in India. The studies have reported that the rate of unexpected antibodies in blood donor varies from 0.32% to 2.4% .[3] This large variation may be due to the different screening methods used and characteristics of the population studied. The prevalence noted in the present study is 0.03%, which is comparable with the similar three studies

Table-1
Specificity and frequencies of irregular antibodies in blood donors

Antibodies identified	Frequency
1. Alloantibodies	4 (57.1%)
2. Autoantibodies	2 (28.5%)
3. Non specific Antibodies	1 (14.2%)

conducted from the same region by Pahuja et al[6],Chenna et al[8]& Garg et al[7] while Giblett[5] had reported 0.32% incidence of irregular RBC antibodies in blood donors.(Table-2)

Table-2

Sr. No.	Study	Prevalence
1	Giblett et al[5] (1977)	0.32%
2	Pahuja et al[6] (2012)	0.05%
3	Garg et al[7] (2014)	0.09%
4	Chenna et al[8] (2016)	0.06%
5	Present Study	0.03%

In our study the most frequent unexpected antibodies identified were alloantibodies from Rh blood group system followed by Auto Antibodies. The frequency of Anti E and Anti D were found to be 50% and 25% respectively.

The Rh blood group is one of the most complex blood groups known among blood group system. D antigen is considered to be the most immunogenic of all antigens and has the potential to cause clinically significant hemolytic disease of fetus and new born (HDFM) and transfusion reactions. In comparison to with the study by Garg et al[7], prevalence of anti-D, anti E found in our study was high.

In our study 25% had autoantibodies which is much higher than reported by Tiwari et al[9] (0.04%). This could also be due to the different techniques used for antibody screening & identification.

Overall prevalence of irregular alloantibodies were 0.03% with Anti E and Anti D being the most frequently identified alloantibodies in blood donors at our centre. Red cell antibody screening of donors, adds safety in transfusion and reduces the need for minor cross matching.

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