



Case Report

Detection, Identification and Titration of Anti- C (RH4) Allo-Antibody in a Multi-Transfused HHA Patient Referred to the Department of Transfusion Medicine of BSMMU

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Abstract

It is a Report of a case of transfusion induced alloimmunization of anti-c (Rh-4) in multi transfused HHA. Following top-up transfusion DHTR resulted in this multi transfused HHA. Patients was referred to the transfusion medicine department of BSMMU to detect the cause/s of DHTR from the Hematology department of Bogra MCH. High tited (1:256) anti-c alloantibody were detected, identified in this patient by the standardized sensitive method of immuno hematological testing at the department of transfusion medicine, BSMMU. When incompatible RCCs are transfused the amount of antibody in recipient's serum may be too low to effect red cell destruction or even to be not detected by sensitive compatibility tests. However Transfusion may provoke as anamnestic immune response so that a few days after transfusion a rapid increased in antibody concentration develops and rapid destruction of transfused red cells occur. Hemoglobinuria is not uncommon in DHTRs. and causes HDN During TOP-UP transfusion to each and every HHAs genotypically matched antigen negative RCC to be practiced to avoid DHTR. Unlike AIHA it is possible to identify and detect alloantibody responsible for the DHTR by meticulous immuno hematological testing and processing.

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Introduction

A Haemolytic Transfusion reaction is one in which signs and symptoms of increased Red cell destruction are produced by transfusion. A distinction is made between IHTR in which destruction begins during transfusion and in DHTR destruction begins only after there has been an immune response provoked by transfusion. Almost invariably DHTR are caused by anamnestic immune responses. Although physicians assume as

if by reflex that haemolysis in the settings of transfusion must be immune mediated, non immune causes such as thermal, mechanical and osmotic stress, infection and intrinsic red cells defects should remain part of the differential diagnosis(1).

Alloimmunization is a very common clinical problem in transfusion dependent patients but detected very rarely in our country. Alloimmunized patients present in such an

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atypical pattern that the actual diagnosis become very difficult. Because these patients are always used to transfuse blood for correction of anemia for long period of time because they were suffering from HHA. The clinical presentation may mimic AIHA. Some patients of HHA presented with the history of fever, jaundice,

Findings & Results of the case studied

Miss Bilkis begum about 28 years old. She comes from Bogra Medical College Hospital with the complains of anorexia, fever, red color urination following few days of Transfusion and there is no benefit after transfusion as no increment of Hb%. She also gives the history of transfusion from her childhood, from her 5 years of age. She is a diagnosed case of beta thalassaemia (HHA). Previously she needs transfusion after 1 to 3 months interval. She receives blood from different

clinic and hospital of Bogra district. She is B positive (Rh D), Her DCT negative but ICT is found positive. Her Rhesus genotype is detected in our lab as $R_1 R_1$ type (CDe/CDe). Anti-c (RH4) is identified, detected with 1:256 titre in her serum in our Lab. We do ICT with different types of Donor having $R_1 R_2$, $R_1 r$, rr , $R_2 R_2$, $R_1 R_1$ phenotype, it is positive with all of the above Donors except $R_1 R_1$ type of 'O' cell. Then we do cross match with 'B' $R_1 R_1$ Blood unit with Bilkis and was found compatible.

We make an elute from Bilkis's serum, this elute also give positive result with rr type of Blood and negative result with $R_1 R_1$ Donor. Thus we confirm that Bilkis developed Anti-c (RH4) by repeated top-up Transfusion.

Our Lab findings are summarized in following Tables (I-VI):

Table I : ABO Grouping protocol

Anti A	Anti B	Anti AB	A cell	B cell	O cell	Auto-control	Result
-	+	+	+	-	-	-	B

Table II : Rhesus phenotype

Anti C	Anti c	Anti D	Anti E	Anti e	phenotype	Genotype
+	-	+	-	+	CCDec	$R_1 R_1$

Table III : Coombs Test

DCT	ICT
Negative	Positive

Table IV : ICT with available panel cells

$O R_1 R_2$	$O R_1 r$	$O R_1 R_1$	$O r r$	$O R_2 R_2$
+	+	-	+	+

Table V : Cross - Matching (by indirect Coomb's test, enzyme method and by albumin method)

$B R_1 R_2$	$B R_1 r$	$B R_1 R_1$	$B r r$	Results
+	+	-	+	Compatible only with B R1 R1 type of blood

Table VI : Cross - Matching (by saline method)

$B R_1 R_2$	$B R_1 r$	$B R_1 R_1$	$B r r$	Results
-	-	-	-	Compatible

Discussion

Antibodies are immunoglobins produced by the lymphocytes of the adaptive immune system in response to an antigen for which they exhibit specific binding. Alloantibodies produced by an individual against foreign antigen present in another individual usually by multiple transfusion or by pregnancy. Commonest alloantibody is anti-D. Because D antigen is considerably more immunogenic than the other Rh antigens which have the following order of immunogenicity: D > c > E > e > C (2). The vast majority of Rh antibodies are IgG causing delayed haemolytic transfusion reaction and haemolytic disease of new born (3).

Alloimmunization is caused by multiple transfusion, pregnancy, transplantation etc. It may occur against red blood cell, platelets leucocytes etc. Immune antibody against red cell antigen commonly formed and causes DHTR and HDN. If immune antibody formed in a multitransfused patient he or she had been suffered from DHTR (4). Every transfusion is associated with some hazard. There is no blood or blood product which is 100% genotypically match with recipient. When transfusion given in a patient apparently looking compatible. DHTR is a delayed type of transfusion reaction when incompatible red cells are transfused, the amount of antibody in the recipient serum may be too low to bring about incompatibility, but after transfusion provoke an anamnestic immune response. After transfusion there is a rapid increase in antibody production and rapid destruction of red cells occur. Virtually all DHTR are due to secondary responses (5). Most commonly the recipient has been immunized by previous transfusion or pregnancies. Clinical presentation of these patients mimic AIHA and may need unnecessary medical intervention.

After anti-D, anti-c is the most important Rh antibody from the clinical point of view (2). Although anti-E is commoner than anti-c, anti-E is frequently a naturally occurring antibody; on the other hand anti-c is found only as an immune antibody (6). Anti-c is relatively often involved in delayed haemolytic transfusion reaction and haemolytic disease of the newborn (1), Jones et al

(1954) produce anti-c in two out of 9 volunteers who were given repeated injection of c-positive blood over a period of 10 months (2).

When incompatible red cells are transfused, the amount of antibody in the recipients serum may be too low to bring about rapid red cells destruction or even to be detected, but the transfusion may provoke an anamnestic immune response so that a few days after transfusion there is a rapid increase in antibody concentration and rapid destruction of the transfused red cells (7). The most constant features are a fall in Hb concentration, fever jaundice and haemoglobinuria. Usually these occurs between 4-7 days of transfusion (8). When a patient abruptly develops signs of increase red cells destruction. Such as falling Hb concentration together with spherocytosis. a diagnosis of AIHA rather than DHTR may be made (9,10). The mistake is serious it leads to the transfusion of incompatible blood. IN a DHTR it may be possible to identify the antibody responsible for the reaction (11). Red cells lacking the corresponding antibody should be transfused if the patient require more blood (12). In routine screening pure Anti-E is the most common, followed by Anti-c although Anti-c is the most common cause of HDN which can be severe, this is probably because one half of Anti-E is weak and Naturally occurring (13).

Conclusion

When incompatible RCCs are transfused the amount of antibody in recipient's serum may be too low to effect red cell destruction or even to be not detected by sensitive compatibility tests. but Transfusion may provoke as anamnestic immune response so that a few days after transfusion a rapid increased in antibody concentration develops and rapid destruction of transfused red cells occur (14). Hemoglobinuria is not uncommon in DHTRs. During TOP-UP transfusion to each and every HHAs genotypically matched antigen negative RCC to be practiced to avoid DHTR and HDN. Unlike AIHA it is possible to identify and detect alloantibody responsible for the DHTR by meticulous immuno hematological testing and

processing(15). Early diagnosis of Alloimmunization causing to delayed haemolytic Transfusion reaction is very difficult but examination of blood for detection and Identification of irregular antibodies provide safe transfusion to deadly dying HHA patient thus minimize their sufferings & prolongation of their life.

According to WHO about 3% people of Bangladesh are the carrier of B-thalassaemia i.e. 3.6 million are carrying gene of B-thalassaemia and 4% are carrier of Hb-E i.e. 4.8 million are carrying gene of Hb-E. In Bangladesh about 6000 child born per year with Hb-E with Beta thalassaemia. So during clinical Top up transfusion Physicians must be careful and cautious about adverse reaction during and after transfusion, the conclusive cross matching report from Transfusion Medicine Specialist all the time.

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