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Research Article

STUDIES ON THE RED BLOOD CELL (RBC) PHENOTYPING IN MULTITRANSFUSED THALASSAEMIA MAJOR CASES IN A DISTRICT HOSPITAL, WEST BENGAL, INDIA

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ABSTRACT

Phenotype matched blood transfusion can prevent allo-immunization in multi-transfused Thalassemia major cases. Eventually, there will be significant reduction in acute and delayed hemolytic reactions. Phenotyping of rbc for ABO, Rh and Kell can serve the purpose in more than 95% of cases. In this study, phenotype detection of A, B, C, c, D, E, e and Kell (K) has been done and and the frequency was found in a decreasing manner from D, C, e, c, E and K in the present study.

Keywords*: Thalassaemia, Phenotype, Alloimmunization*

INTRODUCTION

Thalassaemia is a heterogenous group of genetically determined disorder characterized by the reduced rate of synthesis of one or more types of normal haemoglobin polypeptide chain. It is a major public health problem (Firkin *et al.*, 1990).

It is classified according to the type of chain undergoing reduced rate of synthesis such as alpha thalasaemia is characterized by the reduction of alpha chain syntnesis, Beta Thalassemia is characterized by the reduction in the rate of synthesis of beta-chain of hemoglobin. Clinically it is classified as thalassaemia major and minor (Firkin *at al.*, 1990).

Clinically it is characterized by anemia, splenomegaly and usually require frequent blood transfusion in thalassaemia major cases whereas thalassaemia minor is symptomless carrier state (Hassan *et al.*, 2004).

Blood transfusion is the main treatment of thalassaemia to keep hemoglobin level around 10 to 11 gm/dl. Apart from blood transfusions, iron chelation and sometimes surgical treatment by splenectomy may be required in some rare cases (Firkin *et al.*, 1990; Hassan *et al.*, 2004).

Usually ABO group and Rh matched blood is transfused.

One of the complications of blood transfusion is the development of allo-antibodies against red cell antigen. Various studies have shown the various percentages of antibody formation where some can result in haemolytic transfusion reaction and can reduce the survival of red cells. Allo-immunization is an important risk factor of transfusion reactions, causing reduction of available pool of compatible blood for transfusion in subsequent crisis. RBC phonotyping is essential for identification of suspected allo-antibodies and to provide antigen matched RBC transfusion to patients with thalassaemia major who are transfusion dependent (Breecher, 2005; Singer *et al.*, 2000).

Antigen matching transfusion can effectively prevent alloimmunization for which patients ABO, Rh (D, C, c, E, e) and Kell system typing at diagnosis or before transfusion is effective in majority of cases in this area. Blood to be transfused should always be matched at least with ABO, Rh and Kell system (Singer *et al*., 2000; Walker *et al.*, 1989).

MATERIALS AND METHODS

Blood samples were obtained for RBC antigen detection after having their consent at Barasat District Hospital. Blood was collect in K2 – EDTA (Dipotassium ethylenediamine tetra acetate) anticoagulated vial. In our study, red cell phenotyping was done for A, B, C, c, D, E, e and K antigens using specific antibodies for every antigen using standard blood bank methods (Walker *et al.*, 1989; Hoffbrand, 1999). Total fifty (50) patients were included in the study having age from 8 to 14 years

and requiring about 2-3 units of RBC transfusion per month to maintain their hemoglobin level about 10 gm/dl.

RESULTS

All the patients in this study were thalassemia major of age group 8 to 14 years (mean age 11 years). There were 28 (56%) males and 22 (44%) females.

All o antibodies were detected in all these multitransfused Thalassemia major cases. The frequency of O antigen was maximum followed by B and A, least AB. All were Rh (+) ve cases (Table 1). Frequency of RBC antigen apart from ABO system in multi transfused thalasaemia major cases have been shown in Table 2.

Table 1: Showing the frequency of ABO antigens in the thalasaemia major cases in the study (n=50)

System		Frequency (%)
ABO	A	14 (28)
	B	16 (32)
	AB	2 (4)
	O	18 (36)

Table 2: Showing the frequency RBC antigens excepting ABO system in thalassemia major cases in the study

System	Antigens	Frequency (%)
Rh	D	50 (100)
	C	46 (92)
	c	19 (38)
	E	16 (32)
	e	43(86)
Kell	K	4 (8)

(All the cases were multi transfused thalaessemia major in the study)

DISCUSSION

Development of red cell alloantibodies occur in a variable number of multitransfused thalassaemia major cases. Many of these are haemolytic and some are non-haemolytic as a result of which transfusion of RBC may become significantly be complicated due to development of transfusion reaction. Blood group phenotyping is needed after patients have been transfused multiple transfusions. It has been reported in several studies that phenotyping of ABO, Rh, & Kell can serve this purpose over 95% of cases (Patel *et al.*, 2016). The incidence of RBC alloimmunization can range from 4% to 60% (Castro *et al.*, 2002) in some populations. The frequency of red cell antigens in this study has been shown in table-2. In a study done by Castro et al common antibodies formed specially in multitransfused thalassemia cases were against C, E and K antigens which in our present study was against C, e and c antigens. In another study conducted by vichinsky *et al.* showed that phototype matching for c, E and K resulted a significant decrease in delayed haemolytic reaction (may be dropped 90%) where as the rate of alloimmunization dropped from 3% to 0.5% (Vichinsky *et al.*, 2001).

Conclusion

If in non-alloimmunized cases phenotype matched blood is selected for transfusion, then alloimmunization will not occur which can result in reduction of mortality and morbidity in multi-transfused cases due to mainly reduction of acute and delayed hemolytic transfusion reactions. However, this is a pilot study, which warrants a long term prospective study to strength this view.

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CONFLICT OF INTEREST
None

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