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臨床組-從業

血液透析病人輸血前增加血型配對成效之回溯研究

Red blood cells alloimmunization and extended RBC antigen matching for transfusion in hemodialysis patients

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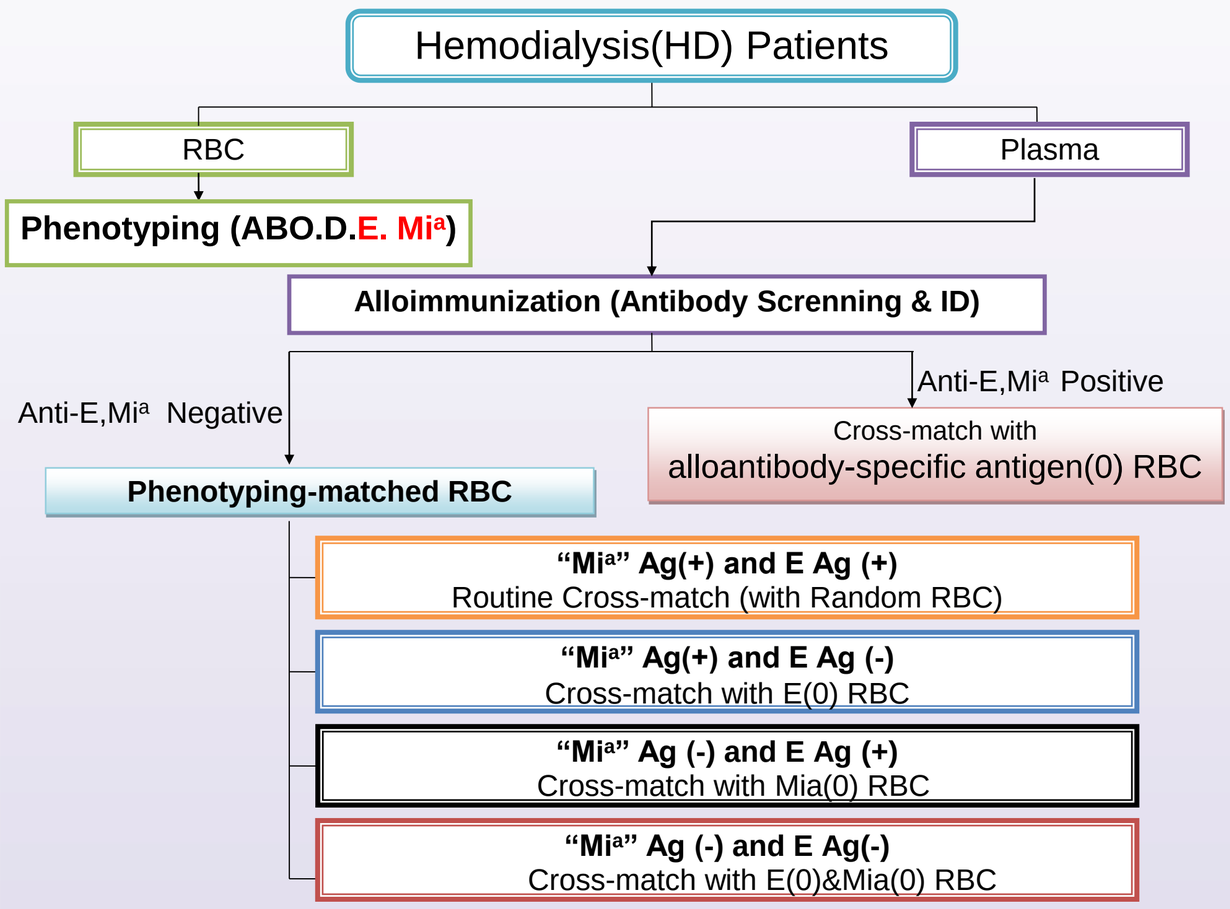
Background

Blood transfusions are frequently used in the management of patients with hemodialysis-related anemia. Alloimmunization to RBC blood group antigens is a major complication for transfusion patients, which limits the usefulness of RBC transfusion. The anti-"Mi^a" and anti-E antibodies were demonstrated to be the most common alloantibodies in Taiwan (Table1). Therefore, a strategy of extended RBC antigen matching to provide Mi^a and E –matched RBC transfusion was tested to reduce alloimmunization in hemodialysis patients (Figure1).

Table1. Distribution of RBC alloantibodies in Taiwan

Blood group system	Types of antibodies	Taiwan Blood Services Foundation N(%)	Hualien Tzu Chi N(%)	Our hospital N(%)
Rh	Anti-E	1028(16.5)	155(24.4)	244(30.2)
	Anti-c	96(1.5)	54(8.5)	49(6.1)
	Anti-C	31(0.5)	7(1.1)	34(4.2)
	Anti-e	33(0.5)	17(2.7)	26(3.2)
Duffy	Anti-Fya	1(0.0)	0(0.0)	0(0.0)
	Anti-Fyb	18(0.3)	1(0.2)	6(0.7)
Kidd	Anti-Jka	3(0.1)	8(1.3)	3(0.4)
	Anti-Jkb	2(0.0)	2 (0.3)	4(0.5)
MNS	Anti-M	404(6.5)	25(3.9)	45(5.6)
	Anti-N	1(0.0)	1(0.2)	2(0.2)
	Anti-S	35(0.6)	1(0.2)	5(0.6)
	Anti-Mia	2169(34.7)	267(42.0)	324(40.0)
Lewis	Anti-Lea	355(5.7)	50(7.9)	18(2.2)
	Anti-Leb	193(3.1)	8(1.3)	7(0.9)
P	Anti-P1	564(9.0)	26(4.1)	26(3.2)
Diego	Anti-Dia	33(0.5)	8(1.3)	9(1.1)

Figure1. Preventive transfusion protocol for HD patients



Methods

Records for 1383 hemodialysis patients transfused with the extended matching protocol between 2012 and 2018 were reviewed. Patients and donors were phenotyped for ABO, D, Mi^a and E antigens. Only matched RBC units were provided for transfusion to the recipients.

Results and Discussions

According to our retrospective study from 2005-2010 at the Blood Transfusion Unit of E-DA Hospital, the overall prevalence of alloimmunization after blood transfusion was 0.75%. However, there was a significantly higher RBC alloimmunization rate of 3.88 % (39/1005) in hemodialysis patients ($p<0.001$). In the period between 2012 and 2018 with extended RBC antigen matching blood transfusion, the prevalence of alloimmunization was 1.44% (19/1323). The RBC alloimmunization rate was significantly decreased after application of the transfusion strategy in hemodialysis patients ($p<0.001$). Anti-"Mi^a" or anti-E were found in 8 hemodialysis patients (0.60%) after transfusion, it was significantly lower than those 21 patients (2.09%) before the extended RBC antigen matching transfusion strategy ($p<0.0001$).

Seven patients were found to produced anti-Mi^a and one patient had anti-E after transfusion. It might cased by glycophorin variants or patients have transfused in other hospital.

Table2. The occurrence of transfusion-induced alloantibodies in HD patients

Category	Before strategy 2005 - 2010	After strategy 2012-2018
Number of red blood cell transfused	1005	1323
Male , N (%)	523(52.0)	723(54.6)
Female, N (%)	488(48.0)	600(45.4)
Not alloimmuizd	966	1304
Alloantibody production after transfusion	39	19
Prevalence of alloimmunization (%)	3.88	1.4*
Male , N (%)	18 (46.2%)	9(47.4%)
Female, N (%)	21 (53.8%)	10(52.6%)
Blood units of alloimmunization (mean±SD)	27.3 ± 60.2	16.8±21.5
Anti-E or Anti-Mia production after transfusion	21	8
Prevalence of Anti-E or Anti-Mia production (%)	2.09	0.60**
Male , N (%)	7 (33.3%)	3 (37.5%)
Female, N (%)	14 (66.7%)	5 (62.5%)
Blood units of alloimmunization (mean±SD)	17.9±21.9	5±3.5

Conclusion

Extending matching for ABO, D, Mi^a and E is an effective strategy to reduce RBC alloimmunization in hemodialysis patients. Extended Blood grouping for common alloantibodies (Mi^a and E) along with ABO matched transfusion is helpful in preventing alloimmunization in hemodialysis patients or other chronically transfused patients.

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