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ABO reverse grouping with "laboratory made" red blood cells with low budget in a small transfusion center in Algeria

Abstract

Objective: Reverse ABO group is required by Algerian Transfusion Guidelines in group identification. Immuno haematology laboratory with limited budget cannot afford commercialized reagent red cell. In this work, laboratory made test cells were used to determine their viability and interest in time gain and economically.

Methods and materials: Double ABO group identification on blood donor and blood products using both forward ABO grouping with antisera test and reverse grouping with prepared 5% red blood cells test tube technique replaced slide technique.

Results: 1095 identifications were performed. One discrepancy was observed with agglutinated B cells. Prepared red cell suspension presented hemolysis from day 5 of conservation and diminution of antigenic activity with low strength of agglutination with antisera test.

Discussion: cold allo antibodies agglutinated B cell causing the discrepancy. Prepared red cell test can be used for 4days.

Conclusion: In developing countries, reverse ABO grouping with laboratory made red cell, in blood group identification, is an economic alternative to ensure blood products and optimize patients outcomes.

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Introduction

In the immunohematology laboratory at Saida transfusion center, donors ABO blood group identification is based on forward grouping. Antisera test are produced by the Algerian reference laboratory, Pasteur Institute, and provided by the National Blood Agency.[1] Reverse ABO grouping is mandatory by regulatory services and Algerian Transfusion Medicine Guidelines.[2–4] The laboratory budget cannot afford commercialized test cells A1, B and O, therefore reverse grouping was implemented using "Laboratory made" test cells.

Methods and materials

I maintained ABO group identification procedure: I performed forward ABO grouping on donor anti coagulated blood, collected on EDTA tubes, using Anti A, Anti B and Anti AB Antisera test for the slide technique on opaline plate, in room temperature.

I employed "laboratory made" 5% red cells test suspension: A cell, B cell and O cell for the reverse ABO grouping, collected blood from regular donors served to prepare red cells test, ABO groups were known, 78% of donors were females. I prepared 5% test cell suspension directly from anti-coagulated blood, the procedure included red blood cell washing step (two times) to remove impurities.[5–7] Tubes were labeled and conserved at 4°C. In order to reduce the risk of human errors, I performed a double ABO group identification: First on donor blood, collected on ADTA tube. Second on blood products: red cell concentrate and plasma for transfusion.

I used test tube technique for both forward ABO grouping with reagent antisera and reverse ABO grouping with laboratory made 5% red cell test. I accepted only results with 4+ agglutination strength, otherwise I repeated the reverse grouping with newly prepared red cell suspension to get the required 4+ result. I used a microscope with magnification of x10 to examine reactions that appeared negative to the naked eye.

Quality control included:

i. Hemolysis control: I checked the suspensions for: macroscopic and/or microscopic hemolysis

ii. Antigenic activity control: determined by the strength of an agglutination obtained with reagent antisera.

iii. Adverse transfusion reactions control.

Results

From June 2nd to September 10th of 2013, I performed 637ABO group identification. I observed one discrepancy: anti A (-), anti B (++++), anti AB (++++), A cell (++++), B cell (++), O cell (-), anti Rh (++++), Auto test (-). I got the same result with the second determination using newly prepared cell suspensions. From September 11th to November 30th 2013, I performed 458ABO group identification without discrepancy. Group distribution percentage was determined as shown in Table 1.

Table 1 ABO group percentage distribution.

Group	AB	A	B	O
%	38	13	31	18

Cell test integrity

Hemolysis

Day 4: none

Day 5: 01% macroscopic hemolysis, 48% of the preparation presented microscopic hemolysis

Day 6: 13% macroscopic hemolysis 57% microscopic hemolysis

Antigenic activity: 32% of the preparation presented 3+ agglutination strength at day5. The haemovigilance services did not report any adverse transfusion reactions.

Discussion

Discrepancy: I carefully repeated the test procedure with new cell test preparation to eliminate any technical nature. Donors rarely present discrepancies for the biological qualification selection. An irregular antibody agglutinated B cells in room temperature. With a negative auto-test, presence of cold allo antibodies theory is accepted. Normally the detection of irregular antibodies needs to be performed. In this case it was impossible for lack of screening and identification reagent red blood cells. Practically, blood may be transfused at 37°C, except if the indirect Coombs in LISS-albumin medium is positive.[8] Cold allo antibodies are not dangerous in transfusion. Fortunately, the blood was not transfused. In emergency cases, low antibody titer is accepted (1/64 titer in Erasme hospital, brussels, Belgium)

ABO group percentage distribution (Table 1) did not reflect population percentage distribution,[9] the transfusion center needs influenced them, those needs responded to repeated transfusion for known patients with AB and B group in hematology service. After day5, hemolysis increases to be microscopic then macroscopic and the antigenic activity decreases. Laboratory made test cells were used for 4days, I predicted 05days.[10]

Conclusion

This procedure can be implemented easily in small transfusion centers and blood banks with an annual average donor approximate to 3000donor/year (2800donor/year in this study). New 5% test cell suspension can be prepared, every 5days. In developing countries with low incomes, reverse grouping with laboratory made test cell for ABO group identification, is an interesting economic alternative with a goal to ensure blood components and blood products and optimize patient outcomes.

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None.

Conflict of interest

The author declares no conflict of interest.

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