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Case Report

Identification of Rare Bombay Phenotype by Immunohematology Workup: A Case Report

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Abstract

Introduction: Rare Bombay phenotype was first reported in Bombay, India by Bhende and Bhatia in 1952. Bombay phenotype is characterized by absence of H, A and B antigens on red cells and in secretions, while plasma contains anti A, anti B and anti H. Genetically Bombay Oh phenotype individuals are termed as homozygous hh/sese.

Methodology: Blood grouping (ABO and RhD) was done in our blood bank by semi-automated Column Agglutination Technology (CAT) as well as Tube agglutination method and performed Adsorption Inhibition Test using saliva (tube method) for confirming secretor status.

Results: A young 21years male voluntary donor donated blood at our blood bank. The ABO Grouping and RhD typing with serum grouping Indicated Bombay Oh RhD Positive group. Further tests done were: Direct Coombs Test/Indirect Coombs Test by 3 cell panel and Adsorption Inhibition Test by using saliva, which confirmed the Bombay blood group.

Conclusion: To identify Bombay Oh Blood group we recommend complete immunohematology workup (Blood Group: Forward and Reverse with Auto control) using standardised agglutination technologies combined with saliva testing for secretary status (with controls).

Keywords: Bombay Blood Group, ABO RhD, Column Agglutination Technology, Saliva Testing, Immunohematology, Direct Coombs Test, Indirect Coombs Test

Abbreviation

Bombay Phenotype is a rare blood group, which was first reported in Bombay, India by Bhende and Bhatia in 1952. Bombay Phenotype is characterized by absence of H, A and B antigens on red cells and in secretions, while plasma contains anti A, anti B and anti H [1]. Genetically Bombay Oh Phenotype Individuals are termed as homozygous hh/sese, representing phenotype as O non secretor [2]. Immunohematology workup helps us understand that this blood group is physiological and has nothing pathological.

Case History

A Young 21years Male voluntary donor donated blood at our blood bank. As there was a blood group discrepancy with O cell clumps, further immunohaemotological workup was done and identified as Bombay Oh Rh D Positive Blood group. To rule out pathological aspects of such discrepancy, history was collected. No H/O Blood Transfusion, drugs found. Followed by direct, indirect coombs test.

Methods

Blood Grouping (ABO and RhD) was done in our blood bank by semi-automated Column Agglutination Technology (CAT) as well as Tube agglutination method and Coombs tests were done by CAT method.

Equipment

Semi-automation on Otho Clinical workstation was used.

Standard Tube agglutination method for all tube methods: further by performing Adsorption Inhibition Test using saliva by tube method secretor status was confirmed.

Results

The ABO and RhD typing with reverse grouping on semiautomated CAT method gave a result of O Rh D Positive (Figure 1). Serum reaction with O pooled cells gave 4+ grade agglutination [Figure 2]. Anti H Lectin antisera: Negative [Figure 2]. Routine Donor ICT using Pooled cells were Positive (4+) [Figure 3]. Such results Indicated Bombay Oh RhD Positive group. Tests results shown in figures 1, 2, 3 and 4.

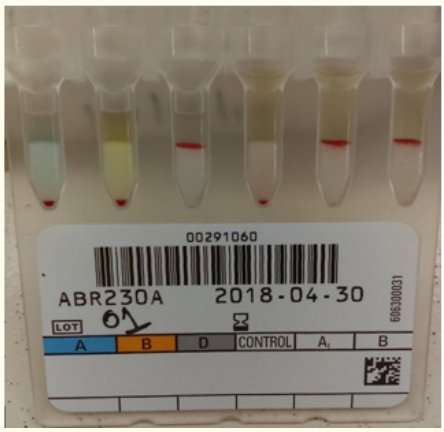

Figure 1: The ABO and RhD typing with reverse grouping on semiautomated CAT method gave a result of O Rh D Positive and Auto control: Negative.

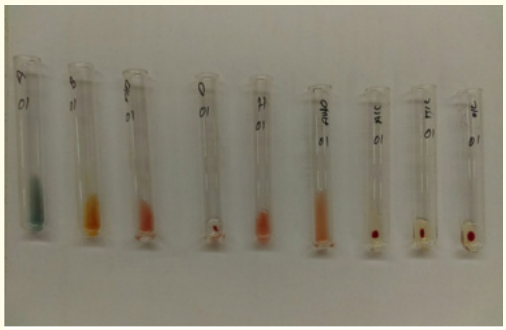

Figure 2: The ABO and RhD typing with reverse grouping on Tube method gave a result of O Rh D Positive, Serum reaction with O pooled cells gave 4+ grade agglutination, Auto control: Negative and Anti H Lectin antisera: Negative.

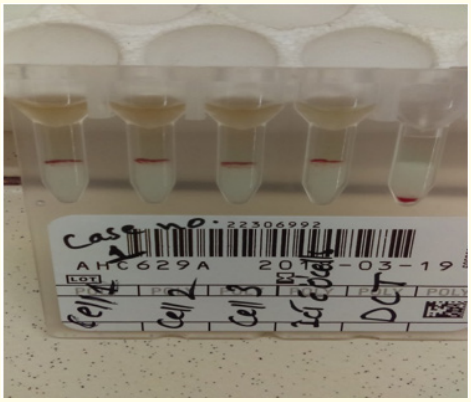

Figure 3: Routine Donor ICT using Pooled cells were Positive (4+), ICT by 3 cell panel: Pan Reactive and DCT: Negative.

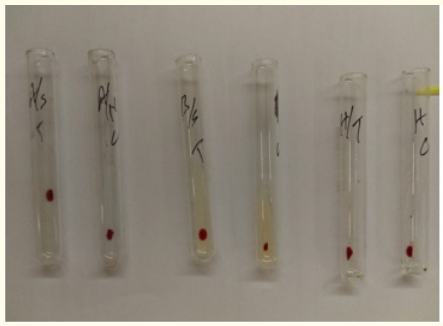

Figure 4: Adsorption Inhibition Test (Saliva test): Non secretor result (Agglutination confirming the non-secretor status).

Discussion

The ABO antigens are formed from H antigen by enzymatic action.

In Bombay blood group individual, there is no formation of H antigen due to lack of Fucosyl Transferase mediated by H gene [3]. Hence phenotypically, Bombay blood group is identified by the absence of A, B and H antigen on red cells while serum contains anti A, anti B and anti H. Prevalence of Bombay phenotype is 1:10,000 in India [4]. During Forward grouping Bombay blood group is appear as O group because it would not show any reaction with anti A and anti B. shortcut methods (without adding supplementary reagent) can lead to misidentification of blood group. Serum grouping using O pooled cells helps in identifying Bombay blood group. Body fluids such as saliva, tears, blood etc., except CSF can be used to identify the Bombay blood group by secretory status [5]. Patient having Bombay blood group can receive only blood of Bombay blood group [5].

However, the patient can safely be transfused any fresh frozen plasma (FFP), platelets and cryoprecipitate. Communication by social media helps in avoiding the discard of such rare group blood, as someone somewhere must be waiting for such Bombay blood.

Conclusion

In this case study we recommend to Identify Bombay Oh Blood group by complete immunohematology workup (Blood Group: Forward and Reverse with Auto control) using standardised agglutination technologies combined with saliva testing for secretary status (with controls).

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