CASE REPORT & BRIEF COMMUNICATION

Rare Case Report-Bombay Blood Group & its Transfusion Impact

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ABSTRACT

The Bombay Blood Group is the rarest blood group first reported in Bombay, India. 55 year old female patient who is admitted in Zydus Hospital with planned spine surgery . For preoperative major profile blood sample was sent to our blood bank for grouping & other lab investigations. Both forward and reverse grouping were done by GAMMA Immucor Automation (microplate method) resulting discrepancy between forward and reverse grouping. Both are important for safe transfusion, if not followed may lead to people with Bombay blood group not being detected, categorized as O group and cause severe hymolytic reaction. So therefore reverse or serum grouping is necessary to detect this group. We present one rare case which was diagnosed in our hospital.

INTRODUCTION

Bombay phenotype is one of the rarest ABO blood groups. The antigens of ABO group (A, B, and H) are complex carbohydrate molecules. The A and B antigens expression is determined by the presence of H antigen on red blood cells. H antigen can be synthesized by H gene (FUT1) which is located on chromosome 19 and give rise to glycosyltransferase that add L-fucose to a precursor substance to produce H antigen on red cells. H antigen is an essential substance to A transferase or B transferase which are encoded by the ABO genes located on chromosome 9.[1] A and B transferases convert H antigen into either A or B antigens, respectively. In group O individuals, the O allele produces an inactive transferase. Therefore, H substance persist unchanged as group O.[2] Individuals with extremely rare Bombay phenotype fail to express H transferase. They cannot synthesize A or B antigens, and ABH antigens are absent from their red cells, regardless of their ABO blood group genotype.[3] In Bombay phenotype, there is a void of A antigen, B Antigen as well as H antigen [3] .Since their red cells do not react with anti-A, anti-B, and anti-AB antiserums, they can be recognized as the O blood group in cell typing. Their plasma contains anti-A, anti-B, and strong anti-H which can be hemolytic and is reactive with all blood types except the Bombay phenotype. As a result, individuals with the Bombay phenotype can only be safely transfused with autologous blood or other Bombay red cells.[4]

CASE PRESENTATION

55 years old female admitted in ortho department for planned spine surgery.Her preoperative profile was sent to laboratory & blood group was part of it.Blood grouping tests are performed on Immucor GAMMA Automation . In which forward & reverse grouping were performed. Result status displayed was NTD means not determined. In immucor GAMMA image based analysis is possible.In which Forward grouping shows no agglutination with Anti A, Anti B & anti AB & grade 4 agglutination with Anti D1 & AntiD2 which is suggestive of O positive. Reverse grouping shows grade 4 agglutination with A1cells & A2 cells ,B cells & O cells. Results showed pan-agglutination. Cold agglutinins were suspected .Laboratory had performed a DAT. Results of the DAT were negative. At this point, it raised attention because some other antigen not on the panel was responsible for this finding. Now, the presence of a rare blood type was also suspected. After repeating the tests and determining it was not a laboratory procedure error, further evaluation was required. An expanded panel,which had anti-H lectin, was then performed on the patient's blood. Normally, all blood types will agglutinate with anti-H lectin. This patient did not react with anti-H lectin, confirming Bombay phenotype. H-blood group substance was then added to anti-H serum in vitro and neutralization occurred. This confirmed the presence of anti-H in the serum.On taking further history, it was found that she was a tribal girl originally from a tribal state

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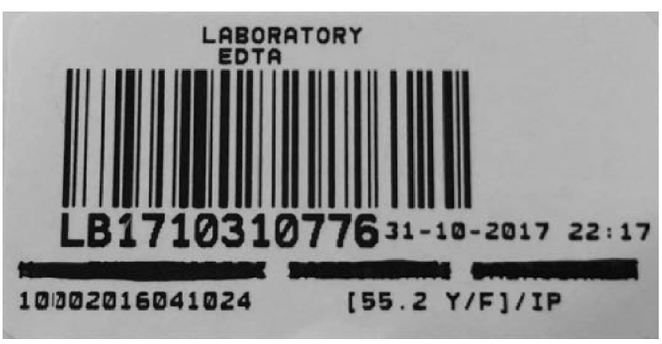
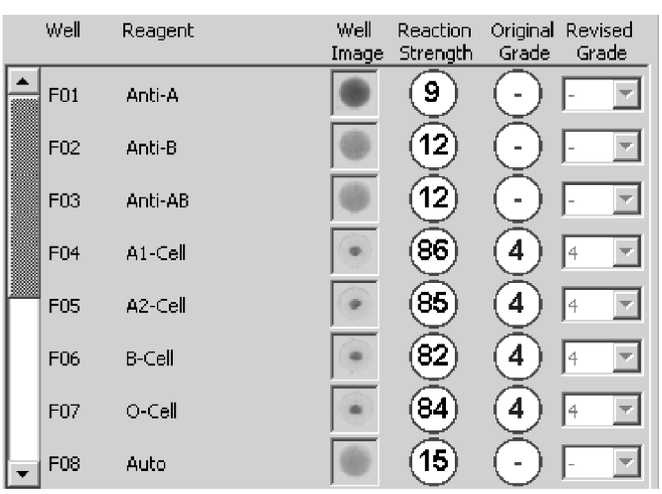
of Gujarat .Two units of blood were required for the patient for her spinal surgery.Department of transfusion medicine of Zydus hospital arranged two units of blood -one from the voluntary blood donor from Rajkot & other from blood bank of Mumbai.Patient was transfused successfully without any transfusion reaction.

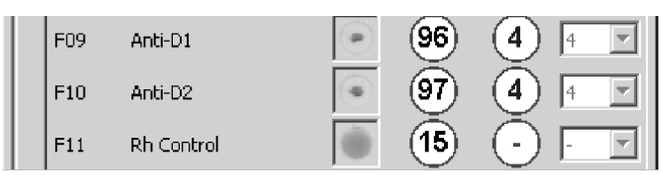
DISCUSSION

Bombay phenotype was first reported by Bhende in 1952 in Bombay, India.[5] More than 130 Bombay phenotypes have been reported in various parts of the world. Bombay phenotype is rare, since it occurs in about 1 in 10,000 individuals in India and 1/1,000,000 individuals in Europe.[3] It is rare in Caucasian with incidence of 1 in 250,000. Regarding the distribution and spread of the Bombay phenotype in different states of India, it is apparent that the phenotype is more common in the states of Western and Southern parts of India when

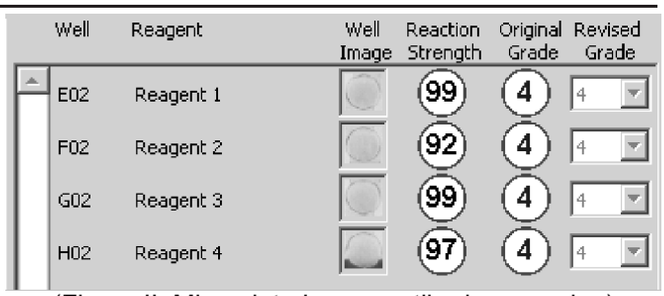




(Figure Ia: Microplate Image- Blood Group)



(Figure Ib Microplate Image- Blood Group)



(Figure II Microplate Image-antibody screening)

(Figure III Anti H Tube test with control)

compared to other states.[6] . In a more recent study from South India, consanguinity among parents was observed in 10 cases (77%) in a study amongst Bombay phenotypes.[7] However, in our case none of the parents had a history of consanguineous marriage.Although rare, the Bombay Oh phenotype patients can have severe or fatal hemolytic transfusion reactions if the blood group is missed.[8,9] Awareness amongst treating doctors is a very important issue in managing such patients. In a recent case report from Iran, transfusion reaction in a case of Bombay blood group patient has been described and the reason for missing out on Bombay group has been stated as, only forward grouping being performed in routine with crude slide method and inappropriate documentation of cross matching.[10] It is very important that a simple test like blood grouping should be done with serious intention and correct method of including both forward and reverse grouping (a practice still needs full implementation) so that no patient is missed out or receives wrong blood, which could lead to serious hemolysis due to transfusion. The Bombay Oh phenotype can be missed if O cells are not used in reverse blood grouping and moreover routine anti-H lectin not being used in forward grouping increases the possibility further. Implementing a quality system in the laboratory minimizes errors and ensures that the right test is performed on the right sample, the right results obtained and the right blood product provided to the right

patient at the right time. Although in India awareness about quality management systems and accreditation activities has increased, still there are a lot of blood centers which need to follow the correct blood grouping procedures.The individuals with Bombay blood group (Oh) can either receive autologous blood or blood from an individual of Bombay phenotype only

CONCLUSION

A simple test like blood grouping should be done with serious intention with incorporation of both forward and reverse grouping, so that no patient is missed or receives wrong blood leading to fatal hemolysis due to transfusion.

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