Alloanti-Fy\textsuperscript{b} in a Fy(a-b-) Patient Homozygous for GATA Mutation

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INTRODUCTION/ABSTRACT

Duffy system antibodies can cause transfusion reactions and hemolytic disease of the fetus and newborn. The Fy(a-b-) phenotype in people of African descent is associated with a mutation in the GATA erythroid promoter motif c.-67T\texttextsuperscript{c} which silences expression of Fy\textsuperscript{b} in RBCs but not in nonerythroid tissues.\textsuperscript{1} Individuals who are homozygous for the GATA mutation are not predicted to make anti-Fy\textsuperscript{b}.\textsuperscript{2,3} When Fy(a-b-) black individuals develop Duffy antibodies, they usually produce anti-Fy\textsuperscript{b}, which may be followed by anti-Fy\textsuperscript{a} or anti-Fy\textsuperscript{5,4}

We report the case of an African American woman homozygous for the GATA mutation whose plasma contained alloanti-Fy\textsuperscript{b} and additional alloantibodies after transfusion of Fy(a-b-) units.

OBJECTIVES

- To identify all alloantibodies detected in the patient’s plasma.
- Demonstrate the presence of anti-Fy\textsuperscript{b} in a Fy(a-b-) individual with the GATA box mutation.
- Exclude the presence of anti-Fy\textsuperscript{a}.

MATERIALS AND METHODS

All serological testing was performed utilizing tube methods. Indirect antiglobulin tests (IATs) were performed using untreated and 0.2M dithiothreitol-treated RBCs with PEG and ficin-treated RBCs. Antigen typing was performed by standard methods. Acid eluates were prepared with the Gamma Elu-Kit II (Immucor). Genomic DNA was isolated from WBCs and HEA Precise Type was performed according to manufacture’s instructions. Amplification and sequencing of FY\texttextsuperscript{a} and FY\texttextsuperscript{b} exons 1-2 and a portion of the promoter region was performed.

RESULTS

Initial Investigation:

A patient sample was received for investigation of a delayed transfusion reaction. The patient was 9 days post transfusion having received two D-negative units; 1 historically E-, K-, Fy(a), Jk(b-) and 1 with no extended antigen typing history. The patient’s RBCs were direct antiglobulin test (DAT) negative with polyagglutinable antigelbin reagent and her plasma was found to contain anti-E, -K, Fy\textsuperscript{a}, -Jk\textsuperscript{b}, -S, -M (clinically significant) and HLA antibody by the IAT. The patient’s microchromatoois separated reticulocytes typed as E-, c-, C+, e+, K-, Fy\textsuperscript{a+b}, Jk(b-a+b), M-, S+, s+ (see figure 1). HEA Beadchip analysis confirmed the serologic antigen typings and indicated the patient had the GATA mutation (see figure 2). Two E-, K-, Fy(a-b+), Jk(b-), M-, S-, units compatible with the patient’s plasma were transfused.

Second Investigation:

Five days post transfusion, the patient’s RBCs were DAT (-lgg and C3) and an eluate contained anti-M, anti-Fy\textsuperscript{b} and 2 unexplained reactions. The plasma contained anti-Fy\textsuperscript{b}, anti-D\texttextsuperscript{O} and HLA antibody. The previous anti-Fy\textsuperscript{b} was not detected and no testing was performed to detect the other alloantibodies. The absence of anti-Fy\textsuperscript{a} was excluded. Subsequently, it was discovered the patient had a history from an out of state facility of anti-E, -K, -Jk\textsuperscript{b}, -Fy\textsuperscript{a}, -Fy\textsuperscript{b}, -M, -S, -Do\textsuperscript{O} and HLA antibodies. Fy\textsuperscript{a} sequencing confirmed the HEA PreciseType results, FY\texttextsuperscript{a} 502*02 and -67c/c (FY*102N.01/*12N.01) and no additional changes were found (see figure 3).

CONCLUSIONS

Investigation of a reported delayed transfusion reaction demonstrated the patient’s eluate and plasma contained alloanti-Fy\textsuperscript{b} in combination with additional antibodies following transfusion of E-, K-, Fy(a-b+), Jk(b-), M-, S-, units compatible with the patient’s plasma. Fy\textsuperscript{a} sequencing confirmed the patient was homozygous for the GATA mutation with no additional changes detected.

The production of anti-Fy\textsuperscript{b} remains unexplained. There are anecdotal reports of similar cases, however a biological explanation has not been reported.

REFERENCES

3. Vengelen-Tyler V. Anti-Fy\textsuperscript{b} preceding anti-Fy\textsuperscript{a} or -Fy\textsuperscript{5}: a study of five cases (abstract). Transfusion 1985;25:482.