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An unusual report of anti-N antibody presenting as ABO discrepancy in an old female patient in Palestine

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Abstract:

The MNS is a highly complex immune blood group system which is almost equal to Rh in size and complexity. Anti-N antibody is naturally occurring in general, cold reactive IgM or IgG saline agglutinin and relatively rare when compared with anti-M. The immune type anti-N is seldom encountered. Anti-N antibody is not clinically significant unless it reacts at 37°C. Clinically significant anti-N antibody is reactive at 37°C or in the anti-human globulin phase, which may cause delayed hemolytic transfusion reactions or hemolytic disease of newborn. Here, we report a rare case presented as blood group discrepancy of a naturally occurring anti-N that reacts at 37°C.

Keywords:

Anti-N antibody, MNS blood group system, Palestine

Introduction

The MNS (002) blood group system was discovered in 1927 by Landsteiner and Levine. It has been assigned the ISBT number 002 (symbol MNS), second after ABO. Familial studies showed that M and N antigens were antithetical antigens.[1] The S antigen was discovered in 1947 after the implementation of the antiglobulin test by Walsh and Montgomery.[2] Most anti-M antibodies are naturally occurring that react below 37°C. They do not bind complement and do not react with enzyme-treated red blood cell (RBC).[3] Anti-M rarely causes hemolytic transfusion reactions[4] or hemolytic disease of the fetus and newborn (HDFN)[5] and appears to be more common in children than in adults.[2] Anti-N antibodies are relatively rare compared with anti-M. They are naturally occurring in general, cold reactive IgM or IgG saline agglutinins that do not bind complement nor react with enzyme-treated RBCs.[6] Anti-N, like anti-M, is not clinically significant unless it reacts at 37°C. It has been implicated only with rare cases of mild HDFN.[7] The immune type anti-N is very rare with only two reported cases in the literature.[7,8] A potent anti-N has been reported in people with African origin whose RBCs type M + N–S–s– because they lack both N and GPB that has "N" activity.[2] Herein, we report a rare case of naturally occurring anti-N reactive at 37°C and causing blood group discrepancy.

Case Report

A 61-year-old female was admitted to the orthopedic ward of Rafidia Governmental Hospital in Nablus, West Bank of Palestine, for left neck femur with no history of previous transfusion. Previous reports showed that historically the patient was A Rh (D) positive. The case presented in the blood bank facility as blood group discrepancy with forward grouping typing as A Rh (D) positive, while reverse grouping showed an extra reactivity (2+) with A1 cells. In reverse grouping, the patient's

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serum was reacting with all the three pooled A, B, and O reagent red cells, while the autocontrol was negative using both gel technique (Biorad-ID Microtyping system) and conventional test tube method. To resolve anti-A1 discrepancy, patient's RBCs were typed with anti-A1 lectin which yields a positive reaction. Reverse grouping with pooled three A1 and A2 cells revealed no agglutination. These results indicate that the discrepancy is not due to anti-A1. Three cell screening panel (ID-Diacell I-II-III, Biorad, 1785, Cressier FR, Switzerland) showed positive reactions with Panels 1 and 3 (2 + and 4+, respectively), while negative with Panel 2 cells. The antibody specificity was identified as anti-N by the 11-cell identification panel (ID-Diapanel, Biorad, 1785, Cressier FR, Switzerland). The grade of reaction in the identification cell panel was 4 + with homozygous N + N + cells (Panels 2, 3, 5, 6, 8, 9, and 10) and 2 + with heterozygous M + N + cell (Panel 1) and negative with N–negative cells (Panel 4, 7, 11). Autocontrol (patient's RBCs with patient's serum) and direct antiglobulin test with polyspecific (anti-IgG + C3d) anti-human globulin were also performed to detect autoantibodies, and the results showed negative results for any autoantibody. The suspected antibody was reactive at the immediate spin phase (IS phase) as well as 37°C. Dithiothreitol treatment of patient's serum before and after panel identification revealed that the antibody was of IgM type. Phenotyping of patient's RBCs using commercial antisera (Spinreact, Spain) was negative for the N antigen (M + N-S-s+). The ABO discrepancy in the reverse grouping was resolved with N negative A1 cells. Thus, anti-N detected in our female patient with no history of blood transfusion and reactive at body temperature can be considered as naturally occurring antibody with clinical significance.

Discussion

Anti-M of the MNS blood group system is a frequently encountered antibody, while anti-N is relatively rare. In transfusion practices, they are usually considered to be naturally occurring cold reactive clinically insignificant antibodies. The majority of these antibodies are of IgM class.[1] They are generally ignored and not detected if the room temperature incubation (IS phase) is eliminated from compatibility testing. They are inactive at 37°C and discrepancy encountered can be resolved at warm temperatures.[9] Our female patient had anti-N antibody of IgM class reacting at high thermal amplitude with clinical significance. This anti-N antibody was detected by ABO discrepancy with reverse grouping cells, which is well documented in the literature.[10] The anti-N encountered in our patient was a naturally occurring IgM antibody reactive at 37°C and not an immune type antibody since she did not have any past history of transfusion. Our results are consistent with the findings of Kumawat *et al*. from India, who reported two cases (one donor and one patient) of naturally occurring anti-N reacting at 37°C.[11] The female patient from Palestine was successfully transfused with N negative packed RBCs. To the best of our knowledge, this was the first report in the West Bank of Palestine of the presence of anti-N with clinical significance among our patients. This finding emphasizes the need of using extended panel antibody testing to detect unexpected antibodies with high thermal amplitude such as anti-N.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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