Presentación de caso

Anti-Chido/Rodgers antibodies in a patient with infectious disease

Anticuerpos anti-Chido/Rodgers en paciente con enfermedad infecciosa

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ABSTRACT

Introduction: Red cell alloimmunization is an immune response against foreign red cell antigens, usually occurring due to sensibilization in blood transfusions and pregnancies. The Chido (Ch) and Rodgers (Rg) antigens are present in about 96-98% of the population in general. Patients who have antibodies against antigens of high frequency in the population are a problem for transfusion medicine.

Objectives: To describe the case of a patient diagnosed with AIDS and invasive cancer of the rectum with a recent hospitalization for lower gastrointestinal bleeding and anemia with the presence of anti-Ch and anti-Rg and the difficulties and solutions found for handling the case.

Case presentation: Anti-Ch and anti-Rg have not been found to cause a hemolytic transfusion reaction (HTR) or hemolytic disease of the fetus and newborn (HDFN). However, the clinical presentation and laboratory findings including the immunohematological workups concerning the reaction are discussed, with a special emphasis on the benefit of identifying such an antibody and providing a compatible blood unit for transfusion support of the patient.

Conclusions: When an antibody against a high-frequency erythrocyte antigen is identified in African or American-descent, anti-Ch or anti-Rg should be considered and that transfusion tests should not be delayed due to its clinical importance.

Keywords: Chido/Rodgers antibodies; alloimmunization; indirect antiglobulin test; infectious diseases.

RESUMEN

Introducción: La aloinmunización de glóbulos rojos es una respuesta inmune frente a antígenos de glóbulos rojos extraños, que pueden ocurrir por sensibilización en transfusiones de sangre y embarazos. Los antígenos Chido (Ch) y Rodgers (Rg) están presentes en aproximadamente el 96-98 % de la mayoría de la población. Los pacientes que tienen anticuerpos contra antígenos de alta frecuencia poblacional son un problema para la medicina transfusional.

Objetivos: Describir caso de un paciente diagnosticado de AIDS y cáncer invasivo de recto con hospitalización reciente por hemorragia digestiva baja y anemia con presencia de anti-Ch y anti-Rg y las dificultades y soluciones encontradas para el manejo del caso.

Presentación de caso: No se ha encontrado que Anti-Ch y anti-Rg causen reacciones hemolíticas transfusionales y enfermedad hemolítica del recién nacido. Sin embargo, se discuten la presentación clínica y los hallazgos de laboratorio, incluidos los estudios inmunohematológicos con respecto a la reacción, con especial énfasis en el beneficio de identificar dicho anticuerpo y obtener una unidad de sangre para transfusión que respalde al paciente con respecto a proporcionar una unidad compatible.

Conclusiones: Cuando se identifica anticuerpos contra un antígeno eritrocitario de alta frecuencia, en afrodescendientes o americanos, se deben considerar Anti-Ch o anti-Rg y no retrasar las pruebas de transfusión por su importancia clínica.

Palabras clave: anticuerpos Chido/Rodgers; aloinmunización; prueba de antiglobulina indirecta; enfermedades infecciosas.

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Introduction

High-frequency antigens occur at frequencies of over 99 percent and vary according to the population being analyzed. Pan-reactive alloantibodies due to HFAs detected during pretransfusion testing are challenging to crossmatching and transfusion laboratories especially in emergency situations.[1]

Chido (Ch) and Rodgers (Rg) antigens are not intrinsically bound to the erythrocyte membrane, being expressed by the C4 protein and then adsorbed on plasma red blood cells.[2,3] Currently, nine antigens have been identified in the CH/RG system: six of high prevalence and one that is polymorphic for CH and two of high prevalence for RG.[4]

Ch/Rg antibodies are frequently IgG, mostly IgG2 and IgG4, and they are not considered clinically significant from the red cell transfusion aspect. Here, we describe the case of a male presenting a positive indirect antiglobulin test due to an anti-Ch and anti-Rg.

Case presentation

He was a 60-year-old male, African American descendent, AIDS, rectal invasive cancer with a recent hospitalization for lower gastrointestinal bleeding which resulted in anemia requiring blood transfusion support. His laboratory parameters showed CD4+ T lymphocyte count 314cells.mm^3, undetectable viral load, Hb – 60g/L, RBC count – 2.40 × 10^6/µL, hematocrit – 18.7%, mean corpuscular volume – 86.3fL, mean corpuscular hemoglobin – 26.3pg, mean corpuscular hemoglobin content – 30.4g%, white blood cell count – 7.22×10^9/L, and platelet count–340×10^9/L. Given symptomatic anemia, 2 packs of red blood cells units were required.

The patient was classified as "O Rh(D) positive", antibody screening and identification of irregular antibodies showed the pattern of reactivity (1+/2+) in all red cells, except for one of the cells (Fig. 1), suggesting the presence of alloantibodies directed to a high-frequency antigen or multiples antibodies.

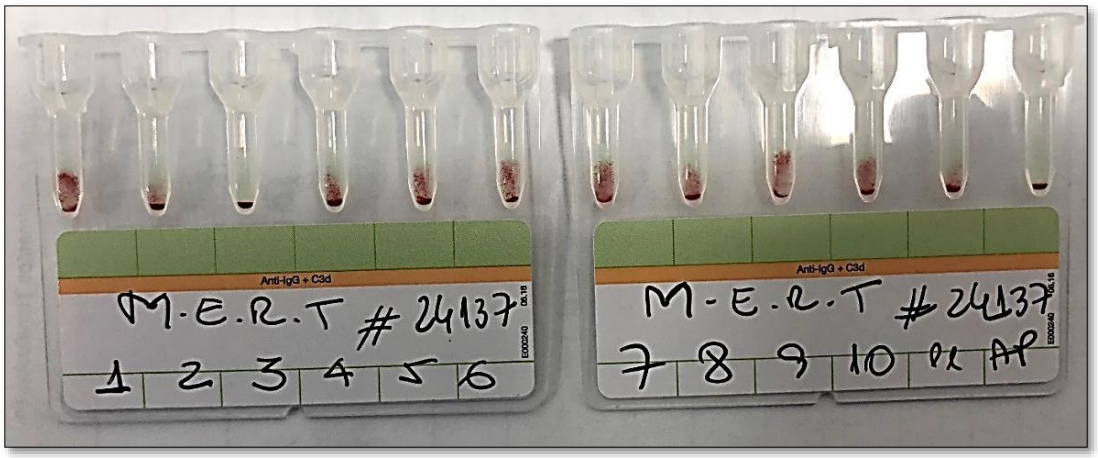

Fig. 1 – Initial identification of the alloantibodies by indirect antiglobulin test.

The antibody identification panel with the papain-treated cells was negative (Fig. 2), which also indicated the possibility that it was an antibody against MNS and Duffy system antigens. Direct antiglobulin (DAT) and autocontrol (AC) tests were negative and the extended phenotype demonstrated that the patient was RH(1,2,-3,4,5), K(-1,2,-3,4), JK(1,2), P1(1), LE(-1,2), LU(-1,2), MNS(-1,2,-3,4) and FY(-1,2).

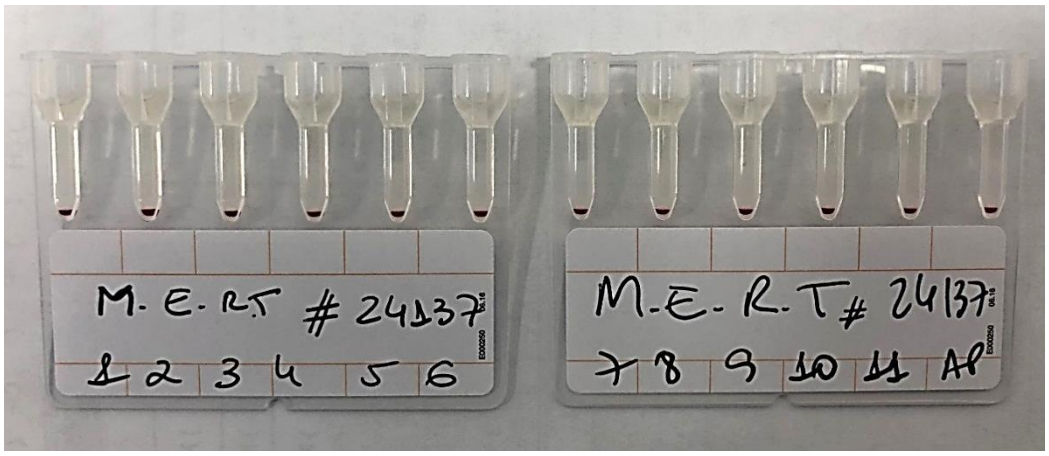

Fig. 2 – Negative reactions with red blood cells treated by proteolytic enzymes.

The AHG phase crossmatch was 2+ incompatible both for the multiple donor bags and blood relatives. The antibody titers were noted to be 1:128. The gel method (Biorad®, Brazil) was used to determine blood group systems, detecting and identifying irregular antibodies, direct antiglobulin, and crossmatching.

The plasma neutralization or inhibition test was performed using 1 mL pooled (3unit) of AB RhD positive plasma (Fig. 3) and 1mL of patient's serum, which was incubated at room temperature for 15 min with appropriate controls, 1mL of patient's serum + 1mL of saline (Fig. 4).

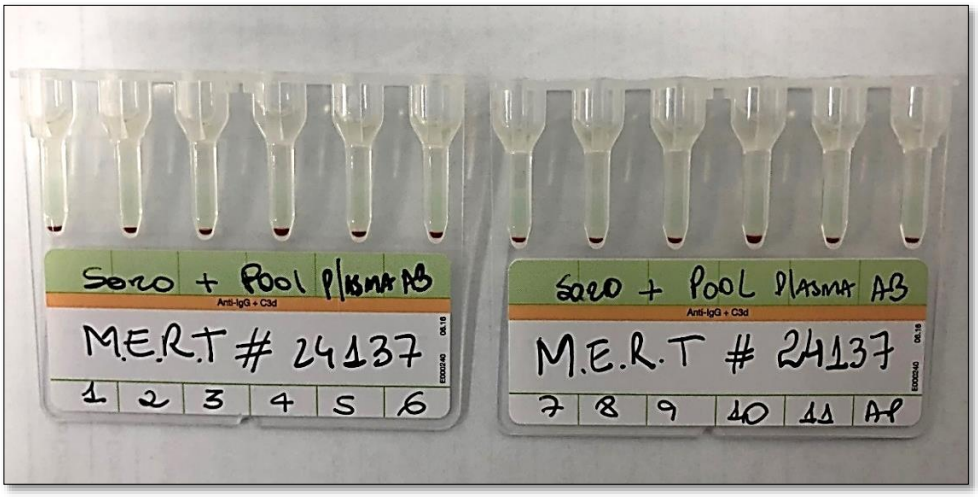

Fig. 3 – Identification of the alloantibodies by plasma inhibition method.

Fig. 4 – Identification of the alloantibodies by serum + saline.

The antibody screening using the neutralized serum and papain-treated red cells resulted in a negative reaction. Hence, the study concluded that the antibody belonged to a high–titer, low-avidity (HTLA) antibody group.

The patient´s sample was sent to the Bio-Rad immunohematology reference laboratory for exclusion of other HTLAs through blood cells and rare sera from other patients, and the presence of anti-Ch/Rg was confirmed.

Discussion

The term HTLA has been used to categorize the following immunoglobulin G (IgG) antibodies: anti-Cs^a, -Yk^a,-Kn^a, -Kn^b, -McC^a, -Sl^a, -Sl^b, -JMH, -Ch, and -Rg.[5]

Except for the low-prevalence antigens Kn^b and McC^b, the Knops antigens have a prevalence of more than 90% in most populations; however, ethnic differences exist. Sl^a is present on RBCs of only about 60% of African Americans.[6] The antithetical pairs of antigens are Kn^a and Kn^b, McC^a and McC^b, and Sl^a and Vil. Serologically, these antigens have been grouped because their corresponding antibodies demonstrate variable reactions, are not neutralized by pooled normal serum (un-like anti-Ch and anti-Rg).[7]

Anti-JMH is usually IgG (predominantly IgG4 in acquired JMH-negative people). The antibodies are often high titer but weakly reactive, even when tested without dilution, and they are not neutralized with pooled plasma.[8]

Chido and Rogers are part of the C4 component of the complement system. Ch/Rg antibodies are IgG type. However, they are not considered clinically significant for red cell transfusion aspect, as they do not cause a reduction in red cell survival, despite being detected as DHTR antibodies in multiply transfused patients.[9,10]

As described in the above case scenario, though the patient had the antibodies, ABO compatible RBCs should survive normally in vivo, and the patient received 2 units of matched RBC neutralized by pooled AB plasma without any adverse reactions associated with the antibodies.

Finally, is necessary to point out that when an antibody against a high-frequency erythrocyte antigen is identified in African or American-descent, anti-Ch or anti-Rg should be considered and that transfusion tests should not be delayed due to its clinical importance.

Serological characteristics indicated the presence of specific anti-Ch/Rg alloantibodies in the patient's serum. Although they are not involved in delayed hemolytic transfusion reactions, the proper management allowed quick and safe transfusion care to the patient.

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Conflict of interests

The authors declare that there is no conflict of interest.

Authors Contribution

Alexandre Gomes Vizzoni: Study concept and design, bibliography revision, drafting of the manuscript, critical revision of the manuscript for important intellectual content. Ability to respond in all aspects of the article. Approved the final version to be published.

Flavia Regina Medeiros da Silva: Bibliography revision, drafting of the manuscript, critical revision of the manuscript for important intellectual content. Ability to respond in all aspects of the article. Approved the final version to be published.

Joanna Paes Barreto Bokel: bibliography revision, drafting of the manuscript, critical revision of the manuscript for important intellectual content. Ability to respond in all aspects of the article. Approved the final version to be published.

All authors had full access to all of the data in the work and take responsibility for the integrity of the data and the accuracy of the data analysis.