

Transfusion care of patients with established anti-C Willis red blood cell alloantibody

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Abstract: Anti-C Willis antibody (anti-C^W) production could occur in response to the presence of C^W antigen (C^WAg) on the membranes of donor red blood cells (RBCs). Identification of antibodies requires the reagent RBCs panel which includes C^WAg-positive RBCs. Although anti-C^W has the potential to cause mild to severe immediate or delayed haemolytic transfusion reactions there is currently limited literature related to the best transfusion management of this patients. We report different approaches to successful transfusion care of two patients with chronic renal failure with established anti-C^W after they were transfused with Rh and Kell blood group phenotype-compatible RBCs units. Anti-human globulin cross-match was used to find compatible blood units in case with single antibody. For patient with multiple antibodies, screening for C^W antigen-negative RBCs units was included in pretransfusion testing.

Key Words: blood grouping and crossmatching, isoantibodies, transfusion reaction, blood group incompatibility, blood component transfusion.

Anti-C Willis antibody (anti-C^W) was first described in 1946. It often occurs naturally as well as in combination with other antibodies to red blood cells (RBCs) [1]. Anti-C^W is usually of the IgG type and has the potential to cause mild to severe immediate or delayed hemolytic transfusion reactions and mild to moderate hemolytic disease of newborns [2]. C^W antigen (C^WAg) is present in 2% of population and most of them are also positive for the CAg from Rh blood group system [1]. Patients with anti-C^W should always receive C^WAg-negative RBCs, which is practically always available within the blood stock. To find compatible blood units it is necessary to have available: 1) for the antibody identification - the reagent RBCs panel which includes C^WAg-positive RBCs and allows exclusions of other clinically significant alloantibodies in result interpretation; 2) for typing of C^WAg - test serum with monoclonal anti-C^W.

Assessing clinical significance of antibodies and selecting compatible blood products for patients is a challenge [3]. Standard transfusion practice in the world to find compatible blood for patients with confirmed presence

of anti-C^W relies on a negative anti-human globulin (AHG) cross-matches or on typing RBCs units for C^WAg [4, 5]. We present both cases. The aim of this report is to add our experience to currently limited literature related to the best transfusion management of this patients.

CASE REPORT

A 48 year old male with chronic renal failure, on chronic peritoneal dialysis since 2005, has developed anemia in February 2006. Blood Transfusion Institute Vojvodina made pretransfusional testing in order to ensure compatible RBCs for the correction of anemia in this patient. It was determined that the patient had a blood group type A, RhD-positive. Cross-matches were performed by using the indirect antiglobulin test (IAT) gel technique on commercial LISS/ Coombs cards (DiaMed AG 1785 Cressier, Switzerland). The results were negative in 2006. After transfusion six RBCs units cross-matches became positive (3+). The patient underwent antibody screening using IAT, gel technique with commercial

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test RBCs (DiaMed ID-Micro Typing System, ID-DiaCell I-II, DiaMed AG 1785 Cressier, Switzerland), which was positive (3+). The direct antiglobulin test (DAT) was negative. The antibody specificity was determined by gel technique with commercial reagent RBCs panel (DiaMed ID-Micro Typing System, ID-DiaPanel, DiaMed AG 1785 Cressier, Switzerland) and irregular anti-E was identified. Patient's Rh and Kell blood group phenotype were determined: CcDee, kk. Further transfusions with phenotype-compatible RBCs units had negative cross-matches. In 2009, when cross-matches again became positive (2+), an irregular antibodies were identified: anti-C^W and auto anti-e. Typing of patient's RBCs showed that he is C^WAg-negative. C^WAg-negative RBCs were used for further treatment. Cross-matches remained positive (1+) due to the presence of auto anti-e. Human monoclonal IgM anti-C^W serum (CE-Immunodiagnostik GmbH Anti-C^W) was used (tube method) for C^WAg typing of blood donors and patients RBCs. Transfusion records review revealed that the patient had received 124 RBCs units in the study period. The present case documents compatible RBCs transfusion to patient with multiple antibodies, including anti-C^W.

A 58 year old woman with chronic renal failure, on chronic peritoneal dialysis since 2004, has developed anemia in July 2005. Due to requests for blood transfusion, blood group was determined: A, RhD-positive, Rh phenotype CcDEe, Kell phenotype kk. During the study period the patient had received a total of 44 RBCs units of its own phenotype. In 2011 the IAT cross-matches became positive (2+). Antibody identification revealed anti-C^W. Patient was typed for the C^WAg and confirmed as C^WAg-negative. Patient continued to receive RBCs with CcDEe phenotype with negative cross-matches.

Hemolytic reactions did not occur in both patients. Patients were labeled as patients with detected antibodies.

This cases of allosensibilization with established anti-C^W (one case with single and other with multiple RBCs antibodies) represent two different approaches to successful transfusion care of these patients. AHG cross-match was used to determine compatibility in the presence of antibodies to this low frequency antigen. For patient with multiple antibodies, screening for antigen-negative RBCs units was included in pretransfusion testing.

In the world the percentage of alloimmunized

patients ranges from 1-6% after single transfusion to more than 30% at multitransfused patients [6-8]. Many studies have focused on a comparison what is more efficient during pretransfusion testing: only cross-matches or antibody screening. The use of Ag-negative RBCs ensures the safety of blood transfusion in these patients. The proposed concept is to use phenotypically matched RBCs units [4, 5].

During 2013 in Vojvodina (Northern Serbia region) 116 patients with irregular RBCs antibodies have received blood: 81 (69.8%) with antibodies which were identified in current year, 35 (30.2%) who had antibodies identified in earlier years. Anti-C^W were identified in only two patients. Both patients had a diagnose of chronic renal failure. It is well known that RBCs transfusions are often used to correct anemia in patients with chronic renal failure who are receiving dialysis. Many studies have demonstrated that alloimmunization to RBCs antigens occurs in a higher percentage among these patients than in the general population [9, 10].

Transfusion support of these patients has been influenced by several factors: urgency of transfusion; clinical conditions requiring multiple transfusions; probability of an immune response to other RBCs antigens; potential clinical significance of the antibody; grading of the IAT cross-match reactions (less than 3 on a scale of 0-5). Compatible blood units were used within the blood stock (the phenotype status has been tested or retrieved from database) or blood donors with known phenotype were invited. Blood units from other transfusion centers were also available.

Although C^WAg has a low incidence in the population and C^WAg -negative blood is widely available, physician must be aware that the occurrence of anti-C^W can lead to serious transfusion complications. The present case shows two patients with anti-C^W successfully monitored and treated with transfusions. The emphasis is put on the individual approach to pretransfusion testing and use of phenotypically matched RBCs for these patients in order to establish the best practice and to increase the blood safety.

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