CASE REPORT

Presence of Irregular Antibody (Anti-c) in a Multitransfused Cardiac Surgery Patient

R. S. Mallhi · U. Dimri · D. R. S. A. Jayamanna · J. Philip

Received: 30 July 2014 / Accepted: 17 October 2014 / Published online: 25 October 2014
© Indian Society of Haematology & Transfusion Medicine 2014

Introduction

Multi transfusion of blood and its components in cardiovascular surgeries still remains a standard practice despite various advances in blood saving practices. Amongst the complications of blood transfusion, the formation of alloantibodies and autoantibodies against red blood cell antigens is one problem that frequently confounds the blood transfusion services [1]. Among such antibodies are alloantibodies against Rhesus (Rh) blood group antigens. Fifty-eight antigens belonging to Rh system have been discovered till date [2]. However the common problems revolve around five principal antigens that are—D, E, e, C and c and their corresponding antibodies, anti-D, anti-E, anti-e, anti-C and anti-c. Anti-c is clinically the most important Rh antibody after anti-D [2]. Anti-c is an important cause of delayed hemolytic transfusion reactions (DHTR) and hemolytic disease of fetus and newborn (HDFN) [2]. One such case of anti-c seen in our transfusion services is presented below.

Case Report

We present a case of 26 year old unmarried female patient of O Rh D +ve blood group, a known case of mitral valve prolapse (MVP), for which she underwent mitral valve replacement (MVR) surgery. She had developed post MVR bleeding and was transfused, without any complication, 06

units during surgery and 04 units of packed red blood cells (PRBCs) after surgery over duration of 3 days.

A fresh blood demand for two more units of PRBCs, 5 days post-surgery, was sent to our department with her fresh blood sample. However out of 16 ABO and Rh D compatible PRBCs bags, only 02 were found compatible.

On further workup patient blood sample was Direct Coombs test (DCT) and auto-control negative, but Indirect Coombs test (ICT) was 2 + positive, alerting us to the possibility of presence of an irregular alloantibody. Antibody detection panel (11 cells BIORAD ID-DiaPanel) was run on patient's post transfusion sample (Fig. 1) which showed presence of **anti-c**. Concurrently the patient sample and one PRBCs bag found compatible and one among the incompatible PRBCs bags were also tested by Rh phenotype card (BIO RAD). It confirmed the absence of c antigen on RBCs of both patient and compatible bag and presence of c antigen on incompatible bag (Fig. 2). Final Rh phenotype of patient was Rh D + C + c – E – e +.

Fig. 1 Result of antibody detection panel agglutination seen in 3, 4, 5, 6, 7, 8, 9, 10, 11 corresponding to anti-c

R. S. Mallhi (✉) · U. Dimri · D. R. S. A. Jayamanna · J. Philip
Department of Immunohaematology & Blood Transfusion,
AFMC, Pune 411040, India
e-mail: pragraj@yahoo.com

Fig. 2 Result of Rh phenotype card of patient and compatible and incompatible donor bags-absence of c antigen in patient and compatible donor, and presence of c antigen in incompatible donor

Discussion

Sensitization to red cell antigens may result from previous transfusions, pregnancy, transplantation or injection of immunogenic material. In our case, patient had transfusion of 10 units of PRBCs which may account for formation of anti-c antibody.

In India and developing countries routine blood grouping of blood of patients and donors still consists of ABO and Rh D antigen typing only. This practice at times leads to missing the absence of other principal Rh antigens, often leading to formation of irregular alloantibodies.

Anti-c is clinically the most important Rh antibody after anti-D [2]. Its prevalence among alloantibodies detected in patients has been reported to range from 3.1 to 17.5 % [3–8]. Like most of Rh antibodies, anti-c also belongs to Ig G class of immunoglobulins and is an important cause of hemolytic transfusion reaction, more so in DHTR [9]. Anti-c is an important Rh antibody that may cause severe HDFN, which in some cases may be as severe as anti-D HDN [2, 10, 11]. Thus as our patient is in child bearing age, she does carry chances of having anti-c HDN in future.

Rh c antigen is comparatively common in India with frequency ranging from 52 to 62 % of Indian population [12–16], meaning thereby that finding Rh c antigen negative blood units is not an easy task. Resolution of such incompatibility issues and finding of implicated antigen negative blood units is time consuming, and jeopardizes transfusions in case of emergencies.

Therefore we recommend doing the Rh phenotype of the recipient and donor, especially in surgical cases involving multi transfusion and those who require long term multiple transfusions as in cases of transfusion dependent anemia like thalassemia and sickle cell disease.

In our case further management, after issue of compatible blood, comprised of informing the patient of the presence of anti-c with the caution about its implications on her future pregnancies and that she is to be transfused with only ABO compatible Rh D antigen +ve blood typed for absence of Rh c antigen.

Conflict of interests None identified.

References

1. Sarin M (2003) Adverse effects of blood transfusion. transfus med tech man, 2nd edn. Directorate General Health Services, New Delhi, pp 133–140
2. Chou ST, Westhoff CM (2011) Rh blood group. In: Roback DJ (ed) Technical manuals, 17th edn. AABB, Bethesda, pp 389–410
3. Tormey CA, Fisk J, Stack G (2008) Red blood cell alloantibody frequency, specificity, and properties in a population of male military veterans. Transfusion 48:2069–2076
4. Pahuja S, Gupta SK, Pujani M, Jain M (2011) The prevalence of irregular erythrocyte antibodies among antenatal women in Delhi. Blood Transfus 9:388–393
5. Xu P, Li Y, Yu H (2014) Prevalence, specificity and risk of red blood cell alloantibodies among hospitalised Hubei Han Chinese patients. Blood Transfus 12(1):56–60
6. Al-joudi F, Ali AB, Ismail M (2011) Prevalence and specificities of red cell alloantibodies among blood recipients in the Malaysian state of Kelantan. Asian J Transfus Sci 5:42–45
7. Reyhaneh K, Ahmad G, Mehdi TN (2013) Frequency & specificity of RBC alloantibodies in patients due for surgery in Iran. Indian J Med Res 138:252–256
8. Chaudhari C (2011) Red cell alloantibodies in multiple transfused thalassaemia patients. Med J Armed Forces India 67:34–37
9. Daniels G (2002) Human blood groups, 2nd edn. Blackwell science, Oxford, pp 195–270
10. Felc Z (2001) Haemolytic disease of the newborn caused by rhesus isoimmunization (anti-c). East Mediterr Health J 7:1065–1069
11. Appelman Z, Lurie S, Juster A, Borenstein R (1990) Severe haemolytic disease of the newborn due to anti-c. Int J Gynecol Obstet 33:73–75
12. Sharma DC, Singhal S, Rai S, Iyenger S, Sao S, Jain B (2013) Incidence of Rh antigens, phenotype & probable genotype in the population of Gwalior and Chambal region, Central India. Int Blood Res Rev 1:29–43
13. Lamba DS, Kaur R, Basu S (2013) Clinically significant minor blood group antigens amongst North Indian donor population. Adv Hematol 2013:1–5
14. Makroo RN, Bhatia A, Gupta R, Phillip J (2013) Prevalence of Rh, Duffy, Kell, Kidd & MNSs blood group antigens in the Indian blood donor population. Indian J Med Res 137:521–526
15. Kahar MA, Patel RD (2014) Phenotype frequencies of blood group systems (Rh, Kell, Kidd, Duffy, MNS, P, Lewis, and Lutheran) in blood donors of south Gujarat, India. Asian J Transfus Sci 8:51–55
16. Thakral B, Saluja K, Sharma R, Marwaha N (2010) Phenotype frequencies of blood group systems (Rh, Kell, Kidd, Duffy, MNS, P, Lewis, and Lutheran) in north Indian blood donors. Transfus Apher Sci 43:17–22