The safety of kidd-incompatible blood transfusion in a restricted setting: a case report

DOI: dx.doi.org/10.22435/hsji.v10i2.2439

Elida Marpaung[1], Pustika Amalia Wahidiyat[2], Stephen Diah Iskandar[3], Anastasia Michelle Pratanata[3]

[1]Blood bank, Cipto Mangunkusumo Hospital, Jakarta, Indonesia.
[2]Pediatric Hematology-Oncology Division, Department of Child Health, Faculty of Medicine Universitas Indonesia - Cipto Mangunkusumo Hospital, Jakarta, Indonesia
[3]Faculty of Medicine Universitas Indonesia, Jakarta, Indonesia

Corresponding author: dr. Elida Marpaung, M Biomed
Email: elidamarpaung@yahoo.com

Received: December 15, 2018; Revised: August 12, 2019; Accepted: November 25, 2019.

Abstrak

Latar belakang: *Protein Kidd merupakan transporter urea pada sel darah merah. Walaupun jarang, adanya antibodi terhadap antigen ini dapat menyebabkan reaksi transfusi dan hemolytic disease of the newborn. Keberadaan anti-Jka dan anti-Jkb cukup jarang ditemukan pada pemeriksaan identifikasi antibodi pasien. Studi ini melaporkan kasus pasien dengan keberadaan anti-Jka and anti-Jkb, yang mendapat darah dengan kadar aglutinasi terendah pada kondisi dimana darah kompatibel sulit didapat sementara tindakan transfusi sangat dibutuhkan segera.*

Penyajian Kasus: *Wanita, 36 tahun, G4P3A0, datang dengan perdarahan vaginam sejak sebulan terakhir. Dari hasil pemeriksaan USG, didapatkan adanya mola hidatidosa. Pasien memerlukan terapi kuret segera setelah anemia terkoreksi (Hb 8.3 g/dL). Pada uji kecocokan pre-transfusi dengan prosedur skrining antibodi yang dilanjutkan dengan identifikasi antibodi, ditemukan anti-Jka dan anti-Jkb. Dari setidaknya 50 darah donor yang dilakukan uji kecocokan, tidak ditemukan darah yang kompatibel, sehingga pasien diputuskan untuk mendapat transfusi menggunakan darah inkompatibel dengan derajat aglutinasi terendah (level 2) dari 5 level, disertai dengan pemantauan ketat terhadap potensi terjadinya reaksi transfusi. Demam dan pruritus dilaporkan dalam 24 jam setelah transfusi, dan membaik setelah pemberian injeksi difenhidramin, deksametason, dan parasetamol.*

Kesimpulan: *Transfusi dengan darah yang inkompatibel merupakan pilihan terakhir bila tidak ditemukan darah donor yang kompatibel. Reaksi transfusi merupakan efek yang sulit dihindari, tetapi dapat dilakukan pemantuan ketat. Pemilihan darah dengan level aglutinansi terendah adalah keputusan terbaik, mengingat tindakan medis diperlukan segera untuk menyelamatkan nyawa. Pada kasus ini, pasien mendapat tatalaksana optimal dari aspek tindakan operasi dan respon transfusi, yang ditunjukkan melalui kenaikan nilai Hb yang bermakna. Sementara itu, efek samping reaksi transfusi yang muncul hanya ringan dan dapat ditanggulangi dengan pemberian obat-obatan.* ***(Health Science Journal of Indonesia 2019;10(2):137-9)***

Kata kunci: *reaksi transfusi, inkompatibilitas, kelompok darah Kidd*

Abstract

Background: Kidd protein is red blood cell's (RBC) major urea transporter. Albeit rare, the presence of antibodies against Kidd antigen may cause significant hemolytic transfusion reaction and hemolytic disease of the newborn. Yet, anti-Jka and anti-Jkb are rare to be discovered during antibody identification. This paper reported "bestmatched" transfusion practice in a patient with anti-Jka and anti-Jkb, where compatible PRC cannot be found, but transfusion is urgently needed.

Case Presentation: A 36 years old, G4P3A0 female, came with continuous vaginal bleeding for the past one month before admission. USG revealed hydatidiform mole. She needed immediate curettage following correction of her anemia (Hb 8.3g/dL). After antibody screening procedure followed by antibody identification, we found a positive anti-Jka and anti-Jkb in her blood sample. At least 50 blood donors were tested for compatibility and none was a match. She was then transfused with the lowest agglutination blood available (level 2 of 5 levels), with a closed monitoring to anticipate the possibility of transfusion reaction development. Fever and pruritus transpired within 24 hours post transfusion and it resolved following diphenhydramine, dexamethasone, and paracetamol injection.

Conclusion: Incompatible blood transfusion is the last option when compatible blood cannot be found. The development of transfusion reaction is inevitable, but it can be anticipated by closed monitoring. In restricted setting, blood transfusion with the lowest level of agglutination is acceptable when transfusion is imperative. In this case, the patient got optimal treatment in term of the medical surgery and transfusion response, which was shown by the significant increase of Hb level. Meanwhile, the adverse transfusion reaction was only mild, and could be treated with medicine. ***(Health Science Journal of Indonesia 2019;10(2):137-9)***

Keywords: Transfusion reaction, incompatibility, Kidd blood group

Kidd (Jk) glycoprotein is the main urea transporter located on the surface of red blood cells (RBC)'s membrane. Individual with negative Jk protein demonstrates inability to concentrate urea in urine optimally. Nonetheless, often this does not manifest clinically, similar to their unaffected RBC which usually has normal lifespan and morphology.[1] Jk-null phenotype (a-b-) is found to be extremely rare, especially in Caucasians and Black population.[2] Consequently, the presence of anti-Jk may induce hemolytic disease of fetus and newborn (HDFN) in second pregnancy.[1,3]

Greater attention should be drawn to the presence of anti-Jk cases, as acute and delayed hemolytic transfusion reactions have been reported following blood administration in those patients.[4-7] Identification of Kidd antibodies is known to be quite challenging. Previous studies reported options for anti-Jk detection are somewhat limited. Studies have reported detection of anti-Jk^a could only be done through solid-phase technique, Erythrocytes Magnetized® technology, and ID-Diamed Gel Tehcnique (GT).[4,5,8] While, anti-Jk^b could be distinguished only by solid-phase technique. All of which are hardly available in centers with limited facilities. In this paper, we discuss a rare case of a "best-matched" transfusion in a patient with Kidd incompatibility, where PRC transfusion is the only option available.

CASE PRESENTATION

Female, 36 years old, presented with continuous spotting for one month before admission. She was pregnant with her fourth child, gestation age of 17 weeks, without any previous history of abortion. The patient had never received any prenatal care, even the bleeding complaint has been on-going for 1 month. No previous history of invasive procedure or blood transfusion was reported. Ultrasonography examination revealed hydatidiform mole without any sign of myometrium invasion. Laboratory examination showed anemia microcytic hypochromic (Hb 8.3 g/dL, MCV 26.1 fL, MCH 26.1 pg). The obstetrician decided to perform curettage with suction after anemia was corrected. From initial screening, blood type was B, Rhesus +, with negative direct antiglobulin test (DAT), and negative auto-control. Subsequent antibody screening displayed reactive antibody at 20^{o}C and LISS/Coomb's test. Further antibody identification panel showed positive Anti-Jk^a and Anti-Jk^b through Saline 20^{o}C and gel test.

After 50 attempts trying to find the compatible blood unit, none was found. Hence, patient's relatives were asked to undergo screening and only one relative was considered compatible. Regardless, she was anemic and for this reason, unable to donate her blood. Since there was no other option for this patient, she eventually received blood transfusion with the lowest level of agglutination (level 2). As predicted, mild acute transfusion reactions transpired within 24 hours post transfusion. Symptoms documented were fever and pruritus. It fortunately resolved after administration of diphenhydramine, dexamethasone, and paracetamol injection. The patient was closely monitored for the following 2 weeks, and no delayed transfusion reaction occurred.

DISCUSSION

In this case, transfusion was considered life saving. The hydatidiform mole should be evacuated promptly, preceded by PRC transfusion. Transfusion was imperative to correct her anemia from the ongoing bleeding and as a precaution for the possibility of severe bleeding following evacuation procedure.[9,10] Evacuation by suction curettage was preferred to reduce the risk of cells spreading to other organs, which might lead to metastatic disease.[11] On the other hand, transfusion with Kidd-incompatible PRC might cause hemolytic transfusion reactions.[4,5] So we were presented with the dilemma of transfusing incompatible blood or not to transfuse yet letting the anemia uncorrected or even worsen.

At that time, we were also concerned about the possibility of HDFN developed on the baby. This was the fourth pregnancy and hence the chance of developing HDFN due to RBC antigen-antibody interaction was high.[12] However, in this case, HDFN did not occur despite the husband having Jk (a+b+) phenotype. A possible explanation to the latter would resolve around their inheritance pattern. Kidd antigens are inherited in codominant patterns, while Jk null phenotype is generally inherited recessively.[13]

Evaluating the benefit and risk of going ahead with the transfusion, the patient was finally decided to be given blood transfusion with the least incompatibility which was from his brother. It is understood that having a donor from family member is actually less preferable compared to unrelated donors - as homozygosity of HLA types is more common to occur between first-degree family members, which may trigger transfusion-associated graft-versus-

host-disease (TA-GVHD).[14,15] Regardless, this was the safest blood option we were able to provide concerning its kidd-incompatibility circumstances.

Following blood administration, the patient fortunately did not experience any hemolytic reaction. Other studies reported both acute (within 2.5 hours) and delayed (6 days after transfusion) hemolytic transfusion reaction due to the presence of this anti-Jk^a.[4,5] The contrasting outcome in our case could be attributed to early detection of Kidd antibody prior to blood administration. Meanwhile, in their cases, Kidd antibody was discovered after hemolytic reaction occurrence; hence, patients were not given blood unit with lowest antigenicity.[4,5]

Ultimately, our data revealed that the lowest agglutination level (in our case +2) blood could be considered for patients with Kidd-incompatibility in a restricted setting in which other safer options are unavailable and in a life-threatening condition. However, it is imperative to monitor transfusion reaction closely for at least 7 days post transfusion and pre-transfusion sample should be stored for at least 3 weeks.

In conclusion, Kidd (Jk) glycoprotein is difficult to be detected, but incompatible transfusion with this antigen may cause hemolytic transfusion reactions, either acute or chronic. The patient with Jk-null phenotype who needs life-saving transfusion, the main priority is to find blood with negative Jk antigen. In a situation where this solution is unmet, another option is, to screen for Jk-null phenotype in all family members, especially first-degree relatives. Blood transfusion with the lowest level of agglutination could be considered as the last resort, when benefits have been carefully considered to surpass the risks. Incompatible transfusion must be accompanied by close monitoring for at least 7 days and pre-transfusion sample should be stored for at least 3 weeks.

REFERENCES

1. Erhabor O, Hassan M, Alhaji YB, Yakubu A, Buhari H. Kidd blood group phenotypes among pregnant women in Sokoto, North Western Nigeria. Asian Pac J Trop Med. 2014; 7S1:S111-5.
2. Makroo RN, Bhatia A, Gupta R, Phillip J. Prevalence of Rh, Duffy, Kell, Kidd & MNSs blood group antigens in the Indian blood donor population. Indian J Med Res. 2013; 137(3):521-6.
3. Rodriguez DV, Perez-Segura G, Jimenez-Ubieto A, Rodriguez MA, Montejano L. Hemolytic disease of the newborn due to anti-Jkb: case report and review of the literature. Indian J Hematol Blood Transfus. 2014; 30(2):135-8.
4. Villa MA, Moulds M, Coluccio EB, Pizzi MN, Paccapelo C, Revelli N, et al. An acute hemolytic transfusion reaction due to anti-Jk^a. Blood Transfus. 2007; 5(2):102-6.
5. Vucelic D, Savic N, Djordjevic R. Delayed hemolytic transfusion reaction due to anti-Jk(a). Acta Chir lugosl. 2005; 52(3):111-5.
6. Kay B, Poisson JL, Tuma CW, Shulman IA. Anti-Jk^a that are detected by solid-phase red blood cell adherence but missed by gel testing can cause hemolytic transfusion reactions. Transfusion. 2016; 56(12):2973-9.
7. Lawicki S, Covin RB, Powers AA. The Kidd (JK) blood group system. Transfus Med Rev. 2017; 31(3):165-72.
8. Sanford KW, Bourikian S, McClain A, Curtis K. Development and detection of Kidd antibodies. Lab Med. 2015; 46(3):235-40.
9. Ince C. Blood transfusions correct anemia and improve tissue oxygenation in surgical and critically ill patients. Turk J Anaesthesiol Reanim. 2017; 45(3):119-21.
10. Yaddanapudi S, Yaddanapudi LN. Indications for blood and blood product transfusion. Indian J Anaesth. 2014; 58(5):538-42.
11. Cavaliere A, Ermito S, Dinatale A, Pedata R. Management of molar pregnancy. J Prenat Med. 2009; 3(1):15-7.
12. Mittal K, Sood T, Bansal N, Bedi RK, Kaur P, Kaur G. Clinical significance of rare maternal anti Jk^a antibody. Indian J Hematol Blood Transfus. 2016; 32(4):497-9.
13. Capriolli TV, Visentainer JEL, Sell AM. Lack of association between Kidd blood group system and chronic kidney disease. Rev Bras Hematol Hemoter. 2017; 39(4):301-5.
14. Malladi SVS, Paul R, Chandra N, Rao NM, Raju SY. TA-GVHD, a fatal complication following blood transfusion from a first-degree relative. J Obstet Gynaecol India. 2013; 63(5):344-6.
15. Malladi SVS, Paul R, Chandra N, Rao NM, Raju SY. TA-GVHD, a fatal complication following blood transfusion from a first-degree relative. J Obstet Gynaecol India. 2013; 63(5):344-6.