



Planned Transfusion of D-Positive Blood Components in an Asia Type DEL Patient: Proposed Modification of the Korean National Guidelines for Blood Transfusion

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Dear Editor,

DEL type red blood cells (RBCs) are characterized by the expression of extremely low levels of D-antigen, and thus, they cannot be detected by routine serologic D typing or a weak D test but are revealed by *RHD* genotyping or adsorption-elution studies [1]. The most common DEL phenotype is *RHD* (NM_016124.4: c.1227G>A), which is also referred to as Asia type DEL [2] and accounts for 94.7% of all Korean DEL cases [1]. Although DEL is a rare phenotype in individuals of European ethnicity [3], it is found in approximately 10–33% of serologically D-negative East Asian individuals of serologically D-negative East Asian individuals [1].

Recently, Shao *et al.* [2] suggested that individuals with the Asia type DEL allele can safely receive D-positive blood, without the risk of forming anti-D antibodies, since their RBCs have the complete repertoire of D-antigen epitopes. However, this proposal was based on data from Asia type DEL women exposed to D-antigens during pregnancy. The Korean National Guidelines for Blood Transfusion (KNGBT) (revised in 2016) [4] allow D-positive transfusions in Asia type DEL patients in only emergency

cases or severe shortage of D-negative blood. This proviso was established owing to the lack of direct evidence from blood transfusion cases regarding the safety of D-positive blood transfusions in Asia type DEL patients.

We report our recent experience of planned D-positive transfusions in an Asia type DEL patient in a non-emergency situation, suggesting that the KNGBT be modified to embrace the broad use of D-positive blood products for Asia type DEL patients (Fig. 1). This retrospective study was approved by the Institutional Review Board of Samsung Medical Center (2017-06-068), and informed consent was waived.

A 29-year-old male suffering from cardiac arrest due to ventricular tachycardia was admitted to Samsung Medical Center, Seoul, Korea, and was successfully resuscitated. He had a history of severe heart failure and multiple cardiac surgeries. Routine serotyping demonstrated an A, CcdEe phenotype, and the antibody screening test was negative. *RHD* genotyping was performed, and the patient was confirmed as Asia type DEL.

Initial transfusion of one unit of D-positive single donor platelets (SDPs) was accompanied by administration of RhIG. After

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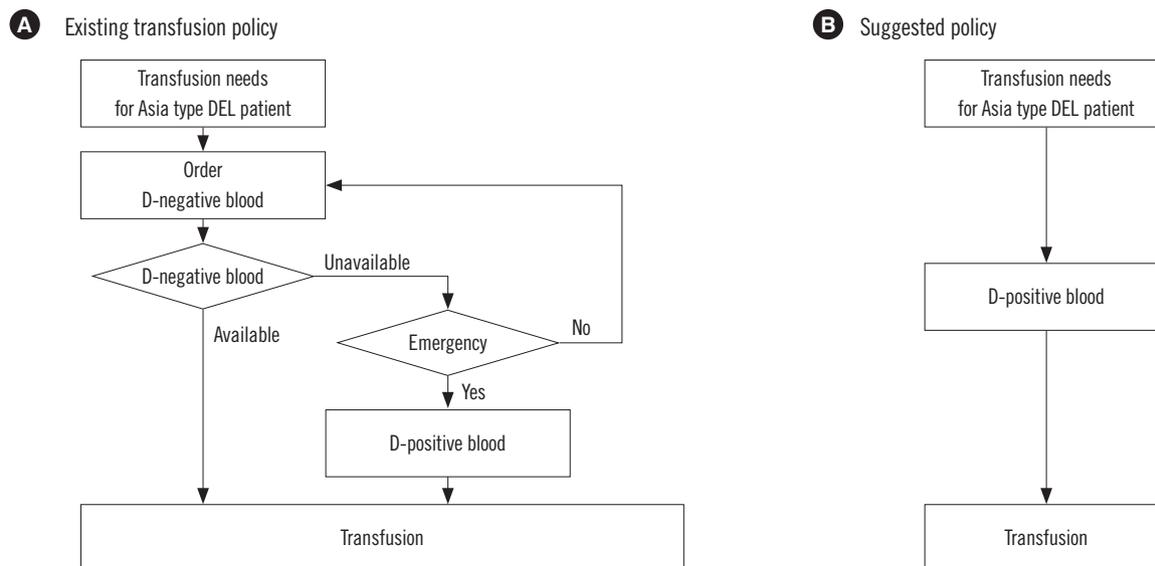


Fig. 1. Comparison of Korean National Guidelines for Blood Transfusion and our suggested policy for blood transfusion in Asia type DEL patients. (A) According to the Korean National Guidelines for Blood Transfusion (revised in 2016), Asia type DEL is regarded as D-negative, and patients can receive D-positive blood in only emergency situations or a D-negative blood shortage. (B) In our proposed policy, an Asia type DEL patient receives D-positive blood without delay in both emergency and non-emergency situations.

Table 1. Reported cases of DEL individuals exposed to D antigen

Source of exposure	Cases (N)	Description	Ethnicity	Transfused blood product	Units of transfused blood	RhCE phenotype	RHD genotype	Anti-D antibody	Reference
Transfusion	1	66-yr-old man	Korean	RBCs	2	Ccee	1227G>A	Negative on post-transfusion day 90	Park <i>et al.</i> [5]
	1	29-yr-old man	Korean	RBCs SDPs PC FFP Cryo	5 40 12 6 15	CcEe	1227G>A	Negative on post-transfusion day 348	Present case
	1	65-yr-old man	Australian	RBCs	Numerous	NA	IVS3+1G>A	Positive	Kormoczi <i>et al.</i> [6]
Pregnancy	44	DEL women who delivered a D-positive infant and did not receive Rho(D) immune globulin	Chinese	NA	NA	NA	1227G>A	Negative	Shao <i>et al.</i> [2]
	101	DEL women who delivered a D-positive infant and did not receive Rho(D) immune globulin	Chinese	NA	NA	Ccee CCee CCEe CcEe ccEe	1227G>A	Negative	Xu <i>et al.</i> [7]
	5					Ccee CCee CCEe	3G>A	Negative	
	1	19-yr-old woman	Australian	NA	NA	cEe	IVS3+1G>A	Positive at 15 weeks gestation	Gardner <i>et al.</i> [8]
	1	32-yr-old woman	German	NA	NA	Ccee	IVS3+1G>A	Positive	
1	28-yr-old woman	Lebanese	NA	NA	Ccee	del Ex8	Positive at 19 weeks gestation	Richard <i>et al.</i> [9]	
Unknown	1	21-yr-old woman without any transfusion or pregnancy history	German	NA	NA	NA	IVS3+1G>A	Positive	Kormoczi <i>et al.</i> [6]

Abbreviations: RBCs, red blood cells; SDPs, single donor platelets; PC, platelet concentrate; FFP, fresh-frozen plasma; Cryo, cryoprecipitate; NA, not applicable.

three months, at the time of heart transplantation, passive anti-D was not detected. During the course of recovery from heart transplantation, the patient received 76 planned D-positive transfusions without RhIG (4, 39, 12, 6, and 15 units of RBCs, SDPs, platelet concentrates, fresh-frozen plasma, and cryoprecipitate, respectively). Antibody screening and direct Coombs tests, checked monthly (last follow-up as of October 2017), were persistently negative for one year after the D-positive transfusions. The patient did not show any rejection episodes related to the heart transplantation. He was discharged from the hospital with an additional transfusion of one unit of D-positive RBCs. Two months after discharge, follow-up antibody screening test showed negative results. Overall, the patient received 77 units of D-positive transfusion products without RhIG prophylaxis and one unit of D-positive SDPs with RhIG, and he did not show alloimmunization. Table 1 summarizes this case and other reported cases of DEL individuals exposed to D antigen, all of which suggest that safe D-positive transfusion can be possible in individuals with the Asia type DEL allele (c.1227G>A), not other DEL alleles (i.e., IVS3+1G>A, del Ex8).

Based on the present case and our literature review [2, 5-9], we suggest modification of the KNGBT to embrace the broad use of D-positive blood products for Asia type DEL patients in both emergency and non-emergency situations. This will relieve the shortage of D-negative blood in Korea by reducing its usage in Asia type DEL patients.

Authors' Disclosures of Potential Conflicts of Interest

The authors declare no conflicts of interest.

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