인종에 따른 국내 Kell 항원 빈도 및 임상적 중요성

신경화^{1,2} · 이현지³ · 김형회^{1,2}

부산대학교병원 진단검사의학과¹, 부산대학교병원 의생명연구원², 양산부산대학교병원 진단검사의학과³

Clinical Importance and the Prevalence of Kell Group Antigen in Korea according to Ethnicity

Kyung-Hwa Shin, M.D.^{1,2}, Hyun Ji Lee, M.D.³, Hyung-Hoi Kim, M.D.^{1,2}

Department of Laboratory Medicine, Pusan National University Hospital¹, Busan; Biomedical Research Institute, Pusan National University Hospital², Busan; Department of Laboratory Medicine, Pusan National University Yangsan Hospital³, Yangsan, Korea

The anti-K antibody has a role in transfusion reactions or hemolytic disease of the fetus and newborns. The K antigen is rarely expressed in Koreans. On the other hand, the distribution of blood group antigens has changed in recent years owing to the increased number of immigrants. This study examined the prevalence of the Kell group antigens according to their parents' birth region. In this study, 4% of participants whose parents were born in America, Europe, South Asia, and other countries expressed the K antigen. No participants whose parents were born in Korea or East Asia expressed the K antigen. The frequency of the anti-K is expected to increase because of blood donors with the K antigen. Therefore, it is necessary to consider the K antigen frequency and anti-K in transfusions and pregnancy cases in Korea. (Korean J Blood Transfus 2021;32:132-134)

Key words: Blood group antigens, Prevalence, Kell blood-group System/blood

Dear editor,

In order of their strong immunogenicity, D, K, C, E, k, and e, are clinically important blood group antigens outside the ABO system [1]. In particular, the anti-K antibody has the second strongest immunogenicity after the anti-D antibody. The anti-K plays a critical role in transfusion reactions or hemolytic disease of the fetus and new-

born after alloimmunization. The expression of blood group antigens is different among different ethnic groups. The K antigen is rarely expressed in Koreans. Thus, the clinical importance of the anti-K is very low. On the other hand, in proportion to the increase in immigrants from all over the world, the distribution of blood group antigens has changed in recent years. This study

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Correspondence to: Hyung-Hoi Kim, M.D.

Department of Laboratory Medicine, Pusan National University Hospital, 179 Gudeok-ro, Seo-gu, Busan 49241, Korea
Tel: 82-51-240-7418, Fax: 82-51-247-6560, E-mail: hnhkim@pusan.ac.kr, ORCID: <https://orcid.org/0000-0003-3989-2037>

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investigated the prevalence of the Kell group antigens according to their parents' birth region.

Participants aged <30 years living in Korea were recruited regardless of nationality. The participants self-identified their parents' birth region. They were classified into a Korean group (both parents born in Korea and of Korean ethnicity), an East Asia group (at least one parent born in East Asia and of non-Korean ethnicity), and a group of 'Others' (at least one parent born in America, Europe, South Asia, or other countries, and of non-Korean ethnicity). The Institutional Review Board of the Pusan National University Hospital approved the study protocol (approval number: H-1509-001-033). Antigen typing was performed using the Antigen profile II (Bio-Rad, Cressier, Switzerland) and Anti-K (Diagast, France) using a manual technique. Testing and interpretation were performed according to the manufacturer's recommendation. Data were analyzed using IBM SPSS Statistics 22 (International Business Machines Corp., Armonk, NY, USA). Comparisons were performed using the Pearson's Chi-squared test and Fisher's exact test. *P* values <0.05 were

considered significant.

Four hundred and eighty-seven participants were recruited in the study. Five (4.0%) participants in the group of 'Others' expressed the K antigen. Both parents were born in America (n=1), Europe (n=2), or South Asia (n=2). No participants in the Korean or East Asia groups expressed the K antigen. No participants expressed the Kp^a antigen. All participants expressed the k and Kp^b antigens (Table 1).

In this study, the participants of Korean ethnicity did not express the K antigen. On the other hand, 4% of participants with a parent born in America, Europe, and South Asia expressed the K antigen. This result was consistent with previous reports. Owing to the ethnic diversity of blood group antigen expression, almost none of the Koreans had the K antigen. In contrast, approximately 9% and 1.5% of individuals of Caucasian and African descent expressed the K antigen, respectively [2,3]. Approximately 1.97~8% of individuals expressed the K antigen in South Asia [4,5]. The Kp^a has a frequency of 2% in Caucasians and 0% in African and Japanese, whereas

Table 1. Positivity (%) for phenotypes of Kell blood group antigen in the Korea group, East Asia group, and 'Others'* group*

Antigenphenotype expression	Korean, % (N=164)	East Asia, % (N=199)	'Others', % (N=124)	<i>P</i> value
K (KEL:1)	0.0	0.0	4.0	0.0006
k (KEL:2)	100.0	100.0	100.0	>0.05
Kp ^a (KEL:3)	0.0	0.0	0.0	>0.05
Kp ^b (KEL:4)	100.0	100.0	100.0	>0.05

*A Korean group (both parents born in Korea and of Korean ethnicity), an East Asia group (at least one parent born in East Asia and of non-Korean ethnicity), and a group of 'Others' (at least one parent born in America, Europe, South Asia, or other countries, and of non-Korean ethnicity).

k and Kp^b have high frequencies in all ethnic groups [6]. This study also showed that no participants expressed Kp^a antigen while all participants expressed the k and Kp^b antigens.

Until now, the prevalence of the K antigen in Korea is very low. The chance of alloimmunization to K is barely considered. Because blood donation by non-Koreans in Korea is possible and interracial marriage is increasing, the possibility of exposure to K antigen is increasing. Therefore, whenever a blood donor with an ethnic origin belonging to the group of 'Others' donates blood, the expression of the K antigen should be determined. According to the guidelines of the Royal College of Obstetricians and Gynaecologists for monitoring fetal newborn hemolytic disease, antibody titers are tracked for anti-K antibodies and anti-E with anti-c [7]. Because of the clinical significance of anti-K in pregnancy, K- girls and women of childbearing age should be transfused with K- blood. If testing for the K antigen is not possible, individuals who might express the K antigen should donate platelets and plasma, but not red blood cells.

In conclusion, with the increasing number of immigrants in Korea, the possibility of finding individuals expressing the K antigen has increased. When individuals with the K antigen participate in blood donation, the frequency of the anti-K in transfusion recipients will change. Owing to the strong immunogenicity of the K antigen, it is nec-

essary to consider the K antigen frequency and anti-K in Korea.

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