Should HLA-B*5701 Screening Be Performed in Every Ethnic Group before Starting Abacavir?

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Human leukocyte antigen allele (HLA)–B*5701 is associated with abacavir hypersensitivity. However, the carriage rate of HLA-B*5701 has rarely been studied in Asians. In 534 Korean patients with human immunodeficiency virus infection, HLA-B*5701 status was determined by polymerase chain reaction with HLA-B*5701–specific primers. No patients had the HLA-B*5701 allele (95% confidence interval, 0%–0%–0.7%). This explains the paucity of immunologically confirmed cases of abacavir hypersensitivity in Koreans.

Hypersensitivity reaction is a major adverse effect of the nucleoside reverse-transcriptase inhibitor abacavir, which has activity against HIV. Because screening for HLA-B*5701 is known to identify patients who are at risk of hypersensitivity to abacavir [1, 2], recent guidelines strongly recommend screening for HLA-B*5701 before starting patients on an abacavir-containing regimen [3]. However, the carriage rate of HLA-B*5701 has rarely been studied in Asians [4], although the prevalence of HLA-B*5701 differs in different ethnic groups [5]. We evaluated the frequency of the HLA-B*5701 allele and the effect of HLA-B*5701 screening on the prevalence of abacavir hypersensitivity in Korean patients with HIV infection.

Methods. In 534 Korean patients with HIV infection who had available blood samples, the presence of HLA-B*5701 was determined by multiplexed PCR with HLA-B*5701–specific primers described elsewhere [6]. In brief, genomic DNA samples were extracted from whole-blood specimens with use of AccuPower Genomic DNA Extraction Kit (Bioneer). The sequence of HLA-B*5701 sequence-specific primers include primer 1F (5′-GTCTCACATCCAGGT-3′), primer 2R (5′-ATCCTTGCGGTAGGCGG-3′), primer 3R (5′-ATCCTTGCGGTAGGCGG-3′), and primer 4R (5′-CGGCTCCACT-TGCCGCTGGG-3′). Housekeeping primer 5F HGH-I (5′-CAG-TGCGCTTCCAACCATTCCCTTA-3′) and primer 6R HGH-II (5′-ATCCTACCGGATTCTGTGGTGTTC-3′) were also included. DNA samples from donors who had HLA-B*5701 and HLA-B*5801 status confirmed to be positive by sequence-based typing were used as positive and negative controls, respectively. The PCR products that were amplified in touchdown amplification-cycling conditions were electrophoresed on a 2% agarose gel.

The prevalence of clinically suspected abacavir hypersensitivity was investigated in all Korean patients with HIV infection who received abacavir therapy at Seoul National University Hospital (Seoul, Republic of Korea) from September 2003 through April 2008. Because the routine screening test for HLA-B*5701 was not performed at Seoul National University Hospital until October 2007, HLA-B*5701 was tested after the beginning of abacavir therapy for the patients who had started receiving abacavir before October 2007.

Clinically suspected abacavir hypersensitivity was defined as occurrences of ≥2 of the following symptoms within 6 weeks after starting abacavir treatment: fever, rash, or gastrointestinal, constitutional, or respiratory symptoms that disappeared but could not be explained by other causes. A skin patch test was performed, as described elsewhere [7], for patients with suspected cases of abacavir hypersensitivity, for which patients provided consent. All patches were taken off after 48 h, and reading was performed at 48 h and 72 h by 1 investigator who was unaware of HLA-B*5701 status.

The study was approved by the Seoul National University Hospital Institutional Review Board. Continuous variables were compared using the Student’s t test, and categorical variables were compared using the χ² test or Fisher’s exact test, as appropriate. A P value < .05 was considered to be statistically significant. Statistical analyses were performed with SPSS software, version 12.0 (SPSS). Results. Of 534 Korean patients with HIV infection for whom the HLA-B*5701 test was performed, none had an HLA-B*5701 allele (95% CI, 0%–0.69%). An abacavir-containing regimen was administered to 150 patients during the study period. Of these, 57 (38%) received abacavir without the HLA-
Table 1. Abacavir hypersensitivity in 150 Korean patients with HIV-1 infection, by availability of the HLA-B*5701 screening test.

<table>
<thead>
<tr>
<th>Variable</th>
<th>HLA-B*5701 test</th>
<th>P</th>
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<tbody>
<tr>
<td></td>
<td>Unavailable (n = 57)</td>
<td></td>
</tr>
<tr>
<td>Age, median years (IQR)</td>
<td>45 (40–52)</td>
<td></td>
</tr>
<tr>
<td>Male sex</td>
<td>53 (93)</td>
<td></td>
</tr>
<tr>
<td>CD4 cell count, median cells/mm³ (IQR)</td>
<td>481 (214–710)</td>
<td></td>
</tr>
<tr>
<td>Undetectable viral load</td>
<td>29 (51)</td>
<td></td>
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<tr>
<td>Concurrent introduction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New NNRTI</td>
<td>5 (9)</td>
<td>.260</td>
</tr>
<tr>
<td>New PI</td>
<td>25 (44)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>HLA-B*5701 carrier</td>
<td>0 (0)</td>
<td>ND</td>
</tr>
<tr>
<td>Abacavir discontinuation within 6 weeks</td>
<td>8 (14)</td>
<td>.197</td>
</tr>
<tr>
<td>Abacavir hypersensitivity reaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinically suspected</td>
<td>3 (5)</td>
<td>&gt;.999</td>
</tr>
<tr>
<td>Immunologically confirmed</td>
<td>0 (0)</td>
<td>ND</td>
</tr>
</tbody>
</table>

NOTE. Data are no. (%) of patients, unless otherwise indicated. IQR, interquartile range; ND, not done; NNRTI, nonnucleoside reverse-transcriptase inhibitor; PI, protease inhibitor.

* None of 534 Korean patients with HIV infection, including these 150 patients, had HLA-B*5701.

** Occurrences of ≥2 of the following: fever, rash, or gastrointestinal, constitutional, or respiratory symptoms.

† Determined by the skin patch test.
showed relatively high carriage rates of HLA-B*5701. For example, the prevalence of HLA-B*5701 is 5%–20% in selected Asian Indian populations and 4%–10% among Thais [5].

The prevalence of suspected abacavir hypersensitivity was 9%–10% in Caucasians not routinely screened for HLA-B*5701 [1, 12]. In Korean patients with HIV infection, clinically suspected abacavir hypersensitivity was relatively low (5%), even in patients not screened for HLA-B*5701, which was comparable to that in Caucasians (4%) who were prospectively screened for HLA-B*5701 [1]. In addition, because there was no patient with a positive skin patch test result in this study, true cases of abacavir hypersensitivity seem to be rare among Koreans, which is compatible with a very low frequency of HLA-B*5701 in this population [9].

HLA-B*5701 screening is supposed to be useful even in countries with a low prevalence of HLA-B*5701, because it may reduce clinical overdiagnosis of abacavir hypersensitivity reactions. However, in the present study, HLA-B*5701 screening did not significantly decrease the prevalence of clinical diagnosis of abacavir hypersensitivity. A negative HLA-B*5701 test result cannot absolutely rule out abacavir hypersensitivity, because an immunologically confirmed case of abacavir hypersensitivity in patients without HLA-B*5701 was reported [13]. A physician in clinical practice will decide to discontinue abacavir treatment if hypersensitivity is clinically suspected, even for patients who test negative for HLA-B*5701. This may be why the prevalence of clinically suspected abacavir hypersensitivity in this study did not decrease after HLA-B*5701 screening was introduced.

Our findings suggest that the HLA-B*5701 test may not be cost-effective as a screening test in regions like Korea, which has a low carriage rate of HLA-B*5701. Instead, clinical observation could replace the HLA-B*5701 screening test, especially in a resource-limited health care setting. In that case, the skin patch test could be used to retrospectively confirm abacavir hypersensitivity in patients who are clinically suspected of or whose symptoms are ambiguous with regard to abacavir hypersensitivity.

This study has some limitations. First, the patient population may not have been large enough to determine differences in the prevalence of abacavir hypersensitivity between patients who did and did not undergo HLA-B*5701 screening. Second, the concurrent introduction of other medications or medical conditions could influence the clinical diagnosis of abacavir hypersensitivity [1]. An NNRTI was concurrently administered with abacavir to 5 patients (9%) who did not undergo the HLA-B*5701 screening test and to 3 patients (3%) who did undergo the HLA-B*5701 screening test. This infrequent use of NNRTIs might have contributed to the low incidence of clinically suspected hypersensitivity reaction in our study, especially NNRTI-associated skin rash.

In summary, HLA-B*5701 is very rare in Korean patients with HIV infection, and that explains the paucity of immunologically confirmed abacavir hypersensitivity in this study. These findings suggest that the HLA-B*5701 test may be less useful as a screening test for abacavir hypersensitivity in Asians, who have a low prevalence of HLA-B*5701.

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References