Investigation on the Interethnic Differences in the Pharmacokinetics of Nifedipine and Nisoldipine

H. G. Schäfer*2 G. Ahr*2 松本孝道*1

Objectives

Interethnic differences of dihydropyridine calcium antagonists nifedipine and nisoldipine were investigated in the pharmacokinetics. Data were determined by internationally cross-validated bioanalytical methods.

Methods

The pharmacokinetic parameters, extracted from the Bayer group data pool, were compared between the Japanese and Caucasian healthy volunteers who received nifedipine or nisoldipine. Comparisons of the parameters were made respectively for each drug with the identical formulations between the two races. Cmax, AUC and t1/2 (and CL for nifedipine) were used as comparative parameters, and compared in geometric means and medians for nifedipine and ranges of mean values in each pharmacokinetic study for nisoldipine. However, as the administered drug dosage and the subject's body structure differed between the two races, Cmax,norm and AUCnorm (multiplied by the body weight and divided by the drug dosage) were used as comparative parameters for Cmax and AUC.

Results

1) nifedipine

Though the comparison was made in a small number of cases, distribution of the pharmacokinetic parameters demonstrated high variability in both races, while the median values were comparable (Fig. 1). There was no difference either in the mean values ± S.D. of each pharmacokinetic parameter (Fig. 2). In other words, the difference of the nifedipine pharmacokinetic parameters between Japanese and Caucasian was within the range of interindividual difference.

2) nisoldipine

Ranges of mean values of pharmacokinetic parameters in each pharmacokinetic study are shown in Tab. The mean pharmacokinetic parameters among Japanese, European and American were comparable.

Conclusion

In conclusion, interethnic difference was not observed in the pharmacokinetics of nifedipine and nisoldipine.
Fig. 1  Distribution of Nifedipine Pharmacokinetic Parameters

Fig. 2  Geometric Means (S.D.) of Nifedipine Pharmacokinetic Parameters

Tab.  Ranges of Means of Pharmacokinetic Parameters in Nisoldipine Pharmacokinetic Studies

<table>
<thead>
<tr>
<th></th>
<th>Japan (n=8)</th>
<th>Europe (n=98)</th>
<th>USA (n=80)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUCnorm [g*h/l]</td>
<td>27 - 49</td>
<td>33 - 59</td>
<td>32 - 83</td>
</tr>
<tr>
<td>Cmax,norm [g/l]</td>
<td>9.3 - 15.8</td>
<td>10.1 - 19.6</td>
<td>3.9 - 15.1</td>
</tr>
<tr>
<td>tmax [h]</td>
<td>0.5 to 6</td>
<td>0.5 to 4</td>
<td>0.5 to 3</td>
</tr>
<tr>
<td>t1/2 [h]</td>
<td>α 2.0 - 2.3</td>
<td>α 1.7 - 10.7</td>
<td>β - γ 6.2 - 15.5</td>
</tr>
</tbody>
</table>