

Population Pharmacokinetic Study of Carbamazepine in Korean

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Background : Because of the narrow therapeutic range of carbamazepine, therapeutic drug monitoring(TDM) has been the inevitable element of carbamazepine therapy. However, pharmacokinetic parameters and distribution of carbamazepine in Korean population is not available yet. To assess the pharmacokinetic parameters and their distribution of carbamazepine in Korean, we prospectively collected Korean out patient's data between Jul, 1993 and Jul, 1994 and analyzed by non-linear mixed effect model(NONMEM).

Method : The data of carbamazepine(both regular form and CR form) daily dosage, steady-state concentrations, demographic profiles(age, sex, body weight, height), time interval, combined drug(dosage, drug level), serum creatinine and liver function test(protein, albumin, bilirubin, alkaline phosphatase, SGOT, SGPT, r-GT) of 245 epileptic patients were collected and analyzed by NONMEM.

Results : Mean daily dose was 882.5 ± 304.1 (14.7mg/kg/d) and steady-concentration was 8.31 ± 2.40 μ g/ml. Absorption rate constant(k_a) was 0.716/h for regular form and 0.639/h for CR form. Elimination rate constant(k_e) value was 0.0212/h in monotheapy, 0.0210/h with valproate and 0.0275/h in combination of other antiepileptic drugs(CV=27.5%). Bioavailability ratio of CR form compared to regular form was 0.877. Volume of distribution was 2.88 liter/kg(CV=1.04%) and residual error was 16.9%.

Conclusion : This present results provide a standard value of pharmacokinetic parameters of carbamazepine in the Korean patients and will be useful for the Bayesian forecasting in the individualization of drug dosage regimen.