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The effect of oxcarbazepine on corticomotor excitability: correlation with plasma levels of the parent drug and metabolites

Vasilios Kimiskidis*[1], Ioannis Niopas[2], Dimitrios Kazis[1], Chrysi Gabrieli[2], Sotirios Papagiannopoulos[3], Kanaze Imaz[2], Kyriaki Sotirakoglou[3] and Daniil Divanoglou[1]

Address: [1]3rd Department of Neurology, Aristotle University, Greece, [2]Department of Pharmacy, Aristotle University, Greece and [3]Department of Mathematics, Agricultural University, Greece

* Corresponding author

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Background

Despite the extensive clinical use of oxcarbazepine for indications such as epilepsy, neuropathic pain and bipolar disorders, its' effects on corticomotor excitabilility have not been investigated in detail. We have recently shown that the main neurophysiological effect of the drug is an elevation of corticomotor threshold (Exp Brian Res). Whether this effect is mediated by the parent drug or its' metabolites is currently unknown.

To correlate the neurophysiological effects of oxcarbazepine on corticomotor excitability with plasma levels of the parent drug and metabolites.

Materials and methods

Twenty patients with partial epilepsy and 10 patients suffering from neuropathic pain (median age: 38 years, range: 13–83, 11 females) were studied before and after the administration of oxcarbazepine (mean dose: 1800 mg, range: 900–2100). TMS was performed with a Magstim 200 stimulator and a figure of eight coil (recording, FDI). Thr was measured at 1% steps using the Mills-Nithi approach.

The quantitative analysis of oxcarbazepine (OXCBZ), 10-hydroxy-10, 11-dihydrocarbamazepine (10OH-CBZ) and 10,11-trans-dihydroxy-10,11-dihydrocarbamazepine (DiOH-CBZ) in plasma and CSF samples was performed using a previously reported HPLC assay (Pienimaki *et al*. 1995), with slight modification. The HPLC system was operated isocratically at a flow rate of 0.8 ml/min, the column was maintained at 35 oC and peaks were detected at 237. Quantification of oxcarbazepine and its metabolites was determined by linear regression analysis of peak height ratios vesrus concentrations of added analytes.

Results

Oxcarbazepine increased Thr from 42.89 ± 8.89% at baseline to 51.21 ± 14.41% ($p < 0.0001$). The mean (± SD) plasma levels of Oxc, 10OH-CBZ and DiOH-CBZ were 259 ± 294 ng/ml, 19039 ± 8263 ng/ml and 1446 ± 812 ng/ml, respectively. The change in threshold induced by the drug was significantly correlated with the plasma levels of the 10OH-CBZ ($r^2 = 0.36$, $p < 0.01$). In contrast there was no significant relationship with the levels of the parent drug or the dixydroxy derivative.

Discussion

Oxcarbazepine, in common with other Na+ channel blockers, increases corticomotor threshold and this neurophysiological effect is mediated primarily by 10OH-CBZ.

References

1. Pienimaki P, Fuchs S, Isojarvi J, Vahakangas K: **Improved detection and determination of carbamazepine and oxcarbazepine and their metabolites by high-performance liquid chromatography.** *J Chromatogr B* 1995, **673**:97-105.