Effects of three calcium channel antagonists (amlodipine, diltiazem and verapamil) on the protective action of lamotrigine in the mouse maximal electroshock-induced seizure model

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Abstract:
The aim of this study was to assess the effect of three calcium channel antagonists (amlodipine, diltiazem and verapamil) on the anticonvulsant action of lamotrigine (a second generation antiepileptic drug) against maximal electroshock-induced seizures in mice. Results indicated that all three calcium channel antagonists when administered alone [amlodipine (up to 20 mg/kg, ip), diltiazem (up to 10 mg/kg, ip) and verapamil (up to 20 mg/kg, ip)], did not significantly affect the threshold for maximal electroconvulsions in mice. However, amlodipine at a non-protective dose of 20 mg/kg, ip significantly enhanced the anticonvulsant activity of lamotrigine in the maximal electroshock-induced seizure test in mice by reducing its ED₅₀ value from 6.33 to 2.87 mg/kg (p < 0.05). In contrast, amlodipine at lower doses of 5 and 10 mg/kg, ip, diltiazem (at doses up to 10 mg/kg, ip) and verapamil (at doses up to 20 mg/kg, ip) had no significant impact on the antiseizure action of lamotrigine in the maximal electroshock-induced seizure test in mice. In conclusion, one can ascertain that the favorable combination of lamotrigine with amlodipine deserves more attention from a clinical viewpoint because of the enhanced antiseizure action of lamotrigine.

Key words:
amlodipine, calcium channel antagonists, diltiazem, lamotrigine, maximal electroshock seizure test, pharmacodynamic interaction, verapamil