Influence of protective drugs on the elevation of extracellular potassium ion concentration in the brain during ischaemia

J Lantos, G Temes, D Kelemen, I Sárosi & B Török

Influence of drugs on the changes of extracellular potassium ion concentration in the brain during total cerebral ischaemia was investigated. The aorta of the dogs was clamped twice with an intermittent reperfusion period of 60 min. In control experiments no significant difference was found in the elevation of extracellular potassium ion concentration of the brain during the first and second clampings. In the present study drugs were administered 10 min prior the second aorta occlusion. Verapamil in a dose of 0.125 mg/kg proved to be ineffective. Piridoxilate in a dose of 10 mg/kg and piracetam in a dose of 100 mg/kg delayed to a small extent the potassium outflow. The following drugs enhanced significantly the duration before the steep increase of potassium ion outflow: phenytoin in a dose of 10 mg/kg by 31.8 sec (p less than 0.01), ethylbutyl-thiobarbital in a dose of 15 mg/kg by 30.2 sec (p less than 0.05), and lidocaine in a dose of 100 mg/kg by 115.8 sec (p less than 0.01). Comparing present results to our earlier data (obtained after 50 sec ischaemia) it can be concluded, that these protective influences become more effective during longer ischaemic period (2-5 min), when lidocaine, phenytoin and ethyl-butyl-thiobarbital were used. Moreover, in spite of the observation seen during shorter ischaemia, even piridoxilate and piracetam exerted some degree of protective effect. No such effect of verapamil could be detected in the present experimental model.