

Comparison of Cerebral Blood Flow and Metabolism to Flumazenil Binding Potential in Patients with Hemodynamic Ischemia

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Abstract

Because benzodiazepine receptors (BZR) are abundant in the cortex, an accumulation of ^{11}C -flumazenil which selectively bind to BZR may be useful as markers of neuron density. The aims of this study were to clarify the relationship between neuron density and cerebral oxygen metabolism and to investigate usefulness of ^{11}C -flumazenil PET for detecting of misery perfusion. Subjects consisted of 16 patients with either internal carotid or middle cerebral arterial occlusive disease who underwent PET. Regional cerebral blood flow (CBF), regional cerebral oxygen extraction fraction (OEF), regional cerebral metabolic rate for oxygen (CMRO_2) and regional cerebrovascular reserve capacity (CVRC) to acetazolamide were calculated. After CBF study, flumazenil binding potential was measured using [^{11}C]flumazenil bolus injection method. Forty eight ROIs were obtained in 16 patients. Seventeen of 29 ROIs with decreased CVRC showed high OEF and the remaining 12 showed normal OEF. Flumazenil binding potentials in ROIs with normal OEF were significantly lower than those with high OEF ($p=0.0003$). This study demonstrated that ^{11}C -flumazenil PET is useful for detecting of misery perfusion in patients with hemodynamic ischemia.