Summary

The Development of New Method for the Assessment of Perfusion Reserve Using Split Dose Iodine-123-IMP SPECT: One-Day Protocol by Modified ARG Method

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Evaluation of the regional cerebrovascular reactivity (rCVR) to a cerebral vasodilatory stimulus is important in the investigation of patients with ischemic cerebrovascular disease. We devised a simplified one-day protocol technique using [123I]-N-isopropyl-p-iodoamphetamine (IMP) autoradiography (ARG) with SPECT. To validate the accuracy of IMP-ARG for quantifying rCVR to acetazolamide, we compared rCVR measured using IMP-ARG with rCVR calculated using IMP split dose method of microsphere model. Twenty patients with chronic steno-occlusive disease in a unilateral major cerebral artery underwent 123I-SPECT. On rCBF SPECT image above 3.5 cm from OM line, large cortical regions of interest (ROI) was bilaterally determined for bilateral middle cerebral artery and anterior cerebral artery. Based on rCBF values in each ROI, rCVR to acetazolamide was calculated. Significant correlation was observed between rCVR values obtained using IMP-ARG and microsphere model IMP methods in the 80 ROIs examined in the 20 patients ($r = 0.72; p < 0.001$). The result demonstrated that [123I]IMP-ARG split dose method can quantify rCVR non-invasively in a short time.

Key words: 123I-IMP, Acetazolamide, Split dose, ARG method, One-day protocol.