Summary

Estimation of Integral of Input Function for Quantification of Cerebral Blood Flow with N-Isopropyl-p-[^{123}I]Iodoamphetamine Using One-Point Venous Blood Sampling

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The present study was designed to investigate a possibility of substitution of the venous blood radioactivity counts sampled 26 min post injection for the octanol-extracted arterial blood radioactivity counts obtained at 5 min after the injection of N-isopropyl-p-[^{123}I]iodoamphetamine (^{123}I-IMP). Furthermore, we investigated whether the integral of input function can be estimated from the venous blood radioactivity counts sampled 26 min post injection and the whole-brain time-activity curves early after ^{123}I-IMP injection. There was a good correlation between the arterial blood radioactivity counts sampled 5 min post injection (y) and those obtained at 26 min ($r=0.902$; $n=91$; $y=2.348x-867.063$). There was also a good correlation between the arterial (x) and venous blood radioactivity counts (y) sampled 26 min post injection ($r=0.954$; $n=14$; $y=0.761x+924.336$). The venous blood radioactivity counts sampled at 26 min (x) correlated well with the octanol-extracted arterial blood radioactivity counts sampled at 5 min (y) ($r=0.964$; $n=32$; $y=0.173x-21.598$). There was a good correlation between the integrals of input function obtained from the regression equation obtained above and the whole-brain time-activity curves acquired during 7 min post injection (y) and those obtained by 5-min continuous arterial blood sampling (x) ($r=0.965$; $n=41$; $y=0.957x+2665.208$). These results indicate that this noninvasive and simple method can estimate the integral of input function for quantification of cerebral blood flow using ^{123}I-IMP.

Key words: ^{123}I-IMP, Input function, Cerebral blood flow, Venous blood sampling, Continuous arterial blood sampling.