

Summary

Phase 1 Clinical Study of ^{123}I -IBF, a New Radioligand for Evaluating Dopamine D_2 Receptor with SPECT (II); Pharmacokinetics Study and Quantification in the Brain

Yoshiharu YONEKURA*, Norihiro SADATO*, Tatsuro TSUCHIDA**, Hidemasa UEMATSU**, Satoshi NAKAMURA*, Yoshihiro ONISHI***, Kazutaka YAMAMOTO** and Yasushi ISHII**

*Biomedical Imaging Research Center, Fukui Medical University

**Department of Radiology, Fukui Medical University

***Nihon Medi-Physics Co., Ltd., Nishinomiya

The pharmacokinetics of (S)-5-iodo-7-N-[(1-ethyl-2-pyrrolidinyl)methyl]carboxamido-2,3-dihydro-benzofuran (^{123}I -IBF) in the brain were studied in 12 healthy male volunteers as a Phase 1 clinical study. The striatum-to-frontal cortex count ratio (-1) ($\text{St}/\text{Fc} - 1$), which is a semi-quantitative index of the binding potential of ^{123}I -IBF reached 1.81 ± 0.19 and 2.21 ± 0.39 at 90–120 min and 180–210 min after intravenous injection of ^{123}I -IBF. $\text{St}/\text{Fc} - 1$ obtained by SPECT at these times correlated well with the distribution volume ratio (-1) ($\text{Vd}(\text{St})/\text{Vd}(\text{Fc}) - 1$) based on three-compartment model analysis using an input function obtained by intermittent arterial sampling. The binding potential (BP_R), calculated by the curve-

fitting method using the time-activity curve in the reference region, also correlated well with the $\text{Vd}(\text{St})/\text{Vd}(\text{Fc}) - 1$. The intra-observer and inter-observer reproducibilities of the striatum-to-cerebral cortex count ratios obtained using fixed-shape regions of interest (template ROIs) were superior to those obtained using manual ROIs. These results suggest that ^{123}I -IBF is a promising agent for non-invasive quantification of the dopamine D_2 receptor (D_2 -R) binding potential by SPECT.

Key words: ^{123}I -IBF, Dopamine D_2 receptor, Phase 1 study, Pharmacokinetics, Single photon emission computed tomography.