Summary

Phase 1 Clinical Study of ^{123}I-FP-CIT, a New Radioligand for Evaluating Dopamine Transporter by SPECT (II): Tracer Kinetics in the Brain

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The kinetics of ^{123}I-FP-CIT in the brain for healthy subjects were studied. Twelve dynamic SPECT data sets (0- to 6-hr after an intravenous injection) from a Phase I clinical trial of ^{123}I-FP-CIT were analyzed. Tracer concentrations in the striatum, midbrain, cerebellum and cerebral cortex were measured on the SPECT images co-registered with the corresponding MR images. High tracer accumulation was observed in the striatum, which peaked at 60 min post-injection, followed by slow elimination (3%/hr). The kinetics were similar both in the cerebellum and in the cerebral cortex, which peaked at 15 min post-injection, followed by rapid elimination. Tracer accumulation in the midbrain was higher than in the cerebellum and cerebral cortex. The striatal specific/nonspecific binding ratio ((striatal−occipital)/occipital concentration ratio) was stable at 3-hr post-injection and later at a value of 3, suggesting that the specific binding of ^{123}I-FP-CIT could be evaluated from a single SPECT image at 3- to 6-hr post-injection. The specific/nonspecific binding ratio at 4-hr post-injection showed a negative correlation with aging ($r=-0.70$, $p=0.01$), with a decrease rate of 11%/decade (95% confidence interval: 3%–19%/decade).

Key words: ^{123}I-FP-CIT, Dopamine transporter, Tracer kinetics, Single photon emission computed tomography.