

## Summary

### Quantification of Cerebral Blood Flow Using $^{123}\text{I}$ -IMP SPECT —A New Method of Estimating the Input Function from Brain Dynamic Data—

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In order to avoid continuous arterial blood sampling, we estimated input function by the method in that the whole brain time activity curves were fitted by two-term exponential function and differentiated analytically after the injection of N-isopropyl-p-[ $^{123}\text{I}$ ]iodoamphetamine ( $^{123}\text{I}$ -IMP). This method was applied to 4 patients with cerebral infarction and 2 patients with brain tumor. Values of regional cerebral blood flow (rCBF) were calculated from the input function calibrated by one-point arterial sampling at 5 minutes after the injection using microsphere method, and then were compared with those obtained from the table-lookup method. In this study, we used the individual input function for the table-lookup method instead of the standard input function. The overall ac-

curacy errors between two-term exponential functions and the whole brain time-activity curves were about 1%. The values of rCBF calculated by this method were well correlated with those by the table-lookup method ( $r = 0.901$ ,  $p < 0.001$ ). Optimal calibration time for this method was between 3-minute and 10-minute after  $^{123}\text{I}$ -IMP injection and the deviation of the rCBF values obtained by this method from those obtained by the table-lookup method in which the input function was calibrated at 5 minutes remained within 10%. This method is a less invasive and convenient alternative to the conventional methods which require continuous arterial blood sampling.

**Key words:**  $^{123}\text{I}$ -IMP, Regional cerebral blood flow, Dynamic data, Input-function.