Evaluation of the use of a standard input function for compartment analysis of [123I]iomazenil data: factors influencing the quantitative results

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Adoption of standard input function (SIF) has been proposed for kinetic analysis of receptor binding potential (BP), instead of invasive frequent arterial samplings. The purpose of this study was to assess the SIF method in quantitative analysis of [123I]iomazenil (IMZ), a central benzodiazepine antagonist, for SPECT.

SPECT studies were performed on 10 patients with cerebrovascular disease or Alzheimer disease. Intermittent dynamic SPECT scans were performed from 0 to 201 min after IMZ-injection. BPs calculated from SIFs obtained from normal volunteers (BP_S) were compared with those of individual arterial samplings (BP_O).

Good correlations were shown between BP_Os and BP_Ss in the 9 subjects, but maximum BP_Ss were four times larger than the corresponding BP_Os in one case. There were no abnormal laboratory data in this patient, but the relative arterial input count in the late period was higher than the SIF. Simulation studies with modified input functions revealed that height in the late period can produce significant errors in estimated BPs.

These results suggested that the simplified method with one-point arterial sampling and SIF can not be applied clinically. One additional arterial sampling in the late period may be useful.

Key words: [123I]iomazenil, SPECT, kinetic analysis