The results were as follows:

(1) Cases of cerebrovascular dementia tended to have a lower mean CBF value.

(2) A comparison of variation ratio revealed lower values in the both hemispheres on the dementia cases.

(3) Regional CBF patterns showed lower values in the central area for cases of chronic stage on dementia cases.

I-123 IMP cerebral blood flow SPECT was studied in 22 cases (24 lesions) of brain tumor: 3 metastasis, 6 meningioma, 2 malignant melanoma, 3 low grade astrocytoma, 3 high grade astrocytoma, 2 craniopharyngioma, 1 hemangioendothelioma, 1 chordoma). Each case was injected 3mCi of IMP intravenously. SPECT data were collected twice from 30 minutes and 4 hours after injection using rotating scintillation camera ECT system (ZLC 75). Low blood flow was observed in the area of peritumor edema as well as the tumor lesion in X-CT in 17 out of 24 lesions (71%) in the early IMP image. The undetected three lesions were small and/or located in the midline area. In two cases of meningioma and one of melanoma early images revealed high radioactivity of the lesions but delayed images showed lower activity of the lesions than that of surrounding cerebral cortices. Tumor activity to cerebral cortical activity in the opposite side (T/N ratio) was calculated in each case. The T/N ratios were ranged from 44% to 132% and no tumor specificity was observed in these ratios.

Intracerebral calcification is one of the complications of prophylactic cranial radiation and intrathecal methotrexate (MTX) treatment for patients with acute lymphoblastic leukemia (ALL), and reported as mineralizing microangiopathy with dystrophic calcification. This complication is clinically significant because of neurologic disturbances accompanied it, but its exact pathological and physiological nature remains unclear. Of 186 children with ALL received prophylactic cranial radiation and intrathecal MTX treatment, 8 were found to have intracerebral calcifications on X-ray CT. I-123 IMP was administrated to 7 of them and SPECT images of regional cerebral blood flow (rCBF) were constructed. In 3 cases with relatively large lesions with calcification, corresponding focal decreased accumulations were found. Those 3 cases had significant EEG abnormalities, dementia and epilepsy, but other 4 cases without evidence of decreased rCBF did not have epilepsy. This method was considered to be useful for physiological evaluation of intracerebral calcification in patients with ALL and have potentialities to be a useful method to evaluate other cerebral complications of ALL such as cerebral atrophy and leukoencephalopathy.