The cerebral blood flow (CBF) was studied on twenty-four patients with a ring type single photon emission CT (SPECT), following intravenous injection of Xe-113 and I-123 isopropylidioamphetamine (IMP). Case materials included fourteen meningiomas, nine gliomas, and one primary malignant lymphoma. Evaluation was performed with emphasis on the following points: 1) Influence of tumors on the normal brain tissue, 2) Correlation of the flow data within tumors to the angiographic tumor stains, 3) Correlation of degree of peripheral edema and the flow data of the affected hemispheres, 4) Image of brain tumors by IMP.

The results revealed that there was significant correlation between data within tumors and angiographic tumor stains. Influence of tumors on the normal tissue was greater in meningiomas than in gliomas. Correlation was not demonstrated against edema and mCBF of the affected hemispheres. Scanning of brain tumors with IMP did not reveal uptake of isotopes. It has been concluded that the measurement of CBF in brain tumors is valuable method in preoperative evaluation.

Measurements of regional cerebral blood flow, oxygen consumption and blood volume in patients with brain tumors by positron emission tomography

Nine patients with brain tumors, including 4 meningiomas and 3 glioblastomas, were examined by positron emission tomography (PET). Measurement of rCBF, rOEF and rCMRO2 were performed by continuous administration of 15CO2 or 15O20, and 0-1502 and rCBV was measured by single inhalation of C-11 CO or O-15 CO.

All patients showed decreased rOEF, ranging from 0.17 to 0.40. In patients with meningiomas, increased rCBF and slightly increased or unchanged rCMRO2 were observed. Increased rCBF and decreased rCMRO2 were seen in 2 patients with glioblastomas. In another patient with glioblastoma, which had large necrotic area, rCBF decreased. Abnormal findings in non-tumorous area were seen in 6 patients. These abnormalities included decreased rCBF in marginal region of the tumor in 2 patients, decreased rCBF in ipsilateral hemisphere in 4 patients and contralateral cerebral diaschisis in 2 patients. PET study is a useful modality to evaluate cerebral blood flow and metabolism in tumor and its effects to non-tumorous areas.