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Clinical Application of ^{18}F -FdUrd as a Nucleic Acid Metabolism Tracer

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The basic investigation into the potential usefulness of F-18-fluorodeoxyuridine (FdUrd) as a nucleic acid metabolism tracer had already been reported in the previous meeting. This time, FdUrd was clinically applied to four brain tumor cases (3 malignant brain tumor and 1 astrocytoma Gr.II). The image of positron emission computed tomography (PECT) and differential absorption ratio (DAR) were obtained by ECAT II. In malignant brain tumor cases, the image of PECT revealed high accumulation of FdUrd in the tumors. The DAR of the tumor was about three times higher than that of contralateral brain tissue. On the other hand, in astrocytoma Gr.II, the image of PECT failed to show high accumulation of FdUrd. The DAR was almost the same as that of contralateral brain tissue. These results suggest that FdUrd will not only be a useful nucleic acid metabolism tracer but also a tracer for making a new grading for brain tumor.

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BRAIN TUMOR SCINTIGRAPHY WITH Tl-201 CHLORIDE.

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Brain scintigraphy with Tl-201 chloride was performed in 10 patients with various kinds of tumor. Data collection for the conventional planar images was started at 5-10 minutes after intravenous injection of Tl-201 chloride (2mCi) followed by data acquisition for the ECT images. 4 meningiomas, 2 metastasis (lymphoma and colon carcinoma), 1 pituitary adenoma and 1 acoustic neurinoma gave positive images. But one case with CP angle meningioma and another with large craniopharyngioma were not delineated. The positive rate of Tl-201 chloride was high and the lesions were clearly distinguished from adjacent normal brain tissue. Deep seated lesions were well demonstrated especially in ECT images. Additionally immediate examination can be performed with Tl-201 chloride. Tl-201 chloride is considered to be a useful agent in brain tumor scintigraphy.

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CEREBRAL BLOOD FLOW AND METABOLISM IN DEMENTIA. STUDIES WITH POSITRON EMISSION TOMOGRAPHY USING O-15.

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Cerebral blood flow and oxygen metabolism were studied in three normal aged subjects, three cases of Alzheimer disease (AD), four cases of Senile Dementia of Alzheimer Type (SD) and twelve cases of Multi-Infarct Dementia (MID) with Positron Emission Tomography using O-15.

The CBF and CMRO₂ of gray matter in AD, SD and MID were significantly low compared with the values of normal aged subjects. The CBF and CMRO₂ in AD were low compared with those of SD, although the pathogenic mechanism of dementia in AD was considered to be the same as that of SD.

The decreases of rCBF and rCMRO₂ in MID compared from those of normal subjects were most remarkable in frontal cortex. The distribution pattern of rCBF and rCMRO₂ in MID showed relative hypofrontal pattern. There were significant correlations between the severity of dementia and the reductions of CBF and CMRO₂ of frontal cortex in MID.

The decreases of rCBF and rCMRO₂ in AD and SD compared from the values of normal aged subjects were most remarkable in temporal cortex, and the distribution pattern showed relative hypotemporal pattern.

The impairment of mental function in MID must have been caused by the decreased neuronal activity of frontal association cortex, and the mental impairment in AD and SD might have been caused by the decreased function of temporal cortex.

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LOCAL CEREBRAL CIRCULATION AND METABOLISM IN A PATIENT WITH HERPES SIMPLEX ENCEPHALITIS. F.Shishido, K.Uemura, A.Inugami, T.Ogawa, T.Yamaguchi, S.Higano, I.Kanno, S.Miura, H.Iida, M.Murakami, K.Takahashi, H.Sasaki, K.Tagawa and K.Nagata. Research Institute for Brain and Blood Vessels-AKITA, Akita.

Using positron CT and O-15-labeled gases, we determined serial changes of local cerebral circulation and metabolism in a patient with herpes simplex encephalitis confirmed by serological examinations, who was 29 year-old woman. Positron CT measurements were performed at about 2 weeks, 4 weeks and 6 months after onset of symptoms.

In about 2 or 4 weeks after onset of symptom, the lesion of herpes simplex encephalitis on X-ray CT showed low OEF (luxury perfusion) and the lesion with marked contrast enhancement on X-ray CT revealed increased CBF and CBV. In about 6 months after onset of symptoms, lCBF and lCBV settled down below the normal values. Though from the point of reversibility of brain tissues CBF and OEF were not useful. CMRO₂ was a possible parameter to indicate the reversibility of brain tissue. The value of possible threshold of CMRO₂ was suggested about 2 ml/100 ml/min.

These results suggest that measurement of cerebral circulation and metabolism was useful for herpes simplex encephalitis, especially CMRO₂ was a useful parameter for predicting prognosis of the disease.