138

GLUCOSE METABOLISM MEASUREMENT USING FDG AND PET:DATA SAMPLING AND CVB CORRECTION.
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Estimation of rate constants of glucose metabolism pixel by pixel from serial PET images at 4 min intervals for 60~120 min scan of FDG was studied. The kinetic model of FDG is based on three compartments with four parameters. PETs were reconstructed employing correction for attenuation,scatter and dead time of the counting. Curve fitting was performed by Newton-Raphson method providing the mapping of each parameter with the relative accuracy. Arterial blood sample curve was approximated by one straight line and sum of three exponential curves. Estimation of all rate constants and CMRG of each pixel could be performed in a few seconds on PDP 11/60 computer. Correction of CVB was done by subtracting CBV image by CO-15 form serial FDG images. The dephosphorylation rate(k4) could not be estimated sufficiently from 1 hr measurement. The values of all constants decreased for 3-parameter fitting both for 1 hr and 2 hr scan,and k1 and k2 decreased 10~40 % by CBV correction. In 3-paremeter fitting,all rate constants decreased for longer measurement. In healty subject, each constant almost coincided with the normal value.
These mapps provide a useful mean for studying the glucose trnasport system in various organs and diseases.

139

DETERMINATION OF THE KINETIC RATE CONSTANTS FOR ^{18}FDG IN PATIENTS WITH CEREBRAL DISORDERS.
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We determined the kinetic rate constants (k^*1-4 & k^*1-3 assuming $k^*4=0$) for ^{18}FDG in two normal volunteers and 30 patients with cerebral disorders. The tissue concentration time course activity was measured by serial scans every 4 min.s for 40 min.s and then at 45 and 65 min after ^{18}FDG injection. The values of k^*1 and k^*2 were decreased in the pathological tissue of patients with presenile dementia, chorea,cerebral infarction and spino-cerebellar degeneration. The values of CMRGIc using single scan method and the previously published average kinetic rate constants were compared with those using individual rate constants. Among the three method described(Phelps, Brooks & Hutchins), the values employing Hutchins's method showed the best fitting to the results using individual rate constants(k^*1-4). The values of CMRGIc using k3 model (k^*1-3) were 20-30% lower than k4 model(k^*1-4). The values k^*1-4 could be determined within a relatively short period and this provides useful information on the cerebral glucose metabolism.

140

AN EASY AND PRACTICAL METHOD FOR CORRELATION OF PET AND XCT.
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The mapping of region of interest (ROI) on functional image with positron emission tomography (PET) has been limited by poor spatial resolution of PET and ability to correlate function and anatomic detail. Therefore, we have developed a system that ensures the same slice level between PET and XCT using a face mask and permits ROI mapping directly over XCT image in the analysis of PET image. XCT images were acquired through video system from XCT film. Since the identification of size and location between PET and XCT images was carried out by adjusting the zoom rate with video camera, it was not necessary to set up and coordinates on these images. This method enables the accurate identification of structurally abnormal regions, such as cerebral infarcts and small regions of the basal ganglia.

141

POSITRON EMISSION TOMOGRAPHY IN PARTIAL SEIZURES.
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Interictal positron emission tomography with F-18-labeled 2-fluorodeoxyglucose was performed on 30 patients with partial seizures. Nineteen patients had only unilateral epiletiform discharges on the EEG, 4 had bilateral discharges, 4 had nonlocalized epiletiform abnormalities, and 3 had no epiletiform discharges. One or more discrete zones of hypometabolism were identified in 21 patients, and only 1 patient showed focal interictal hypermetabolism. Twentythree patients had focal abnormalities in the EEG and 12 of them showed hypometabolic regions corresponding to the foci. Unilateral and bilateral PET hypometabolic regions were seen among 4 and 1 respectively of 7 patients without definite foci in the EEG. This study reveals PET is more sensitive in the detection of focal abnormalities in the brain with partial seizures which is not detected by the EEG.