Scintigraphical Studies with New High Resolution Gamma Camera

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The experience in a high resolution new gamma camera was reported. This camera (GCA-401 Toshiba) has a maximum resolution power of 3.2 mm. From analysis of the 34 cases of brain scintigraphy, 2 cases of cisternography and 5 cases of RI-labeled red cell angiography, the following results were obtained.

1. The structures and the lesions in the skull were visualized clearly in their details, especially small lesions of the posterior and middle fossa.
2. Superior sagittal sinus was recognized along its entire course separately from the scalp and the skull.
3. In RI-angiography, the smallest visualized arteries were arcus palmalis superficialis and profundus.
4. During the procedure, the strict fixation of the patients was required.

Numerical Analysis of the punched out Data in the Brain Scanning

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The numerical way to analyze scintiscan data was presented. In this study, the scan data were obtained from isocount scanning system, which has been already reported elsewhere. The count rates at each measuring point in the lateral scanning were printed out. Three areas were selected as ROI for numerical analysis, namely, the area responsible for the lesion (L), the area of the non-lesion, which represented normal brain (B) and the area of the lateral sinus (V). L/B and B/V were introduced as parameters to express the RI uptakes quantitatively.

22 patients with various brain diseases were studied by this method. In 15 of 22 cases brain scans were repeated at various intervals after the injection of ^{99m}Tc-pertechnetate. In normal controls, average B/V was 0.78 ± 0.02 (SD) 30 minutes after the RI injection. Brain scans performed 30 minutes after the RI injection showed that high B/V was obtained in one case of epidural hematoma, cerebral embolism and menigioma, 0.91, 0.94 and 0.92 respectively. On the other hand, high L/B was obtained in one case of menignioma, sarcoma, glioblastoma multiforme and cerebral thrombosis, 2.00, 1.44, 1.37 and 1.39 respectively. The repeated scans revealed that L/B ratio reached to its maxi-

mum value 60 minutes after the injection in the glioblastoma. In the oligodendroglioma and the epidermoid maximum L/B ratio were obtained 2–3 hours after the injection. On the other hand, in non-neoplastic lesions, such as arachnoiditis, epidural hematoma, brain abscess and so forth, maximum L/B ratio were obtained 60 minutes after the RI injection.

Thus, it would be concluded that the scanning would be favorably delayed for 60 minutes after the injection of ^{99m}Tc-pertechnetate as a radionuclide.

Comparison of the Radionuclide Imaging and EMI Scan for Detecting Brain Diseases

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The comparison of the radionuclide imaging (RN) and computerized axial tomography (CT) for detecting various brain diseases was performed.

RN was performed with a gamma camera using perchlorate premedication followed by 20 mCi of ^{99m}Tc-pertechnetate.

Dynamic images and standart four views 2 hours after intravenous injection of ^{99m}Tc-pertechnetate were used for comparison. With CT, intravenous contrast medium was sometimes used.

One hundred fifteen patients with brain tumors were reviewed, and 89 out of them were detected with both two studies.

In other 26 patients, 5 were detected only by RN, 8 only by CT and 13 were missed by both. These results mean that CT is able to detect a little bit higher percentage of brain tumors than RN. About the location of the tumors there is no significant difference in detectability between two studies.

In assessing the results of non neoplastic disease in these comparison studies, RN was superior to CT in detecting occulusive cerebrovascular diseases, but CT was superior to RN in the identification of intracerebral hemorrhage, porencephalic cyst, hydrocephalus and cerebral atrophy.

Multilevel Analysis of Isocount Scanning in Brain Tumor

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In the previous reports, the theoretical background and technical details of the isocount scanning were described. Based on clinical experiences of various brain diseases, the newly developed