USEFULNESS OF RCT IN CLINICAL CASES.

Single photon emission CT (RCT), using a home made rotating chair controlled with a computer, was performed in clinical cases. We reported the usefulness of the RCT for physiological and quantitative observation of the lesions as well as for detection of the small lesions located in the deep region not detected by conventional scan. In the liver scan, all lesions with a diameter greater than 2 cm were clearly detectable on the RCT. The activity ratio in the hyperparathyroidism was markedly higher than in the normal group.

EXERCISE PULMONARY PERFUSION STUDY.

We developed a new approach using ECT for the measurement of the alterations of the regional conductance which is the inverse of the resistance of the pulmonary vessels, when the blood flow increased. 3 ml of Tc-99m-HA was injected to a subject exercising with an ergometer in a supine position, followed by an ECT study. After the first ECT study we administered the same dose of Tc-99m-HA and the second ECT study was carried out. The data obtained from these two ECT studies were processed by a computer to get the distribution of the radioactivity per unit lung volume. Subtractions of the regional count rates at rest were made from those during exercise. In a normal man, the increased blood flow tended to distribute more evenly, i.e., more blood flow in the anterior parts of the lung in a supine position. This methods were applied to the patients with pulmonary fibrosis, emphysema, emboli and cancer. The diseased portions of the lung were clearly delineated. Thus, it is possible to evaluate the health of the lung by assessing its ability to increase its conductance against the augmented blood flow.

THE CLINICAL EVALUATION OF ECT IN VARIOUS PULMONARY DISEASES BY Tc-99m MA

ECT of pulmonary perfusion scintigraphy were performed on 32 cases of various pulmonary diseases. Each ECT image was studied in comparison with conventional inhalation scintigrams, x-ray CT images and chest x-rays. Mainly, detectabilities of abnormal finding in ECT was evaluated. As a result, cause of the highest detectabilities was observed on chest x-rays, however, all 4 cases of aortitis syndrome did not show any abnormalities that should be corresponding to their deficiency. Some significant cold area on conventional static perfusion scintigrams were obtained in 2 cases of aortitis syndrome. However, they were not enough to get the conclusion of their abnormalities. Therefore, ECT was performed as a further examination, the extent and location of their perfusional deficiency were clearly shown in directory in ECT. As a conclusion, ECT of various lung diseases especially aortitis syndrome was very useful as an examination for lung perfusional deficiency.

CLINICAL EVALUATION OF RADIONUCLIDE (EMISSION) CT USING Tc-99m-DMSA IN UROLOGICAL NEPHROPATHIES.
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We attempted to obtain radionuclide tomographic images of the kidney using rotating gamma camera (Maxi 400-T, GE), following the regular renal image with Tc-99m-DMSA. Renal tomographic images were expressed in a form of multiple section slices such as transaxial, frontal and sagittal. Filtered back projection algorithms using the Cheesler's filter were used for reconstruction. The processing time took 45 sec/slice for 64 views collection using PDP 11/60DEC.

In the case with the fused kidney, the morphological characteristics were well demonstrated on the transaxial or frontal section image. In the case with the space occupying lesions (SOL) in the kidney, residual functioning areas around and/or among the SOL were demonstrated 3 dimensionally and the shape and location of the SOL were reconstructed stereoscopically. In the case with regional loss of functional areas such as renal tuberculosis or hydrenephrosis, a shape and area of the residual functioning mass were seen on the images.

This investigation is a preliminary one, however, 3 dimensional tomographic expressions of the kidney give us a new insight to the morphological approach to the variety of kidney diseases. In addition, 3 dimensional reconstruction of slices of the whole kidney enables us to evaluate a renal cortical volume as Tc-99m-DMSA preferentially accumulates in the renal cortex.