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USEFULNESS OF RCT IN CLINICAL CASES.

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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 quontative 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 RCT of Ga-67 studies were extremely usefull for decision of the pathologic sites,however, conventional Ga-67 scans could not accurately decided the abnormal uptake sites even if the multi-views were taken. In a secondary hyperparathyroidism,the abnormal uptake of the bone seeking agent was seen in the chest and kidneys by the conventional scan. The RCT showed the abnormal high uptake not in the pleura or chest wall but in the whole lung due to ectopic calcification not detected by the chest X-ray and XCT. In the bone scan of the secondary hyperparathyroidism, the activity ratio of the frontal bone and soft tissue was calculated from the transaxial view of the skull obtained by using the RCT. The activity ratio in the hyperparathyroidism was markedly higher than in thecontrol group.

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THE CLINICAL EVALUATION OF ECT IN VARIOUS PULMONARY DISEASES BY TC-99M MAA.

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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, of cause 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 of their deficiency. Some significant cold area on convensional static perfusion scintigrams were obtained in 2 cases of aortitis syndrome. However, they were not enough to get the conclusion of their abnormalitis. Therefore, ECT was performed as a further examination, the extense and location of their perfusional deficiency were nicely shown directory in ECT. As a conclusion, ECT of various lung diseases especially aortitis syndrome was very useful as an examination for lung perfusional deficiency.

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EXERCISE PULMONARY PERFUSION STUDY.

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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 mCi of Tc-99m-MAA was injected to a subject exercising with an ergometer in a supine position, followed by an ECT study. After the first ECT study he was administered the same dose of Tc-99m-MAA 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 radio activity 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.

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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 rorating 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 saggital. Filtered back projection algorithms using the Chesler's filter were used for reconstruction. The processing time took 45 sec/slice for 64 views collection using PDP 11/60(DEC).

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 occuping 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 hydronephrosis, 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.

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