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EVALUTION OF SINGLE PHOTON ECT IMAGE WITH ROTATING GAMMA CAMERA.

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The influence of data sampling conditions on tomographic image was evaluated. We obtained ECT images for various data sampling conditions with a phantom including line source. Then,we caluculated the count ratio of hot region to all the matrices (S/N)which was analogous to "signal-to-noise ratio".The curve of S/N against data sampling time for each view increased and immediatly reached a plateau. It implies that even if we take time for data acquisition, we cannot expect an improvement upon S/N. Against data sampling angles, the curve of S/N for HR collimator decreased steeply with increasing the sampling angles. On the other hand, the curve for HS collimator made a plateau and decreased gradually. It implies that when we set small sampling angles, we can expect an improvement upon S/N with HR collimator but we cannot, with HS collimator. Furthermore, we calculated MTF and examined the relation between S/N and MTF. It was revealed that the same MTF was obtained under the plateau phase of S/N and HR collimator was inferior to HS collimator in the low spacial frequency domain.

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AN EMISSION COMPUTED TOMOGRAPHY USING DUAL SCINTILLATION CAMERA DETECTORS.

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An ECT system using one camera detector can produce more than ten tomografic images of distribution of radio nuclides in human body. In order to make the data aquisition time shorter, We have been designing the ECT system using dual detectors of scintillation camera P/G LFOV. In this system, the reconstruction time of the tomografic image becomes shorter by using a convolver and a back projector instead of a floating point unit.

This system can collect gated cardiac data in about 15 minutes. At the same time, it can obtain the scintigram of heart by its two detectors.

We are now useing NOVA 4/X with 128 kW memory. Detectors rotate 360° continuously or step wise around a patient. The speed of rotation is selectable from 360°/2 min. to 360°/60 min.. Maxmum radius of rotation is 30 cm at the surface of H.R. collimator.

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THREE-DIMENSIONAL DISPLAY OF SINGLE PHOTON ECT IMAGES.

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Recently a variety type of tomographic expression of radionuclide emission images can be obtained. This type of expression necessitates 3 dimensional display to complete clinical diagnosis. Present report discribes an attempt to display 3-D shaded images,easily perceptible to physician's eye, those of which derived from a series of tomographic images obtained by using a rotating gamma camera.

The creating procedure of the 3-D shaded images are as follows. The contours of the tomographic images were determined primarily. Then the 3-D geometric model of the organ of interest was summed up to be constructed in a computer. This 3-D model was projected on a screen and the images were shaded to emerge up surfaces of the organ vividly.

The system can be implemented in a standard gamma camera data processing system and may help one to understand the spatial relationship among several tomographic images.

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RCT AND LIVER SCINTIGRAM FOR LIVER DISEASES.

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RCT was performed to 74 patients whose liver scintigrams showed or suspected uptake defects. Among them, 50 patients including 27 with liver tumor, 17 hepatocellular disease and 6 others were confirmed whether there were SOL in their liver or not by other studies such as XCT, angiography, ultrasound and surgery.

ROC curve was made in these 50 patients, and showed superiority of RCT to liver scintigram especially in patients whose scintigrams had possible or doubtful defects. It needs only 10 min. to perform RCT, so RCT does not disturb routine work very much. To patients, there is no additional radiation exposure. Thus, RCT should be added to liver scintigraphy in proper patients.