Development of Renal Radioisotope Images

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Since scan image can be fairly changeable under recording condition, it is advisable to deduce the result of scan reading from examing scans under various conditions by any means. We have been for a long time using a multi-cut off technique enabling us to obtain four scans of different recording conditions simultaneously.

The kidneys are the organs respiratory movement and renal scan image is affected by the movement. Renal scanning was performed on the patient who had pneumonectomy of the right lung because of pulmonary carcinoma. The scan contour of the right kidney showed quite a smooth margin in contrast with that of the left normal side. Namely, respiratory movement of the kidneys influence on the scan image especially its upper and lower pole.

Renal scanning phantom was made simulating clinical condition, was put into the water bath as a substitute for the trunk, was placed on the specially designed driving apparatus and was moved back and forth at the distance of 0, 1 and 2 cm at the frequency or 18 per minute while it was scanned. The limit of detection of filling defect was 2.5 or 2 cm in diameter. A cyst of 2 cm in diameter was barely detected in the patient with renal cyst.

^{113m}InFe DTPA, of which synthesis was reported in the paper No. 14 of this meeting, concentrates selectively in the kidneys. Although the compound was excreted too fast to delineate the kidney by usual area scanning, renal image was obtained successfully with scintillation camera. Six mCi of ^{113m}InFe DTPA was injected intravenously and serial scintiphotos were taken at each 8 seconds of exposure. This procedure presents the information similar to X-ray angiography and should be called as "Intravenous radioisotope angiography". A case with Grawitz' tumor showing tumor stain by renal radioisotope angiography and a case with renal solitary cyst showing constant filling defect by renal radioisotope angiography were demonstrated.

An Approch to Developing Adrenal Gland Scanning

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The adrenal gland remains about one of the few organs left to be scanned. This report describes our experience on animal distribution studies and clinical scanning with a new compound, ^{131}I stigmasterol, with sufficient adrenal gland specificity to be useful for external scanning.

As demonstrated by whole body autoradiography of mice, ^{131}I and ^{3}H stigmasterol were accumulated in the adrenal gland cortex. In Wistar rats, the adrenal/liver concentration ratio of ^{131}I stigmasterol rose significantly in 24 hours after injection with a further slight increase. Much higher concentration ratio was obtainable with rats given ^{3}H stigmasterol. The data showing that the concentration of ^{131}I in the adrenal glands was as great as six times the concentration in the liver and 30 to 50 times that in the blood or kidneys indicated that this compound would be suitable for scanning purpose.

The adrenal glands contained approximately 0.3% of the administered dose. More than 80% of the total tissue radioactivity in organs was in lipid fractions, and the maximum radioactivity was usually found in the diglyceride or monoglyceride fractions and a considerable amount of radioactivity was found