

Comparison of Renal Scintigraphy with ^{99m}Tc -gluconate and ^{99m}Tc -DMSA

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Recently ^{99m}Tc -gluconate and ^{99m}Tc -DMSA have been investigated as radiopharmaceuticals for renal scintigraphy and they have been used clinically.

We studied experimentally renal uptake and body distribution of these two radiopharmaceuticals using rats. And a scinticamera equipped with a computer was utilized for dynamic curves in clinical studies.

^{99m}Tc -gluconate gave rapid urinary excretion and blood clearance. Renal uptake was rapid initially and then showed gradual decrease.

^{99m}Tc -DMSA, on the other hand, gave slow

urinary excretion and blood clearance. Renal uptake was maximum at 3 hours and then showed the even level. In comparison of images, renal collecting system which was not demonstrated in ^{99m}Tc -DMSA were visualized in early phase with ^{99m}Tc -gluconate.

In the patient with severe renal damage, scintigraphy with ^{99m}Tc -DMSA had an advantage showing clear image of kidneys at 24 hours. In conclusion, the both gave good renal image and seems to be suitable radiopharmaceuticals for renal scintigraphy.

Clinical Research of Renal Function using Scintillation Camera:

Clinical Evaluation of ^{99m}Tc -DMSA in Urological Nephropathy

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Kinetics of ^{99m}Tc -DMSA was investigated in ten patients with normal renal function. The whole blood and plasma clearance curves and the urinary excretion rate of DMSA were obtained to be analyzed. These study revealed that approximately 50% of DMSA was cleared from the blood pool about 30 min. after administration and approximately 20% of the dose was excreted in the urine after 24 hours and considerable accumulation of the dose was expected within the kidney.

From clinical usage of DMSA, excellent quality

of renal image was obtained in urological nephropathy. Sequential renal scanning by ^{99m}Tc -DTPA as GFR marker was rather useful in detecting intrarenal urine flow. DMSA renal image was most useful to detect renal masses morphologically. Especially, cortical small cyst which caused microscopic hematuria was found before abnormal pelvic calyceal system appeared on IVP. And furthermore DMSA renal scan showed good image corresponded to functioning areas in obstructive nephropathy. Even in the case of severe renal

damage with mild azotemia, renal image was clearly demonstrated. Severity of DMSA uptake by the kidney might quantitatively correspond to residual

cortical function, because DMSA is characteristically accumulated in the cortex.

Clinical Evaluation of Renoscintiphotos, about 1000 cases

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Since May 1972, 1209 renoscintiphotos were carried out in our laboratory. Until last year, renoscintiphotos gradually increased, but this year it slightly decreased. It might be one of the cause that many other scintiscans such as brain, lung and liver scans were performed and its number is rather increased than before.

Actually number of patients performed renoscintiphotos was 852. Of these patients 206 were carried out this examinations two or more times on the same patient. One of the cases with trasplanted kidney was carried out nine times because of its many complications.

As renal scanning agent, for dynamic studies ^{131}I -hippuran was used more than 70% of all agents every year. Recently $^{99\text{m}}\text{Tc}$ -DTPA was used instead of hippuran. For static images $^{99\text{m}}\text{Tc}$ -PAC had been used but this year $^{99\text{m}}\text{Tc}$ -DMSA is gradually increased because of its good imaging and covenience for preparation.

The number of cases carried out two or more times on the same patient are as follows; transplanted kidneys 36 cases, hydronephrosis 32, renal tumors 23, renal cysts 23, polycystic kidneys 19 and so forth. In these cases, transplanted kidneys were mostly examined by dynamic studies. Tumors and cysts were diagnosed by static images. The detection of complication after renal transplantation dynamic study using $^{99\text{m}}\text{Tc}$ -DTPA and ^{131}I -hippuran is more useful than static images. On the other hand, detection of space occupying lesion by static images using $^{99\text{m}}\text{Tc}$ -DMSA and $^{99\text{m}}\text{Tc}$ -PAC are very valuable for diagnosis of renal tumor and cyst.

Lastly nine renal scanning agents which were used in our laboratory are compared each other. For dynamic studies $^{99\text{m}}\text{Tc}$ -DTPA, for static images $^{99\text{m}}\text{Tc}$ -DMSA and for perfusion phase in other words vascular phase $^{99\text{m}}\text{Tc}$ labeled agents are most useful, respectively.