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Renal microcirculation and autoregulation play very important roles in the pathogenic resolution of essential hypertension. In order to refine the diagnostic possibilities employing renography to establish renal involvement in essential hypertension, we have developed a concise method of exercise renography utilizing temporally spaced double doses of Tc-99mDTPA and have moreover quantitatively evaluated the renographic data by deconvolution analysis.

There were weak correlations between Peak Times (r=0.61), T1/2 values (r=0.38) and Mean Transit Times (r=0.64) but significantly strong correlations between Ho values (r=0.96; p<0.001) on 1st and 2nd testings with half an hour's interval and without intervention. During renography with exercise, a strong correlation was also found between the Ho values at rest and those during exercise (r=0.78; p<0.01) in the normal group, but the essentially hypertensive group presented with various responses of Ho during exercise in comparison with values at rest.

The applicability of these results is bifold, firstly in that it has indicated that renal microvasculature exhibits multifarious responses during exercise in essentially hypertensive patients, and secondly in its investigatory applications to the hypertensive patient.

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We have attempted to evaluate pre- and postoperative renal function in patients with ureteral calculi by the dynamic renoscintigraphy using Tc-99m DTPA.

This study was performed in 36 patients. For the dynamic renoscintigraphy, 10 mCi of Tc-99m DTPA was injected intravenously as a rapid bolus, and sequential images of the kidney were recorded by using a gamma scintillation camera and on-line microcomputer system. The parameters of the renal function were calculated from the serial images and the dynamic curves of the radio-activity (r).

Postoperatively, the renal function of the affected kidney became normal in 9 patients and improved in 21 patients. The IVU showed moderate to marked improvement in 28 of 30 patients. A normal IVU was obtained in 17 patients, but the renoscintigraphy showed decreased renal function in 12 of these 17 patients.

In conclusion, it is suggested that the Tc-99m DTPA dynamic renoscintigraphy is superior to the IVU in evaluating pre- and postoperative renal function in patients with ureteral calculi.

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In the previous meetings of this society the result on I-131-OIH was reported. The paper reported here was that of simultaneous injection of Tc-99m-DTPA and I-131-OIH.

GFR was calculated as follows, 

\[ \text{GFR} = \frac{1.5 \times 2.5 \times \text{cpm} \times 96 \times 100}{30 \text{ min. bladder excretion rate (cpm) \times 3.7} \text{ (ml/min)}} \]

where k=1 in the case of the right kidney and k=2 in the case of the left kidney.

Y: kidney depth, Z: bladder depth 

GFR was devised to each single kidney by the right to left ratio of 1.5-2.5 minutes cpm on the renogram. The correlation between R and B of the single kidney was good (r=0.834547).

H(1) and MTT was calculated from the curves of renal and aortic activities by deconvolution using matrix argolism. H(1) showed a good correlation with the single kidney GFR(B). MTT was considered to be increased as the kidney function decreases, excluding M2-like Type cases.

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The split glomerular filtration rate (GFR) was measured by the fractional renal uptake of Tc-99m DTPA within 2 to 3 minutes following radioisotope arrival into the kidneys, according to the method of Gates (Clin.Nucl.Med. 8: 400-406, 1983).

The radionuclide computed GFR was correlated well with sodium thiosulfate clearance determination (r=0.864, p<0.001) as well as 24-hour creatinine clearance determination (r=0.875, p<0.001). And the radionuclide computed GFR was also examined for the evaluation of split renal parenchymal function, in comparison with Tc-99m DTPA renogram pattern and renal parenchymal uptake degree of Tc-99m DTPA.

In the cases with normal renogram pattern and/or normal renal uptake, the split GFR showed the values over 30 ml/min. In the cases with hypofunctioning renogram pattern and/or low renal uptake, on the other hand, the split GFR showed the values under 30 ml/min. In the present study, the split GFR determination was found to be a useful and reliable method for the quantitative evaluation of split renal parenchymal function.