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ESTIMATION OF THE EXERCISE RENOGRAPHY IN ESSENTIAL HYPERTENSION USING DECONVOLUTION ANALYSIS. Y. Kubota, K. Miyao, T. Mineo, Y. Okajima, S. Kusuoka, T. Okada, M. Murata, H. Kotera, T. Yamada, M. Yamashita and M. Hosoba. Kyoto Second Red Cross Hospital, Kyoto Prefectural University of Medicine and Shimazu Corporation, Kyoto.

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 ($r=0.61$), $T_{1/2}$ values ($r=0.38$) and Mean Transit Times ($r=0.64$) but significantly strong correlations between H_0 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 H_0 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 H_0 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 investigative applications to the hypertensive patient.

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PRE- AND POSTOPERATIVE EVALUATION OF RENAL FUNCTION IN PATIENTS WITH URETERAL CALCULI BY THE DYNAMIC RENOSCINTIGRAPHY USING Tc-99m DTPA. N.Hirao, H.Washida, M.Tsugaya, Y.Hachisuka, F.Tanaka, H.Fujii, T.Fukushima and T.Matsubara. Anjo Kosei Hospital, Anjo.

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.

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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ESTIMATION OF GFR AND ERPF FROM RENOGRAMS USING Tc-99m-DTPA AND I-131-OIH. M.Maeda, R.Hasegawa, S.Tanaka, H.Yoshida, JNR Osaka Hospital, Osaka

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,

$$1.5-2.5 \text{ min. GFR(R)} = \frac{1.5-2.5 \text{ min. cpm} \times 2.96 \times 100}{\text{injected cpm} \times e^{-0.135 \times Y}} \times 3.7 \text{ (ml/min)}$$

$$30 \text{ min. bladder excretion GFR(B)} = \frac{30 \text{ min. bladder cpm} \times 100}{\text{injected cpm} \times e^{-0.135 \times Z}} \times 3.7 \text{ (ml/min)}$$

Y: kidney depth, Z: bladder depth
GFR(B) was divided to each single kidney GFR by the right to left ratio of 1.5-2.5 min. 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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MEASUREMENT OF SPLIT GLOMERULAR FILTRATION RATE BY FRACTIONAL RENAL UPTAKE OF Tc-99m DTPA. T.Aburano, T.Takayama, K.Nakajima, N.Tonami, K.Hisada, M.Yamada, Y.Iida, K.Kawamura, M.Matsudaira and Y.Miyazaki. Kanazawa University, Kanazawa and Noto General Hospital, Nanao.

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 radio-nuclide 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 30ml/min. In the cases with hypofunctioning renogram pattern and/or low renal uptake, on the other hand, the split GFR showed the values under 30ml/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.