A. Ishibashi and J. Kurokawa, Keio University, Sagamihara.

Tc-99m-DTPA renoscintiphoto in renal-vascular diseases was studied. The subjects were 61 cases consisting of aneurysm, reno-vascular hypertension etc. As instrumentation for this study, Nuclear Chicago LFOV type camera were used, and 5 to 10 mCi of Tc-99m-DTPA was injected rapidly.

In this study, we investigated the clinical usefulness of renoscintiphoto for renal-vascular disease comparing with arteriography. Regarding to the cases of hypertension, the difference of perfusion of both sides was examined by image itself, region of interest (ROI) and the value of first pass, calculating with Hillson's methods.

Consequently, Tc-99m-DTPA renoscintiphoto is useful to diagnose and to follow up the cases of aneurysm, especially in the case effecting renal-vascular flow.

The value of first pass is also useful like as ROI and image itself for screening study of hypertension.

Estimation of GFR was estimated from fractional rate (FRU) of Tc-99m-DTPA using the gamma camera-digital computer system with attenuation correction for kidney depth. Forty-eight patients were studied, in whom 24 hour creatinine clearance (Ccr) were concomitantly obtained within a week of the study.

Attenuation corrected total renal counts at various time intervals after tracer injection were obtained by ROI selection over renal scintigram followed by background subtraction and depth correction to compensate for gamma ray attenuation by the soft tissues. Our formula for determining kidney depth, obtained by ultrasonic scanning, is shown as follows.

Right kidney depth = 16.55 x W/H + 0.66
Left kidney depth = 17.05 x W/H + 0.13

Attenuation corrected total renal counts was divided by injected dose measured by the gamma camera and thus FRU was calculated.

FRU at 1-2 min. was best correlated with Ccr (r=0.925, p<0.001). The formula for calculation of GFR was derived from the regression analysis.

GFR = (FRU at 1-2 min.) x 6.26 + 3.10

This method is highly valuable for estimating GFR rapidly and accurately.


We proposed a non-invasive method for measuring fractional cortical flow to the total renal blood flow by using deconvolution analysis of I-123-OIH data and applied it to the cases with essential hypertension. To determine the transfer function, the direct operational method proposed by Yamamoto was employed. And for the subtraction of blood background, we used the single injection method by Rutland et al. The mean percent cortical flow in 11 normal subjects was 75.5±6.7%. On the other hand, in 19 cases with essential hypertension, the values were reduced in proportion to the severity of the disease. This suggests there is mainly reduction of cortical blood flow in hypertensive nephropathy. Consequently, it was thought this method was useful for analysis of intrarenal flow distribution.