Clinical Evaluation of Functional Imaging of The Kidney Using $^{131}$I-Hippuran

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We have previously reported clinical studies on the functional imaging of the kidney mainly applied to renal obstructive diseases. Present study is devoted to clinical evaluation of hypertensive patients.

Eleven patients were studied including 9 cases of essential hypertension, one Conn's syndrome and one renovascular hypertension. All of these had the blood pressure of more than 150/90 mmHg. Those patients were not included in this study in whom hypertension appeared secondary to nephritis.

According to clinical findings, these patients were divided into two groups. Namely, A group had any definite evidence of renal parenchymal disease, while B group had no evidence of parenchymal disease as diagnosed by renal function tests and selective renal angiography.

Following intravenous injection of 350 $\mu$Ci of $^{131}$I-Hippuran, 60 sequential frames were collected at one per 20 seconds in a frame mode with 64 x 64 matrix. Each of 5 parameters, as reported previously, including $T_{max}$, $T_{1/2}$, $T_{2/3}$, up-slope and down-slope was calculated on all the elements of matrix and displayed as density of brightness on an image.

All patients classified into A group showed very irregular distribution in $T_{max}$ view which was attributed to multiple focal areas with variously prolonged $T_{max}$ values. All other parameters showed more or less the same irregular distributions respectively. In contrast, those classified into B group showed diffuse distribution of the calculated values ranging within normal limits for any of the parameters.

In a patient with renovascular hypertension, affected kidney had prolonged but diffusely distributed $T_{max}$ before operation and recovered to normal after operation. On the other hand contralateral kidney had prolonged and irregular $T_{max}$ in both before and after the operation, suggesting preoperative evidence of nephrosclerotic change.

It was highly expected that our functional imaging is valuable for the evaluation of nephrosclerotic change in hypertensive patients.