

QUANTITATIVE ASSESSMENT OF RENAL VASCULAR DISEASES  
WITH TECHNETIUM-99M DTPA AND IODINE-131 HIPPURAN  
DYNAMIC STUDIES

Tsunehiko Nishimura, Toru Kashiwagi, Kazufumi

Kimura

National Cardiovascular Center, Osaka University  
Hospital

To evaluate blood perfusion and renal function in renal vascular diseases, double isotope methods with DTPA and Hippuran were developed using an Anger camera and on-line minicomputer system. DTPA sequential image were recorded on a computer as one-second frame of digitalized data for two minutes. Then, hippuran sequential images were obtained in the same manner as twenty-second frame for twenty minutes. From these data, a dynamic curve in each element of the digitalized image was extracted, which expressed blood perfusion and renal function, were calculated to display as parametric maps. These procedures were performed clinically in 40 cases of renal vascular diseases such as renal infarct, renal hypertension and so on.

(1). For DTPA dynamic study, there is remarkable prolongation of the mean transit time in the ischemic area in comparison with normal area. The functional image of Up Slope which reflects blood perfusion was demonstrated as low index in the impaired portion. This method is useful for the follow up of renal parenchymal change in the case of hydro-nephrosis, renal hypertension.

(2). For Hippuran dynamic study, significant delay of T<sub>max</sub> and increase of the number of compartments were demonstrated in the image of the impaired portion which reflected the prolongation of the tracer in the kidney. In generally, this portion was expressed as defect area in the image of Up Slope according to the low accumulation of the tracer in the kidney.

In conclusion, from these combined methods, the size and degree of renal parenchymal change were estimated quantitatively by the functional images. And, functional images were in good agreement with the angiographical findings noninvasively.

The measurement of individual renal blood flow using <sup>131</sup>I orthoiodo hippurate and computer in children

Haruo Ishida\*, Akio Jujo\*, Yasuo Ito\*, Noriyuki Ihara\*  
Shoichiro Kamagata\*, Michihiko Inoue\*, Kazuhiko  
Ohmori\*\*, Masao Ito\*\*, Senichi Takeyoshi\*\*, Katsumi  
Ishii\*\*\*, Kiyoshi Kume\*\*\*\*

\*Department of Surgery, \*\*Department of Radiology,

Tokyo Metropolitan Kiyose Childrens Hospital.

\*\*\*Department of Radiology, Kitasato University

\*\*\*\*Shimazu Seisakusho Co., Ltd.

The measurement of individual renal blood flow is helpful in the clinical management in children. For this reason <sup>131</sup>I orthoiodo hippurate have been used to estimate the essential renal blood flow in our hospital.

Our method of the measurement of total renal blood flow using computer was reported on the 16th meeting of this society.

On this meeting the method and clinical results of individual renal blood flow were reported. One ml of peripheral blood sample was counted 50-60 minutes after the injection of <sup>131</sup>I Hippuran for measurement of total renal blood flow by our method. Normal values of total renal blood flow was Ca 10ml/min/kg in neonates and 15-20ml/min/kg in infants and older children.

Individual renal blood flow was calculated from the count ratio of individual kidney by means of integration of individual renograms between 50 sec. to 150 sec. after injection.

The measurement was performed on 36 pediatric surgical cases, ranging in age from 3 days to 16 years old. Most cases did not show much difference of blood flow between the right and the left kidneys.

Unilateral decrease was observed in a Neuroblastoma case of post-operative irradiation, a case of renal failure by G-6-P-D deficiency and two cases of heart failure by cardiac anomalies.

We concluded that this method is safe and reliable from new born period and its value correlated well with clinical evaluation.