They consisted of parenchymal dysfunctions produced. The peak count, the peak time, and the half peak time were selected as the parameters of functional images. With the use of the regional renograms, early dysfunctions of kidneys were classified in 3 types. They consisted of parenchymal dysfunctions, excretory system dysfunctions and dysfunctions in both systems. The regional renograms with I-123-Hippuran seemed to promise the great clinical usefulness.

Diuretic renography assisted with Lasix was performed in 44 cases with obstructive uropathy. The procedure was done in four steps: (1) hydration with an intake of water 10 to 20 minutes before the examination, (2) non-diuretic (regular) dynamic renal scan with 99mTc-DTPA for 20 minutes. (3) Voiding and (4) post-voiding diuretic dynamic renal scan followed an i.v. injection of Lasix (0.4-0.5mg/kg, Max 20mg) at 2 minutes for 15 minutes. Quantitative analysis of the time-activity curves which were obtained from data stored as 64x64 matrix per frame of 10 seconds during imaging was simultaneously performed on a computer system.

Most of Kidneys showed a prompt linear, monocompartmental excretion in a semi-logarithmic scale after the administration of diuretics. Mean half time (D-T1/2) and S. D. of diuretic excretion in normal Kidneys was 4.4±2.73 minutes and reactive duration 2.0±1.23. The excretion pattern of these diuretic renograms showed four different groups, (I) linear decrease with D-T1/2 under 10 Min., (II) linear with D-T1/2 between 10 to 20 min. (III) linear with D-T1/2 over 20 Min. and non-linear and (IV) flatt or elevated excretion.

We tried to estimate "in vivo" renal cortical volume using Emission Computed Tomography(ECT). 4mCi of Tc-99m-DMSA were given intravenously and 3 hours later, transaxial tomogram was taken using a rotating gammascinticamera, Maxicamera-4000(GE). Transaxial tomographic slices were reconstructed through PDP 11/60 computer(DEC) by means of the convolution method. Each slice had 64X 64 matrices (m(x)) with the depth of 12mm (d). S indicates the area of a matrix. Renal cortical volume(V) was calculated from the following equation: V=S∫m(x)·x·d·d(x).

Phantom studies revealed that the most reliable cut off level was 51%, comparing to the maximum count. In the healthy kidney(n=15), cortical volume ranged from 142 ml to 283 ml. Average volume was 201 ml in the right kidney and 181 ml in the left. There was a positive correlation between renal cortical volume and DMSA renal uptake(r=0.705 p<0.001). There was a positive correlation between renal cortical volume and an area of body surface(r=0.462 p<0.001).

In conclusion, renal cortical volume estimated using ECT may demonstrate a new concept of a functioning volume of the kidney since DMSA preferentially accumulates in the renal cortex.