DETERMINATIONS OF EFFECTIVE RENAL PLASMA FLOW AND GLOMERULAR FILTRATION RATE BY FRACTIONAL RENAL UPTAKE.

The total and split effective renal plasma flow (ERPF) were determined by the modified Schlegel's method of fractional renal uptake of intravenously administered T-131 hipuran, between 1 and 2 minutes following radiotracer appearance in the kidney. After correcting the obtained renal uptake by depth and dose, the ERPF was computed from the significant correlation with paraaminophenuric acid (PAH) clearance (r=0.866, y=16.3x + 61.4). The total and split glomerular filtration rate (GFR) were also determined by the Gate's method of fractional renal uptake of Tc-99m DTPA between 2 and 3 minutes, corrected by depth and dose. The GFR was computed from the significant correlation with sodium thiosulfate (Na-thio) clearance (r=0.847, y=8.77x + 9.68). And total and split filtration fraction (FP) were determined by dividing the GFR with Tc-99m DTPA by the ERPF with I-131 hippuran. The FP of 0.244±0.031 in 22 patients without renal functional impairment was very close to that of 0.249±0.035 determined by the GFR with Na-thio by the ERPF with PAH. The disparities between GFR and ERPF alterations were found among the patients with hypertension following the medical or angioplastie treatment.

THE TRIAL CALCULATION OF THE GFR VALUE FOR EACH KIDNEY USING NMR-CT.

We reported last year in this society about a part of the renal kinetic test method using NMR-CT by Gd-DTPA which is labeled by ourselves. Now this time we tried to calculate GFR values without blood sampling. The changes of Gd-DTPA concentration on relaxation values (1/T1) followed continuously for one to two hours after intravenous injection of Gd-DTPA. All images were obtained by the 0.1Tesla resistive type NMR-CT imaging system (Asahi Mark-J) with T1(300,1000) sequence, in 0.05 mmol/kg Gd-DTPA administered rabbit.

GFR values were calculated from some parameters, time constant of excretory phase in NMR renography, injected dose etc. The calculated GFR values of the control rabbits were about 3 to 4 ml/min and the GFR values of renal dysfunction models showed clearly low values compared with normal case. By the way NMR signal has no scatter photon or attenuation, so it is more suitable to analyze the renal regional dynamic function.

FUNDAMENTAL STUDY OF RENAL DYNAMIC ECT (Deconvolution analysis and functional imaging of Tc-99m DTPA renal ECT) .

We attempted to make an experimental study with rabbits in order to get pathological proof for this phenomenon. Rabbits were dehydrated state and were given Kanamycin and Low Molecular Dextran by intravenous injection. 3 days after the preparation, Tc-99m DTPA renal scintigraphy was performed to them. The scintigram showed ATN pattern as observed in the clinical case. And also pathological examination proved that rabbits kidneys were suffered from ATN. And we investigated the frequency of ATN pattern in renal failure patients. From 1.1984. to 9.1985. there were 11 cases of ATN pattern in 47 acute renal failure patients and 4 cases in 53 chronic renal failure patients.