

Measurement of GFR and RPF Using a Single Injection of $^{51}\text{Cr-EDTA}$ and $^{125}\text{I-Hippuran}$ (3) Comparison of Total Clearance and Renal Clearance

M. TAKASUGI, K. KIMURA, and H. IBAYASHI

*Third Department of Internal Medicine, Faculty of Medicine,
Kyushu University, Fukuoka, Japan*

H. UEMATSU

Department of Computer Science, Kyushu Institute of Technology,

K. NOMO

Department of Electric Engineering, Kitakyushu College of Technology

GFR and RPF estimation using blood disappearance curve after a single injection of $^{51}\text{Cr-EDTA}$ and $^{125}\text{I-Hippuran}$ was evaluated comparing plasma clearance and renal clearance of these isotopes. Plasma clearance of $^{51}\text{Cr-EDTA}$ and $^{125}\text{I-Hippuran}$ were correlated well with correlation coefficient of 0.87, but clearance ratio tended to be low when $^{51}\text{Cr-EDTA}$ clearance decreased below 20ml. However, plasma clearance and renal clearance of $^{51}\text{Cr-EDTA}$ was correlated well with correlation coefficient of 0.97 and plasma/renal clearance ratio of 1.0 over the whole range of renal functions.

This dissociation was investigated by animal experiment. Plasma clearance and organ distribution of $^{51}\text{Cr-EDTA}$ and $^{125}\text{I-Hippuran}$ were studied in nephrectomized rats. Whole body autoradiography showed accumulation in the

liver and then excretion into the intestines 15 to 20 minutes after $^{125}\text{I-Hippuran}$ injection. Organ/plasma ratio of $^{51}\text{Cr-EDTA}$ was not changed throughout 24 hours after injection, however there were accumulation of $^{125}\text{I-Hippuran}$ in the liver and muscle during the first 60 minutes after injection and after 120 minutes these liver, muscle/plasma ratios of radioactivity remained constant showing apparently the equilibrium between plasma and organs. Plasma half disappearance time of $^{51}\text{Cr-EDTA}$ was 8,400 minutes and that of $^{125}\text{I-Hippuran}$ was 3,000 minutes, and plasma clearance was calculated as 0.06ml/min/kg and 0.18ml/min/kg, respectively. Thus, accumulation and organ clearance were estimated very small when compared with renal clearance of $^{125}\text{I-Hippuran}$ giving over estimation of 1 to 10%.