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

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GFR and RPF estimation using blood disappearance curve after a single injection of $^{51}$Cr-EDTA and $^{125}$I-Hippuran was evaluated comparing plasma clearance and renal clearance of these isotopes. Plasma clearance of $^{51}$Cr-EDTA and $^{125}$I-Hippuran were correlated well with correlation coefficient of 0.87, but clearance ratio tended to be low when $^{51}$Cr-EDTA clearance decreased below 20ml. However, plasma clearance and renal clearance of $^{51}$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 $^{51}$Cr-EDTA and $^{125}$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 $^{125}$I-Hippuran injection. Organ/plasma ratio of $^{51}$Cr-EDTA was not changed throughout 24 hours after injection, however there were accumulation of $^{125}$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 $^{51}$Cr-EDTA was 8,400 minutes and that of $^{125}$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 $^{125}$I-Hippuran giving over estimation of 1 to 10%.