clearance and hippuran clearance ($r=0.80$, $p<0.01$, $N=55$). The relationship between thiosulfate clearance and iothalamate clearance was excellent, if blood disappearance curve was recorded up to 180 min post dose. ($r=0.83$, $p<0.01$, $N=48$) Filtration fraction showed a reasonable value, ranging from 0.18 to 0.23 in normal subjects, with a mean $\pm$ SD of $0.10 \pm 0.20$ in patients with chronic nephritis, and $0.17 \pm 0.20$ in those with diabetic glomerulosclerosis. It was concluded that simultaneous measurement of GFR and RPF from disappearance curve has a very useful way of assessing renal function in outpatient clinic.

**Measurement of GFR and RPF using a Single Injection of $^{51}$Cr-EDTA and $^{125}$I-Hippuran, II. Estimation from Theoretical Volumes of Distribution**

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A single-shot urineless technique for the estimation of GFR and RPF is evaluated using $^{51}$Cr-EDTA (1 $\mu$Ci/kg) and $^{125}$I-Hippuran (0.4 $\mu$Ci/kg). The blood clearance curves are observed by serial blood sampling.

Assuming that the plasma disappearance curve of these substances can be described by arbitrary number of exponential functions: $Ct=\sum A_i e^{-kt}$, parameter values of the equation are obtained by digital computer with the peeling method. Then blood clearances are expressed as $G=\int (\text{ Injected RI Dose})/\int_0^t Ctdt$.

Clearances obtained by these computer programs agree closely with those obtained by the manual compartmental analysis. Theoretical volumes of distributions of these substances are calculated from the reciprocal of the plasma concentration. A good correlation is observed between clearances derived from plasma disappearance curve and the total theoretical volume of distribution. The correlation coefficient of $^{51}$Cr-EDTA increases gradually to a maximum of 0.92 between 120 and 140 minutes after injection, while the correlation coefficient of $^{125}$I-Hippuran increases rapidly to a maximum of 0.84 between 30 and 40 minutes after injection, then decreases rapidly. Thus, to estimate GFR and RPF, 30–40 and 120–140 minutes after injection seem to be adequate. For this purpose regression equations between the clearances and the total volume of distribution are established with standard deviation.