III. Kidney

Determination of Renal Glomerular Filtration Rate with 
$^{131}$I-Sodium Iothalamate

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The determinations were made of renal glomerular filtration rate (G F R) by analysis of the external $^{131}$I disappearance curve after the injection of $^{131}$I sodium iothalamate.

After the intravenous injection of about 100 $\mu$Ci of $^{131}$I sodium iothalamate, the external $^{131}$I disappearance curves were recorded for 60 minutes at upper third of sternum, temporal region and heart region, using the scintillation counter equipped with ratemeter and recorder. Furthermore, the serum $^{131}$I concentrations and renal $^{131}$I excretions were determined by well type scintillation counter.

The excellent correlation of half time of the external $^{131}$I disappearance curve at upper third of sternum with that of $^{131}$I disappearance in serum ($r = +0.98$) showed this region was the best to obtain the curve.

The analysis of the $^{131}$I disappearance curve was done by the method of Sapirstein based upon two compartments system.

The direct relationship was observed between G F R calculated from the external $^{131}$I disappearance curve and that obtained from serum $^{131}$I concentrations and renal $^{131}$I excretions ($r = +0.96$).

Thus, the calculation for G. F. R. from the external $^{131}$I disappearance curve was simple and useful method clinically.

Measurements of Renal Function by Double Isotope Technique

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Measurements of renal function were investigated by double isotope technique, namely, renal glomerular filtration with Sodium iothalamate $^{131}$I and renal plasma flow with Sodium iohippurate $^{125}$I.

Method of measurement: $^{131}$I-SI and $^{125}$I-SH were administrated as single rapid intravenous injection (1.0 ~ 1.5 $\mu$Ci/kg body weight) simultaneously and blood is drawn after 3, 20 minutes and plasma value ($P_3$, $P_{20}$) estimated by sample counting method from blood. The decreasing curve of radioactivity in blood was recorded separately by external counting method at the heart during