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 μCi 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 fo 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 iodohippurate ^{125}I.

Method of measurement: ^{131}I-SI and ^{125}I-SH were administrated as single rapid intravenous injection ($1.0 \sim 1.5$ μCi/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