Studies on ^{203}Hg-renal Accumulation Test

K. Ando, M. Furukawa, R. Suzuki, M. Matsushima,
K. Nakayama and H. Matsumoto

Department of Urology, Toho University School of Medicine, Tokyo

Since the renal accumulation curve using ^{203}Hg-chlormerodrin may be considered, during the first 60 minutes, a mere ascending curve, being the renal excretion practically negligible, it seemed to us that the use of ^{203}Hg-chlormerodrin might yield better, and more quantitative results in the detection of unilateral renal diseases.

The technique is similar to the ^{131}I-Hippuran studies. Ten to thirty μCi of ^{203}Hg-chlormerodrin are injected intravenously; larger doses are used if scanning is to be performed subsequently. The count rate of each kidney is recorded continuously for first sixty minutes following injection. The results are expressed as the ratio of the count rate at various times (Ct), after injection, to the count rate recorded five minutes (C5) after injection (Ct/C5).

We performed this test in sixteen cases of normal persons, and obtained normal pattern of ^{203}Hg-Accumulation rate curve, and discussed some cases of various renal diseases such as hydronephrosis, tuberculosis of the kidney, remaining kidney and chronic nephritis.

The Measurement of Glomerular Filtration Rate with ^{131}-I-sodium Iothalamate and Its Clinical Evaluation

K. Hashimoto, O. Sakai, S. Maruyama, A. Tanaka
M. Oonishi and H. Akagi

Second Division, Department of Internal Medicine, Osaka Medical Coll., Takatsuki
Department of Radiology, Osaka Medical Coll., Takatsuki

Purpose: In the previous meeting of this society, we reported that the glomerular filtration rate of ^{131}I-sodium iothalamate (^{131}Glofil) was similar to that of thiosulfate. Now Glofil clearance rate (C_{Glofil}) was calculated from the curve of renocystocardiogram (RCCG) in an attempt to evaluate the renal function quantitatively.

Results: 1) Glofil clearance rate showed an excellent correlation to the quantitive renal function test with the coventional method. 2) RCCG's curves were analyzed to obtaine urinary excretion U(t) and plasma concentration P(t) in time course, and Glofil clearance value in time couse ($t_1 \sim t_2$ C_{Glofil}) were calculated to the following formula,

$$t_1 \sim t_2 C_{Glofil} \doteqdot \frac{U(t_2)-U(t_1)}{\int_{t_1-a}^{t_2-a} P(t)\,.dt} \cdot \frac{K_u}{K_p}$$

where, K_u: cystogram coefficient
K_p: cardiogram coefficient
a : appearance time on urinary bladder.

3) As the result, a good correlation was found between $t_1 \sim t_2$ C_{Glofil} and C_{Thio}. The correlation coefficient of 5′~10′ C_{Glofil}, 10′~20′ C_{Glofil} and C_{Glofil} were 0.72, 0.92 and 0.83. respectivitly, but the Glofil clearance rate decreased with the lapse of time after single injection. And also the correlation coefficient of 5′~20′ C_{Glofil} and 5′~30′ C_{Glofil} were 0.93 and 0.96 respectivitly. and average Glofil to Thiosulfate clearance ratio were 1.00±0.18 (1S.D.) and 0.95±0.17 respectivily.

Conclusion: The accuracy and simplicity of this method indicates its usefull in the area of glomerular filtration studies.