60 minutes directly after injection, corresponding with the position of two energy windows which are defined as follows: (a) window “A” is 364.5 ± 5 KeV in 131I and (b) window “B” is 27.4 ± 5 KeV in 125I.

These obtained decay curves of 131I and 125I were plotted on semilogarithm graph individually and are analyzed in two exponential components which consists of early rapid slope (X) and late slow slope (Y), then half decreasing time (T½) is obtained from 0.693/T½. Then Y-slope is moved paralleled on plasma value P20 and the value t = 0 on spindle is considered as A. The value after retracting 3 minute value on Y-slope from P3 is plotted, then X-slope is moved on it and the value of t = 0 is B. The value of γ1, γ2, A and B are induced into formula (1) and C is estimated.

Where C is plasma clearance of 131I-SI or 125I-SH, 6I equals injected radioactivity dose of 131I or 125I.

This method of calculation has been utilized by Sapristein and co-workers.

Moreover, on the occasion of sample counting of plasma containing both isotopes, the amount of 125I corrected by the expression (2). Where “A” is total counting rate in window “A”, “B” in window “B”, (A) counting rate of 131I in window “A” and (B) counting rate of 131I in window “B”.

Results: This double isotope method was done in 12 cases of healthy and patients with various kidney lesion and were compared to the single intravenous injection method using thiosulphate and Sodium hippurate, done at the same time.

Conclusion: Measurements utilized 131I and 125I labeled compounds seems as useful clinical examination of GFR and RPF, espicially without catheter urine collection and multiple venepunctures.

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Separate Renal Function Test By 197Hg-Chlormerodrin

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We, already, described the usefulness of the 203Hg-Chlormerodrin renal accumulation test, and over 170 patients with various renal diseases was examined.

However, the major disadvantage of this test is relatively long retention of the 203Hg-Chlormerodrin, and massive radiation dose to the kidney.

For this reason, it is difficult to study this technic repeatedly.

Then, we considered the utilization of the 197Hg-chlormerodrin for accumulation test instead of 203Hg-chlormerodrin.

1) Investigation of renal retention and excretion of 197Hg-chlormerodrin was carried out in unilateral nephrectomized dogs. Externally measured renal radioactivity reach a peak 2-5 hrs after injection, following this there was a rapid decline in renal radioactivity.

2) The renal excretion curve can be broken down into two components: initial rapid excretion and subsequent slower excretion phase. The initial rapid excretion phase is of such duration that effective half life in the kidney is 0.6 ~ 0.8 days, as same as 203Hg-chlormerodrin, and in slower excretion phase, effective half-life is less than 3 days, whereas the effective half-life of 203Hg-chlormerodrin is around 14 days.

Thus it is better to use the 197Hg-chlormerodrin for accumulation test in the case of renal diseases which should be examined renal function repeatedly.

3) We reported the 19 yrs female patient with congenital hydronephrosis, examined pre-operative and post operative renal function with this technic repeatedly, and emphasized that the 197Hg-chlormerodrin accumulation test is useful if we needed the investigation of the renal recovery after prolonged ureteric obstruction.