

Clinical Application of the Simultaneous Measurement of Radiocardiogram and Renogram with Double Tracer Method

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In order to evaluate the cardiorenal function of hypertensive patients and cardiac patients, especially of patients with congestive heart failure, and as a screening test for hypertensives, we developed a new method to record the radiocardiogram(RCG) by ^{131}I -HSA and the renogram by ^{125}I -Hippuran simultaneously.

We presented this method at the 10th annual meeting of the Japanese Society of Nuclear Medicine in 1970.

RCG and renogram are analysed respectively with the analog simulator according to the analog simulation methods by Kuwahara and Hirakawa, as a consequence, we can calculate cardiac output(CO), heart volume(HV), renal plasmaflow(RPF), 25 minutes urinary excretion ratio of ^{125}I -Hippuran and so forth.

30 μci of ^{131}I -HSA and the same dosis of ^{125}I -Hippuran are mixed in 1 ml of saline solution and are injected into the cubital vein by a shot injection. 8 minutes later, blood sample is extracted from another cubital vein to calculate the blood volume. The patients drink 500 ml of water before the test, and urine is collected after 25 minutes.

A long focus scintillation counter with 3 \times 2 inch NaI crystal is placed vertically to the breast at the left sternal border of the 4th intercostal space to record RCG.

A pair of scintillation counter with 2 \times 2 inch NaI crystal are placed vertically to the lum-

ber region at the maximal point of radio activity.

As a screening test, we examined 283 patients with hypertension and as the result we detected the patient with kidney cancer, myoma uteri, primary aldosteronism and so forth, besides many patients with renal function disturbance.

We also use this method to evaluate the effect of antihypertensive drugs in hypertensives. In adequate effect of the treatment, the renal plasma flow to cardiac output ratio (RPF/CO) was not changed, whereas in an inadequate case, RPF and RPF/CO decreased.

In patients with labile hypertension, some of them showed higher RPF, RPF/Co and 25 minutes excretion ratio of ^{125}I -Hippuran than normals.

In case of congestive heart failure with mitral stenosis treated with Digoxine, stroke volume, stroke volume to heart volume ratio (SV/HV) much increased, and circulating blood volume and mean circulation time of the left heart much decreased, as the improvement of the cardiac function. Whereas RPF, RPF/CO and the urinary volume much increased as the subsequent phenomenon of the improvement of the cardiac function.

As mentioned above, this method is very useful for screening and for the evaluation of the cardiorenal function.