

Studies of Radiocardiograph: Analysis of R-wave and the Estimation of Residual Blood Volume in Right Heart

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1. Scintillation counters (two of 2×3 , and two of 2×2 inches NaI xtals), 4 fracks, 4 channels, tape recorder and 2 pen recorder were used for radiocardiograph (RCA) by external dection of ^{131}I human serum albumin (Risa) injected intravenously.

2. From the geometrical difference of these counters to the heart, "pure R-wave" or right heart curve in radio cardiograph was derived by electrically substracting the output of the counter placed on left side of the heart from the one on the middle of the heart.

3. After plotting the down slope of the right heart curve on semilogarithmic paper, removal rate of Risa from right heart was obtained, and the cardiac out put per one stroke was also carculated from RCG.

The residual blood volume in right heart

was determined from these data.

4. By using ^{131}I macroaggregated albumine, and by angiocardigraphy the "pure R-wave" was proved to be the right heart curve.

5. Right heart curves of 19 normal cases, 13 of patients with atrial or ventricural septal defect, 9 of mitral stenosis, and 15 of Fallot's tetralogy were studied. Prolonged down slopes of right heart curves were found in patients.

6. The values of residual blood volume in right heart, and ratio of cardiac out put per stroke/residual blood volume in right heart were $77.4 \pm 15.9 \text{ ml/m}^2$, $67.2 \pm 20.0\%$ in normal cases and $110.3 \pm 51.5 \text{ ml/m}^2$, $32.3 \pm 17.9\%$ in patients with mitral stenosis.

7. The right heart wave was useful in programing of radio cardiography.

Radiography by Using Radioactive Oxygen and Carbon Dioxide

(The First Report)

(The Apparatus and the Measuring Method)

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Development of the external isotope method for measuring cardiac and pulmonary function contributed to cardiology and particularly to the study of abnormal caripulmonary physiology. But in Japan, it is not popularized to use the radioactive gases for the purpose of those studies.

This presentation was described about the apparatus and measuring method for the radioactive O_2 and CO_2 as results of studing

in 45 patients (17 of heart disease).

We used oxygen-15, which had a half-life only two minutes and was produced continuously in the Institute of Physical and Chemical Research cyclotron by deuteron bombardment of nitrogen molecules. The gas was piped to the laboratory where it was diluted with air for immediate use as oxygen or converted to carbon dioxide before dilution.

The apparatus consisted of a rate-meter,