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REPRODUCIBILITY OF LEFT VENTRICULAR PERFORMANCE BY FIRST-PASS RADIONUCLIDE ANGIOCARDIOGRAPHY, USING A MULTICRYSTAL CAMERA; PHANTOM AND CLINICAL STUDIES. H. Seto, R. Futatsuya, T. Kamei, N. Furumoto, Y. Ishizaki, M. Hada, M. Kakishita, T. Sugimoto. Toyama Med. and Pharm. University, Toyama.

We determined the reproducibility of left ventricular performance such as left ventricular ejection fraction (LVEF), end-diastolic volume (EDV) and cardiac output (CO) by first-pass radionuclide angiocardio-graphy (RNAG).

In the phantom study a spherical rubber ball with a 1-mm wall thickness and 7.8-cm internal radius was filled with 6 mCi of NaTc-99mO₄ solution. The projected surface area-total count in image curves were generated at 0, 5, 10, 15, 20 cm from the 1.5-in. crystal camera with or without a sheet of 1-cm thick acrylic plate as a chest wall equivalent absorber. The optimal count thresholds to obtain actual projected surface areas are 1,200 and 2,000 count at 5 and 20 cm respectively. However more than 4,000 count is required at 15 cm if a sheet of the acrylic plate is used.

For clinical study first-pass RNAG was performed twice in RAO projection at 10 min. interval in 26 patients with a bolus injection of 15 mCi of Tc-99m-labeled radiopharmaceutical. Correlation coefficients and mean variabilities (MV) are as follows; LVEF: $r=0.97$, $MV=3.0\pm 1.9\%$, EDV: $r=0.91$, $MV=11.2\pm 7.1$ ml, CO: $r=0.86$, $MV=0.48\pm 0.39$ ml

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EFFECT OF THE RADIONUCLIDE INJECTING TIME ON VENTRICULAR TIME-ACTIVITY CURVE OBTAINED BY THE FIRST PASS METHOD. K. Iwata, H. Shibatsuji, S. Tsutsui, K. Tanaka, K. Kitaba, T. Amesara and S. Hamada. Nara Medical University. Nara.

The gamma variate method and the exponential extrapolation method were compared using cardiovascular dynamic phantom which had variable heart rate and stroke volume. The injected bolus was uniform and the injecting time was 2sec, 5sec, 7sec respectively. We estimated the differences between the recirculation-free area and the areas obtained by the gamma variate method and by the exponential extrapolation method. When the fit was made at 70% of the maximum on the downward slope and the injecting time was 2sec, relative error of the gamma variate method was $-5.2\pm 3.2\%$ and that of the exponential extrapolation method was $4.8\pm 2.6\%$. When the injecting time was 7sec, relative error of the gamma variate method was $26.0\pm 19.3\%$ and that of the exponential extrapolation method was $8.0\pm 6.8\%$. When the injecting time was long, the exponential extrapolation method fitted better than the gamma variate method. But when the injecting time was short, the gamma variate method prevailed.

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EVALUATION OF THE REPRODUCIBILITY AND THE CLINICAL USEFULNESS OF LEFT VENTRICULAR EJECTION FRACTION BY FIRST PASS METHOD. A. KATAYAMA, N. OHGITANI, M. YAMADA. OSAKA PREFECTURAL HOSPITAL. OSAKA.

The left ventricular ejection fraction (LVEF) using first transit analysis (FTA) and multi-interval cardiac analysis (MICA) was measured by the Technicare VIP-460 Video Image Processor 128KW with gamma camera Σ 410S. 11 patients with myocardial infarction and 6 normal subjects were studied. Each study was analyzed three times by the same observer.

The coefficient of variation (CV) in MICA was smaller than 8%, otherwise in FTA the most of CV was smaller than 10%. The correlation coefficient of LVEF by first pass method was 0.87 for multi-gated radionuclide angiography, and 0.92 for contrast angiography. The results of this study indicate that the LVEF by FTA is highly reproducible.

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EVALUATION OF INTRA-PULMONARY ARTERIAL INJECTION FIRST PASS RADIONUCLIDE ANGIOGRAPHY K. Tsuji, M. Naka, H. Arai and M. Shibuya. Hanwa Memorial Hospital, Osaka.

First pass radionuclide angiography (RNA) has been reported to be correlative with contrast cine-angiography (LVG) in the evaluation of left ventricular ejection fraction (LVEF) and its wall motion. It is difficult to evaluate cardiac function in the case of severe dysfunction by the conventional RNA. For the radiotracer injected into peripheral vein is transferred to right atrium, right ventricle, left atrium and left ventricle, but the tracer exists in the right ventricle at the same time in the patients with low cardiac function. Therefore the left ventricle cannot be separated from the right ventricle. In this present study, we demonstrated the validity and usefulness of the radiotracer injection into pulmonary artery in performing RNA using Swan-Ganz catheter. Intra-pulmonary arterial injection first pass radionuclide angiography (PA-RNA) and LVG were performed in 32 cases. In 8 of 32 cases, both PA-RNA and the conventional RNA were performed and compared. The result of comparison of PA-RNA and LVG showed a good correlation, but LVEF calculated by PA-RNA was slightly lower than that calculated by LVG. As regards to LVEF, PA-RNA and the conventional RNA correlated exceptionally. In PA-RNA, the radiotracer is injected into pulmonary artery, therefore the right ventricle is not piled up the left ventricle. As the result of this fact, PA-RNA is applicable to not only the patients with almost normal cardiac function but the patients with extremely low cardiac function.

We conclude that the quantitative evaluation of cardiac function can be done even in the patients with severe cardiac dysfunction precisely by PA-RNA.