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CLINICAL EVALUATION OF LEFT VENTRICULAR EJECTION FRACTION BY FIRST PASS AND MULTI-GATED RADIONUCLIDE CARDIOANGIOGRAPHY. T.Nishimura, Y.Imai, M.Kagawa, M.hayashi, T.Kozuka
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The left ventricular ejection fraction (LVEF) can be measured quantitatively from radionuclide angiography using An Anger camera and on-line minicomputer system. LVEF by first pass method was calculated by the average of three cardiac cycles which corresponded to the left ventricular volume changes during each cardiac cycles, on the other hand, LVEF by multi-gated method was calculated the ratio or SV/EDV counts determined from the left ventricular volume curves. The effects of LV size and background on determination of LVEF were examined on both methods. The findings demonstrated that the time activity curve must be generated from ROI fits LV precisely and must be corrected from the contribution arising from non cardiac structure. First pass EF was correlated well with contrast EF in 20 patients ($r=0.89$) and multi-gated EF was correlated well with contrast EF in 50 patients ($r=0.902$). Then, First pass EF and multi-gated EF has simple correlation coefficients of 0.87. In conclusion, these noninvasive methods appear particularly useful for serial evaluation of cardiac patients.

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EVALUATION OF LEFT VENTRICULAR FUNCTION AT CARDIAC PACING BY MULTI-GATED RADIONUCLIDE CARDIOANGIOGRAPHY. T.Nishimura, T.Uehara, T.Kozuka, Y.Kosakai, Y.Kitoh, T.Fujita, T.Oa
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In recent year, with the development and use of programmable pacemakers, there has been a growing need for a method to measure the hemodynamic effects of changes in pacer parameters. The parameters calculated from multi-gated and dye methods were cardiac output, enddiastolic volume, endsystolic volume, stroke volume and ejection fraction. The relative SV counts determined from edge extraction of ED, ES images were good correlation with stroke volume by dye method.

4 patients of complete A-V block treated with programmable pacemaker were studied at various heart rates (30-120/min) by these methods. According to the increase of heart rate, rate-output curve showed the flat type. EDV, ESV, SV were decreased gradually and EF was unvariable in all cases.

In conclusion, left ventricular function at ventricular pacing by increase of heart rate were mainly determined from the decrease of EDV caused by the shortening of filling time of left ventricle, therefore, other parameters were changed by the contractility of myocardium and Starling's law of cardiac function.

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COMPARISON OF VENTRICULAR FUNCTION BETWEEN THE FIRST PASS METHOD AND THE EQUILIBRIUM METHOD. E.Ohtake, M.Iio, H.Murata, H.Toyama, M.Noquchi, S.Kawauchi, K.Chiba, H.Yamada, Y.Kobayashi and K.Matsui. Tokyo Metropolitan Geriatric Hospital and Yokohama City University School of Medicine. Tokyo and Yokohama.

Left ventricular ejection fraction (LVEF) and ventricular wall motion obtained by the first pass method were compared with those by the equilibrium method.

Materials and Methods: Thirty cases (11 normal volunteers, 13 myocardial infarctions and 6 others) were examined. Used unit was Pho/Gamma V (Searle) with parallel hole collimator and Pho/Gamma LFOV (Searle) with bilateral collimator was partly used. In the first pass method, all cases were observed from RAO and a few cases were observed from LAO at the same time. The equilibrium method was performed from LAO in all cases.

Results: LVEF obtained by the first pass method from RAO had good relations with LVEF obtained by the equilibrium method ($y=1.02x-3.86$, $r=0.92$). In the first pass method, LVEF from LAO was less than LVEF from RAO, probably due to the overlap of the aorta. About the ventricular wall motion, first pass method from RAO could detect the asynergy of anterior wall, inferior wall and a part of posterior wall. Equilibrium method was suitable to observe lateral wall and septum.

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ARTIFACT BY RESPIRATORY MOTION ON ASSESSMENT OF LEFT VENTRICULAR FUNCTION USING EQUILIBRIUM CARDIAC BLOOD POOL SCINTIGRAPHY. H.Wakamatsu Y.Wakamatsu, M.Kido, T.Takada, T.Ashie and M.Furudate. Nippon Steel Corporation Muroran Works Hospital, Wakamatsu Musen and Department of Radiology, Hokkaido University School of Medicine. Muroran, Ebetsu and Sapporo.

A conjunctive gated method (COG) which yields both respiratory and ECG synchronized images (RESIM) and a respiratory synchronized (RES) region of interest technique (RESROI) which assessed left ventricular curve (LVC) in consideration of respiratory motion (REMO) has been developed using a minicomputer system and an expiratory trigger trial device. Measurements were made at rest, immediately after supine bicycle exercise and 10 minutes after it utilizing LAO view with a gamma camera following in vivo Tc-99m (15-20 mCi) blood pool labelling. REIM were reconstructed by COG as both RE gate (200 msec) and ECG gate (80 msec) were closed. These images might have showed that only ECG synchronized images were blurred by REMO, and so more after exercise. RESROI was performed by variable ROIs adjusted to changes in RES position of LV images throughout the RE cycle. By this, it might have been proved in normal person that under no consideration of REMO LVC was distorted, and LVEF(%) was assessed more lower as follows:

	at rest	after EX	10min after EX
heart rate	75	120	75
use RESROI LVEF	70	83	71
no RESROI LVEF	73	71	56

These methods may be useful and necessary for cardiac performance study.