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FACTOR ANALYSIS IN GATED CARDIAC SCINTIGRAPHY FOR THE CASES WITH NORMAL LEFT VENTRICULOGRAPHY.

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Factor analysis of dynamic structures (FADS) was applied to the gated blood-pool scintigraphy to evaluate left ventricular wall motions. Twenty-three patients (7 with atypical chest pain, 7 with effort angina, 6 with variant angina, and 3 with paroxysmal ventricular tachycardia) were examined by FADS, and all of the cases were diagnosed as normal left ventricular wall motion by contrast cineangiography. In 16 patients, only one factor ("ventricular factor") was found in the left ventricle (LV). Two or more factors were shown in LV in 7 cases (5 with effort angina, 1 with variant angina, and 1 with atypical chest pain). In 5 cases with effort angina, the abnormal factor showed an abnormal shape in dynamic curve and its location was considered to be reasonable with the findings of the coronary angiography. It was thought that FADS could sensitively extract cardiac functional abnormality. Fourier analysis was also performed in all cases, and it showed slightly abnormal findings in two cases. Factor analysis was tend to be better than Fourier analysis for objective evaluation in the cases with latent wall motion abnormalities.

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A STUDY AND CLINICAL EVALUATION OF A QUANTITATIVE REPRESENTATION METHOD FOR CARDIAC FUNCTIONAL IMAGES.

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Using a histogram technique and control data, we analyzed various cardiac functional images for numerical distribution within the ventricle and determined normal areas. We then studied a quantitative color representation method for abnormal area values and evaluated its clinical applicability.

By setting and displaying four color level which included two intermediate colors for indicating normal area values determined for each functional images, we were able to define abnormal areas more clearly and evaluate them objectively. The functional images studied this time are phase, amplitude regional EF, ejection time, PER, PFR, TPE, TPF, PER/PFR, and TPE/TPF.

Such an image representation method will allow a more quantitative and definite display of abnormal wall motion sites. The data obtained were compared with the results of factor analyses. This representation method provided a clearer definition of abnormal PFR and TPF areas in stenocardiac cases. As for PER/PFR and TPE/TPF images, this method also allowed a more quantitative, discriminating observation of ischemic sites in the infarcted area and its vicinity and of abnormal myocardial contraction sites. These results suggest that this method is clinically effective.

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QUANTITATIVE ANALYSIS OF GLOBAL AND REGIONAL CARDIAC PERFORMANCE IN NORMAL SUBJECTS AND PATIENTS WITH CORONARY ARTERY DISEASE BY REST/EXERCISE RI BLOOD-POOL STUDY.

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Rest and serial exercise (Ex) (25w-75w) gated blood-pool study (Tc-99m-RBC) of 6 normal subjects (N), 5 patients with stable angina pectoris (AP) and 5 with LV aneurysm (LVan) were evaluated in regional LVEF and Fourier analysis using two-order harmonics.

In the patients with LVan, global LVEF increased with Ex and regional EF showed positive responses to Ex. Global LVEF in the patients with AP indicated similar change with normal subjects during Ex and regional EF declined slightly in antero-apical segment, corresponding to stenotic LAD.

Diastolic indexes of regional and global cardiac performance: PFR (peak filling rate), TPF (time to PFR) and standard deviation (SD) of TPF histogram were obtained by Fourier analysis.

Patients with coronary artery disease (CAD) showed significantly lower PFR, longer TPF and higher SD of TPF than normal group, suggesting asynchronous relaxation.

We conclude that regional EF response and diastolic indexes of cardiac performance to Ex provide useful and sensitive information detecting severity of CAD.

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EVALUATION ON FOURIER ANALYSIS IMAGE OF MULTIPLE VIEWS TO DETECT LEFT VENTRICULAR REGIONAL WALL MOTION ABNORMALITIES IN PATIENTS WITH CORONARY ARTERY DISEASE.

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We reported previously the usefulness of Fourier analysis images (FAI) in left posterior oblique (LPO) view at this society last year. In this presentation, we assessed FAI on various views such as anterior (Ant), left lateral (L), left anterior oblique (LAO) and left posterior oblique (LPO) to detect wall motion abnormalities (WMA) in patients with coronary artery disease.

In one vessel disease, antero-septal WMA were demonstrated clearly in LAO view and identified location and size in LPO, L and Ant views. Inferoposterior WMA were demonstrated more clearly in LPO view than in L view and were not recognized in Ant and LAO views. In two vessel disease of left anterior descending and right coronary artery, anterior and inferior WMA were expressed more clearly in either LPO and LAO views than in Ant and L views.

We concluded LPO and LAO views should be taken routinely in cardiac gated pool method and Ant or L views will be added if necessary. For this study the original data with statistical high quality should be obtained.