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VALIDITY OF FACTOR ANALYSIS FOR DYNAMIC STUDY ASSESSED BY CARDIAC PHANTOM AND MATHEMATICAL MODEL. K. Nakajima, N. Tonami, K. Hisada, M. Yamada, M. Matsudaira, T. Sato*, M. Hosoba* and H. Wani*. Kanazawa University School of Medicine, Kanazawa, and Shimadzu Corporation, Kyoto.

Factor analysis (FA) for dynamic study has been introduced in clinical nuclear medicine. However, the factors which affect FA have not been well studied. In this study, mathematical models and cardiac phantoms were generated, and characteristics of FA was evaluated. Generated models are: mathematical rectangular model, two mathematically superposed phantoms of the same shape with different contraction phase, two superposed phantom of the different shape, and two phantoms with simulated asynergy. Two superposed phantoms were well separated by FA. The time-activity curve (TAC) had the shape characterizing its theoretical component. However, quantitative parameters obtained from extracted TAC was affected by the degree of overlap and the estimated number of factors. Physiologic or functional meaning of the factor is important. Therfore, if extracted TAC was considered to be meaningless, it should be excluded. The FA seems to be useful for qualitative pattern recognition; however, we must be careful about the quantitative assessment derived from the extracted TAC.

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STUDY ON FACTOR ANALYSIS OF CARDIAC POOL IMAGE.
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Factor analysis has been available recently in various organ. We applied this method to cardiac pool image in patients with myocardial infarction, angina pectoris, valvular heart disease etc.. Using a scintillation camera (ZLC-7500) equipped with Scintipac 2400 was used to record cardiac pool images. A ECG gated data were collected by 64x64 matrix, and RR interval was divided by 20. Three and four factor analysis were performed. Clinical usefulness was also evaluated.

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DIAGNOSIS OF THE FOCUS OF MYOCARDIAL ISCHEMIA BY THE FACTOR ANALYSIS METHOD. A.Asahara,Y.Mori,T.Ohkubo Y.Watanabe and E.Tamiya. Central Hospital of J.N.R., Tokyo. M.Hosoda,T.Satoh and H.Wani Shimadzu Co. Kyoto

To determine the range and regions of myocardial ischemia and infarction focus is of prime importance in selecting the choice of therapy and deciding on the period for evaluating the prognosis. We developed how to determine the diagnosis by factor analysis of the cardiac dynamic data and examined its usefulness.

We analyzed 3 factors by taking only the left ventricle region from data of the first pass method (RAO 30) and the equilibrium method (LAO 45). We regard the regions of analyzed Hypokinetic Factor as ischemic regions and infarction focus as the regions of the Akinetic Factor. Each factor's usualcalculated area is a two-dimensional territory reglected in a detector. Therefore we suppose the ventricle is the rotationalellipse and corrected sphere. We howed the area of each factor as a percentage of the whole area of the left ventricle and developed the software to proceed with this series of the process. According to this software, 64 percent of cases of angina were shown as the Hypokinetic Factor, so judging the range of coronary arteries and the degree of them, we examined the adaptation of surgical traetment and the effect. Regarding myocardial infarction, 62 percent of these cases indicated both Akinetic and Hypokinetic Factors. Using the software, we obtained effective data for judging the evaluation of the prognosis and to choose the therapies from each region and the range of myocardial ischemia.

Using this software for only the left chamber's analysis has good merits - to observe the left ventricle's moving pattern more accurately, nad to extract each different factor of the chamber's lines, septa, and valve.

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FACTOR ANALYSIS FOR EXERCISE STRESS RADIONUCLIDE VENTRICULOGRAPHY.
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Factor analysis was applied to gated cardiac blood-pool studies to evaluate its detectability of exercise-induced regional wall motion abnormalities (RWMA). Multi-stage supine ergometer exercise was performed in 14 patients with coronary artery disease. Fourier analysis was also applied for comparison.

Abnormal factors other than normal ventricular factor were found in left ventricles of 8 cases before exercise, and in 5 cases of them the area of abnormal factor was expanded as increasing stress. New abnormal factor was appeared during exercise in 6 cases.

Irrespective of symptoms or ST-T changes in ECG, abnormal factors were found in most cases at 50W stress. Factor analysis had higher detectability for RWMA than Fourier analysis at 50W stress. These abnormal factors were visualized in locations corresponding to diseased coronary vessels, and appeared at relatively low level exercise.

Factor analysis was considered to be a useful method for evaluating ischemic heart disease.