VALIDITY OF FACTOR ANALYSIS FOR DYNAMIC STUDY ASSESSED BY CARDIAC PHANTOM AND MATHEMATICAL MODEL. K. Nakajima, N. Tonami, K. Hisada, M. Yamada, M. Matsuda, 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 asynnergy. 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 is important. Therefore, 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.


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 Akinet factor. Each factor's usualcalculated area is a two-dimensional territory reflected in a detector. Therefore we suppose the ventricle is the rotationalellipse and corrected sphere. We hoved 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 treatment 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, to extract each different factor of the chamber's lines, septa, and valve.