A NEW PHASED ANALYSIS USING FOURIER'S TRANSFORMATION OF GATED BLOOD POOL SCINTIGRAM
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Recently, Fourier's transformation is used to analyse the time activity curve of the radioventriculogram as a temporal filter. Each pixel's phase of the 1st harmonics of Fourier's series represents the outline of left ventricular contractile pattern. But the approximated phase of 1st harmonics is easily influenced by ventricular diastolic duration and signal to noise ratio of its image is not so good. As above reasons, it is expected to develop the more precise approximation of ventricular time activity curve. In this study, the following method was used to minimize the influence of the long diastolic duration. The difference of the area surrounded by the original time activity curve of the ventricle and the 1st harmonics fitted to it was measured by using Mincll digital computer (DEC). The cyclic length of the ventricular Fourier transformation was reduced one by one frame and the area difference was calculated at each cyclic length. At the least area difference, the 1st harmonics was most fitted to ventricular time activity curve. By using such a method, cardiac contractile pattern was analysed more precisely in comparison with usually used phased analysis and, in normal subject, resolution of the phase image was less than 15m seconds.


We reported the reliable left ventricular phase analysis of a long axis view for the regional wall motion evaluation. In this study, we compare the results of this method, those of movie observation, regional wall motion image and phase analysis in LAO view. In 22 normal and 26 abnormal cases diagnosed by contrast left ventriculography, 20 mCi of Tc-99m pertechnetate was injected and serial images of cardiac cycle were taken in anterior view using a multicrystal gamma camera. In 37 cases, LAO study was followed within 1 hr.

The sensitivity of movie observation was highest for wall motion abnormality. However, the combined study of phase image and regional wall motion image was as sensitive as movie observation.

Phase image in ANT view was better than LAO view to localize the lesion. And standard deviation of the left ventricular phase histogram in ANT view in normal group was significantly lower than LAO view.

From above results, phase analysis in ANT view is clinically useful method for regional wall motion assessment in ischemic heart disease.