Right ventricular ejection fraction (RVEF) was assessed using first-pass radionuclide angiography in 10 normal subjects and 30 patients with right ventricular overload including atrial septal defect (ASD), mitral valve disease (MVD), primary pulmonary hypertension (PPH) and mitral valve disease with tricuspid regurgitation (MVD + TR). RVEF was significantly lower in patients with MVD + TR than in normal subjects (0.58 ± 0.10), but there was not a significant difference of RVEF between the patients with ASD and normal subjects. RVEF inversely correlated in all patients with pulmonary arterial systolic pressure (PASP). In patients with pure mitral stenosis (MS) and PPH, right ventricular end-diastolic volume ratio (EDVR) was significantly higher than in normal subjects, and correlated with PASP. With operation, RVEF increased significantly in patients with MVD and MVD + TR, but it decreased in patients with ASD. And then EDVR decreased significantly in patients with MS. In conclusion this technique is useful for evaluation of right ventricular function.

Fourier analysis method for multigated myocardium images was developed and evaluated for a normal control and a hypertrophic cardiomyopathy (HCM). Multigated myocardium images were obtained at 40 msec time interval during about 20 min after 2-4 mCi of Tl-201 chloride solution injection intravenously. The left ventricular myocardium was divided into 12 segments in each frame after automatically edge detection. Time activity curves generated from counts summing in each segment were analyzed by Fourier function. Images of amplitude and phase were displayed with 16 steps color. The high amplitude was shown at the region of good contraction for the normal heart. In a case of HCM, low amplitude was shown inspite of high ejection fraction. This fact indicates that the amplitude is corresponding to the percent wall thickness of the left ventricular chamber. Various two-dimensional dynamic pattern were also generated and their clinical usefulness was evaluated.

To estimate the usefulness of Fourier phase analysis of right ventricular (RV) wall motion (WM) for the detection of proximal right coronary artery (RCA) stenosis, RV ejection fraction (EF) and phase images were analyzed in 48 patients with coronary artery disease, 23 with (G-1) and 25 without (G-2) proximal RCA stenosis, following multigated cardiac blood pool scan at rest (R) and during maximal exercise (Ex). The degree of RVWM abnormality was estimated by standard deviation of phase angles (SDP) within RV. RESULTS: RVEF decreased in 21 of G-1 (91%) and 12 of G-2 (48%) during Ex. SDP increased significantly in G-1 during Ex (11.1 ± 6.2° to 16.1 ± 8.4°, p < 0.01). But in G-2 no significant change in SDP was observed between at R (8.8 ± 2.3°) and during Ex (9.1 ± 2.1°). Abnormal increase in SDP during Ex (ΔSDP > 2.0°) was observed in 17 of G-1 (74%) and in only 3 of G-2 (12%). Specificity (88%) and accuracy (81%) of phase analysis for "threshold" of RVEF analysis (52% and 71%, respectively) in detecting proximal RCA stenosis.

These results indicate that a combined analysis of RVEF and RVWM by phase analysis is necessary in detecting proximal RCA stenosis.