
The clinical usefulness of phase image analysis in evaluating the ventricular activation sequence was investigated in 12 patients with the Wolff-Parkinson-White syndrome and 8 patients with right ventricular endocardial pacemaker. The phase image was performed on multiple gated blood pool scintigrams acquired in left anterior oblique and left lateral projection.

The phase image identified the site of the bypass tract as determined by the electrophysiological study or the location of the pacing electrode. The mean phase angle in the ventricle with the bypass tract or the pacing electrode was significantly earlier than in the other (p<0.01). In 10 patients studied with endocardial mapping, the phase difference between anterior LV and anterior RV regions correlated significantly with the time difference between anterior RV and posterior LV activation in endocardial maps (r=0.89, p<0.001).

In conclusion, the sequence of mechanical contraction assessed by phase image reflected well that of ventricular activation.

APPLICATION OF FOURIER ANALYSIS TO GATED BLOOD POOL TOMOGRAPHY: DETECTION OF THE SITE OF ACCESSORY CONDUCTION PATHWAY. K. Nakajima, H. Bunzo, A. Tada, J. Takl, N. Tomani, K. Hisada, T. Misaki, and T. Iwai. School of Medicine, Kanazawa University, Kanazawa.

Phase analysis of gated blood pool study has been performed in Wolff-Parkinson-White syndrome (WPS) to detect the site of accessory conduction pathway (ACP). We have reported that the side of pre-excitation was correctly identified; however, there were limitations to detect the more precise site of the ACP especially in the left cardiac type. In this study, we applied Fourier analysis to gated tomography. Study group consisted of 19 patients with WPS and 11 control patients without asynomy or conduc- tion anoma. In 13 patients, ACPs were determined by epicardial mapping and the result of surgery. Using 20 mL of To-99m Hg, gated blood pool study were performed in multiple projections (LAO, RAO or L.lat.) seven pinhole tomography (7PT, n=20) and emission computed tomography (ECT, n=10). In 7PT, the site of ACP grossly agreed to the phase image. In ECT, phase images were generated in rotated transverse, sagittal and coronal sections. Although further study is required on this method, ECT was useful to avoid the overlap of blood pool and to understand the three-dimensional progression of contraction.


ECG-gated equilibrium cardiac blood pool scintigraphy in LAO and RAO projection and seven-pinhole tomography were performed in 7 normal subjects (N) and 29 patients with abnormal ventricular activation. Planar, tomographic and surface phase images were constructed using the first-harmonic Fourier analysis in order to presume ventricular activation sequence. Each phase image well demonstrates ventricular activation sequence estimated by ECG and body surface maps in the case of WPS syndrome and ventricular pacing. However, the site of the earliest phase angle did not correspond to the site of onset of ventricular activation in the cases of N, CRBBB and CLBBB. This discrepancy may be caused by paradoxical motion of the upper septum and overlap between atrium and ventricle.

Tomographic and surface phase images showed the phase angle distributions in the right and left ventricle spatially. In conclusion, tomographic and surface phase images using a seven-pinhole collimator were clinically more useful to evaluate ventricular activation sequence than planar phase images.