

Assessment of Left Ventricular Dyssynchrony by Phase Analysis of Gated SPECT: Preliminary Results

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Background: Cardiac resynchronization therapy (CRT) has shown benefits certain group of patients. However, about 30% of them failed to respond to CRT. Recently, phase analysis software has been developed to assess mechanical left ventricular (LV) dyssynchrony from gated SPECT (GSPECT) using the Emory Cardiac Toolbox.

Aims: to apply the toolbox software in consecutive patients referred to GSPECT, define our normal values, secondly, correlate phase measures with various range of LVEF and QRS duration.

Methods: We revised all consecutive patients referred to GSPECT to our laboratory during 3 weeks and applied phase analysis. LV dyssynchrony was measured by phase standard deviation (SD) and histogram bandwidth (BW). Because of poor technical results (for phase analysis), patients who underwent thallium tests, low dose TC99 sestamibi tests, obese patients (>110 Kg) and inadequate imaging quality, were excluded.

Results: 72 patients with high dose TC 99 Sestamibi (40 stress and 32 rest) were recruited for study. Normal controls of SD and BW were defined in patients with EF>50%, normal perfusion and QRS<120, and found to be similar to the literature normal controls. Comparison of phase SD and BW measures among 3 groups according to EF [Table1] and 2 groups according to the duration of QRS [Table 2] are as follows:

| Table 1 | A EF>50% | B EF 35%-50% | C EF <35% | P (A-B) | P (B-C) |
|---------------------|----------|--------------|-----------|---------|---------|
| Number | 52 | 9 | 11 | | |
| Phase SD (Mean±SD) | 17.2±11 | 29.4±14 | 73.1±25 | 0.01 | <0.01 |
| Bandwidth (Mean±SD) | 44.1±21 | 78±43 | 195.3±76 | 0.02 | <0.01 |

| Table 2 | QRS<119 | QRS>120 | P |
|---------------------|---------|----------|-------|
| Number | 57 | 15 | |
| EF (Mean±SD) | 57.7±12 | 41.6±22 | <0.01 |
| Phase SD (Mean±SD) | 21.6±2 | 48.75±27 | <0.01 |
| Bandwidth (Mean±SD) | 52.1±4 | 145±89 | <0.01 |

Conclusions: Normal data base for phase analysis was validated for high dose sestamibi GSPECT, similar to that in the literature. A good correlation was found between LV dyssynchrony, EF and QRS duration.