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Biventricular pacing improves left ventricular synchrony irrespective of AV-delay in patients with congestive heart failure.

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Background: Biventricular pacing (bivPM) in patients with heart failure results in improved left ventricular performance through resynchronization of systolic myocardial contraction. A prolonged AV-delay improves diastolic left ventricular filling but is associated with increased probability of AV fusion beats that may interfere with resynchronization. The relative influence of these two potentially opposing effects is unknown so far. **Aim:** To assess the influence of different AV-delays on left ventricular synchrony and left ventricular ejection fraction (EF) using multigated acquisition radionuclide ventriculography (MUGA).

Methods: In 12 patients with severe congestive heart failure EF and synchrony was assessed without (noPM) and during bivPM at different AV-delays (80ms, 100ms, 120ms, 140ms, 160ms) with MUGA. Synchrony was defined by the standard deviation in the phase-delay within the left ventricle (LV-SD). This was calculated by use of a phase-histogram and expressed as fraction of a 360° heart cycle. EF was compared to LV-SD at the different AV-delays using Pearson Correlation.

Results: see table 1.

Conclusion: bivPM for congestive heart failure improves left ventricular synchrony irrespective of the chosen AV-delay. Left ventricular synchrony is closely related to EF.

Table 1

| A: | | | | | | |
|------------------------------|-------|-------|-------|-------|-------|-------|
| AV-delay of bivPM (ms) | 80 | 100 | 120 | 140 | 160 | noPM |
| LV-SD (°) | 66 | 68 | 67 | 69 | 67 | 76 |
| p-values vs. noPM | 0.006 | .004 | 0.003 | 0.006 | 0.001 | |
| B: | | | | | | |
| correlation of LV-SD with EF | -0.85 | -0.88 | -0.82 | -0.92 | -0.82 | -0.84 |
| p-value for correlation | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | 0.001 |

A: LV-SD was significantly reduced by bivPM at any AV-delay. B: LV-SD was inversely correlated to EF.

9.6

Selection of heart failure patients for cardiac resynchronisation therapy: Could there be a role for equilibrium radionuclide angiography with Fourier phase analysis?

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Background. Equilibrium radionuclide angiography (ERNA) with Fourier phase analysis could be used to identify heart failure patients likely to benefit from cardiac resynchronisation therapy (CRT). We compared phase indices in patients with left ventricular failure (LVF) with a "control group" of patients post orthotopic cardiac transplantation (OCT).

Methods. 138 patients with severe LVF due to coronary disease (CAD; n=19) or dilated cardiomyopathy (DCM; n=45), or who were clinically stable post OCT with (n=28) or without (n=46) LV dysfunction (ejection fraction (EF) >50%) underwent routine ERNA. A left anterior oblique projection was acquired with 32 frames per cycle.

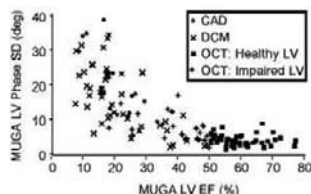
Results. LV phase standard deviation (SD) and interventricular phase difference (RV-LV) increased with increasing QRS duration and decreasing LV EF (Figure). Phase values were low with little variability in normal LV OCT patients, with progressively higher values for impaired LV OCT and LVF patients (Table). There was little overlap between normal LV and LVF groups for SD, but more for RV-LV.

Conclusion. SD and RV-LV increase with increasing QRS and decreasing LV EF, but the scatter implies that independent information is provided. Compared with RV-LV, SD may provide a clearer cut-off for selecting patients for CRT.

Table

| | OCT healthy | OCT impaired | DCM | CAD | P |
|-------------|-------------|--------------|-------------|-------------|--------|
| LV SD (deg) | 4.3 (1.6) | 7.4 (4.7) | 17.3 (9.8) | 20.3 (9.1) | <0.001 |
| RV-LV (deg) | 6.7 (6.7) | 4.3 (9.4) | -2.6 (15.8) | -1.8 (12.0) | <0.001 |

Mean (SD) values of phase indices in different patient groups



Variation of LV phase SD with EF