DEFINING LEFT VENTRICULAR STRAIN WITH SEGMENTAL ATRIAL, RIGHT VENTRICULAR AND LEFT VENTRICULAR PACING CONDITIONS: AN ULTRASOUND VECTOR VELOCITY STUDY

ACC Poster Contributions
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Background: To determine left ventricular (LV) strain alterations with variable LV/RV (right ventricular) pacing conditions we compared LV circumferential (circ), longitudinal (long) and radial (rad) strains, systolic twist and diastolic untwisting in an open chest paced animal model.

Methods: We studied 12 pigs with high frequency/frame rate 2D echo, continuous LV dP/dt measurements and a stepwise variable LV/RV pacing protocol (Baseline SR 70-115bpm; Sequential atrial RV pacing150-160bpm; SR 70-115bpm; Sequential atrial LV pacing 150-160bpm). Ultrasound images (ECG gated) were acquired at transverse basal and oblique apical views to visualize the entire LV cavity wall motion for 6 wall regions and analyzed offline by VVI (Siemens). LV myocardial circ, long, and rad strains, twist, and untwisting were measured in each subject.

Results: At baseline circ strain was m-14.2% ± 6.3%, counterclockwise twist (m-6.7º ± 3.9º) and diastolic untwisting (m-2.3º ± 1.3º). RV sequential pacing showed a significantly lower circ strain (m-10.6% ± 6%, p≤ 0.05), lower systolic twisting (m-4.8º ± 3.4º), and prolonged diastolic untwisting (TTP 850ms, p≤ 0.05). LV pacing showed also a significantly lower circ strain (m-12.7% ± 4%, p≤ 0.05) and systolic twisting (m-5.6º ± 2.8º). Time to peak diastolic untwisting was 350ms across.

Conclusions: In our study, systolic strains and diastolic untwisting were markedly affected by RV pacing.