**MYOCARDIAL VELOCITY IMAGING (DMI) – OTHER**

915 The second regional systolic shortening found in LV lateral wall motion is due to ventricular interaction and should not be used to infer late contraction in this wall when studying LV dysynchrony

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Variations in regional systolic velocity profiles (SVP) have been widely used to assess cardiac dys synchrony. However, regional longitudinal SVP have a non-uniform path. SVP in the septum (SEP) and inferior wall are similar being mono-phasic with an early systolic peak. In contrast, SVP in the anterior (ANT) and lateral (LAT) walls differ, being bi-phasic with two systolic peaks. Thus when assessing the timing of delayed contraction in the ANT and LAT walls it is important to know which each peak represents. Ventricular interaction could be responsible for the early deceleration of the first peak in ANT and LAT wall motion and could explain the bi-phasic systolic pattern. We postulated that early cessation of the first systolic motion and appearance of a second shortening motion in the LAT wall may be due either to a combination of cardiac twisting around the long axis of the heart and interaction with right ventricle (RV) contractility rather than local myocardial shortening. As regional strain rates (SR) but not velocities (VEL) reflect myocardial contractile function we investigated the relationship between regional peak systolic SR and SVP in the RV free wall, SEP and LAT wall.

**Methods:** In 23 normals (age 45.5 ± 2.0 yrs) longitudinal LV SVP and SR were obtained from the basal segments of SR, SEP, and LAT wall. Time to max deceleration of the first peak was measured in the LAT and its relationship to RV peak SVP determined. In addition the time to peak VEL and SR in all walls was calculated.

**Results:** The time of peak SVP in the RV corresponded to the end of deceleration of the first peak in the LAT SVP (0.199 ± 0.03 vs 0.197 ± 0.03 s. p=NS). There was a consistent and significant difference between the time to peak systolic VEL in LAT vs RV (0.130 ± 0.02 vs 0.119 ± 0.03 s, p<0.001) with the SEP peak systolic VEL in an intermediate position at 0.154 ± 0.03 s (p=NS vs RV and LAT). Systolic SR in all walls had a single peak which occurred in early systole with no significant difference between cardiac walls (0.100 ± 0.02; 0.103 ± 0.02; and 0.105 ± 0.02 s in SEP, LAT and RV respectively). The second systolic peak in the LAT wall was not associated with any measurable deformation on the SR curve.

**Conclusions:** This study showed that the early cessation of the first peak systolic VEL and second VEL peak in the LV wall is due to motion induced by RV contraction and does not represent LV contractile function. Furthermore, first rather than second peak in LAT corresponded to peak systolic SR, which reflects true myocardial contraction. Therefore measurement of cardiac synchrony should not be based on VEL but rather on SR profiles.

**HEART FAILURE – RESYNCHRONISATION**

916 Interventricular delay optimization in cardiac resynchronization therapy: Comparison of two echocardiographic methods

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**Background:** There is no consensus on which is the best methodology to optimise cardiac resynchronization devices. The aim of our study was to compare 2 echocardiographic methods to optimise LV programming.

**Methods:** Thirty patients (p) with severe left ventricular (LV) systolic dysfunction and LBBB received CRT. Three VV intervals (LV preactivation at -30 ms, simultaneous biventricular pacing at 0 ms or right ventricular preactivation at +30 ms) were tested evaluating their effect on LV ejection by aortic velocity time integral (VTI measurement) and on LV synchrony evaluated with Echocardiographic method TDI. Aortic VTI was evaluated with PW Doppler and the LV interval that induced the greatest aortic VTI was considered as the optimum by this method. This was compared to the optimum LV interval chosen by LV synchrony assessment considering it as the one that yielded the maximum superposition of the curves of displacement of 2 opposite LV walls evaluated by TDI. The Table shows the distribution of the optimum VV intervals according to both echocardiographic methods. There was a good agreement between them (kappa=0.66, p<0.01).

**Conclusions:** 1. When programming VV intervals in CRT devices, the best intraventricular synchrony results in the best hemodynamic performance in most patients. 2. Both methods could be equally useful to optimise CRT devices.

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<td>Optimal VV obtained with aortic VTI</td>
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917 Comparison among different intraventricular asynchrony indices to predict reverse remodelling after cardiac resynchronization therapy (CRT)

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We compared a new asynchrony index derived from 2D Strain Echocardiography (2DSE) to previous indices to select responders to CRT. We studied 49 pts (age: 66±8 years; M: 88%; F: 12%) in NYHA class III-IV before and after six months of CRT; CAD was present in 44%; QRS duration was 134±8±26 msec. A significant left ventricular reverse remodelling (RR) was defined by a reduction of LVEF>15%, Intraventricular asynchrony was evaluated by three methods: 1) SD of 12 time to peak intervals >3 (Ts-DS); 2) % of basal segments with delayed longitudinal contraction (DLC); 3) From a standard 4 chambers apical view we obtained 2DSE of basal and mid segments of septum and lateral wall. Asynchrony was defined as percent of discordance between the 2DSE curves of septum and lateral wall (GDI) in a single cardiac cycle both for R (Fig. 1a) and for L (Fig. 1b). Six months after CRT in the overall population LVEDV and LVEF respectively decreased from 239± to 213± 73 ml (p<0.008) and from 178±63 to 143± 65 ml (p<0.003) while LVEF increased from 27±7 to 34±10% (p<0.006). A reduction of LVEF was found in 31 (R). A significant linear relationship was found between RR and Radial GDI of the basal segments (r: 0.59; p<0.0005) and mid segments (r: 0.53; p<0.001). No significant relationship was found between RR and both Ts-DS and DLC. A ROC curve showed that radial GDI >0.53 of the basal segments had a sensitivity and specificity respectively of 93.2% and 71% to predict RR. In conclusion our study show that 2DSE is a useful technique to evaluate left ventricular synchrony and that radial asynchrony is a better predictor than longitudinal asynchrony for RR after CRT.

918 Concordance of different echocardiographic methods to assess left ventricular asynchrony

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**Background:** Different echocardiographic methods have been proposed to quantify the presence of left ventricular (LV) dyssynchrony; however, few studies have compared them side by side, so there is no consensus on which, if any, is best. Our aim was to compare 4 methods to describe the presence of LV asynchrony.

**Methods:** Twenty-one patients with LV dysfunction and LBBB (mean QRS 175±23 ms) were studied with Doppler echocardiography. A septal to posterior wall delay >130 ms measured from M-mode scans in the parasternal view was considered as a criterion of LV asynchrony. From 2 and 4-chamber apical views, other 3 parameters derived from of Doppler Tissue Imaging (DTI) were also measured and considered indicative of LV asynchrony: the presence of a) a maximum delay to peak tissue velocity >60 ms in a four segments model (DTI velocities), b) the non superposition of the curves of displacement of the lateral and septal walls and/or the anterior and inferior walls (DTI displacement), c) the non superposition of the curves of strain (with post-systolic contraction) of the lateral and septal walls and/or the anterior and inferior walls (DTI derived strain).

**Results:** Feasibility was 57% for M-mode, 81% for strain and 90% for both velocity and displacement measurements. Prevalence of LV asynchrony was 24% according to M-mode, 57% to DTI velocities, 62% with DTI-displacement and 76% with strain. The best concordance was observed between DTI-velocities and displacement with 16 (76%) coincidences (Kappa 0.66, p<0.01). Concordance between the other methods was not significant despite DTI-velocities and strain had 11 (52%) coincidences and DTI-displacement and strain had 13 (62%).

**Conclusions:** M-mode was the least feasible and sensitive method to detect LV asynchrony. DTI-derived parameters are all useful, being DTI-velocities and displacement more feasible with similar diagnostic ability. Further technological improvements may increase the feasibility of strain which appears to be the most sensitive method to detect LV asynchrony.