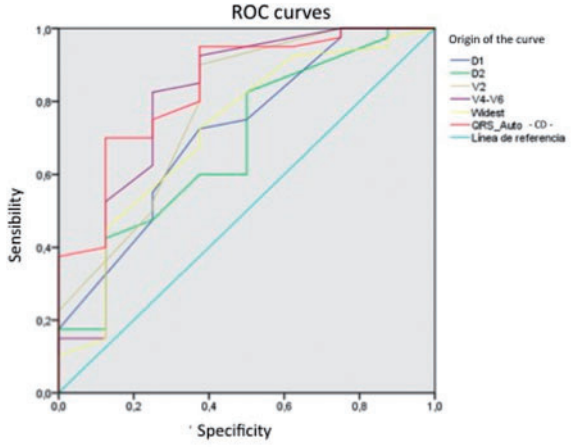
Background: Measurement of QRS duration (QRSd) on surface electrogram (ECG) is the main tool, together with left bundle branch block (LBBB), to select patients (pts) which will benefit from cardiac resynchronisation therapy (CRT). This value is accepted as an undeniable fact but neither guidelines nor randomised studies which support evidence of CRT (even single centres of individual practitioners) use standardised measurements of QRSd.
Purpose: To assess reliability and precision of different measurement methods of QRSd.
Methods: 56 consecutive patients with LBBB with one available ECG with at least 6 simultaneous leads were evaluated in our Arrhythmia outpatient clinic (age 69,5 ±11,4 years, 48,2% male, 63% without structural heart disease and 16 patients with left ventricular ejection fraction < 35%). We registered the computerized determination of QRSd value (CD-QRS) obtained from the electrocardiograph as well as measurements obtained from 2 different observers and using 4
methods: a) QRSd in individual leads, b) mean QRSd from V4-6, c) longest QRSd, d) global measurement (from earliest QRS begin to the latest J-point on precordial leads, considered as reference). We analysed intraclass correlation coefficient (ICC), diagnostic odds ratio (DOR) and receiver operating characteristic (ROC)curves.
Results: ICC between global QRSd and other methods showed good agreement measures (never excellent) for V2 (0.76, confidence interval (CI): 0,62-0,85), CD-QRS (ICC 0,74; CI: 0,59-0,85), mean in V4-6 (ICC 0.72; CI: 0.57-0.83) y longest QRSd (ICC 0.69; IC: 0.42-0.75). Agreement measures were moderate for lead I (ICC 0,61; CI: 0,42-0,75) and specially for lead II (ICC 0.58; CI: 0.38-0.73). Similar trends were observed in interobserver ICC. In the ROC curves, CD-QRS showed the greatest area under the curve (AUC) (0.841) followed by the mean in V4-6 (0.683) for a threshold point of 130ms (Figure).
Conclusions: QRSd varies significantly between different leads and different measurement methods, these could a potential risk of exclusion of CRT for patients who could benefit. The CI-QRS was the measurement method which most related to the global QRSd, followed by the mean in V4-6 and V2. The routine use of lead II is not recommended. Accurate measurement of QRSd should be standardised to improve patient selection for CRT and interpretation of research results.



Abstract P319 Figure. ROC curves for QRSd estimation methods

P320

End-systolic septum strain: a multi-modality strain parameter that accurately predicts cardiac resynchronization therapy response

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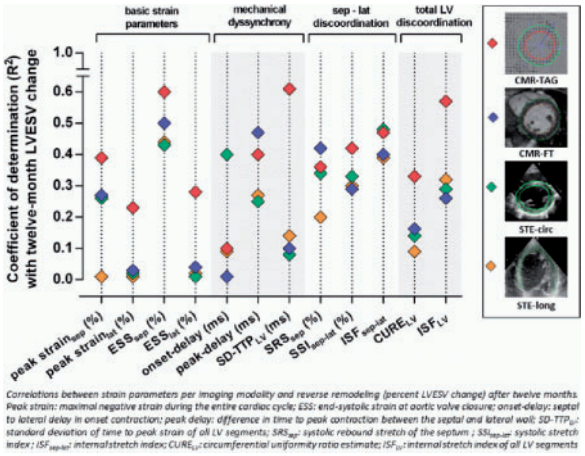
Objectives: This study aims to compare predictive performance of different strain parameters and evaluate results per imaging modality to predict cardiac resynchronization therapy (CRT) response.
Background: Myocardial strain imaging is a potential tool to improve patient selection for CRT. Various strain parameters have been proposed as predictors of CRT response measuring regional timing differences (dyssynchrony) or inefficient contraction patterns (discoordination). Also, multiple imaging modalities are presently available including CMR tagging (CMR-TAG), CMR feature tracking (CMR-FT) and speckle tracking echocardiography (STE). Despite promising results for multiple parameters and different modalities, a systematic comparison between parameters and methods is lacking.
Methods: Twenty-seven patients, prospectively enrolled in the MARC study, underwent both CMR- and echocardiographic examination before CRT implantation. Strain analysis was performed in the circumferential (CMR-TAG, CMR-FT and STE-circ) and longitudinal (STE-long) orientation. Different subsets of strain parameters were measured including regional strains, measures of dyssynchrony, and discoordination. After twelve months, CRT response was measured by the echocardiographic change in left ventricular end-systolic volume.
Results: Twenty-six patients (age 65±9 year, 58% men) completed follow-up. Mean LVESV change was -29±27% with 17 (65%) patients showing ≥15% reduction in LVESV. Each subset of strain parameters was strongly related to CRT response when using the reference CMR-TAG technique with best results for dyssynchrony (SD-TTPLV R2 0.61) and discoordination (ISFLV: R2 0.57) including all LV segments. However, these measures showed wide variability between imaging modalities with less favorable results for CMR-FT and STE. In contrast, regional end-systolic septal strain (ESSsep) showed a consistent high correlation with LVESV change for all modalities (CMR-TAG R2 0.60; CMR-FT R2 0.50; STE-circ R2 0.43; and STE-long R2 0.44).
Conclusions: Both measures of dyssynchrony and discoordination were strongly related to CRT response when using the CMR-TAG reference technique. However, CMR-FT and STE showed less favorable results for these parameters. In contrast, the end-systolic septal strain marker (ESSsep) showed a consistently high correlation with CRT response irrespective of modality.



Correlations between strain parameters per imaging modality and reverse remodeling (percent LVESV change) after twelve months. Peak strain: maximal negative strain during the entire cardiac cycle; ESS: end-systolic strain at aortic valve closure; onset-delay: septal to lateral delay in onset contraction; peak delay: difference in time to peak contraction between the septal and lateral wall; SD-TTP$_{LV}$: standard deviation of time to peak strain of all LV segments; SRS$_{sept}$: systolic rebound stretch of the septum ; SSI$_{sept-lat}$: systolic stretch index ; ISF$_{sept-lat}$: internal stretch index; CURE$_{LV}$: circumferential uniformity ratio estimate; ISF$_{LV}$: internal stretch index of all LV segments

Abstract P320 Figure.

P321

Effect of biventricular pacing on ventricular remodeling in asymptomatic heart failure patients with ischemic cardiomyopathy

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Background: Since introduction of cardiac resynchronization therapy (CRT) in clinical practice, reversal of remodeling has been identified as one of the key elements of beneficial response. Data on reverse remodeling (RR) to CRT in asymptomatic heart failure(HF) patients (pts) are however scarce. We sought to evaluate echocardiographic RR to CRT-D in pts enrolled in the Multicenter Automatic Defibrillator Implantation Trial with Cardiac Resynchronization Therapy (MADIT-CRT) Trial, by baseline New York Heart Association (NYHA) Class I vs. II.
Methods: MADIT-CRT trial enrolled pts with reduced left ventricular ejection fraction (LVEF)≤30% and prolonged QRS≥130ms, pts with non-ischemic cardiomyopathy (CM) and NYHA Class II, or ischemic CM and either a NYHA class I or II. Of the 999 pts with ischemic CM, 265 (26.5%) were classified as NYHA class I, 152 of them had a CRT-D. Among the NYHA Class II ischemic subjects, 446 pts were implanted with CRT-D. Echocardiographic images were obtained both at enrollment and at 1-year follow-up analyzed by a central core laboratory. End points were changes in left ventricular end-diastolic and end-systolic volumes, LVEF and left atrial (LA) volume at 1-year.
Results: In pts with NYHA class I, CRT-D was associated with a mean reduction in LVEDV of -18.28%, similar to pts with NYHA class II (-17.97%, p=0.823). Additionally, there was a significant reduction in LVESV in both NYHA I and NYHA II ischemic pts (NYHA I: -29.03%, NYHA II: -29.00%, p=0.993), indicating similar degrees of LV volume reduction 1 year after CRT-D implantation. LA volumes were also significantly lower after CRT-D in both NYHA classes (Figure). LVEF significantly improved in both NYHA classes with CRT-D (NYHA I: 9.8±5.1% vs. NYHA II: 10.0±4.9%, p=0.694).
Conclusions: In MADIT-CRT, asymptomatic (NYHA class I) and moderately symptomatic HF pts (NYHA class II) with ischemic CM demonstrated similar degrees of