Methods: All pts in sinus rhythm with LBBB and all pts, in any atrial rhythm presenting with VRF, referring for echocardiographic examination, were consecutively included. Pts were divided in two groups according to the presence of RVP or LBBB and underwent a standard echocardiographic examination including the evaluation of ventricular asynchrony by TDI. To assess LV systolic and diastolic synchronicity, standard deviation of time to peak systolic velocity (TS) and of time to peak early diastolic velocity (TE) from the 12 LV myocardial segments in each patient were calculated, and the values of 32.6 ms and 30.1 ms used as cut-off for systolic and diastolic asynchrony respectively.

Results: Sixty-two pts were enrolled (31 LBBB/31 RVP). Seven pts (23%) with continuous RVP had permanent atrial fibrillation. The duration of RVP was in all pts longer than 1 year. Pts with LBBB had significantly higher prevalence of dilated cardiomyopathy (p<0.05). There was no significant difference between the two groups in terms of sex, age and drug’s prescription. Pts with continuous RVP had significantly longer QRS duration (184±34 vs 151±24 ms, p<0.001). There was no significant difference in the prevalence of left intraventricular systolic and diastolic asynchrony. The mean time intervals TS and TE of the 12 LV segments, were statistically greater in the RVP group than in LBBB one (256±53 vs 229±44 ms and 622±51 vs 590±50 ms respectively, p<0.05). RVP pts showed a consistently shorter LV filling time (413±136 vs 510±168 ms, p<0.03) and higher LV EF (41±16 vs 32±16%, p<0.05). Mean heart rate during examination was not statistically different between groups. RVP pts, divided according to QRS width (<180 ms vs>180 ms), showed different degree of diastolic asynchrony, being more asynchronous when QRS is wider.

Conclusions: Pts with RVP and pts with LBBB show the same extent of mechanical asynchrony. RVP pts have greater impairment of diastolic function as expressed by reduced filling time, and show longer electromechanical activation times. This could be an additive mechanism for the development of heart failure.

908 Evaluation of mechanical dyssynchrony in patients with right bundle branch block

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Objectives: Cardiac resynchronization therapy (CRT) has emerged as an established therapy for congestive heart failure due to severe left ventricular systolic dysfunction. Clinical studies of CRT have not included many patients with right bundle branch block (RBBB). Focusing these issues is important in identification of patients most likely to respond to CRT. This study aimed at defining the prevalence of interventricular and intraventricular dyssynchrony in heart failure patients with RBBB.

Methods: A total of 123 consecutive patients (69 patients with left bundle branch block (LBBB) and 54 ones with RBBB) with severe heart failure were prospectively included. Different parameters of inter and intraventricular dyssynchrony was measured by tissue Doppler echocardiography and was compared between two groups.

Results: Baseline demographic characteristics were not different between the two groups. LV mass reductions in TDI-Ea (LBBB=54.6±13.2 vs 57.1±9.7 g/m²; p=0.93); Ischemic heart disease 76% vs 74%; QRS width 139±130 ms; ejection fraction 33% vs 31%; All p=NS. All the parameters of intraventricular dyssynchrony were significantly higher in patients with LBBB compared with those with RBBB (Total asynchrony index 69% vs 46%; p=0.05, Septal posterior wall motion delay 58% vs 44%; p<0.05, Septal lateral wall motion delay 71% vs 48%; p=0.029). Interventricular mechanical dyssynchrony did not seem to have any significant difference between two groups (56% vs 49%; p=0.11).

Conclusion: The majority of heart failure patients with RBBB do not have any significant mechanical dyssynchrony in tissue Doppler echocardiography and have significantly lower incidence of dyssynchrony in comparison with heart failure patients with LBBB. This study does not support the use of CRT in RBBB patients unless tissue Doppler study demonstrates significant mechanical dyssynchrony.

909 Single heart cycle measurement of interventricular delay by color doppler myocardial imaging in right ventricular paced patients

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Purpose: Interventricular (IV) delay is measured by timing events from aortic and pulmonary Doppler flow traces. This requires unsimultaneous data acquisition and timing of events. The aim of this study was to assess IV asynchrony in normals and right ventricular pacing (RVP) patients from a single Color Doppler Myocardial Imaging (CDMI) data-set of both values and compare obtained values to PWD data.

Material and methods: 30 healthy individuals (41±10 years) and 15 patients (66±8 years) with apical DDD RVP (EF 62±7%, pacemaker independent) underwent echocardiographic examination extended with CDMI data acquisition during DDD RVP and compared to data acquired in sinus rhythm (SR) during VVI pacing mode. LV and RV timing was assessed by measuring the difference in pre-ejection time (PET) from the aortic and pulmonary PWD signal as well as by extracting velocity traces from a single cycle velocity data-set of aortic (AV) and pulmonary valve (PV) motion. On such CDMI traces where valve opening and closure are represented by distinct spikes, the time between opening and closing of the AV and PV (PV-AV PET) was calculated and compared to PWD data.

Results: Normals: PV-AV PET=8.9±7.7 ms (PWD), PV-AV PET=6.7±7.1 ms (CDMI), p=n.s. RVP induced reversible IV asynchrony in all pts, assessed by CDMI (PV-AV PET: SR=12.3±2.2 ms vs PV-AV PET: RVP=7.0±1.2 ms, p<0.01) and PWD (PV-AV PET: SR=11.9±2.1 ms, PV-AV PET: RVP=64.2±12.3 ms, SR vs RVP p<0.01, CDMI vs PW p=n.s.). Good agreement between two methods was found (r=0.75±17.5, r=0.83, p<0.05).

Conclusion: IV timing in normals and RVP patients baseline assessed by CDMI from a single heart cycle shortens data acquisition process, improves accuracy due to analysis during the same cardiac cycle and is comparable to measurements obtained from PWD.

LV FUNCTION – OTHER

910 Acute effects of VVI pacing on left ventricular function in elderly patients with normal left ventricular systolic function

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Background: Elderly patients, despite preserved left ventricular (LV) systolic function, may have LV diastolic dysfunction, which is associated with worse outcome. However, asynchronous ventricular (VVI) pacing is often the preferred option in aged patients for atrioventricular (AV) block. The echocardiographic Tissue Doppler Imaging (TDI) and Color M-Mode (CMM) techniques, and the B-type natriuretic peptide (BNP) are valuable in the assessment of the LV systolic and diastolic function. We determined relationships between BNP responses and echocardiographic parameters of LV function following short-term VVI pacing in dual-chamber pacemaker recipients with normal LV systolic function.

Methods: We examined 58 clinically stable patients (mean age 79±8 years) without organic heart disease and normal LV systolic function. Baseline TDI and CMM data, and BNP (median (IQR) levels during AV rhythm in two patient-groups with underlying permanent heart rhythm either intrinsic normal ventricular activation or permanent atrial synchronous ventricular pacing were obtained and compared with those echocardiographic data during VVI pacing and BNP responses following a 30-minute continuous VVI pac- ing period.

Results: VVI pacing significantly decreased the echocardiographic systolic parameters in both patient groups, whereby patients with intrinsic ventricular activation, as compared to patients with ventricular pacing, showed higher heart rate in ejection fraction (9.2±5.5% vs 5.7±4.9%, respectively; p<0.05) and stroke volume (24.8±10% vs 19.4±10%, respectively; p<0.01). Among the indexes of diastolic function, there were in both patient groups significant reductions in TDI- and CMM-derived E/Ea and E/Vp ratios, p<0.05). Baseline BNP levels [58 (23-138) pg/ml] showed independent associations with age (β=0.41, p<0.001) and E/Ea (β=0.40, p<0.001). BNP increased approximately 26% following VVI pacing in both patient-groups with underlying permanent heart rhythm other intrinsic normal ventricular activation or synchronous ventricular pacing. There were no echocardiographic correlations to post VVI pacing BNP increments.

Conclusion: Short-term VVI pacing in elderly patients for AV block seems to worsen LV systolic and diastolic function and to induce significant BNP increases. Optimal pacemaker selection in elderly patients may include pre-implantation assessment based on signs of LV diastolic dysfunction.

MYOCARDIAL VELOCITY IMAGING (DMI) – LV FUNCTION

911 Beneficial effect of the right ventricular outflow tract pacing on cardiac function and coronary circulation in comparison with the right ventricular apex pacing

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Backgrounds: It is unclear that the right ventricular outflow tract pacing (RVOT) pacing might be more suitable for permanent pacing in patients than the right ventricular apex (RVA) pacing and the increase of coronary blood flow might be related to improvement of left ventricular (LV) dysfunction.

Objective: The purpose of this study was to investigate the efficacy of RVOT pacing on cardiac function and coronary circulation in comparison with that of RVA pacing.