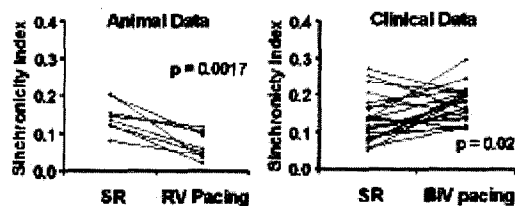


increased SI from 0.14 ± 0.06 to 0.18 ± 0.05 ($p=0.02$), while EF increased from 24 ± 8 to $32 \pm 8\%$, ($p=0.02$).

Conclusion: SI represents an efficient measure of left ventricular synchrony.



1187-2

Combining Electrical Therapies for Heart Failure: The Milan Experience With Biventricular Pacing-Defibrillation Backup Combination in Patients Without Standard Indication for Implantable Cardioverter Defibrillators

Salvatore Rosanio, Gabriele Vicedomini, Giuseppe Augello, Patrizio Mazzone, Simone Gulletta, Cosimo Dicandia, Alessia Pappone, Gabriele Paglino, Mario Pittalis, Carlo Pappone, San Raffaele University Hospital, Milan, Italy

Background: Biventricular pacing (BVP) improves hemodynamics and symptoms in heart failure (HF) pts with bundle branch block. Pts with left ventricular ejection fraction (EF) <35% and life-threatening ventricular tachyarrhythmias are at high risk of sudden death (SD) and benefit most from implantable cardioverter-defibrillators (ICDs). To date, only limited information is available about the prophylactic use of ICDs in pts receiving BVP regardless of standard ICD indications.

Objective: This study investigated the incidence of appropriate ICD interventions in pts indicated for BVP and their predictors.

Methods: From January 1999 and April 2001, 143 consecutive pts indicated for BVP (aged, 57 ± 12 yrs; 72% male; NYHA class, 2.5 ± 1.6 ; EF $21 \pm 6\%$; ischemic etiology, 43%; QRS duration, 162 ± 24 ms) received adjunctive backup ICD. Pts were followed-up in our outpatient cardiac pacing clinic in 3- to 4-month intervals or as soon as possible after spontaneous ICD shocks for device interrogation and retrieval of stored electrograms, and included ECG and echocardiographic examinations.

Results: Follow-up averaged 523 days, 31% of pts showed VT/VF inducibility on electrophysiologic (EP) test and during follow up, 13 (29%) of these 44 pts received successful appropriate interventions for ventricular tachycardia (VT)/ventricular fibrillation (VF) episodes, compared with 32 (32%) of 99 pts with negative EP test. 78% of the VT episodes were converted to sinus rhythm with antitachycardia pacing. Multivariate Cox analysis of baseline clinical variables and EP test results failed to identify VT/VF inducibility as predictor of appropriate ICD interventions during follow-up. There was no evidence that the predictive value of EP testing differed between ischemic and non-ischemic HF pts (ratio of hazard ratios, 0.86; $P=0.78$).

Conclusion: Although with the limitations of an observational study, our data suggest that ICD backup grants increased security and emphasizes the importance of preventable SDs in BVP pts without standard ICD indications. Further, these data suggest that the use of EP testing doesn't help to identify BVP-indicated pts who benefit from ICD backup.

1187-13

Ventricular Tachycardia Storm After Initiation of Biventricular Pacing in Patients With Prior Inferior-Inferolateral Myocardial Infarction

Hemal M. Nayak, Joseph Poku, Erica Zado, Andrea M. Russo, Francis E. Marchlinski, University of Pennsylvania, Philadelphia, PA

Background: Biventricular pacing (BP) has been shown to reduce symptoms and improve functional class in pts with severe CHF, low EF and prolonged QRS duration. By reducing CHF, BP is thought to reduce the incidence of ventricular arrhythmias. However, we have seen ventricular tachycardia storm (VTS) develop among some pts with CAD manifest by recurrent ICD shocks or therapy after initiation of BP. We sought to identify potential risk factors for the development of this VTS. **Methods:** We reviewed the records of 30 consecutive pts who underwent biventricular pacemaker-ICD implantation at our institution between Jan - June 2002. Twenty had CAD and were used for analysis. VTS was defined as frequent and recurrent ICD shocks and/or delivery of anti-tachycardia pacing due to SMVT in pts who previously had no clinical SMVT 3 months prior to the initiation of BP. Variables including age, sex, race, EF, location of infarction, indication for ICD therapy, anti-arrhythmic use percent pacing and coronary sinus lead position were identified as possible risk factors. Fisher's exact test was used for analysis.

Results: Four of the 20 pts (20%) developed VTS. Of the variables listed, only the presence of an inferior-inferolateral infarction was identified as a risk factor for the development of VTS. ($p=.01$) All 4 pts with VTS had an inferior-inferolateral infarction, implying that 40% of pts with an inferior-inferolateral infarction in this study group developed VTS.

Conclusions: The presence of an inferior-inferolateral infarction was identified as a risk factor for developing VTS in pts with CAD in whom BP was initiated. We hypothesize that pacing from the lateral left ventricle, as part of normal BP, may facilitate reentry and hence the induction of sustained monomorphic ventricular tachycardia in patients with inferior-inferolateral infarctions.

1187-14

Plasma Markers of Clinical Improvement in Patients With End-Stage Heart Failure Treated With a Biventricular Pacemaker Device

Ellen J. Jongedijk, Sander G. Molhoek, Jeroen J. Bax, Ernst E. van der Wall, Martin J. Schalij, Arnold van der Laarse, Leiden University Medical Center, Leiden, The Netherlands

Background: The levels of the plasma hormones atrial and brain natriuretic peptide (ANP and BNP) are elevated and used as diagnostic and prognostic indicators for the treatment of patients with congestive heart failure. Tumor Necrosis Factor alpha (TNF- α) and endothelin-1 (ET-1) (marker for endothelial dysfunction) are correlated with the severity of heart failure. Biventricular (BV) pacing results in clinical improvement in patients with congestive heart failure and ventricular conduction disturbances. The objective of this study was to evaluate the effect of BV pacing on plasma hormones (ANP, BNP), ET-1 and TNF- α .

Methods: 14 patients with end-stage heart failure (NYHA class III-IV), LBBB and QRS duration >120 ms received a BV pacing device and clinically improved (reduction in NYHA class ≥ 1) after 6 months of BV pacing therapy. At baseline and 6 months post-implantation the following parameters were evaluated: NYHA class, Minnesota Quality of Life (QOL) score and 6-minute walking distance. N-terminal pro-ANP hormone, N-terminal pro-BNP, ET-1 and TNF- α plasma concentrations were evaluated before and after 6 months of follow-up.

Results: Table

Conclusions: Six months of BV pacing therapy results in clinical improvement and a decrease of BNP-, ANP- and ET-1 levels. TNF- α plasma concentrations were not affected by this therapy. Plasma ANP and BNP levels as well as ET-1 levels can be used as markers of the clinical benefit in congestive heart failure patients, treated by BV pacing.

	Baseline	6 months follow-up	P-value
NYHA class	3.1 ± 0.3	1.9 ± 0.4	<0.01
QOL score	38 ± 16	24 ± 13	<0.01
6-min WT	269 ± 96	381 ± 106	<0.01
BNP (pmol/L)	1495 ± 766	946 ± 593	<0.01
ANP (pmol/L)	11454 ± 6812	8141 ± 5072	<0.05
ET-1 (pg/mL)	1.68 ± 0.95	1.04 ± 0.63	<0.05
TNF- α (pg/mL)	39 ± 27	38 ± 45	NS

1187-15

Sustained Improvement in Peripheral Immune Responses by Biventricular Pacing and Its Association With Exercise Tolerance and Quality of Life

George N. Theodorakis, Panagiota Flevari, Fotis Kolokathis, Efthimos G. Livanis, Stamatias Adamopoulos, Christos Kroupis, Dionyssios Leftheriotis, Aikaterini Koniavitou, Dimitrios T. Kremastinos, Onassis Cardiac Surgery Center, Athens, Greece

Background: To date, limited information exists regarding chronic inflammatory changes induced by biventricular pacing (BiVP) and their relation with patients' functional capacity and quality of life (QOL). **Methods:** Thirteen pts with heart failure (HF), NYHA class III-IV were studied (mean age 65 ± 8 years, PR duration 192 ± 17 msec, QRS duration 195 ± 22 msec, LV EF $23 \pm 5\%$). All were implanted a Biv defibrillator ($n=11$) or pacemaker ($n=2$). After a preliminary no pacing period of 1 month (M) following device implantation (VVI 30 bpm), baseline evaluation was performed, including NYHA class assessment, treadmill exercise stress testing and QOL evaluation (Minnesota Questionnaire). Serum levels of tumor necrosis factor- α (TNF- α), soluble TNF receptors (sTNFR-I, sTNFR-II) and interleukin-6 (IL-6) were assessed at that time point by ELISA. The same parameters were also evaluated i) after 3 M of BiVP (VDD mode 30 bpm), ii) following a subsequent 3-M no pacing period. **Results:** An improvement was observed in clinical and inflammatory markers, sustained following therapy discontinuation (Table). Among the inflammatory markers, the % reduction in IL-6 following 3 M of pacing therapy was significantly related to the pacing-induced improvement in exercise duration ($r=-0.055$, $p<0.05$) and QOL status ($r=0.73$, $p<0.05$). **Conclusion:** The improvement observed in functional capacity and QOL of HF pts by BiVP pacing is associated with a reduction in IL-6 and is sustained following 3 M of therapy discontinuation.

*: significant differences vs baseline

	Baseline	BiVP	No pacing
NYHA	$2.8 \pm 0.4^*$	$1.6 \pm 0.4^*$	$1.9 \pm 0.3^*$
Exercise duration (min)	7.9 ± 3.3	$9.5 \pm 2.5^*$	$9.6 \pm 1.7^*$
QOL score	43.6 ± 13.1	$32.2 \pm 9.5^*$	$29.8 \pm 12.1^*$
TNF- α (pg/ml)	2.1 ± 1.3	$1.6 \pm 0.7^*$	$1.6 \pm 1.2^*$
sTNFR-I (pg/ml)	1626 ± 561	$1402 \pm 380^*$	$1330 \pm 312^*$
sTNFR-II (pg/ml)	2796 ± 766	$2467 \pm 650^*$	$2376 \pm 553^*$
IL-6 (pg/ml)	11.8 ± 9.3	$7.7 \pm 6.4^*$	$5.5 \pm 3.9^*$