10.5 CRT APPROACH USING RIGHT VENTRICULAR BIFOCAL PACING IN CHF PATIENTS

L. Zamparelli, *A.R. Martiniello. *Div. of Cardiac Pacing, Osp. Monaldi, Napoli, Italy;*Dep. of Cardiology, Osp. Monaldi, Napoli, Italy*

Right ventricular bifocal pacing (RVBP), performed at apex and at root of IV septum, shortens QRS and reduces mitral regurgitation (MR). Our study is addressed to assess if RVBP may assure durable benefits in pts with CHF and severe MR.

Twenty-seven pts (19 m, 65±11 yrs), all with: DCM, LBBB, MR and CHF (NYHA class 3.1), were implanted with a three chamber pacing system delivering DDD pacing with ventricular bifocal stimulation. QRS duration and left ventricular hemodynamic parameters were assessed at basal condition and during f-u. Cardiac dynamics during conventional DDD with apical pacing only and DDD-RVBP were evaluated with Tissue echo-Doppler Imaging (TDI).

Results: (basal vs 18 m f-u) QRS 157±22 ms vs. 115±21 ms; LVEF 32±8% vs 41±11 %; MR index 3±0.3 vs 1.5±0.3; NYHA class 3.1±0.5 vs 2.0±0.5. TDI showed that RVBP induces a CRT effect by shortening both inter- and intraventricular delays.

Conclusion: RVBP improves hemodynamics and quality of life in DCM patient with LBBB and CHF.

10.6 SEPTAL vs. APICAL PACING: A MATTER OF TIME

L. Molina, S. Lara, F. Limón. *Mexico's National University and General Hospita, Mexico City, Mexico*

There is data that septal pacing is less deleterious than the apical site.

Method: Sixty patients submitted to dual chamber pacemaker implant were studied by means of cardiac output (CO) measurements by the thermal dilution. Six patients formed the test ("T") group, 47 patients were alternatively distributed into septal ("S") and apical ("A") groups placement of the ventricular lead. Seven patients were programmed as AAI. In the "T" group, CO was measured using a septal and apical leads. There was no significant difference in CO. Patients were then alternatively distributed into groups "S" and "A." Control CO was measured pacing only the ventricles, then programmed to DDD at 80 bpm, with 150 ms AV delay.

Results: After 60 min. the increment in CO in the "S" group had been 0.79 ±1.15 l/min greater than the "A" group (p<0.01), and after 24 h., the difference was 1.43 ±1.2 l/min (p=0.008), (35%).

Conclusions: CO increments from VVI to DDD pacing are evident from the first minute; after 24 h. the increase was 35% in the "septal" group vs. 17% with an apical lead (p<0.05).

10.7 SEPTAL VENTRICULAR STIMULATION WITH STANDARD SCREW-IN LEADS

G. Mazzocca, L. Magni, E. Venturini, M. Fiaschi, M. Pacchini, G. Corbucci. *Cardiovascular Unit, General Hospital, Cecina, Italy; *Vitatron Italy*

Patients (Pts) with impaired AV conduction must be paced in the ventricle, but alternative pacing sites to right ventricular apex (RVA) should be tried.

Aim of the study: was to evaluate RV septal (S) pacing in Pts with indication to single-chamber or dual-chamber stimulation.

Methods: We enrolled 24 consecutive Pts (18M, 6F; mean age 75±8.9 years) for RVS pacing (1 VVIR; 23 DDD(R)). The ventricular lead was a standard bipolar screw-in lead (58 cm length, ActFix-Vitatron). A control group of 24 RVA Pts was studied.

Results: RVS Pts had an acute threshold of 0.52±0.3 V and 0.47±0.3 V at 1 month follow-up (P=NS). All RVS leads were stable. QRS duration was 117±35 ms vs 205±42 ms in RVS Pts and RVA Pts, respectively (P<0.03). At color Doppler evaluation RVA Pts showed ventricular asynchrony. On the other hand only 4 RVS Pts showed it but also before implantation (P<0.02). Fluoroscopy time for RVS positioning was 4.44±1 min.

Conclusion: RVS pacing is feasible and safe in patients with standard indication to stimulation and it is promising to preserve ventricular synchrony.

11. CARDIAC RESYNCHRONIZATION THERAPY: DIFFERENT ISSUES

11.1 HEART RATE VARIABILITY AND BIVENTRICULAR PACING

E. Ammendola, L. Santangelo, C. Savarese, C. Cavallaro*, A. D'Onofrio*, R. Calabrò. *Department of Cardiology Second University of Naples. * Department of Cardiology A.O. Monaldi, Naples*

Objective: Cardiac resynchronization therapy (CRT) using biventricular pacing has been a major advance in long-term therapy for treatment of congestive heart failure (CHF). Heart rate variability (HRV) analysis has become an important predictive tool in CHF for the effects arrhythmogenic. In our study we observed if CRT can affect HRV in patients with CHF after six months of follow-up.

Methods and Results: 20 consecutive patients with CHF (12 men and 8 women; mean age 64.9 ± 11.8, range 48-79 years, NYHA class III-IV, FE<35%, QRS>120 ms., intraventricular and interventricular delay) received biventricular pacing (Guidant Renewal 4). HRV recorded by implanted device and was performed at implantation and six months after procedure. After implantation QRS duration changed from 156 ± 21msec to 132 ± 16msec (p<0.001) and NYHA class decreased in all patients.

HRV improved at follow-up (SDANN 66.8 ± 24.8 vs. 86.6 ± 17.3, p <0.02) with reduction of main heart rate (81.8 ± 7.7 vs. 71.4 ± 4.2, p <0.01). EF improved progressively and were significantly higher at follow-up (24,5±4,15. vs 33,5±9,23, p< 0.05). The LVEDD was significantly smaller than baseline after 6 months (7,41±0.53 vs 5,93±0,77, p<0.03). The intraventricular electromechanical delay was significantly improved with a mean decreased of 27,9 msec (52,6±11,4 mesc vs 24,7±6,5, p<0,001), while interventricular electromechanical delay was shortened of 72,2 msec (92,6±12,7 msec vs 20,4±7,6 msec, p<0,003).

Discussion: Our data shows that CRT in CHF seems improve autonomic function and reduce adrenergic tone as demonstrate by increasing HRV. In conclusion biventricular pacing can exert a positive effect on the mechanism that sustains the harmful hyper-adrenergic state and so it could be useful in opposition to disease progression.

11.2 LEFT VENTRICULAR LATENCY INDICATES REDUCED LV FUNCTION AND AFFECTS THE AV DELAY

B. Ismer, T. Körber, G.H. von Knorre, W. Voss, F. Weber, C. Melzer*, H.H. Minden**, C. Butter**, J. Brandt***, C.A. Nienaber. *Cardiology Divisions at the University Hospital Rostock, Charité Berlin*, Bernau Heartcenter**, Germany and the University of Lund***, Sweden*

Optimal AV delay (AVD) is the net effect of pacemaker related interatrial conduction time (IACT), duration of left atrial electromechanical action (LA-EAClong) and duration of left ventricular latency (Sv-EACshort): AVD = IACT + LA-EAClong – Sv-EACshort.

Aims: To study the influence of heart failure on the three AVD determinants.

Methods: The AVD determinants were measured by simultaneously recording mitral flow, telemetric sense event marker and filtered esophageal left atrial electrogram in 34 atrio-right-ventricular paced bradycardia patients without heart failure (group A) and 33 atrio-biventricular paced congestive heart failure patients (group B).

Results: IACT in functional VDD (A: 33±28ms, B: 42±43ms, p=0,753) and DDD mode (A: 112±20ms, B: 122±32ms, p=0.076) as well as LA-EAClong (A: 192±20ms, B: 193±23ms, p=0.836) did not differ significantly in both groups. In contrast, Sv-EACshort increased significantly in heart failure (A: 125±14ms, B: 147±22ms; p<0.001). The increase was about 13ms every 10% decrease in ejection fraction resulting in about 21 ms shorter AVD in group B.

Conclusions: Left ventricular latency is an indicator of reduced left ventricular function and the need for shorter individual AV delays in biventricular pacing.

11.3 ICS3000 PROGRAMMER TO INDIVIDUALIZE AV DELAY IN BIVENTRICULAR PACING

R. Sadowski*, B. Ismer, T. Körber, G.H. von Knorre, W. Voß, C.A. Nienaber. *Divisions of Cardiology of the Community Hospital Schwedt* and the University of Rostock, Germany*

AV delay (AVD) can be approximated to be either about 45ms or 70ms longer than individual interatrial conduction intervals in biventricular or right ventricular pacing, resp. Biotronik ICS3000 programmer enables filtered esophageal left atrial electrogram (LAE). It can be used irrespective of pacemakers make and model to measure interatrial conduction intervals (IACT) in order to simplify AVD optimization.

Aims: To test the ICS3000 based LAE in biventricular pacing.

Methods: In 13 congestive heart failure (CHF) patients, we compared results of individual echo AVD optimization with 1) factory settings and 2) results of simplified AVD approximation by individual IACT measurement using the ICS3000. AVDs were considered to be optimal if they differed less than 30ms compared to echo results:

13 patients (pts)	VDD
	DDD
AVD factory setting optimal	3 pts (23%)
	2 pts (15%)
AVD approximation optimal	7 pts (54%)
	8 pts (62%)