1213-12 **Clinical Profile and Prognosis of Patients With Intermittent Versus Persistent Left Bundle Branch Block**

Prabhakara S. Heggunje, Joe Yammine, Arroyo-Duran Maxmillano, Mohammad El-Hajjar, Ratnakar Mukherjee, Michael J. Wade, Nasser Khan, VA Medical Center, Syracuse, NY, SUNY Upstate Medical University, Syracuse, NY

Background: Left bundle branch block (LBBB) is usually associated with structural heart disease and a poor prognosis. In most instances, LBBB is chronic or persistent; occasionally, it has an intermittent pattern. The clinical significance of intermittent LBBB is less well understood.

Objective: To review the clinical, echocardiographic and electrocardiographic features of patients with intermittent versus persistent left bundle branch block, and to compare their outcomes.

Methods: We reviewed the charts of all the consecutive patients who had a diagnosis of LBBB between January 1990 and June 2001 at our institute. Patients were considered to have intermittent LBBB if they had at least one 12-lead electrocardiogram (ECG) without LBBB pattern and a QRS width of less than 120 milliseconds after an index 12-lead ECG demonstrating LBBB. Patients with definite rate-dependent LBBB were excluded. Two groups were compared for the differences in the prevalence of established atherosclerotic risk factors, structural heart disease and mortality due to any cause over a mean follow up period of five years.

Results: Of the 688 patients studied, 603 had persistent and 85 had intermittent LBBB. Mean age was 70 years in both groups. No significant differences were found in the prevalence of hypertension, diabetes or left ventricular hypertrophy. ECG variables (QRS axis, QRS width, PR interval and ST-T changes) were also similar in the two groups. Prevalence of established coronary artery disease (68% vs. 56%, P=0.035), use of aspirin (62% vs. 46%) and beta-blockers (60% vs. 44%) were more frequent in patients with intermittent LBBB than in those with persistent LBBB. No significant difference in mortality was observed between the two groups (persistent LBBB = 34%, intermittent LBBB = 36%, P=0.72) over a mean follow up period of five years.

Conclusions: In this predominantly elderly male population, non-rate-dependent intermittent LBBB is associated with a higher prevalence of coronary artery disease than persistent LBBB, but the long term outcome is similar in two groups.

ORAL CONTRIBUTIONS

862 New Insights in Cardiac Resynchronization Therapy

Tuesday, April 01, 2003, 4:00 p.m.-5:00 p.m.
McCormick Place, Room S103

4:00 p.m.

862-1 **Tripolar Pacing Reduces Left Ventricular Capture Threshold in Patients Having Biventricular Device Implantation**

Jonathan J. Langberg, Robert Schwartz, Fernando Mera, Kevin McTeague, Paul Walter, Emory University, Atlanta, GA

Background; Biventricular (BiV) pacing is beneficial for patients with advanced congestive heart failure and left bundle branch block. Transvenous left ventricular (LV) pacing using the coronary veins is associated with higher capture thresholds than right ventricular (RV) endocardial pacing. BiV pacing is most often performed using a "shared ring" configuration with the cathodal output connected to the RV and LV tip electrodes and the RV ring (or RV shocking coil) serving as a common anode. The purpose of the current study was to evaluate the effects of a novel tripolar pacing technique on LV capture threshold.

Methods and Results; With tripolar pacing the LV pulse was equal in amplitude but opposite in polarity to the RV pulse, such that the shared ring served simultaneously as the cathode for the LV and the anode for the RV. Ten consecutive patients having BiV devices (6 ICD, 4 pacemakers) were studied. The mean age was 67+/-7 years and the LV ejection fraction was 22+/-9%. Decremental BiV capture threshold measured at a pulse width of 0.5 msec was 48+/-13% less using the tripolar configuration compared with shared ring (.93+/-.38V vs 1.87+/-.84V, p<.001). Incremental capture threshold was reduced by a comparable amount (tripolar 1.2+/-.2V vs shared ring 2.3+/-.9V, p<.001). Tripolar pacing did not cause ectopy or skeletal muscle stimulation.

Conclusions; Tripolar stimulation reduces capture threshold by almost 50% compared to shared ring BiV pacing. Incorporation of this feature into future BiV devices may increase longevity.

4:15 p.m.

862-2 **Will Cardiac Resynchronization Therapy Reverse Left Ventricular Remodeling in Patients With Mild Prolongation of QRS Complexes?**

Cheuk-Man Yu, Qing Zhang, Hong Lin, Shun-Ling Kong, Wing-Hong Fung, John E. Sanderson, The Chinese University of Hong Kong, Hong Kong, Hong Kong

Background: Cardiac resynchronization therapy (CRT) has been shown to reverse left ventricular (LV) remodeling in patients with heart failure and electromechanical delay with QRS complexes of >150ms. However, it is uncertain if this would occur in patients with mildly prolonged QRS complexes. Methods: 41 patients with heart failure (age 65±12years, 71% male) received biventricular pacing were prospectively studied. Among them, 19 had a QRS duration between 120-150ms (Gp A), and 22 were >150ms (Gp B). Echocardiography with tissue Doppler imaging was performed to assess LV volume and systolic synchronicity. Results: Only Gp B had significant gain in ejection fraction, sphericity index & LV filling time, and reduction of LV volumes (Table). The mitral regurgitation was reduced in both groups. Systolic asynchrony was more severe in Gp B than Gp A, as shown by the standard deviation of the time to peak regional systolic contraction of the 12 LV segments (22.8±5.8 vs 45.1±11.4 ms, p<0.001). Significant reduction of LV end-systolic volume (>15%) was present in 33% in Gp A and 74% in Gp B (χ^2=7.1, p<0.01). Systolic asynchrony is an important predictor of reverse remodeling (r=-0.83, p<0.001) and gain in ejection fraction (r=0.72, p<0.001). Conclusions: LV reverse remodeling is less effective after CRT for heart failure patients with QRS of 120-150ms. This is likely attributed to the less severe mechanical asynchrony. Therefore, screening of mechanical asynchrony by TDI may help to select volumetric responders of CRT.

Parameters	Group A			Group B		
	Baseline	3-month	P value	Baseline	3-month	P value
LV end-diastolic volume, cm^3	182±90	175±81	NS	189±72	136±55	<0.001
LV end-systolic volume, cm^3	134±68	124±63	NS	147±76	90±52	<0.001
Ejection fraction, %	27.1±6.4	30.9±8.7	NS	24.7±8.1	37.5±10.4	<0.001
Sphericity index	1.73±0.30	1.79±0.32	NS	1.72±0.14	1.93±0.35	0.02
LV filling time, ms	352±107	420±108	NS	367±104	451±79	0.02
Mitral regurgitation, %	31±24	21±14	0.04	34±14	20±19	0.03

4:30 p.m.

862-3 **Cardiac Venous Assessment With Electron-Beam Computed Tomography: Implications for Cardiac Resynchronization Therapy**

Marc J. Girsky, Steven Kang, Matthew J. Budoff, Harbor-UCLA Medical Center, Torrance, CA, Good Samaritan Hospital, Los Angeles, CA

Background: Cardiac resynchronization therapy requires placement of a left ventricular (LV) pacing lead using a transvenous approach via the coronary sinus (CS). Failure to place this lead ranges from 7-15% thereby prompting a thoracotomy approach. Anatomical variation of the cardiac veins (CV) and small vessel size are important limitations to successful LV lead placement. Electron beam CT (EBCT) scans produce high resolution images that can be used to determine location, size, and tortuosity of the CV.

Methods: EBCT scans of 46 patients with cardiomyopathy were reviewed to define CV anatomy. The LV was divided into 3 regions (posterior, lateral, anterior) based on distance from the CS ostium. CV in each region were characterized by diameter and tortuosity grade (1-no angulations to 3-multiple angulations).

Results: Mean age = 63 +/- 13 years, end systolic diameter = 48 +/- 7 mm, and LVEF = 34 +/- 7%. Regional distribution of the CV is summarized in Table 1. EBCT revealed a single CV > 3 mm and multiple CV > 3 mm in any LV region in 52% and 39% of the patients, respectively. EBCT failed to identify a CV > 3 mm in 9% of patients.

Conclusion: EBCT demonstrates highly variable CV distribution with significantly larger and less tortuous branches on the posterior LV surface. Pre-operative EBCT assessment can improve LV lead placement success rates by providing accurate assessment of venous targets for lead implantation as well as defining the potential need for alternative implant approaches prior to the procedure.

Table 1: Cardiac Venous Size and Regional Distribution

	Posterior LV	Lateral LV	Anterior LV	P value
All veins (% patients)	70%	67%	83%	NS
Veins > 3.0 mm (% patients)	54%	43%	39%	NS
Mean diameter (mm)	4.0 +/- 1.8	3.7 +/- 1.2	3.2 +/- 0.9	<.01
Grade 3 tortuosity	3%	22%	5%	.02