



1112-143 Chronic Effect of Cardiac Resynchronization Therapy on Functional Mitral Regurgitation in the Advanced Systolic Heart Failure

Kazuya Murata, Rikimaru Oyama, Nobuaki Tanaka, Yasuyuki Hatano, Eizo Akagawa, Akihiko Shimizu, Masunori Matsuzaki, Yamaguchi University, Ube, Japan

Acute and chronic effects of cardiac resynchronization therapy (CRT) on functional mitral regurgitation (FMR) in severe systolic heart failure and their mechanisms were not still elucidated. Nine severe heart failure patients with wide QRS complex duration (>140msec) and FMR received CRT were studied. pical 4- and 2-chamber views were obtained by tissue Doppler imaging before and one week and 6 months after CRT. Total Eight regions of interest were placed on mid and base of IVS, posterior, anterolateral and inferior wall. Time interval from end-diastole to the timing of peak systolic velocity (T-Sm) in each ROI was obtained and coefficient of variation (CV=standard deviation/mean) of T-Sm was calculated as an index of LV asynchrony. Mitral valve area (MVA:cm2) and mitral leaflet tethering lengths defined as the distance between the papillary muscle tips and the contralateral anterior mitral annulus were measured in the apical 4- and 2-chamber views and sum of tethering lengths (TLs) was obtained. LV sphericity index (SI: ratio of LV short- to long-axis dimension in apical four chamber view) was estimated. MR regurgitant fraction (MRF:%) was calculated by pulsed Doppler method. **Results:** CV and MRF tended to improve one week after CRT (from 0.33 to 0.16, from 64 to 61%, respectively), although LV dimension and MVA unchanged. Six months after CRT, CV and SI improved (from 0.33 to 0.14 %, from 0.74 to 0.71, P<0.05, respectively) and TLs shortened (from 87 to 76mm, P<0.01). MVA and MRF also improved 6 months after CRT (from 9.5 to 8.1cm², from 64 to 57%, P<0.05, respectively). **Conclusion:** In addition to the improvement of LV synchronicity, the improvement of LV sphericity and tethering effect caused by reverse remodeling of dilated LV played an important role for reduction of FMR in chronic phase after CRT.

1112-144 Evaluation of Left Ventricular Function in Pediatric Sickle Cell Anemia Patients Using the End Systolic Wall Stress-VCFc Relationship

Luke Lamers, Greg Ensing, Caren Goldberg, Robert Gajarski, University of Michigan Congenital Heart Center, Ann Arbor, MI

INTRODUCTION: Abnormalities in myocardial function have been documented in sickle cell anemia (SCA) patients (pts.) using load-dependent indices. Whether the systolic dysfunction results from impaired myocardial contractility or altered loading conditions is unknown since studies using a load-independent measure of contractility have not been performed.

PURPOSE: To identify differences in myocardial contractility using the load-independent end-systolic wall stress (ESSm)-VCFc relationship in SCA pts. compared with age-matched African American (AA) controls.

METHODS: 50 healthy AA and 57 SCA pts. 3 mo to 17 yrs were studied. Simultaneous indirect carotid or brachial pulse tracing, phonocardiogram, ECG, and M-mode tracing of the LV short-axis were recorded. LV dimensions, ETc, % FS, VCFc, and ESSm were determined. Using linear regression, the ESSm-VCFc relationship was calculated and compared between groups.

RESULTS: Age, BSA, and BP were similar between groups. SCA pts. had increased LV dimensions in systole and diastole, and increased LV mass (p<0.01).

	Healthy AA	Sickle Cell Anemia	p-value
Fractional Shortening %	41 +/-4.3	38 +/-5.8	<.01
ETc (msec)	334 +/- 23.7	350 +/- 27.9	<.01
VCFc (circ/s)	1.23 +/- .14	1.09 +/- .19	<.01
ESSm (g/m ²)	32.8 +/- 13.5	41.0 +/- 15.3	<.01
ESSm-VCFc relationship	VCFc=1.48-.077(ESSm)R=0.7	VCFc=1.40-.08(ESSm)R=0.7	<.01

CONCLUSION: SCA pts. have significant LV dilatation consistent with increased preload and elevated afterload which may contribute to increased ETc and lower FS. Load-independent assessment of myocardial function suggests that SCA pts. have reduced contractility compared to controls. These findings may be due to long-standing volume overload associated with chronic anemia or an effect of microvascular coronary changes secondary to SCA.

1112-145 Determinants of Severe Pulmonary Hypertension in Patients With Severe Aortic Stenosis

Nikhil Kapoor, Padmini Varadarajan, Ramdas G. Pai, Loma Linda University Medical Center, Loma Linda, CA

Background: Aortic stenosis (AS) is an increasing problem with the aging population. Presence of significant pulmonary hypertension in these patients increases the operative morbidity and mortality. We explored the determinants of severe pulmonary hypertension in patients with severe AS.

Methods: Our echocardiographic database between 1993 and 2003 was searched for patients with severe AS defined as a Doppler estimated aortic valve area (AVA) of ≤0.8 cm². 949 patients were identified. 626 patients had measurable tricuspid regurgitation velocity signals forming the study cohort. Doppler estimated pulmonary artery systolic pressure of ≥60 mmHg was considered as severe pulmonary hypertension (PHT).

Results: Patient characteristics: age 74±13 years, 50% women, EF 54±20%, AVA 0.74±0.4 cm². Of the 626 patients, 146 (23%) had severe PHT. Patients with severe PHT had a smaller AVA (0.65±0.18 vs 0.72±0.19 cm², p<0.0001) and AVA index (0.37±0.10 vs 0.41±0.11 cm²/m², p=0.02), lower EF (42±21 vs 56±20%, p<0.0001), larger LV end-systolic (52±9 vs 49±8 mm, p<0.0001) and end-diastolic dimensions (38±10 vs 33±10, p<0.0001) and a lower relative wall thickness (0.51±0.13 vs 0.56±0.15, p=0.0002). They also had a greater preponderance of 3 or 4+ mitral regurgitation on a 0-4 scale (55 vs 23%, p<0.001) and a trend towards female preponderance (62 vs 53%, p=0.07). Age, LV wall thickness and transaortic gradient were not predictive. The independent predictors of severe PHT were lower EF (p=0.001), greater degree of mitral regurgitation (p=0.0003) and smaller aortic valve area (p=0.04). In those with EF<40%, the prevalence of severe PHT was 38% increasing to 52% when AVA was ≤0.5 cm².

Conclusions: 1) Severe pulmonary hypertension occurs in about a quarter of patients with severe AS. 2) It is associated with a smaller AVA, low EF and greater degree of mitral regurgitation. 3) These findings have implications in the timing of aortic valve replacement in severe AS.

1112-146 Clinical Predictors and Characteristics of Patients With Intra-pulmonary Shunts

Richard A. Santa-Cruz, Matthew D. Pearson, Mauricio G. Cohen, Roshan Shrestha, Park W. Willis, IV, Alan Hinderliter, Venu Menon, University of North Carolina, Chapel Hill, NC

Background: Acquired pulmonary arteriovenous shunts are a known complication of chronic liver disease. A systematic evaluation of the incidence and predictors of intra-pulmonary shunting (IPS) in patients with liver disease being evaluated for transplantation has not been previously performed. **Methods:** We prospectively evaluated for the presence of IPS in 204 consecutive patients who underwent an echocardiogram with an agitated venous saline contrast bubble study as part of their pre-transplant evaluation. IPS was diagnosed by the appearance of saline bubbles in the LA after ≥ 3 ventricular beats post initial appearance in the RA. The shunt size was measured utilizing still frame images in the apical four chamber view. The bubble count was taken at the heaviest concentration still frame and scored using a quantitative scale by two independent observers. Discordant results were adjudicated by consensus. **Results:** IPS was documented in 115 out of 204 patients (56.4%). Patients with IPS were more likely to have a history of alcohol abuse (64.8% vs. 46.9%, p=0.01) and more severe liver disease (Child-Pugh Class C 72% vs. Class B 54% vs. Class A 44%, p<0.05). No difference was found in altitude of residence for patients with and without IPS (781 vs. 625 feet above sea level respectively, p=0.11). No differences were also seen in age, sex, body mass index, smoking, pulmonary function tests, room air PaO₂, estimated pulmonary artery pressure, liver function tests or underlying etiology of liver disease in patients with and without IPS (all p=NS). Room air PaO₂ was significantly higher in patients with Grade 1-2 vs. Grade 3-4 IPS (88mmHg vs. 82mmHg, p<0.04). Two out of 110 (1.8%) patients with evidence of IPS fulfilled criteria for the Hepatopulmonary Syndrome (IPS with liver disease and a PaO₂ of less than 60mmHg). **Conclusions:** The prevalence of IPS in patients with liver disease was 56.4%. IPS was associated with a history of alcohol abuse and worse class of liver disease. Increasing IPS grade correlated with worsening room air PaO₂. The impact of IPS positivity and grade on transplant listing and outcomes needs to be determined. We recommend a saline contrast study should be performed on all patients with liver disease.

1112-147 Echocardiographic Manifestations of Obstructive Sleep Apnea Syndrome at Rest and With Dobutamine: A Guide to Effective Medical Management

Antonio Q. Chan, Marietta Abalos Galito, Estrellita Recaro Lua, Noel Antonio, Michael Philip Chan, Rosalinda Yutangco Mandreza, Peter Oliver Chan, Zhuo Wen Chen, Stanford University Medical Center, Stanford, CA, Chanwell Clinic, Cupertino, CA

Background: Obstructive sleep apnea syndrome (OSA) causes profound disturbance on cardiovascular physiology. Untreated OSA leads to hypertension that in turn increases the risks for coronary heart disease, pulmonary hypertension, heart failure and arrhythmias later on in life. We examined the various echocardiographic features on OSA patients and use these findings to triage patients for aggressive medical management.

Methods: All patients with documented OSA underwent resting echocardiogram (Recho) and Dobutamine echocardiogram (Decho). 265 patients (Male: Female 1.1:1 ages range 32-88) with OSA were entered in the study. **Results:** Recho: 252 (95%) have diastolic dysfunction (DDF), 217 (82%) have concentric left ventricular hypertrophy (cLVH), 119 (45%) have pulmonary hypertension (pHPN), 90 (34%) exhibited left ventricular dysfunction. Decho: 140 (53%) have segmental wall motion abnormality (SWMA), 225 (85%) have dobutamine-induced left ventricular end-systolic intra-cavitary gradient (LVESG), maximum gradient range 22-220 mmHg, mean 10-62 mmHg, 69 (26%) have combined SWMA, and LVESG, 156 (59%) have LVESG but no SWMA. 109 (41%) were shown to have coronary artery disease by coronary angiogram. DDF and cLVH were present in the

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