

ORAL CONTRIBUTIONS

2:30 p.m.

852 Echocardiographic Prognostic Markers

Tuesday, April 01, 2003, 2:00 p.m.-3:30 p.m.
McCormick Place, Room S102

2:00 p.m.

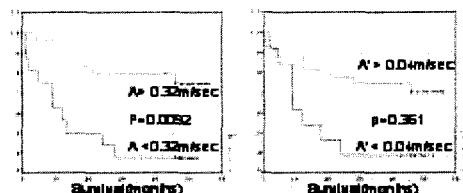
852-1 Identification of Long-Term Prognostic Markers in Heart Failure Patients With Restrictive Filling Pattern Using Doppler Echocardiography

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Background: Restrictive left ventricular filling pattern (RFP) is a well-known poor prognostic marker in patients with congestive heart failure (CHF). However, the information regarding the prognostic marker in CHF patients with RFP is scarce. The aim of the present study was to look for long-term prognostic markers in CHF with RFP using echocardiography.

Methods and results: 40 CHF patients (28 men, age = 54 ± 34 yrs) with RFP were followed for 35 ± 19 months. Using Doppler echocardiography, early (E) and late (A) filling velocities, deceleration time (DT) of E wave, and early and late (A') mitral annulus velocities were measured. The reversibility of RFP was defined as a reversal of E/A ratio with Valsalva maneuver. Mean ejection fraction was $30.0 \pm 12.7\%$. During the follow-up period, 16 patients died of cardiac causes. Nonsurvivors showed lower A (0.29 vs 0.37 m/s, $p = 0.04$) and lower A' (4.3 vs 5.3 cm/s, $p = 0.02$). Also, mortality was higher in patients with irreversible RFP (52 vs 13%, $p = 0.01$). However, left ventricular ejection fraction, DT of early filling and left atrial size did not show significant difference. Multivariate analysis revealed A' ($p = 0.02$), followed by A ($p = 0.04$), as the only independent predictor of subsequent cardiac death. Patients at high risk for fatal outcome could be identified by A' < 4 cm/s ($p = 0.030$, C.I. = 0.000-0.000) and A < 0.32 m/s ($p = 0.023$, C.I. = 0.000 - 0.048) in Cox regression analysis.

Conclusion: A' and A were independent prognostic markers in CHF patients RFP.



2:15 p.m.

852-2 Left Atrial Volume Is a Powerful Independent Predictor of Mortality in Patients With Ischemic Cardiomyopathy

Nikant K. Sabharwal, Roberto Cemin, Krishnamani Rajan, Michael Hickman, Avijit Lahiri, Roxy Senior, Northwick Park Hospital, Harrow, United Kingdom

Background: Previous studies have shown the value of Doppler derived diastolic function for prediction of outcome in patients with ischaemic cardiomyopathy. However, these parameters are load dependent. Left atrial (LA) volume is a load independent marker of diastolic function. We hypothesised that in the absence of significant mitral valve disease, LA volume may be an important predictor of mortality in patients with ischaemic cardiomyopathy.

Methods: Accordingly 109 patients with ischaemic cardiomyopathy underwent resting transthoracic echocardiography. Left ventricular ejection fraction (LVEF), Doppler derived diastolic parameters, LA dimensions and LA volume were assessed at the time of presentation with heart failure. Clinical and angiographic prognostic markers were also assessed. Image analysis was undertaken by two blinded observers. Patients were followed up for mortality.

Results: At baseline, LVEF was $26\% \pm 5.8$ (SD). Of the 109 patients, 47 (43%) underwent revascularisation within a mean 281 days (median 228 days) of the resting transthoracic echocardiogram and the rest continued with medical therapy. During a mean follow up of 61 months (median 73 months), 44 (40%) patients died. The univariate predictors of mortality were age ($p = 0.04$), peak E velocity ($p = 0.03$), LA diameter ($p = 0.02$), and absolute LA volume ($p = 0.02$). Various multivariate models were constructed utilising the data generated from the study. Absolute LA volume was the most consistent and significant predictor of mortality.

Conclusion: Absolute LA volume on resting echocardiography in patients with ischaemic cardiomyopathy is a powerful independent predictor of mortality.

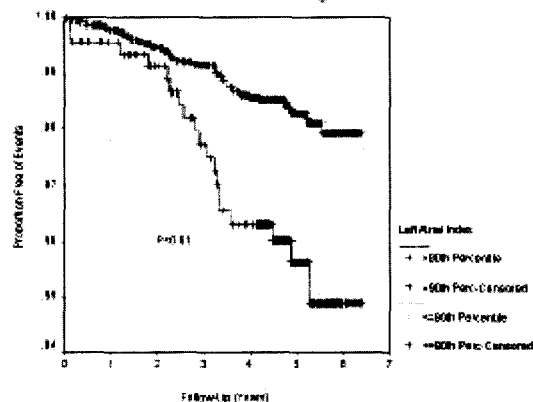
852-3

Left Atrial Size and Risk of Stroke in American Indians Free of Clinical Cardiovascular Disease

Jorge R. Kizer, David O. Wiebers, Jack P. Whisnant, James M. Galloway, Thomas K. Welty, Flisa T. Lee, Lyle Best, Mary J. Roman, Richard B. Devereux, Weill Medical College of Cornell University, New York, NY, Mayo Clinic, Rochester, MN

Prior studies have documented an association between left atrial (LA) size & stroke, but adjustment for other echo predictors has been incomplete. We investigated the predictive value of echo LA size for incident stroke while accounting for other established echo predictors. Our cohort comprised American Indians in the Strong Heart Study who underwent echo in 1993-95. Exclusion criteria: coronary/valvular disease; prior cerebral ischemia; atrial fibrillation; segmental wall motion abnormality; ejection fraction $\leq 35\%$. Prospective follow-up was obtained through 12/99. LA diameter was indexed by height, & an optimal sex-specific predictive cutoff was investigated. N = 2859, age = 58 y, women = 64.4%, hypertension = 54.3%, diabetes = 46.9%, cholesterol/HDL = 4.7, smoker = 30.6%, body-mass index = 31 kg/m^2 , alcohol = 34.3%, mitral annular calcification = 9.7%, LV mass index = 40 g/m^2 . Incident strokes = 60 (6 fatal). In Cox models adjusting for all foregoing variables, LA index was significantly associated with stroke (RR 6.5 per 1.0 cm/m increase; $P = 0.001$). LA index > 90th percentile (men > 2.50, women > 2.40 cm/m) was a strong univariable (Figure) & multivariable predictor (RR 2.7, $P = 0.004$). Our findings extend those of prior investigators, demonstrating the independent predictive value of LA index in American Indians when strong echo predictors are also taken into account. In subjects free of clinical cardiovascular disease, an elevated LA index should prompt aggressive risk factor modification.

Freedom From Fatal and Non-Fatal Stroke According to Left Atrial Index



2:45 p.m.

852-4

Effect of Left Ventricular Remodeling on Mortality in 35,602 Patients With Normal Systolic Function

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Background: The development of left ventricular hypertrophy is associated with an increase in mortality in general population studies and in patients with hypertension.

Methods: We assessed the impact of early concentric remodeling (CR) as well as definite hypertrophy on all cause mortality from a large echocardiographic database ($n = 35,602$) and with normal systolic function ($EF \geq 50\%$) (mean follow-up 3.1 years). Based on previously published criteria utilizing relative wall thickness (RWT) ($2 \times$ posterior wall thickness / LV end diastolic diameter; increased > 0.43), and LV mass index (LVMI) (increased > 104 g/m^2 in women and > 116 g/m^2 in men), we classified patients as normal (normal RWT and LVMI), CR (increased RWT, normal LVMI), concentric hypertrophy (CH) (increased RWT and increased LVMI) and eccentric hypertrophy (EH) (normal RWT, increased LVMI).

Results: See table (* $p < 0.0001$ compared to all other groups; † $p < 0.0001$ compared to normal; ‡ $p < 0.05$ compared to CR and EH, ¶ $p < 0.0001$ compared to normal and EH).

Conclusions: CR is a common finding, found in over one-third of patients referred for echocardiography with normal systolic function. This structural change is associated with a 2-fold increase in mortality, similar to the increased mortality with EH. CH is associated with a further increase in mortality. Greater attention is needed in the assessment of subtle ventricular structural changes that are commonly present on routine echocardiograms, particularly the common finding of CR.

Cardiac structure	Normal	CR	EH	CH
N	19,282	12,362	1939	2019
Age (yrs)	56.4 ± 15.6	$62.9 \pm 14.4^*$	$64.9 \pm 13.5^*$	$65.1 \pm 13.6^*$
EF	59.9 ± 4.3	60.8 ± 4.4	58.4 ± 5.1	60.4 ± 5.3
RWT	0.37 ± 0.04	$0.51 \pm 0.07^\ddagger$	0.38 ± 0.04	$0.52 \pm 0.08^\ddagger$
LV mass (g)	147.9 ± 46.0	$150.0 \pm 48.0^*$	$249.7 \pm 54.5^*$	$260.0 \pm 64.2^*$
LVMI (g/m ²)	69.1 ± 23.2	$65.5 \pm 27.2^*$	$128.4 \pm 21.6^*$	$134.6 \pm 28.0^*$
Mortality	4.4%	8.7%†	8.4%†	10.4%††