10:45

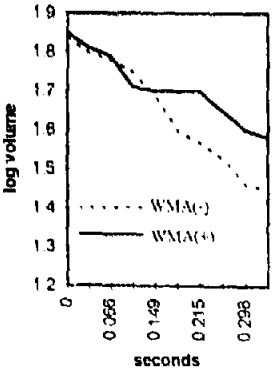
803-2 Automated Echocardiographic Confirmation of Regional Wall Motion Abnormalities: Quantitation of Continuous LV Volume

S.J. Fry, P. Hunziker, H. Bosch, H. Reiber, M.H. Picard. *Massachusetts General Hospital, Boston, MA, USA*

Background: The qualitative assessment of LV regional wall motion abnormalities (WMA) is challenging and subject to high inter-rater variability. Since the temporal sequence of regional wall motion is altered after infarction, we hypothesized that the temporal characteristics of LV volume during systole as determined by automated border detection (ABD) would also be altered and provide a simple, quantitative method of detecting WMA.

Methods: Two-dimensional echocardiograms from 73 patients referred for coronary disease were studied. Wall motion scoring was performed on all images to separate those with resting WMA (+) from normal (−). Cardiac cycles of the apical 4 and 2 chamber views were digitally acquired and transferred to a workstation where LV volume by Simpson's method was calculated for each frame utilizing endocardial borders automatically detected by a minimal cost contour detection algorithm. Log-transformed systolic LV volume was plotted against time yielding slopes which characterized the rate of LV emptying ($\Delta \log V/\Delta t$) in each patient.

Results: The population consisted of 49 WMA- and 24 WMA+. The $\Delta \log V/\Delta T$ derived from ABD volume analysis in both the apical 4 and 2 chamber views achieved statistical significance between the groups (WMA (−) vs. WMA (+): 4 chamber: 1.32 ± 0.59 vs. 0.87 ± 0.38, $p < 0.001$; 2 chamber: 1.27 ± 0.58 vs. 0.86 ± 0.40, $p < 0.001$).



Conclusion: This ABD parameter which is easy to derive from digital echocardiograms can identify patients with WMA and thus has the potential to improve confidence in WMA assessment and reduce interobserver variability.

11:00

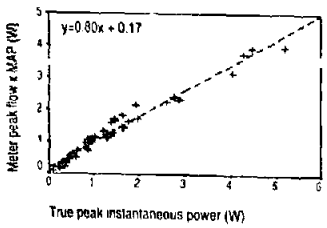
803-3 Cardiac Power can be Readily Estimated: Validation of a Simple Index

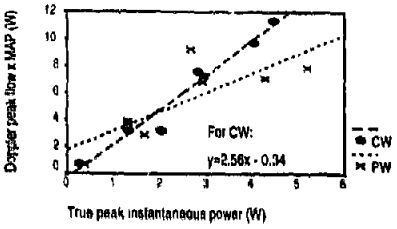
G. Armstrong, K. Fukamachi, S. Carlier, L. Cardon, J. Thomas, T. Marwick. *Cleveland Clinic Foundation, Cleveland, Ohio, USA*

Peak power (PP) measures LV function independent of geometry but requires estimation of central aortic pressure waveform. PP occurs shortly after peak flow, as LV pressure is rising. Seeking a simplified index of PP to be applied non-invasively, we used the product of peak flow and mean arterial pressure.

Methods: In open-chest animals peak aortic flow was measured with an ultrasonic flowmeter (FM) to validate our index; and by PW and CW Doppler epicardial echocardiography (peak velocity × aortic annulus area) to assess clinical applicability. Recordings were made at baseline, during partial aortic cross-clamping, dobutamine infusion, inferior vena cava compression and LV dysfunction.

Results: Correlations with true PP (the instantaneous product of aortic FM and Millar pressure catheter measurements): FM PP $r = 0.984$, $p < 0.0001$;





CW Doppler PP $r = 0.980$, $p < 0.0001$ and PW Doppler PP $r = 0.804$, $p = 0.016$ (see figs). Because Doppler measures the maximum (central luminal) flow, Doppler PP was greater than FM PP ($p < 0.05$). PW Doppler had the lowest correlation, probably because of difficulties in matching area measurements with sample volume location.

Conclusions: 1. Peak power can be accurately estimated from measurements easily obtained non-invasively. 2. This may simplify quantitation of contractile reserve in the echocardiography laboratory.

11:15

803-4 The Role of Pulmonary Venous Flow Velocities by Doppler Transesophageal Echocardiography in Constrictive Pericarditis

S.S. Kabbani, R.D. Murray, K.L. Arheart, A.L. Klein. *The Cleveland Clinic Foundation, Cleveland, OH, USA*

Background: Previous studies have shown that marked respiratory variation (%E) in mitral inflow and pulmonary venous flow velocities is characteristic of constrictive pericarditis (CP). A comparison of the extent of variation between mitral and pulmonary venous velocities by TEE has not been done in large number of cases.

Methods: We compared the %E of mitral inflow velocities with pulmonary venous velocities of 28 patients ages 59 ± 13 years with CP diagnosed by magnetic resonance imaging, cardiac catheterization, and surgical findings.

Results:

Mitral	Inspiration	Expiration	%E
E (cm/s)	56 ± 17	69 ± 19	19 ± 10
A (cm/s)	37 ± 16	46 ± 18	20 ± 10
Pulmonary			
S (cm/s)	36 ± 15	61 ± 25	35 ± 23
D (cm/s)	30 ± 13	61 ± 34	47 ± 17

More pronounced %E of left ventricular filling is seen by pulmonary venous peak D velocities as compared to that of mitral inflow E velocities 47 ± 17% vs 19 ± 10% respectively (p-value < 0.001). The same extent of respiratory variation was noted in 7 patients with A.fib (56.5 ± 13.3% vs 17.1 ± 3.2% p-value 0.018).

Conclusion: Characteristic patterns of respiratory variation in left ventricular filling in CP is best seen by pulmonary venous flow velocities which reflects the dissociation between intrathoracic and intracardiac pressures.

11:30

803-5 Mitral and Tricuspid Valve Prolapse: A Common association?

L.A. Freed, L.F. Pajin, M.B. Leavitt, R.A. Levine. *Massachusetts General Hospital, Boston, MA and Hospital Virgen De La Salud, Toledo, Spain*

Previous studies have reported that tricuspid valve prolapse (TVP) occurs frequently in patients with mitral valve prolapse (MVP) with a 20–50% prevalence. Recent advances in our understanding of 3D valve geometry, however, have improved the specificity for diagnosing prolapse. We therefore examined 2307 consecutive patients diagnosed with MVP over 7 years by current 2D echo criteria. TVP was diagnosed as superior systolic displacement in the RV inflow view (above the high points of the annulus in 3D). Tricuspid regurgitation (TR) was considered significant (moderate or severe) for jet area/right atrial area ≥20%. 91 patients (prevalence of 4%) were found to have prolapse of at least one tricuspid leaflet (table).

Compared with patients with MVP only, those with MVP and TVP more frequently had classic MVP with leaflet displacement >2 mm and thickened

	TVP patients (mean ± SD)
Age	57 ± 20 years
Sex (male)	45%
Maximum leaflet displacement	5 ± 2 mm
Maximum leaflet thickness	3 ± 1 mm
Significant TR	42%

MONDAY ORAL