Abstracts of Original Contributions: Computer Applications

The American College of Cardiology received 84 abstracts of original contributions involving computer technology. Six will be presented at an oral session on Tuesday and fifteen will be presented at poster sessions scheduled throughout the week. These may be found elsewhere in this issue of *JACC*. In addition, twelve abstracts have been scheduled for demonstration at info@ACC, a new area in the exhibit hall which will bring together activities related to computer technology. These are featured below.

In addition, the info@ACC area will feature a series of presentations related to Internet, a series of presentations on enhancing productivity using computer technology, hardware and software advising, as well as displays of computer-related ACC products.

Many excellent programs are planned, and we look forward to an exciting meeting.

Alfred A. Bove, MD, FACC
Chair
Information Technology Committee

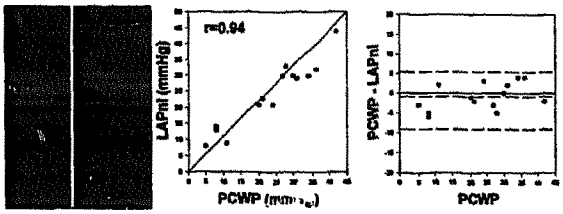
1050 Left Heart Analysis by Computer

Monday, March 25, 1996, 9:00 a.m.–12:30 p.m.
Orange County Convention Center, Hall C

1050-1 Computer-Assisted Noninvasive Measurement of Left Atrial Pressure

Jeffrey S. Soble, James H. Stein, Kuang-Lung Wu, Alex Neumann, Dae H. Kim, Joseph E. Parrillo, James Robergé, Richard H. Marcus. *Rush Medical College and Illinois Institute of Technology, Chicago, IL*

Left atrial pressure (LAP) can be measured from the diastolic blood pressure and mitral regurgitation (MR) Doppler spectrum, but this method is cumbersome and requires meticulous evaluation of hard-copy recordings. We developed and evaluated custom software which processes digital MR Doppler signals for use in measurement of LAP. *Methods:* Digital MR and aortic valve Doppler spectra were recorded in 14 patients during pulmonary artery catheterization. The interval from the ECG R-wave to aortic valve opening (AVO) was determined from the aortic valve Doppler. MR spectra were processed by averaging grey levels of individual ECG-gated pixel coordinates from 5–10 beats. The signal-averaged MR spectrum was used to determine the LV-LA gradient at AVO, which was subtracted from aortic diastolic pressure to give LAP. *Results:* Signal averaging (right picture) enhanced the spectral MR image, improved the signal : noise ratio, and facilitated identification of MR velocity at AVO. The correlation between invasive pulmonary wedge pressure (PCWP) and noninvasive LAP (LAPni) was good, with a bias of −0.9 ± 6.6 mmHg (± 2SD) and individual discrepancies of 6 mmHg or less.



Conclusions: Signal averaging enhances the sharpness of the MR Doppler envelope, and facilitates the computer-assisted measurement of LAP. This novel technique may improve other quantitative methods based on the MR Doppler spectrum and make possible accurate, fully-automated LAP determination.

1050-2 Accuracy of Computer-Generated Synthetic M-mode for Left Ventricular Regional Wall Thickening

Michael R. Bauer, Jeffrey S. Soble, Inhee Song, Alex Neumann, Philip R. Liebson, Joseph E. Parrillo, James Robergé, Richard H. Marcus. *Rush Medical College, Illinois Institute of Technology, Chicago, IL*

The clinical utility of wall thickening as a translation-independent quantitative parameter of regional left ventricular (LV) systolic function is limited by tedious data acquisition and loss of temporal continuity using 2-dimensional (2D) stop-frame images. We have shown that computerized redisplay of regional 2D data in M-mode format facilitates quantification of wall thickening in anterior and posterior (AP) segments, but this has not been evaluated in segments in the medial and lateral aspects of the 2D sector, where scan line density and specular definition are less. *Methods:* Digital 2D LV short axis images were acquired from 14 patients, along with conventional subcostal M-mode (M-conv) through the inferoseptal (IS) and posterolateral (PL) walls. An IS to PL synthetic M-mode (M-synth) was generated from the 2D cineloop using custom software. The IS and PL end-diastolic and end-systolic wall thicknesses [h(ed), h(es), mm] from M-synth and 2D images were compared with M-conv values. *Results:* Values are mean ± SD (* = P < 0.01). There were no significant differences between M-synth, 2D and M-conv values, for both the IS and PL walls, other than PL h(ed), which was overestimated by 2D. *Conclusions:* Computer generated synthetic M-mode facilitates accurate measurement of regional wall thickness in segments out of the AP dimension, and may be a clinically accessible method for translation-independent quantification of regional systolic function.

	M-conv	2D	M-synth
h(ed)-IS	9.8 ± 2.4	9.9 ± 2.3	10.0 ± 2.7
h(es)-IS	14.3 ± 3.5	13.4 ± 3.5	14.3 ± 4.0
h(ed)-PL	9.1 ± 1.7	10.5 ± 1.8*	9.6 ± 2.3
h(es)-PL	14.6 ± 3.1	14.8 ± 2.9	15.0 ± 2.7

*P < 0.01

1051 Computer Models of Cardine Function

Monday, March 25, 1996, 1:30 p.m.–5:00 p.m.
Orange County Convention Center, Hall C

1051-1 Computer Model That Characterizes Hemodynamics During Cardiac Tamponade and the Valsalva Maneuver

Ying Sun, Mazen Beshara[1], Richard J. Lucariello[1], Salvatore A. Chiaramida[1]. *University of Rhode Island, Kingston, RI;[1] Our Lady of Mercy Medical Center, Bronx, NY*

A comprehensive model that incorporates heart rate-arterial pressure feedback into an electrical analog model was developed to simulate complex physiological conditions such as cardiac tamponade and the Valsalva maneu-