Computer Applications: Cardiac Imaging and Physiologic Modeling
Tuesday, March 19, 2002, 4:00 p.m.-5:00 p.m.
Georgia World Congress Center, Room 267W

877 Quality Assessment in Management of Arrhythmias
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877-1 Decreasing Risk of Sudden Cardiac Death: A Role for Both Primary and Secondary Prevention
Caroline Fox, Jane Evans, Martin Larson, William Kannell, Daniel Levy, NHLBI's Framingham Heart Study, Framingham, Massachusetts.

Background: A decline in coronary heart disease (CHD) mortality in recent decades has been widely acknowledged. However, it is not known if there has been a parallel decline in the risk of sudden cardiac death (SCD).

Methods: We examined temporal trends in SCD in the Framingham Heart Study original cohort and offspring cohort from 1950 to 1966. SCD was defined as the onset of death with preceding symptoms lasting less than 1 hour, in the absence of resuscitation, and meeting the criteria for fatal ventricular fibrillation. CHF was defined as the presence of functional CHF, CHD was defined as the presence of clinical CHD, and other cardiovascular diagnoses were classified as other cardiovascular conditions.

Results: Over the study period, the rate of SCD decreased from 28.5 per 100,000 person-years in 1950-1956 to 14.4 per 100,000 person-years in 1965-1966 (p=0.001)

Conclusions: These data suggest that the overall risk of SCD has decreased by 50% since 1950, which is consistent with a reported 50% reduction in coronary heart disease mortality. This decrease has been observed both in subjects with and without CHD, with reductions seen across all age and sex subgroups.

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Telemedix, Westford, MA. Studies where then interpreted a) locally and b) remotely (from physician home 26 miles from hospital). Remote review of images was performed using the same software to access the server via a DSL line. Results. Uploading patient studies (8-10 loops) to the remote server was simple and took 6.1±3.3 minutes. Images were automatically "pushed" from the server to the remote home computer avoiding the need to wait for image download. Remote study review was completed within 2.3 minutes. Remote interpretation of the echo study was equivalent to the local reader for assessment of LV function, pericardial effusion and regional wall motion in all 20 patients. One patient had a discrepancy in the assessment of RV function. Conclusions. When using prototype software and a high-speed DSL line, remote (at home) interpretation of echocardiographic studies is feasible and accurate. This technology allows remote consultation and expert echocardiographic interpretation at all hours. This may prove most useful for the urgent echocardiographic evaluation of patients when an expert reader is not available on-site.

Reduction of Mitral Regurgitant V Wave by Biventricular Pacing Is Due to Acute Increase in Left Atrial Compliance and Not Improved Atrioventricular or Interventricular Synchrony: A Model-Based Study
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Background: Previous studies have demonstrated reduction or elimination of the V-wave in the pulmonary capillary wedge pressure (PC) in patients with mitral regurgitation (MR) treated with biventricular pacing (BVP). Methods: We utilized a previously presented hemodynamic model of the circulatory system to assess the mechanisms of the reduction of MR V-wave by BVP. The ventricular contractility and compliance were held constant to eliminate the effect of infraventricular synchronization by BVP. Results: The computer simulation demonstrated no effect of altering atrioventricular or infraventricular synchrony on the magnitude of the V-wave. A systematic analysis further showed that the V-wave is mainly affected by the left atrial (LA) compliance. As shown in figure, for a regurgitant mitral valve area of 1 square cm, V wave decreases in magnitude dramatically when the LA compliance is increased (PC to PC). However, disappearance of V wave is not associated with reduction of regurgitant flow; the pressure-volume loops indicate that both left ventricular hydraulic work and stroke volume decrease. Conclusions: The model study showed that acute increase of LV compliance is likely the mechanism of V-wave reduction by BVP, not infraventricular or atrioventricular synchrony.