

INTERNATIONAL SOCIETY FOR COMPUTERIZED ELECTROCARDIOLOGY
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Before 1 December 2004 email the abstract and submitter information as an attachment in MSWord format (*.doc) or Rich Text format (*.rtf).

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Using Simultaneous ECG and Acoustical Data to Evaluate and Monitor Patients Undergoing Cardiac Resynchronization Therapy

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Background: Despite the growing use of biventricular (BiV) pacemakers, optimization of the pacemaker timing, thresholds and sequencing remains difficult with only the ECG and limited echocardiographic parameters currently available to assist the clinician in the optimization process.

Methods: We obtained continuously recorded ECG and acoustical data from 10 consecutive patients during the A-V timing, V-V timing and threshold optimization procedures using Audicor™, a device that acquires, stores and algorithmically interprets simultaneous digital 12-lead ECG and cardiac sound data. For various pacer settings during the procedures, the E/A diastolic filling ratios were also determined using echocardiography.

Results: During the pacer optimization procedures the ECG revealed the depolarization patterns and specific rhythm abnormalities, whereas the heart sounds provided evidence of the following that were modifiable using appropriate pacemaker settings: 1) phrenic nerve stimulation related to LV threshold settings 2) transient systolic murmurs from papillary muscle dysfunction 3) third heart sounds suggesting hemodynamic abnormalities at (a) particular V-V timing and sequencing and (b) particular A-V timing and sequencing 4) impaired atrial emptying in diastole 5) low amplitude first heart sounds related to inappropriate A-V timing intervals and 7) suboptimal durations of electromechanical systole and of electromechanical diastole.

Conclusions: We conclude that the combination of electronically recorded heart sounds and ECG data provides relevant, actionable, easily obtainable and cost-effective information that facilitates the optimization of BiV pacemaker parameters.