

Admittance to Warn of Impending Heart Failure

In vivo left ventricular (LV) mechanics have been traditionally described by pressure volume relations. Although LV pressure measurement is straightforward, instantaneous LV volume measurement has been more problematic. One approach has been the use of electric fields to derive instantaneous LV volume. We will describe our admittance technique which solves the problem of current leakage into the myocardium which artificially increases the LV volume measured. Our solution has been commercialized for rodent and large animal studies. We then describe maturing this approach from an intra-cavitary measurement with fixed stimulating and sensing electrodes, to an epicardial approach with moving source and sense electrodes. The later approach can be used as a heart failure warning system to detect increasing LV preload when piggybacked onto cardiac defibrillators and bi-ventricular pacemakers in patients with congestive heart failure.

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