Lone CRT Underused in Heart Failure Therapy

No data show that biventricular pacemaker/defibrillators are better than the former alone.

BY BRUCE JANCIN
Denver Bureau

SNOWMASS, COLO. — American physicians are probably overtreating many patients with advanced heart failure and conduction delay by implanting combined biventricular pacemaker/cardioverter defibrillators, Dr. Michael R. Gold said at a conference sponsored by the Society for Cardiovascular Angiography and Interventions.

It's likely that in many such patients, a simpler biventricular pacemaker for cardiac resynchronization therapy (CRT) alone would achieve the same goals of reduced mortality, fewer hospitalizations, and improved quality of life, compared with medical management, according to Dr. Gold, professor of medicine and director of adult cardiology at the Medical University of South Carolina in Charleston.

"We do not have definitive data that biventricular pacemaker/defibrillators are better than biventricular pacing alone, despite being about four times the cost," he said.

Yet 9 out of 10 devices implanted for treatment of advanced heart failure in the United States are combination CRT/implantable cardioverter defibrillators (ICDs), whereas European physicians tend to favor CRT alone, he said.

And a landmark European trial, the Cardiac Resynchronization–Heart Failure (CARE-HF) study—"one of the most important studies ever done in this field," in Dr. Gold's view—showed that CRT without an ICD resulted in a 45% reduction in death from worsening heart failure and a 46% drop in sudden death over 3 years, compared with medical management, said Dr. Gold.

For now, however, it is not clear which specific patients ought to get a simple biventricular pacemaker rather than a combined CRT/ICD device; that issue is being investigated in the second Sudden Cardiac Death in Heart Failure Trial (SCD-HeFT-2).

In addition to the mortality benefit, cardiac resynchronization therapy brings impressive quality-of-life and economic gains. In the Multicenter InSync Randomized Clinical Evaluation (MIRACLE) trial, reported in 2002, CRT resulted in a 50-m improvement in 6-minute walk distance after 6 months. No heart failure drug provides an improvement of comparable magnitude.

CRT has been shown in multiple studies to cut hospitalizations by up to 50%, compared with medical management alone. "If you start to play that out, we're not talking about the expense of resynchronization, we're talking about the cost savings," Dr. Gold said.

"It actually saves money to put in a biventricular pacemaker in the right group of patients because the amount saved in hospitalizations more than offsets the cost of this therapy," he added.

Cardiac resynchronization therapy is so effective because it has been shown to increase myocardial contractility while reducing myocardial oxygen consumption. The only other treatment that can do that is a β-blocker.

"Biventricular pacing is essentially an electronic β-blocker for our patients. We see virtually the same response long term with β-blockers that we see with CRT," he explained.

He stressed that cardiac resynchronization therapy needs to be used in conjunction with optimal medical therapy. Indeed, CRT actually facilitates drug therapy. For example, by regulating blood pressure and minimizing hypotension, CRT permits uptitration of ACE inhibitors. And because CRT prevents bradycardia—a common limiting factor in β-blocker therapy—that drug can also be uptitrated.

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The CRT nonresponder rate is high—30% in most studies.

It's not widely appreciated that this nonresponder group includes a substantial number of patients who are made hemodynamically worse by biventricular pacing.

"These tend to be patients with a narrower QRS interval. I am often referred patients with a QRS interval of 120, 115, or even 110 milliseconds, with the comment that 'Their heart failure is bad—why don't you put in a biventricular pacemaker?' Well, one of the reasons not to is that you can make these patients worse. They're better off conducting through their native conduction system than to artificially be stimulated from the right ventricular apex or left ventricular free wall," Dr. Gold said.

"If you look at large patient series using QRS duration as a crude way to try to identify these groups of patients, you'll find that when you get out to 160-170 milliseconds, 80%-90% of patients are going to respond," he said. But down at 125 milliseconds only about 20% are going to be responders, and a very significant percentage of the others not only will not be responders but will have an adverse hemodynamic response to this therapy," he added.

Dr. Gold serves as a consultant to the device makers Guidant Corp. and Medtronic Inc. ■

Atrial Pressure Monitors May Reduce HF Hospitalizations

BY BRUCE JANCIN
Denver Bureau

SNOWMASS, COLO. — Implantable left atrial pressure sensors may provide a breakthrough in the outpatient management of heart failure by identifying impending acute decompensations hours to days before symptom onset, said Dr. James S. Forrester at a conference sponsored by the Society for Cardiovascular Angiography and Interventions.

"I believe that by using implanted hemodynamic sensors, the mechanisms responsible for acute decompensation of heart failure can be defined in the vast majority of patients, and that the physician can prevent these episodes using preplanned strategies. Implanted sensors will be able to decrease hospitalization, reduce progression of heart failure, and increase quality of life in these patients," said Dr. Forrester, professor of cardiovascular research at Cedars-Sinai Medical Center and professor of medicine at the University of California, both in Los Angeles.

Heart failure (HF) is "arguably the biggest problem in all of health care," he said. It already tops the list in terms of Medicare hospitalization costs, a situation that will only worsen with the aging of the population.

Implanted left atrial pressure sensors may also be able to reduce the progression of heart failure and increase quality of life for patients who have heart failure.

Dr. Gregg C. Fonarow of the University of California, Los Angeles, showed in previous research that HF patients with a well-controlled left atrial pressure (LAP) of 16 mm Hg or less at hospital discharge had a 46% lower mortality and 85% reduction in rehospitalizations, compared with those with a higher LAP.

By contrast, cardiac output, right atrial or pulmonary artery pressures, and systemic vascular resistance each failed to predict outcomes.

"Increased left atrial pressure is associated with increased acute and long-term mortality and is the real driver of heart failure rehospitalization," Dr. Forrester stressed.

There are two investigational implanted devices that are being developed for LAP assessment. The first is the Medtronic Chronicle, which is under review by the Food and Drug Administration for possible marketing approval. Dr. Forrester is involved in studies of a second device, the Savacor HeartPOD System, which was invented by colleagues at Cedars-Sinai.

The HeartPOD consists of a pressure monitor placed in the left atrium via transseptal catheterization and a handheld device that can convey information to the patient.

The device beeps at certain times during the day to remind the patient to record the LAP. It also stores the LAP waveform and gives the patient instructions that have been previously entered into the device by the physician.

The instructions could be about changes in medications and activity in response to different LAP levels, and, if warranted, a directive to contact the physician.

To date, the HeartPOD has been implanted in 18 heart failure patients, with a collective 76 months of follow-up. Although that is insufficient clinical experience from which to draw conclusions, the pilot study results are encouraging.

The number of total hospitalizations was significantly lower, compared with an equal period in the previous year, and there have been no unplanned HF hospitalizations or clinic visits since the monitors were activated, Dr. Forrester said.

The early experience with the HeartPOD has already yielded fascinating new insights into HF physiology. For example, huge fluctuations in LAP occur during the course of a day, most of which are asymptomatic.

But as LAP goes up, increasingly large V-wave peaks appear, which is evidence the patient is developing mitral insufficiency. And when LAP increases to a certain level, a patient often becomes dyspneic. Some patients exhibit diurnal variation in LAP, with the peak coming in the early morning. These LAP variations can be attenuated—and dyspnea often prevented—by preemptive changes in medications, according to Dr. Forrester.

The Medtronic device was assessed in the previously reported 274-patient Chronicle Offers Management to Patients with Advanced Signs and Symptoms of Heart Failure (COMPASS-HF) randomized trial.

In that study, physicians used data from patients' implantable monitors to guide HF therapy.

The patients had a 22% reduction in the primary study end point—the 6-month combined incidence of HF-related hospitalizations and emergency department and urgent-care visits—compared with controls.

However, this finding was not statistically significant, probably because the trial was underpowered, Dr. Forrester said.

But he noted that the Chronicle's sensor, which is placed near the right ventricular outflow tract and infers LAP indirectly from a measurement of pulmonary artery end diastolic pressure, could sometimes give inaccurate LAP results.

Dr. Forrester is chair of the scientific advisory committee for Savacor, a Research!America company. He holds a significant financial interest in the company. ■

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