CRT Outcome Influenced by LV Lead Position

BY BRUCE JANCIN

FROM THE ANNUAL MEETING OF THE HEART RHYTHM SOCIETY

DENVER — A left-ventricular lead positioned in the apical region in recipients of cardiac resynchronization therapy was associated with a significantly increased risk of death or heart failure hospitalization, compared with midventricular or basal lead positioning, in a secondary analysis of the landmark Multicenter Automatic Defibrillator Implantation Trial With Cardiac Resynchronization Therapy (MADIT-CRT).

"Based on this study we have enough data to suggest that the apical lead position is not a good place. ... My take-home message would be to avoid the apical lead position if you can," Dr. Jagmeet P. Singh said at the meeting.

An estimated 15%-20% of patients with CRT have their left-ventricular (LV) lead positioned in the apical region. Avoiding this lead position could cut down on the current overall CRT nonresponse rate of roughly 30%, added Dr. Singh, director of the CRT program at Massachusetts General Hospital, Boston.

MADIT-CRT involved 1,820 patients with minimally symptomatic heart failure, an LV ejection fraction of less than 30%, and a QRS duration of at least 130 msec, all of whom also met the standard criteria for receiving an implantable cardioverter defibrillator (ICD). They were randomized to receive an ICD only or a combined CRT plus ICD device (CRT-D).

In the previously reported main results, CRT-D was associated with a highly significant 34% reduction in the primary composite end point of death or heart failure hospitalization over 2.4 years of follow-up (N. Engl. J. Med. 2009;361:1329-38).

The new secondary analysis presented by Dr. Singh involved 799 CRT-D recipients with coronary venograms and chest x-rays obtained at device implantation. These imaging studies were analyzed in a central core laboratory to determine the LV lead position, which was apical in 14%, midventricular in 63%, and basal in 23%.

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DR. SINGH

The rate of death or heart failure hospitalization during 2.4 years of follow-up was 22% in patients with the LV lead in the apical region, 14% with a midventricular location, and 10% with a basal location. The thought is that an LV lead in the apical region is placed too close to the right-ventricular lead to allow the full benefits of resynchronization to occur, the investigator explained.

In a multivariate Cox analysis, an apical lead position was associated with an adjusted 1.6-fold increased risk of death or heart failure hospitalization, compared with nonapical positioning. The apical position also was associated with a 2.6-fold increased risk of mortality.

Importantly, the MADIT-CRT analysis also showed that there was no difference in outcomes regardless of whether patients had their LV lead in an anterior, posterior, or lateral position in the midventricular or basal region. All proved superior to apical positioning, contrary to the conventional wisdom.

"Oftentimes we're constrained by the limitations of venous anatomy, but I think we now realize that some of the locations that we considered suboptimal, like the anterobasal region, are not as detrimental as an apical lead placement," Dr. Singh continued.

Scientific Sessions Program Committee Chair Bruce L. Wilkoff predicted in an interview that this report from MADIT-CRT will have a big impact.

"This probably will change practice to some degree because it's counterintuitive to the way some people have been thinking.... It formerly had a negative connotation, but now if you have a choice between apical and anterior you're going to move the lead more anteriorly," said Dr. Wilkoff, professor of medicine and director of cardiac pacing and tachyarrhythmia devices at the Cleveland Clinic Foundation.

The MADIT-CRT data also open the door to consideration of redo procedures with alternate lead positions in CRT nonresponders with an apical LV lead position.

"CRT is one of the few things you can do for people with bad heart failure short of transplantation. If you've done your best and it's still not working, and you've put the lead in a spot you now have reason to believe won't be very useful, you might be willing to open their chest and do other things," Dr. Wilkoff added.

However, discussant Dr. Michael R. Gold said it's too early to give up on apical lead positioning altogether.

"There has been a drive that's almost an obsession with trying to place the lead on the LV free wall," he observed. "The lesson learned from recent LV lead position studies is it's much more complicated than we thought. Don't abandon an implant if a good lateral wall vein isn't found. I think there are now compelling data that there are good responses with an anterior lead. There probably is no 'sweet spot,' " said Dr. Gold, professor of medicine, chief of cardiology, and medical director of the Heart and Vascular Center at the Medical University of South Carolina, Charleston. ■

Disclosures: *MADIT-CRT was sponsored by Boston Scientific. Dr. Singh, Dr. Wilkoff, and Dr. Gold disclosed that they receive research grants from and serve as consultants to all the major implantable cardiac device companies.*

Cardiac Device Shock-Reduction Strategies Validated

BY BRUCE JANCIN

FROM THE ANNUAL MEETING OF THE HEART RHYTHM SOCIETY

DENVER — Programming implantable defibrillators using specific shock-reduction strategies safely reduced shock rates by 17%-28% in an observational study of nearly 89,000 cardiac device recipients at more than 2,500 U.S. centers.

This study of unprecedented size, featuring 221,000 patient-years of comprehensive follow-up, clearly demonstrates that implanting cardiac resynchronization therapy defibrillators (CRT-Ds) or implantable cardioverter defibrillators (ICDs) using preprogrammed, default-mode settings needlessly exposes device recipients to the morbidity of extra shocks, Dr. Bruce L. Wilkoff said in presenting the study findings at the meeting.

"This is important data because it allows physicians to reconsider the choices that they're making," added Dr. Wilkoff, professor of medicine and director of cardiac pacing and tachyarrhythmia devices at the Cleveland Clinic Foundation.

He reported on 88,804 patients who received a dual-chamber ICD or CRT-D and were followed for an average of 2.5 years through Medtronic's CareLink database, which provides complete data on all device interrogations.

During follow-up, 64% of patients had no shocks or episodes of antitachycardia pacing (ATP), 14% had ATP only, and 22% experienced a collective 72,239 shock episodes.

A multivariate analysis identified the key shock-reduction device programming strategies. Switching on the supraventricular tachycardia discriminator was independently associated with a 22% decrease in the rate of shock episodes per 100 patient-years. Switching on ATP for fast ventricular tachyarrhythmias reduced the shock rate by 28%. Lengthening the number of intervals required to detect ventricular tachychardia/ventricular fibrillation (VT/VF) to 24/32 or 30/40, thereby allowing some episodes to terminate spontaneously, decreased the shock rate by 17%.

"The clinical implications are that physicians should choose strategic programming, including increasing VT/VF detection rates and duration thresholds, and turning on SVT discriminators and ATP for fast VTs," he stressed.

The analysis also highlighted those device programming settings resulting in increased shock rates. For example, 37% of devices were set to detect VT/VF after 12/16 intervals, and patients with those devices had a 55% increase in their shock rate. Devices programmed for a slower VT/VF detection threshold had a shock rate up to 148% greater than with longer detection durations.

Importantly, patients with atrial fibrillation with a rapid ventricular response of 180 bpm or more had a shock rate 244% greater than patients without atrial fibrillation, and 149% greater than patients with atrial fibrillation and a controlled ventricular response, Dr. Wilkoff said. ■

Disclosures: *The registry study was supported by Medtronic. Dr. Wilkoff is a consultant to Medtronic and the other major device companies.*

MY TAKE

Program Devices to Minimize Shocks

This huge registry study convincingly corroborates what has been seen in earlier, far smaller studies.

Shocks are not benign. Whether appropriate or inappropriate, they are associated with increased mortality. People are still teasing out whether the shocks themselves are dangerous or just markers, but clearly we know that the more shocks patients have, the worse their outcome and their quality of life.

The registry shows that more than 40% of patients have devices programmed with traditional default-setting rate cutoffs and detection intervals. Clearly, there is a great opportunity to reduce shocks further with better adoption of these evidence-based programming strategies. The lesson that the registry tells us is we have a long way to go to do what we've proven should be done.

MICHAEL R. GOLD, M.D., *is professor of medicine, chief of cardiology, and medical director of the Heart and Vascular Center at the Medical University of South Carolina, Charleston. He made his remarks as the designated discussant of the paper. Dr. Gold disclosed that he is a consultant for Medtronic and several other major device companies.*