STE-Guided Lead Placement Improved Outcomes

VITALS

Major Finding: For the primary end point of echocardiographic response, defined as a greater than 15% change in left ventricular end systolic volume from baseline to 6-month follow-up, the speckle-tracking echocardiography group had a 70% response and the standard placement group had a 55% response ($P = .031$).

Data Source: A single-blinded, randomized, controlled trial of 220 patients recruited from three different hospitals in the United Kingdom. Participants were in sinus rhythm, had NYHA class III/IV heart failure, left ventricular ejection fractions less than 35%, and QRS intervals greater than 120 milliseconds.

Disclosures: Dr. Khan said he had no relevant financial disclosures.

BY ALICE GOODMAN

FROM THE ANNUAL MEETING OF THE AMERICAN COLLEGE OF CARDIOLOGY

NEW ORLEANS – Using speckle-tracking echocardiography to guide pacemaker lead placement improved the outcomes of cardiac resynchronization therapy for patients with severe heart failure in the TARGET trial.

When speckle-tracking echocardiography (STE) was used to identify target sites for pacemaker lead placement for individual patients, leads were more likely to be placed at concordant sites. The result was improved echocardiographic response at 6 months – defined as a greater than 15% change in left ventricular end systolic volume (LVESV) from baseline to 6-month follow-up. The STE group had a 70% response as compared with a 55% response in the group with conventional

lead placement without echocardiography guidance ($P = .031$), said Dr. Fakhar Z. Khan of Cambridge (England) University, who reported the results of the TARGET (Targeted Left Ventricular Lead Placement to Guide Cardiac Resynchronization Therapy in Patients with Heart Failure) trial at the meeting.

Lower rates were also seen with STE for the combined end point of all-cause mortality and heart failure hospitalization. The difference was primarily driven by fewer heart failure hospitalizations. Looking at mortality alone at a mean follow-up of 400 days, the investigators found the two groups did not significantly differ.

"This is a well-designed, well-conducted study with impressive differences in clinical outcomes," said Dr. Byron Kwock Lee, who is with the University of California, San Francisco, and chaired the session where the TARGET results were presented. "Other studies have shown echocardiographic outcomes but have had difficulty showing clinical differences."

"I am impressed that the modest echocardiographic changes translated to dramatic clinical effects," commented Dr. Michael Crawford, also of the University of California, San Francisco, and a panelist at the presentation of the study results.

Up to 40% of patients fail to gain significant clinical benefit from cardiac resynchronization therapy, Dr. Khan noted. The position of the left ventricular lead has emerged as an important determinant of response, with better results achieved when pacing at the latest site of contraction and lesser responses noted when pacing areas of scar.

Speckle-tracking radial strain imaging correlates with delayed enhanced cardiac MRI for determination of scar, Dr. Khan said. In patients undergoing cardiac resynchronization therapy, less than 10% amplitude of radial strain at the left ventricular pacing site has a high negative predictive value (91%) for response.

Using STE, "we found that concordant lead placement, baseline dyssynchrony, and pacing away from areas of scar are strongly related to improved outcomes," he said.

The single-blinded, randomized, controlled trial enrolled 220 patients recruited from three different hospitals in the United Kingdom. Participants were in sinus rhythm, had severe heart failure (New York heart Association class III/IV), left ventricular ejection fractions less than 35%, and QRS intervals greater than 120 msec. Patients were randomized in a 1:1 ratio to receive either standard lead placement without the benefit of echocardiographic guidance or targeted lead placement using STE to position the lead at the latest site of contraction and away from areas of scar. Following implantation, all devices were optimized using echocardiography.

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Concordant lead placement was achieved in 61% of the STE group vs. 45% of control group. Placement was adjacent in 25% of the STE group and 28% of the control group, and was remote in 10% and 24%, respectively.

At baseline, both groups were comparable in demographic and disease characteristics. Mean age was about 70 years, about 86% were male, about 94% had NYHA class III heart failure, and 56% had underlying ischemic cardiomyopathy.

Both groups had a 14% rate of implant-related complications. Procedural length of time was similar for both groups.

In addition to the primary end point improvements in echocardiographic response at 6-month follow-up, the STE group also had significantly improved clinical end points, compared with the standard placement group. Statistically significant differences from baseline to follow-up for the STE group vs. the standard placement group included improvement in heart failure class, 6-mile walk test results, and quality of life scores.

Patients in the study will continue to have ongoing follow-up.

"STE software can be applied to any existing echocardiographic image at no additional risk to the patient," Dr. Khan said.

"STE makes targeting of the lead feasible at any facility that performs echocardiography and has the software available to analyze their images, so it is widely accessible at smaller centers and nonacademic hospitals where more and more pacemakers are being implanted. That being said, it requires training and experience." ■