

LETTERS TO THE EDITOR

Robot Schmobot . . .

Our eyes rolled as we read the recent report by DeRose et al. (1) concerning robotically assisted left ventricular epicardial lead implantation for biventricular pacing. This report joins a long progression of reports of operations, cardiac and otherwise, using the daVinci robotic surgical system. The procedure was done using double-lumen left endobronchial intubation, single-lung ventilation, 8–10-mm Hg positive-pressure left chest insufflation, four small incisions (each likely 1 to 2 cm), and took between 30 and 180 min of robotic operating time alone (not counting double-lumen tube placement with bronchoscopic position confirmation, and robot setup time).

Our hospital also has a daVinci robot system, but we have chosen not to use it for epicardial lead placement. Rather, when difficulty has arisen with coronary sinus lead placement in the electrophysiology suite (four patients in the last few months), the generator and right-sided leads are left in place, the wound is closed, and the patient is taken to the operating room at the next convenient opening. We use a simple single-lumen endotracheal tube, a rolled towel under the left chest, and make a 6-cm or less left anterior-lateral incision with minimal spreading of the ribs using two hand-held Army-Navy retractors for left ventricular epicardial lead placement. The procedure takes about 8 to 10 min, including skin closure (even in the face of previous coronary bypass grafting). The lung is not in the way; the enlarged left ventricle rests right under the pleura in the anterior-to-mid-axillary line. No paracostal sutures are needed for closure as the ribs are essentially not spread. The patients have reported no more pain from this incision than from their pacemaker site. The skin incision is small, cosmetic, follows the natural skin lines, and rides in the subpectoral or breast-fold crease.

The available data suggest that pacing either the mid-lateral free wall (easily accessed through anterior-lateral thoracotomy) or the posterobasal left ventricle gives comparable hemodynamic results (2). We agree with the authors' assertion that these patients are fragile. Does the theoretical benefit of being able to reach the posterobasal left ventricle using the robot justify the extra cost (robot, set-up time, and disposables), extra operating time, extra manipulation (double-lumen tube with position confirmation, pulmonary artery catheter, transesophageal echocardiography, 4 incisions instead of 1, and a small drain site), and extra physiologic load (right lung ventilation, collapsed left lung with positive intrathoracic pressure)? The alternative operation is simple, inexpensive, quick, cosmetic, and truly minimally painful.

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REFERENCES

1. DeRose JJ Jr, Ashton RC, Belsley S, et al. Robotically assisted left ventricular epicardial lead implantation for biventricular pacing. *J Am Coll Cardiol* 2003;41:1414–9.
2. Auricchio A, Klein H, Tockman B, et al. Transvenous biventricular pacing for heart failure: can the obstacles be overcome? *Am J Cardiol* 1999;83 Suppl 5B:136D–42D.

REPLY

In “rolling their eyes” in response to our recent report on robotic biventricular pacing, Drs. Lick and Saeed failed to “see” the potential impact of an endoscopic, site-directed approach. Based on their limited experience (four patients) of left ventricular (LV) lead placement through a small anterior thoracotomy, they have concluded that this approach is superior to robotic, endoscopic lead placement. Unfortunately, follow-up echocardiographic and clinical data are unavailable on these patients, and supporting data for this approach are lacking in the contemporary international literature.

We have performed over 100 limited anterior and antero-lateral thoracotomies for both minimally invasive mitral valve repair and robotically assisted minimally invasive coronary artery bypass graft (CABG). These incisions have propelled forward the field of minimally invasive cardiac surgery, and we continue to work toward totally endoscopic treatments for complex cardiac disease. However, it was our vast experience with these incisions that made us conclude that this was exactly the *wrong* approach for the intricacies of biventricular pacing. In our experience with both single- and multi-vessel robotically assisted minimally invasive CABG through a limited (6 cm) antero-lateral thoracotomy, we have found that even with endoscopic stabilization in *normal-sized* hearts, the most lateral access to the LV is the region of a ramus intermedius or high obtuse marginal vessel. In the massively enlarged hearts that we have encountered in our robotic biventricular pacing experience (mean left ventricular end-diastolic diameter, 6.9 cm), the obtuse marginal (OM) vessels are displaced even further laterally into the left chest. In these cases, limited anterior thoracotomy results in a “keyhole” view of, at best, the region of the first diagonal and mostly the region of the left anterior descending coronary artery (LAD). If Drs. Lick and Saeed were able to access the true lateral wall (region between OM1 and OM2) with this incision, then they have accomplished something in four cases that minimally invasive CABG surgeons have been trying to do in normal hearts for the past five years. Limited lateral and postero-lateral thoracotomy with the patient in the full decubitus position has been described for OM access, but this is not the procedure that the authors are referring to.

As electrophysiologists have known for years, LV stimulation site is critical to the success of cardiac resynchronization therapy (CRT). In both short- and long-term studies, it is clear that coronary sinus leads in the postero-lateral distribution provide better hemodynamic results than lateral sites, which provide still better augmentation than anterior sites (1,2). The obvious advantage to the robotic, totally endoscopic approach is the ability to access the *entire* LV. This access allows both electrophysiologic and echocardiographic mapping of the LV in order to delineate the best LV site for CRT. It is our hope that we will be able to improve