



## Off-pump ventricular assist device implantation: Easy as 1, 2, 3?

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Left ventricular assist devices (LVADs) undoubtedly will be implanted in a growing number of patients with end-stage heart failure.<sup>1</sup> Advancements in the field are encouraging in both the technology of the devices themselves and the approaches to operative technique and management.<sup>2</sup> In this issue of the *Journal*, Potapov and colleagues<sup>3</sup> describe a bilateral thoracotomy approach for implantation of the off-pump HeartMate 3 LVAD (Thoratec, Pleasanton, Calif). The authors should be congratulated for pushing the envelope in terms of performing this operation with theoretically less operative burden to the patient.

There are several concerns regarding this approach. There are certain situations in which this technique would not be feasible, such as the need for concomitant valve surgery. Another limitation of the technique is that it requires 2 skilled surgeons to perform components of the operation. In terms of operative planning, the left thoracotomy may be suboptimally positioned initially or need to be extended if there is significant apical displacement, for example, in patients with dilated cardiomyopathy. Moreover, the current footprint of the HeartMate 3 LVAD, although smaller, requires a reasonably sized thoracotomy to allow mediastinal placement of the pump. Although this avoids sternotomy, it is likely pushing the limits in terms of defining the approach as minimally invasive. With limited exposure, sewing of the inflow ring or attaching the device with the novel clamp that Potapov and colleagues<sup>3</sup> describe may prove challenging to surgeons less experienced with this technique. Although the authors nicely describe their method of sizing and positioning the outflow graft, this portion of the operation can be a nuisance, particularly with limited exposure. Too short of a graft places undue tension at the anastomosis, and too long of a graft can lead to kinking and issues with maintaining adequate flows or thrombosis. There is also a question of how much better

### Central Message

Implantation of the off-pump HeartMate 3 (Thoratec, Pleasanton, Calif) device via bilateral thoracotomy is attractive in avoiding a sternotomy and bypass, but there are concerns that should be carefully assessed before surgical intervention.

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this approach would truly be for a patient's recovery than a traditional sternotomy. Bilateral thoracotomy is certainly painful to a patient, and there is always a risk of conversion to sternotomy, which would generate even more pain and slower recovery. Finally, in the eleventh hour, when there is significant bleeding, or a need for right ventricular support, and the patient is unstable, minimizing delays in tackling the problem at hand is crucial. Although it can be done expeditiously, going on bypass through the groin and proceeding with sternotomy will take longer in these situations compared with the traditional approach.

Despite these concerns, this technique is attractive in that it has several advantages, including avoidance of an initial sternotomy in patients being bridged to transplant. There is also avoidance of cardiopulmonary bypass, which is beneficial in terms of minimizing bleeding and other associated adverse effects of bypass. In turn, less blood product use may be helpful, particularly in limiting sensitization in patients being bridged to transplant. Surgeons need to have several tools and tricks to optimally care for patients. Potapov and colleagues<sup>3</sup> should be congratulated again on advancing the surgical technique and providing additional strategic options in managing patients with heart failure.

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