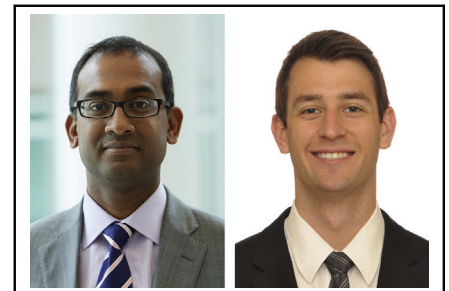


See Article page 55.



## Commentary: Intraoperative cryoablation during HeartMate 3 left ventricular assist device implantation for refractory ventricular arrhythmias: *Ipsa scientia potestas est*



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Despite a lack of complete hemodynamic collapse in patients with ventricular arrhythmias (VAs) on left ventricular assist devices (LVADs), several studies have demonstrated the presence of VA as a significant contributing factor to postimplant morbidity and mortality.<sup>1-3</sup> Although VAs in patients with LVADs may result from scar formation from around the inflow cannula, the most significant predictor of postimplant VA is the presence of preimplant VA.<sup>2,3</sup> Several small sample studies have demonstrated efficacy of VA ablation at time of LVAD implantation in reducing the burden of postimplant VA,<sup>4-6</sup> although to date no study has evaluated surgical ablation in patients receiving newer-generation HeartMate 3 (HM3; Abbott, Abbott Park, Ill) LVADs.

In this issue of the *Journal*, Orozco-Hernandez and colleagues<sup>7</sup> describe the use of intraoperative cryoablation to treat VA in a patient receiving a HM3 LVAD. The patient was a 71-year old man with advanced heart failure and recurrent monomorphic ventricular tachycardia (VT) presenting with recurrent episodes of VT-related decompensation despite 2 previous radiofrequency ablations as well as biventricular implantable cardioverter defibrillator placement. The source of his VT was infarct scar-mediated.

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### CENTRAL MESSAGE

Cryoablation at time of HeartMate 3 LVAD placement can reduce postoperative ventricular arrhythmias. A larger, more rigorous evaluation of safety and efficacy of treatment is necessary moving forward.

Intraoperative endocardial cryoablation was performed on a fully arrested heart through an apical ventriculotomy and was extended to create a surrounding ablation tract to prevent reentry circuits. The patient did demonstrate evidence of right ventricular (RV) failure in the operating room requiring temporary RV support and did experience 1 episode of VT in the early postoperative period requiring defibrillation and pharmacologic treatment. Both of these, however, resolved with time and his RV support was weaned with no further episodes of VT beyond 72 hours from surgery. At time of latest follow-up (5 months), he remained well-compensated without further episodes of VT or implantable cardioverter defibrillator shocks. Admittedly, there does remain the question of whether the VT would have improved with VAD implant and decompression of the ventricle.

The proposed benefit of intraoperative catheter ablation in reducing postoperative VAs at the time of LVAD implantation is 3-fold. Preoperatively, the procedure addresses a patient population known to be at risk of developing VA in the post-LVAD implant setting who have already not responded to conservative measures. Intraoperatively, it allows for precise ablation under direct visualization of both epi- and endomyocardial targets. Postoperatively, it minimizes the potential need for further catheter-based therapies to treat VA that may be

complicated by the postoperative state with intraventricular hardware, including potential for interaction with the VAD suction and rotor. Limitations to intraoperative ablation are well described by Gopinathannair and colleagues<sup>8</sup> in a recent statement from the American Heart Association and highlight the challenges presented in precise electrical mapping owing to an inability to use precordial leads as well as noise generated from the HM3 device. In addition, pump thrombosis remains a concern, especially in patients with endocardial ablation.<sup>6</sup> Although these provide additional technical obstacles, more advanced preoperative electrophysiologic mapping and continued careful postoperative vigilance may assist in reducing these concerns.

Overall, Orozco-Hernandez and colleagues deserve commendation for promoting the growth of understanding of the feasibility of an infrequently used therapy in their case report and continuously progressing this evolving field. For the subset of patients with refractory VA before LVAD implantation, intraoperative catheter ablation may be a viable therapy.

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