Commentary: When less is more: Is valve repair the optimal intervention for aortic insufficiency at time of ventricular assist device implantation?

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Pavan Atluri (left) and Jason J. Han (right)

Central Message

Aortic valve repair using annuloplasty may offer a safe and effective option for patients with aortic insufficiency at the time of ventricular assist device implantation.

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As the use of left ventricular assist devices (LVADs) continues to increase, especially for long-term, destination therapy, progressive aortic insufficiency (AI) is a major limitation to its durability.¹ The etiology is believed to be multifactorial, driven by both the device-generated pressure gradient across the aortic valve (AV) as well as the subsequent structural changes that take place such as annular dilatation, mal-coaptation of AV leaflets, and eventual commissural fusion.² Clinicians have proposed that allowing the AV to open intermittently as a potential option to mitigate the risk of developing AI; however, this is not always feasible nor proven. Worsening AI eventually results in significant recycling of device output and therefore decompensated heart failure (HF), which poses a challenge to the HF community because by this point their risk in undergoing conventional open-heart surgery may be significantly elevated. Although transcatheter approaches have been reported to treat the development of de novo AI, this area remains largely anecdotal and remains to be fully investigated for this off-label use.³

More than 30% of patients develop de novo, greater-than-moderate AI by 2 years after LVAD implantation.⁴ Existing AI, as in the case presented by Barac and colleagues⁵ in this issue of *the Journal*, must be addressed at the time of implantation.⁶ However, finding the solution has been challenging because previous studies have suggested an increased mortality in patients who undergo concomitant AV repair, replacement or closure, as the added operative insult is likely poorly tolerated in this patient population.⁷ Particularly, methods of AV closure such as Park's stitch may increase the risk of sudden death in the setting of device failure or thrombosis.⁸ Moreover, AV replacement may be associated with bioprosthetic valve thrombosis and fusion.

In this setting, the authors' report of successful AV ring annuloplasty proposes a meaningful alternative for patients with existing AI or at high risk of developing de

novo AI at the time of implantation. The compelling benefits include the ability to conserve the integrity of native AV leaflets, which may further protect against VAD-related AI. Annuloplasty appears to be successful in the short term, as the authors report minimal AI at a 2-month follow-up; its mid- to long-term durability as well as effects of AV opening status remain to be explored. Furthermore, patient selection will be critical to the success of annuloplasty, which may be less effective in addressing AI that is secondary to causes other than annular dilatation such as leaflet degeneration. One foreseeable limitation is that because the pathologic changes associated with de novo AI appear to be related to commissural fusion, it is difficult to know whether this corrective approach will be durable long term. Lastly, based on this report, it is difficult to ascertain just how much crossclamp or bypass time this approach will ultimately save compared with a Park stitch or AV replacement. In this patient cohort, crossclamp time is not trivial for an often-associated dysfunctional right ventricle.

Overall, the authors ought to be congratulated for their successful demonstration of concomitant AV annuloplasty at the time of LVAD implantation with excellent short-term outcome. As the HF and MCS community seeks to address the feasibility of long-term VAD support to potentially rival the durability of heart transplantation in certain patients, mitigating the risk of AI is crucial. By combining

their expertise in mechanical circulatory support and valvular surgery, they have raised a compelling, innovative alternative to the existing surgical repertoire in the literature for this rapidly growing population.

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