Commentary: Mitral valve repair with left ventricular assist device implantation: Yes! But who?

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Significant functional mitral regurgitation (MR) is present in most patients undergoing left ventricular assist device (LVAD) implantation.¹⁻⁴ It is generally accepted that MR present at the time of LVAD implantation resolves as a consequence of ventricular unloading afforded by the LVAD, which promotes favorable reverse remodeling.⁴ As a result, MR present at implantation is thought to have little impact on LVAD outcomes and routine mitral valve (MV) repair has not been advocated because of lack of knowledge of the risk/benefit ratio of the intervention and the inability to identify patients at risk for residual MR.^{4,5} Recent data, however, have suggested that residual MR is associated with persistent pulmonary hypertension, worse right ventricular function, and significantly shorter time to hospitalization and death,⁶ and patients undergoing concomitant MV repair have less late right heart failure,⁷ an improvement in quality of life, and a reduced hospital readmission rate.⁸

In this issue of the *Journal*, Pawale and colleagues⁹ report on a single-center experience of concomitant MV repair in 78 consecutive patients with severe MR undergoing LVAD implantation and compared outcomes with those of 28 historical control patients. The investigators observed no significant differences in 30-day mortality, major adverse events, or postoperative hemodynamics; however, they observed significantly less residual MR (greater than mild) in the group receiving MV repair (0% vs 29%, respectively; $P < .001$). The cumulative incidence of readmission for heart failure at 2 years was lower in the MV repair group than in non-MV repair group (7.1% vs 19.7%; $P = .02$).

The study by Pawale and colleagues⁹ is relevant to the current controversy regarding concomitant MV repair, and their observations are consistent with previous findings reported by Fukahara and associates⁷ and Robertson and co-workers.⁸ These data add to mounting evidence that residual MR after LVAD implantation adversely influences

Concomitant mitral valve repair at the time of LVAD implantation.

Central Message

Mitral valve repair for severe mitral regurgitation at the time of LVAD implantation decreases the incidence of significant residual mitral regurgitation and reduces the risk of hospital readmission.

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LVAD outcomes and that MV intervention to abate residual MR improves outcomes.

Despite the importance of these observations, there are a number of limitations of this study. These include a study design that used a historical control group, significant differences in baseline characteristics of the groups, and high incidence of concomitant tricuspid valve repair in the contemporary cohort, adding an important confounder that may not have been completely accounted for by statistical methodology. Further, mean cardiopulmonary bypass times exceeded 2 hours in the contemporary cohort receiving MV and tricuspid valve interventions, suggesting that these procedures can add risk to LVAD implantation alone.

Does the current level of evidence support routine intervention in all patients with severe MR undergoing LVAD implantation? In the study by Kassis and colleagues,⁶ significant residual MR was present in only 20% of patients. LVAD implantation alone is thus effective in resolving MR in a majority of cases. The important question is “How can we identify those patients at risk of significant residual MR who would potentially benefit from MV repair?” Importantly, one group of patients that may be at particular risk would be those with significant impairment of right ventricular function, for whom maximal unloading of the right ventricular might decrease the risk of late right heart failure. It is difficult to advocate for routine MV repair in

all patients with significant MR, particularly in the absence of a clear survival benefit, and based on the current level of evidence from nonrandomized, single-center studies. As in the debate regarding treatment of functional MR in patients not receiving LVAD support, the most informative recommendations have arisen from multicenter, prospective, randomized clinical trials.¹⁰⁻¹²

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