Turn up the pump or fix the leak?

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Mitral regurgitation (MR) is the most common valvular pathology in patients with advanced congestive heart failure.¹ The majority of this MR is functional, a result of the ventricular dilation and spherical remodeling associated with heart failure. Ventricular decompression with left ventricular assist devices (LVADs) increases mitral leaflet coaptation and often abates MR. Long term, as the ventricle remodels, the displacement of the papillary muscles may improve, thereby minimizing the malcoaptation of the valve. In one series, LVAD implantation decreased the prevalence of moderate or severe MR from 77% before implantation to 11% at 6 months after implantation.² Furthermore, similar 1-year survivals have been reported in LVAD recipients with and without persistent MR after device placement.³ As such, current guidelines do not recommend mitral valve intervention for severe MR at the time of LVAD implantation unless ventricular recovery is expected.⁴ The utility of concomitant mitral valve intervention remains, however, a hotly debated topic without consensus.

In this issue of the *Journal*, Fukuhara and colleagues⁵ present retrospective data that challenge the current paradigm. Of 115 LVAD recipients with greater than moderate preexisting MR, 63 (54.8%) went without mitral valve repair and the other 52 (45.2%) underwent concomitant mitral valve repair consisting of either annuloplasty or edge-to-edge repair (Alfieri stitch). As expected, the mitral valve repair group had longer cardiopulmonary bypass times; however, there were no differences between the groups in early postoperative complications, blood product use, or dosage of vasoactive drugs. MR was durably controlled by either annuloplasty or edge-to-edge repair at 2 years after LVAD implantation, whereas approximately 30% of the patients in the nonrepair group had significant MR.

Although there was no difference between groups in right heart failure (RHF) during the index admission, patients in the mitral valve repair group were less likely to have late RHF develop (2.2% vs 13.6%). Fukuhara and colleagues⁵ postulate that this effect may be due in part to the lower pump speeds allowed by mitral valve repair. Pump speed is typically adjusted to optimize left ventricular unloading,

Pavan Atluri, MD (left) and Mark Helmers, MD (right)

Central Message

Concomitant mitral valve repair and continuous-flow left ventricular assist device support may decrease late right heart failure in patients with more than moderate preoperative mitral regurgitation.

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interventricular septal position, aortic valve opening, and MR.⁶ MR can be mitigated by increasing pump speed; however, this increase may predispose patients toward the development of RHF by increasing the preload of the right ventricle and deleteriously affecting right ventricular geometry and contractile efficiency through septal bowing.^{7,8} Indeed, mean predischARGE pump speeds were significantly lower in patients who had the HeartMate II (Thoratec Corporation, Pleasanton, Calif) implanted and also underwent mitral valve repair than in recipients who had no concomitant mitral intervention (8931 rpm vs 9200 rpm).

As has been repeatedly demonstrated, the development of late RHF may portend dismal outcomes. Of the 9 patients in the study who had late RHF develop, 6 were bridged to transplant. Notably, the 2-year posttransplant survival was only 33.3% in this group, as opposed to a survival of 93.3% in the 45 patients who received transplants but did not have late RHF develop.

Given its retrospective nature, this study is subject to confounding and certain biases, including selection bias. Although none of the potential confounders demonstrated association with late RHF in a multivariate regression, the patients in the mitral valve repair group were more recent in the study period and were more likely to be receiving the LVAD as destination therapy. Regardless of these limitations, Fukuhara and colleagues⁵ should be commended for their contribution. Their work certainly challenges the

theory that concomitant and mitral valve repair is unnecessary with continuous-flow LVAD implantation, and it suggests that further investigation is warranted.

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