The invisible hands conducting minimally invasive mitral valve surgery

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As technology and our understanding of the human body continue to improve, there is a natural progression in surgery toward achieving more while doing less. So, too, in the field of mitral valve surgery, such enthusiasm for less-invasive approaches has been increasingly espoused by patients and referring physicians alike during the past several decades. Yet, as Hawkins and colleagues¹ astutely note in this issue of the *Journal*, the adoption of minimally invasive mitral valve surgery (mini-MVR) has been relatively stagnant, recently comprising only 20% of all mitral operations at only a quarter of the cardiac surgery centers in the United States. Because mini-MVR has been firmly established as a noninferior option to traditional, open mitral valve replacement (MVR), this standstill beckons the question of where the barriers to entry and shift in paradigm exist.

This article by Hawkins and colleagues¹ is a timely contribution to our understanding of this topic, rendering it more nuanced and multifactorial. In addition to reinforcing the abundant literature on the excellent outcomes able to be accomplished with mini-MVR, Hawkins and colleagues¹ found no financial impediment to its widespread adoption in a successfully propensity-matched analysis. Despite longer operative times associated with mini-MVR, which translates to marginally higher operative costs, there was no significant difference in overall cost relative to conventional MVR, likely because of reduced ventilator dependence, transfusion, and ancillary costs. The major strength of this analysis is its propensity matching, which reduces the treatment allocation bias inherent in retrospective analysis, particularly in this area, in which patients undergoing conventional MVR tend to be markedly sicker with more varied mitral disease etiologies. The composition of repair versus replacement, and inclusion of concomitant operations such as tricuspid valve repair and ablation, can also skew findings without matching. Only a few studies to date have addressed both clinical and economic advantages of mini-MVR with this degree of statistical rigor.²⁻⁴

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

Central Message

Minimally invasive mitral valve surgery is clinically and economically comparable, even advantageous in some respects, to the conventional approach and can be considered in even higher risk patients.

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Interestingly, Hawkins and colleagues¹ did not find that mini-MVR reduced length of stay or the rates of readmission and discharge to facility, which one would expect to have major implications for resource use and has been a recurrent finding in other studies.

Of note, although Hawkins and colleagues¹ found excellent clinical outcomes and resource use in mini-MVR, the degree of generalizability outside a specialized, academic setting remains to be further elucidated. In part, operating with high-volume surgeons and staff well-versed in mini-MVR may have enabled such degree of success, even among higher risk patients. We have reported similar findings at our institution previously,^{5,6} although our aortic occlusion technique of choice was an endoaortic balloon through femoral cannulation instead of a direct clamp, which admittedly has additive cost.

Overall, Hawkins and colleagues¹ deserve our congratulations on their rigorous analysis and excellent presentation. In an era where the implications of rapidly emerging transcatheter therapies for mitral valve diseases are profound, these studies are crucially needed to continue to help define and steer us toward the path of improved patient outcomes and satisfaction.

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