Robotic surgery: Maximizing the potential of a minimally invasive platform

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Robot-assisted mitral valve (MV) repair offers a less-invasive, yet equally durable, effective and safe option for patients with mitral pathology requiring surgical intervention.¹⁻³ However, the technology currently remains relatively niche in the bionic hands of a few well-experienced institutions, given the steep learning curve, cost, and supporting infrastructure necessary to achieve desired outcomes.

The featured article by Dearani⁴ in this issue of the *Journal* is an insightful foray into these expert institutions' perspectives. He accomplishes precisely what any author should aspire to do in an expert review—succinct distillation of the core principles reflected in the data, embellished by nuanced insights that arise from one's own extensive clinical experiences. In remarking on the excellent outcomes reported by Gillinov and colleagues,⁵ evidenced in their near-perfect success rate (98%) of mitral repair with less than 1% early mortality, the author makes remarkably clear the 2 factors of utmost significance that enable success in robot-assisted mitral repair: careful patient selection and workup combined with a high volume of cases, enabling institutional familiarity with the technology and rapid transcendence of the learning curve. Experience leads to refinement of technique and protocol, ever-decreasing crossclamp times and the need for open-conversion. He astutely points out the detail of 2% stroke rate in the first 500 patients decreasing to 0.8% by the latter 500 patients. We glean from his insight that robotic-assisted mitral surgery may not inherently promise excellent outcomes but with rigorous learning and commitment, an institution can achieve near-impeccable results with minimal comorbidities.

This has similarly been our own experience as we have adapted this valuable technology. As stated previously, the key principle in translating this therapy to patients is a deep understanding of MV anatomy, pathology, and repair techniques. It is vital to maintain the core principles of MV repair that have resulted in excellent

Pavan Atluri MD (Left), and Jason J. Han MD (Right)

Central Message

Robot-assisted mitral valve surgery is a safe, durable, and effective approach. The learning curve is steep and is predicated on an existing mastery of anatomy, pathology, and open surgical techniques.

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long-term outcomes that cardiologists and patients alike have come to expect. The robotic platform has reintroduced 3-dimensional visualization as well as wrist motion into the minimally invasive platform that does not exist with standard endoscopically assisted MV platforms.⁶ Even at our center, where we have gained significant experience in the port access platform, we have appreciated these advantages in MV repair.⁷ However, the learning curve should not be minimized. A commitment to the technology with patience, dedication, and focus is vital, as Dr Dearani has elucidated. As newer platforms are introduced by competitors, further advantages and improvements should be evident, hopefully minimizing the learning curve.

Ultimately, we congratulate Dr Dearani on his thoughtful review. It is not only an insightful analysis of the manuscript by Gillinov and colleagues but also a demystification of the niche landscape of robotic-assisted cardiac surgery. Its advantages seem clear as long as the procedure is performed on the “right” patients under the “right” conditions. Through his words, the readers will be left with what is better than either “hype or hope”—an insight that is balanced, realistic, and rare.

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