To repair or to replace: four decades in the making

Patpilai Kasinpila, Y. Joseph Woo

Department of Cardiothoracic Surgery, Stanford University School of Medicine, Stanford, CA, USA

Correspondence to: Y. Joseph Woo, MD. Department of Cardiothoracic Surgery, Stanford University School of Medicine, Stanford, CA, USA. Email: joswoo@stanford.edu.

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Comment on: Lazam S, Vanoverschelde JL, Tribouilloy C, *et al.* Twenty-Year Outcome After Mitral Repair Versus Replacement for Severe Degenerative Mitral Regurgitation: Analysis of a Large, Prospective, Multicenter, International Registry. Circulation 2017;135:410-22.

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The lively debate regarding the surgical treatment options of mitral valve regurgitation continues and remains dynamic. This is likely due to the prevalence of degenerative mitral valve disease, not just in the United States, but all around the world. With the emergence of the concept of the mitral valve "Centers of Excellence" and newer and ever-evolving repair techniques, mitral valve repair has far surpassed replacement in popularity. Because of the observed superiority of mitral valve repair—both anecdotally and by multiple large studies that have recently emerged (1-3)—we are witnessing a paradigm shift in which mitral valve repair is preferred over replacement. This is reflected in the latest guidelines, in which repair is strongly recommended as the preferred surgical intervention for severe degenerative mitral regurgitation by both the American Heart Association/American College of Cardiology and European Society of Cardiology (4,5).

But to this day, the evidence supporting this transition is based largely on single-center, retrospective studies. However, in this featured article by Lazam *et al.*, the authors undertook an ambitious task of amassing the Mitral Regurgitation International Database (MIDA), that would encompass 2,472 patients across Europe and in the United States. Beginning in 1980, these 6 tertiary centers prospectively enrolled patients with mitral regurgitation exclusive with degenerative disease with prolapsed leaflet. Of those patients, 1,922 patients underwent surgical interventions—1,709 patients with repairs and 213 patients' mitral valves were replaced. To offset the lack of randomization, this prospective study utilized propensity score matching and inverse probability weighting to reduce confounding bias and to avoid loss of power, respectively.

Admirably, but unsurprisingly, operative mortality, all-cause mortality, and valve-related complications (reoperation, thromboembolism, major bleeding events, infective endocarditis) over the span of over two decades were lower in the mitral valve repair cohort despite longer bypass and cross-clamp times. This was congruent in the entire population and in the propensity score matched and IPW groups. This superiority is maintained when analyzed across the sexes, age groups, and leaflets involved. Having the herculean task of comparing the two methods amidst evolving surgical techniques, prostheses available, and likely surgeons' operative learning curves, the authors also examined the results by calendar years of operation (before 1995, 1995–2000, and after 2000). Remarkably, the advantage of mitral valve repair seems to be independent of the surgical eras (6).

Now, we must pause to congratulate the authors for pursuing a study of such scale over an impressive amount of time, all while achieving an impressive 1.7% 30-day mortality rate (This, again, should highlight the importance of patient referral to high-volume mitral valve centers). The authors here succeeded in validating the shift from replacing to repairing. Yet there are a few—albeit expected—limitations to the study. While propensity score matching can make up for some of the selection bias, it remains limited to the confounding factors that are chosen. The question could always be raised about the potential contribution of the unknown, unaccounted-for factors.

This brings us again to address the simple absence of a randomized controlled trial showing the superiority of mitral valve repair over replacement. The fact that there has not been a large RTC after all these decades, though, is now further complicated by the seemingly dwindling number of mitral valve replacements in the recent years. This, perhaps, begs the question of whether a randomized controlled trial today is necessary or feasible.

The enigma, now, is identifying the patients comprising the current, small cohort of valve replacements. Historically, patient's advanced age (7), anterior or bileaflet prolapse, complex pathology (8,9), and increased pre-operative comorbidities have been the prime deterrents for valve repairs. This insightful study, hopefully, will add another layer of reassurance that survival benefits are maintained in these cohorts that would have once been the cause of hesitancy. The take-home message here, therefore, is if there is any hesitation over the benefit or durability of a repair, the patient may benefit from a referral to a center with expertise in mitral valve repair.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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