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Commentary: Repairing the rheumatic mitral valve—know the enemy and know yourself!

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We have to remember that what we observe is not nature in itself, but nature exposed to our method of questioning.

—Werner Heisenberg

One of the most popular quotes by Sun Tzu (544 BC–496 BC), also known as Sun Wu, appeared in his seminal book *The Art of War*: “Know the enemy and know yourself; in a hundred battles you will never be in peril.” As far as the surgical treatment of rheumatic heart disease (RHD) is concerned, this simple statement, imbued with ancient wisdom, can only prompt the response, “Well said.”

Mitral valve repair in patients with RHD has long been recognized as a challenging task, even for those considered expert mitral surgeons. In this issue of the *Journal*, Chen and colleagues¹ re-examined the “repair versus replacement” debate using a regional health insurance administration database covering the entirety of Taiwan and involving 5086 patients with RHD over a 14-year period. In particular, a majority of these patients (n = 4597) received mitral valve replacement and only 9.6% of them (n = 489) underwent mitral valve repair. Chen and colleagues¹ concluded that mitral valve repair in RHD “offers no survival benefit and produces a higher risk of reoperation over mitral valve replacement.” They claimed that such an observation was based on “real-world” data, with comparisons made using

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CENTRAL MESSAGE

Without expertise combining specialized surgical skill and an in-depth understanding of the pathology, repairing a rheumatic mitral valve may not offer any clinical advantage over valve replacement.

large-scale samples. No doubt, the question raised by the authors is of significant clinical importance, given that RHD is still widely prevalent in the developing world, such as in Southeast Asia and sub-Saharan Africa.^{2,3} Nevertheless, is the evidence generated from this retrospective analysis really credible and, therefore, applicable to our daily practice?

On one hand, do we truly “know the enemy” here? First, the patient population in Chen and colleagues’ study appeared to be older than that of many previous investigations,^{4–7} which demonstrated the survival advantage of mitral valve repair over replacement in patients with RHD. In fact, patients younger than 20 years were excluded in the current study,¹ despite mitral valve repair being known to be much more imperative in younger patients with RHD than in the older subgroup of patients.^{2–7} Second, the patients in Chen and colleagues’ study predominantly presented with pure mitral stenosis or mixed pathologies (78.3% vs 90.1% in the repair and replacement group, respectively), which had been recognized to be associated with worsened reparability than mitral regurgitation.^{4–8} Finally, the lack of echocardiography data could be “the weakest link” of any study on valve reconstruction, and the current one was no exception. Although the authors admitted that this was inherited with the nature of their database research, the consequence is much worse than a negligible “limitation.” Without pre- and postoperative echo data confirming the degree of pathologic changes and the final results

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of the repair, we are left with no reliable intergroup comparisons. Regardless of how well the propensity score matching was conducted (ie, 3:1 or 1:1), there is no way to prove whether the postrepair effective orifice area is adequate, if the transmitral pressure gradient is acceptable, or if the valve is competent. Thus, how can readers be convinced in the first place that the repair results were at least comparable with those gained following the implantation of an artificial prosthesis? After all, this is a matter of science, not opinion.

On the other hand, do we truly “know ourselves” here? No one would disagree that a bad repair is even worse than a good replacement, and repairing a rheumatic mitral valve takes additional expertise that can only be obtained after mastering a steep learning curve. Chen and colleagues’ observation regarding the repair arm of the study was based on 489 cases in Taiwan spread over 14 years.¹ To our knowledge, valve surgery programs are available at more than 60 hospitals in Taiwan, although many of them may not have an adequate annual case volume. Hence, even if we assume that all the repair operations in the current study were performed at the top 10 institutions in Taiwan, it still amounts to an average of fewer than 4 cases per year at each hospital. According to Chen and colleagues’ own institutional record (in their response to the reviewers’ comments, which was not published in the final report), in a hospital with the largest number of rheumatic mitral valve repair series, a total of 61 procedures were carried out from 2005 to 2015 (ie, less than 6 cases per year). Thus, it would be unreasonable to believe that the data collected over such an apparent “learning curve period” could fairly reflect “real-world” clinical outcomes. In addition, we are puzzled by the postoperative mid-term all-cause mortality rates in the current study: 1 out of 3 patients in both groups died during a mean follow-up of 5.9 years, which were unexpectedly greater than the previously reported “real-world” data.⁴⁻⁸

Chen and colleagues’ study does remind us that repairing a rheumatic mitral valve could present a stressful challenge to the surgeons and, if unsuccessful, may further harm the patient. Since randomized comparisons appear to be somewhat unrealistic in the foreseeable future, we are once again alerted by the parable of the blind men and the elephant* when validating the available evidence concerning repair or replacement of diseased mitral valves for RHD. At the end of the day, should we always choose the easy and risk-free path by replacing the valve? Only through carefully selecting suitable patients and improving our skill and techniques can we raise the bar to a new height of surgical excellence. If we truly understand that our decisions may determine the long-term survival and quality of life of patients, we have no choice but to do the right thing.

References

1. Chen S-W, Chen C-Y, Chien-Chia V, Chou A-H, Cheng Y-T, Chang S-H, et al. Mitral valve repair versus replacement in patients with rheumatic heart disease. *J Thorac Cardiovasc Surg.* 2022;164:57-67.e11.
2. Tamirat S, Mazine A, Stevens LM, Agwar F, Dejene K, Bedru M, et al. Contemporary outcomes of aortic and mitral valve surgery for rheumatic heart disease in sub-Saharan Africa. *J Thorac Cardiovasc Surg.* April 25, 2020 [Epub ahead of print].
3. Wan S. Commentary: out of Africa’s unmet needs. *J Thorac Cardiovasc Surg.* 2020 [Epub ahead of print].
4. Phan KP, Nguyen VP, Pham NV, Dao HT, Dang tTA, Le HD, et al. Mitral valve repair in children using Carpentier’s techniques. *Semin Thorac Cardiovasc Surg Pediatr Card Surg Ann.* 1999;2:111-20.
5. Chauvaud S, Fuzellier JF, Berrebi A, Deloche A, Fabiani JN, Carpentier A. Long-term (29 years) results of reconstructive surgery in rheumatic mitral valve insufficiency. *Circulation.* 2001;104(12 suppl 1):I12-5.
6. Yau TM, El-Ghoneimi YA, Armstrong S, Ivanov J, David TE. Mitral valve repair and replacement for rheumatic disease. *J Thorac Cardiovasc Surg.* 2000;119:53-60.
7. Kim JB, Kim HJ, Moon DH, Jung SH, Choo SJ, Chung CH, et al. Long-term outcomes after surgery for rheumatic mitral valve disease: valve repair versus mechanical valve replacement. *Eur J Cardiothorac Surg.* 2010;37:1039-46.
8. Fu JT, Popal MS, Zhang HB, Han W, Hu QM, Meng X, et al. A meta-analysis of late outcomes of mitral valve repair in patients with rheumatic heart disease. *J Thorac Dis.* 2017;9:4366-75.

* “The Blind Men and the Elephant” is a famous Indian fable about 6 blind men who come across different parts of an elephant in their journeys. In turn, each blind man creates his own version of the elephant from that limited experience and perspective.