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BIOPROSTHETIC VERSUS MECHANICAL TRICUSPID VALVE REPLACEMENT: BIOLOGICAL AGE IS NOT THE SAME AS CHRONOLOGICAL AGE

To the Editor:

We read with interest the population-based observational study by Sohn and colleagues comparing the outcomes of mechanical versus bioprosthetic tricuspid valve replacement (TVR), which found that the latter was associated with higher mortality rates. These findings seem to contradict a large number of previous studies describing no mortality difference between valve types, including a recent meta-analysis by Negm and colleagues. Proper interpretation of the study findings therefore requires scrutiny of confounders that may have influenced the observed outcomes, as well as whether or not these have been adequately accounted for.

It is well known that bioprosthetic valves are preferentially used in older patients and/or those with a shorter life expectancy because the mean lifespan of a bioprosthetic valve only reaches 7 to 9 years. Furthermore, patients who are scheduled for bioprosthetic TVR tend to have more comorbidities that would put them at a disproportionately high risk of the complications that are typically associated with mechanical valves, such as thromboembolic and bleeding events. This is clearly reflected in the baseline demographic characteristics in the study by Sohn and colleagues, where patients in the bioprosthetic group were older and had higher Charlson comorbidity index as well as a worse cardiovascular risk profile. For any study on this topic, extensive correction for confounding factors is essential to derive reliable conclusions from the data.

The authors study should be commended for their efforts to control for confounding using propensity score matching and multivariate-adjusted analyses. Nonetheless, it should be considered that unmeasured factors that have not been controlled for may still influence the observed findings. In any real-life setting, the decision for bioprosthetic versus mechanical valve is determined by a heart team’s assessment of a patient’s life expectancy and risk profile. Factors such as biological age are likely to be more influential than chronological age in this decision-making process. For instance, a heart team may decide that a 70-year-old patient with young biological age may still benefit most from a bioprosthetic valve, whereas they would recommend mechanical TVR for a 70-year-old patient with an old biological age; the 2 patients will obviously have a very different outlook mostly because of their different biological age and

FIGURE 1. Propensity score matching accounts for chronological rather than biological age difference. TVR, Tricuspid valve replacement.
not necessarily due to valve factors. The entity of biological age is complex and probably not entirely accounted for by the baseline characteristics measured in by Sohn and colleagues\(^1\) (Figure 1). Thus, there might still have been selection bias in the bioprosthetic group, which implies that some of the increased mortality risk in this group may simply be due to patient factors rather than valve factors.

Concluding that mechanical TVR should be preferred over bioprosthetic TVR for all patients between ages 54 and 65 years may be premature. The choice of valve type should always be carefully weighted in the context of a patient’s overall health status, biological age, and individual risk factors, rather than taking a 1-size-fits-all approach.

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