The Use of Inspiris Resilia Valves in the Pulmonary Position for Repaired Congenital Heart Defects

To the Editor:

We read with great interest the article by Nguyen and colleagues1 involving 70 propensity score-matched pairs that revealed lower structural valve deterioration- (SVD) free rates in the Inspiris valve (Edwards Lifesciences) group versus non-Inspiris valves implanted in the pulmonary position over 2 years (53.5% vs 78.5%; P = .03), primarily due to pulmonary regurgitation. There was no significant difference in the SVD rate between the valved conduit group using Inspiris versus Perimount valves (Edwards Lifesciences). These findings are consistent with the results reported by Said and colleagues.2

We analyzed early surgical outcomes of Inspiris and Epic (Abbott Cardiovascular) valves in the pulmonary position for repaired tetralogy of Fallot. The valve implantation technique was to suture a prosthetic ring into the native right ventricular outflow tract. We included 13 patients with Inspiris and 19 with Epic valves who had a median pulmonary valve replacement age of 26.5 years (interquartile range [IQR], 17-44 years) with a median follow-up period of 5.3 years (IQR, 3.3-8.6 years). The follow-up was complete. The SVD-free rates did not significantly differ between the 2 groups: the Inspiris group remained 100% up to 5.2 years, whereas the Epic group was 100% at 1 year, 93.8% at 2 years, and 87.1% between 5 and 12 years (P = .48). The presentation of SVD was only pulmonary stenosis, with no incidence of moderate or greater pulmonary regurgitation.

Discrepancies in SVD incidence rates between what we found and those found by Nguyen and colleagues1 led us to consider the influence of age. The multicenter retrospective study by Baird and colleagues3 has indicated that patients younger than age 18 years are at risk of SVD. Analysis of Nguyen and colleagues’1 data (see their Table 4) revealed that SVD was predominantly found in early teenagers or younger with a median age of 15.4 years (IQR, 10.8-27.3 years). Before propensity score matching, the Inspiris group was significantly older than the non-Inspiris group; however, this difference disappeared after matching, suggesting a potential selection bias in propensity score matching toward younger patients in the Inspiris group. Factors other than the bioprosthetic valve type may contribute to SVD incidence. Firstly, the angle at which the bioprosthetic valve is implanted is crucial. The inclination of the bioprosthetic valve should be oriented posteriorly. The slower degeneration in valved conduits with Inspiris valves suggests that the tilting angle of valves implanted in the native right ventricular outflow tract may be suboptimal, potentially obstructing smooth blood flow. Secondly, the position of the valve leaflets is also pivotal. According to a computational fluid dynamics study by Yoshida and colleagues,4 positioning 1 of pulmonary leaflets anteriorly could facilitate smoother blood flow and reduce thrombus formation, thus impeding SVD progression.5 Therefore, the bioprosthetic valve commissures in the pulmonary position should ideally be placed at the 2, 6, and 10 o’clock positions rather than at 0, 4, and 8 o’clock.

Nguyen and colleagues1 great work prompted a reevaluation of pulmonary valve replacement surgical techniques and emphasized the need for modification of implanting techniques for better outcomes. Further analysis considering only patients older than age 18 years, as well as valve-tilting angles and leaflet positioning, may yield different outcomes. Finally, we suggest caution in using the Inspiris valve for patients during early to midadolescence.

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Conflict of Interest Statement

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References


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