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EDITORIAL COMMENT

The Role of Sutureless Aortic Valves in the Treatment of Severe Aortic Stenosis*

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Management of severe aortic valve stenosis has evolved significantly over the past 20 years (1). What was classically treated with an open surgical operation and stented bioprosthetic valve (surgical aortic valve replacement [SAVR]) has now almost completely transitioned to a percutaneous approach with transcatheter aortic valve replacement (TAVR). This evolution has resulted, in part, from innovations in aortic valve technologies. Indeed, during this same time period, we have also seen the development of sutureless and rapid deployment (RD) valves. These valves are based on the stented or balloon-expandable technology used in TAVR but are able to be implanted through a surgical incision under direct visualization.

In this issue of *JACC: Asia*, the paper by Kim et al (2), "Comparison of Sutureless Bioprosthetic Valve with Surgical or Transcatheter Aortic Valve Replacement for Severe Aortic Stenosis," explores the outcomes of these 3 different treatment modalities. This single-site study contains data from patients undergoing isolated aortic valve replacement from 2010 to 2018. Kim et al (2) are to be commended for a very inclusive database with over 1,000 consecutive patients evaluated in this study. Importantly, the patients underwent propensity matching between the sutureless and RD group and the SAVR group, as well as between the sutureless and RD group and the TAVR group. Follow-up extended beyond the index hospitalization, and outcomes were evaluated at 1 year.

The results of this study demonstrate that there was no significant difference in rates of the primary composite of death, stoke, or rehospitalization between the group with sutureless and RD valves and either the SAVR or TAVR matched groups. Although Kim et al (2) were careful to state that the study was underpowered, there were notable trends between the groups. First, postimplant gradients appeared to be highest in the SAVR group and lowest in the TAVR group. Second, the incidence of permanent pacemaker placement was highest in the TAVR group and lowest in the SAVR group. Finally, the incidence of moderate or severe paravalvular regurgitation was higher in the sutureless and RD group than in the group undergoing SAVR and the use of a stented bioprosthetic valve. The limitations of this study also include the potential for selection bias, the lack of longer-term follow-up, and the inability to address potential changes in implantation technique or developments in valve technologies over the time period of the study.

With 3 different modalities to choose from in the treatment of severe aortic stenosis, it is important to understand the limitations of each approach. Recent data from the PERSIST-AVR (Perceval Sutureless Implant Versus Standard-Aortic Valve Replacement) trial, in which patients were randomized to conventional stented bioprosthetic aortic valve replacement or sutureless valve, demonstrated noninferiority for major adverse cerebral and cardiovascular events at 1 year and reduced cross-clamp times in the sutureless group. Interestingly, gradients across the valve were similar between groups at 1 year, and the incidence of perivalvular leak was not different in this study. There was a significant increase in the need for permanent pacemaker implantation (11.1% vs 3.6%) in the sutureless valve group (3).

Proponents of sutureless valve technology argue that valve implantation is more straightforward if

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using a minimally invasive approach, and the RD feature is important when performing complex cases or operating on frail patients. Vendramin et al (4) presented a nice paper compiling case series in which the use of sutureless and RD valves was successful in patients with challenging reoperations. These cases included patients with failing and heavily calcified stentless bioprosthetic porcine valves, failing homografts, and previous valve-sparing root procedures (4).

The value of RD valves is not universally accepted. Ensminger et al (5) reported the German experience using in the German Aortic Valve Registry of over 20,000 patients from 2011 to 2015. Their propensity-matched study found that the incidence of pacemaker implantation and disabling stroke was higher with the RD valves when compared with surgery using traditional stented valves. Long-term data on the durability of stentless and RD valves are still relatively lacking. A handful of studies with follow-up longer than 5 years suggest that, at least in in the midterm, gradients are stable, and there are very few case reports of structural valve degeneration (6).

Compiling the data at hand, it is my conclusion that there is a place for sutureless and RD valves in the treatment of severe aortic stenosis. The clearest benefit, in my opinion, is in those complex reoperative patients who are not feasible candidates for TAVR. This group may include those patients who have previous porcine or homograft implants. The use of sutureless and RD valves in low-risk surgical patients will need to be justified because there is a significantly higher rate of permanent pacemaker use when compared with the traditional suturing technique. The lower gradients observed in some studies with the sutureless valve when compared with the stented valves are intriguing. However, the data here are mixed, and for a small annulus in an otherwise good operative candidate, root enlargement procedures may offer the best long-term solution.

To conclude, the study by Kim et al (2) provides a real-world look at sutureless and RD valves compared with TAVR and SAVR. The findings of this study reflect nearly a decade of patients undergoing treatment for severe aortic stenosis. There have been iterative improvements in both valve technologies and implantation techniques during that time (7). It is our continued responsibility to remain informed about the evolving treatment options, including their limitations, to best provide a durable and tailored treatment plan for our patients.

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