Editorial

Who should get surgical aortic valve replacement in the era of transcatheter aortic valve replacement?—interventional cardiology perspective

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The past decade has witnessed an important shift towards transcatheter approaches to treat valvular heart disease (VHD). For patients with severe symptomatic aortic stenosis (AS), transcatheter aortic valve replacement (TAVR) has been rigorously evaluated against the standard of care, surgical aortic valve replacement (SAVR), and has shown in the short term to be equivalent, if not better, in certain patient populations across the spectrum of surgical risk (1,2). What remains to be seen is whether TAVR can maintain equivalence or advantage over SAVR beyond 3–5 years. With rapid adoption of TAVR, there has been tremendous growth in utilization. This has occurred at the expense of SAVR, with evidence to support the practice and patient preference for the less invasive option. The Society of Thoracic Surgeons/American College of Cardiology Transcatheter Valve Therapy Registry of US commercial procedures confirms that TAVR procedural volume growth has been accompanied by improvements in important outcomes, including mortality (3).

While the heart team remains the center of this evolution, TAVR is an extension of the catheter-based skillset of the interventional cardiologist. Although many cardiac surgeons have undergone training to acquire an endovascular skillset, SAVR remains completely within the cardiac surgery domain. Although these biases exist, the question remaining is, with what we know about TAVR in the current era, who should still get SAVR? While one may argue that the answer varies depending on whether it comes from an interventional cardiologist or cardiac surgeon; both would agree that ultimately, it is to do what is best for the patient. Furthermore, as it is necessary to evaluate all the options with every patient, it is also important to include the patient in shared decision-making. Despite the growth of TAVR, SAVR remains an important and necessary option. What follows is a brief discussion detailing the role of SAVR in the current era from the interventional cardiologist's perspective.

When evaluating patients for treatment of AS, the most important consideration is that all options should be available. While a patient may be referred for consideration of TAVR, the decision to offer a specific therapy should be based on providing the best clinical outcome and procedural result. Considerations should be given to a variety of anatomic and clinical factors, including patient preferences. Regarding aortic root anatomy, certain anatomic issues may be better addressed with SAVR. Small or narrow aortic sinus segments with concomitant low coronary origin(s) which may predispose to TAVR related coronary obstruction by native leaflets, should be considered for open surgery (4). Techniques such as BASILICA can be considered by experienced operators to address this issue; however, longer term outcomes remain unknown (5). TAVR, more so than SAVR, may also complicate future coronary access in some patients.

Extensive annular calcification extending into the left ventricular outflow tract (LVOT) is another important consideration. Two areas of concern exist with respect to extensive dense LVOT calcification. The first is related to residual paravalvular aortic regurgitation (PAR) at the area of contact between the valve stent frame and calcification (6). Aggressive post dilation may be insufficient to resolve PAR and may predispose to the second concern, disruption of the

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annulus or LVOT, leading to annular rupture or ventricular septal rupture (7), requiring urgent surgical repair.

Vascular access also remains important with respect to decision-making for procedural selection in these complex patients. While transfemoral (TF) access accounts for the majority of TAVR procedures, performing alternative access remains an important adjunct for up to 10% of patients.

Despite the value of alternative access for some, trial data demonstrating benefit of TAVR over SAVR has been limited to those undergoing TAVR with TF access. The PARTNER 2A trial subgroup analyses demonstrated a hazard ratio of 1.21 (0.84–1.74) for the primary endpoint in alternative access cases and 0.79 (0.62–1.00) (P value of 0.06 for interaction) for TF cases (8). Furthermore, in this intermediate-risk cohort, benefits of TAVR over SAVR for the primary combined endpoint of all-cause mortality or disabling stroke was only noted in TF cases. Taking this one step further in low-risk TAVR trials, the benefit of TAVR over SAVR for the primary endpoints was limited to TF patients, only as alternative access patients were excluded from enrollment in these trials of carefully selected patients (1,2). SAVR remains an important therapeutic option, particularly for low-risk patients requiring alternative access.

Important anatomic exclusion criteria, derived from both the PARTNER 3 and Evolut low-risk clinical trials, should be applied in the decision to pursue SAVR over TAVR. Patients with annular dimensions either too large or too small to accommodate commercially available TAVR valves were excluded from the randomized trials. For patients with a small annulus, severe prosthesis-patient mismatch (PPM) is associated with greater mortality and re-hospitalization after TAVR (9) and some of these patients may be candidates for surgical repair with root enlargement or a composite graft that may avoid severe PPM. Other anatomic situations that are likely better treated with SAVR include unicuspid and bicuspid valves (particularly in young low-risk patients), severe aortic insufficiency, inadequate calcification to seat the TAVR prosthesis, and significant LVOT obstruction not amenable to alcohol septal ablation. Finally, clinical situations that may also benefit from SAVR include patients with active endocarditis, severe mitral or tricuspid regurgitation, and severe coronary artery disease (CAD) (e.g., Syntax score >32) and/or CAD not amenable to percutaneous revascularization.

Patient engagement is imperative in the decision-making process. Patient preference should be an important consideration following informed discussion regarding all treatment options, including a comprehensive review of expected benefits and associated potential risks with each specific treatment. Patients should be informed about lack of long-term (>5–8 years) durability data on TAVR prostheses, the clear though low-risk of moderate or severe PAR as well as the potential risk of mild PAR observed by the trend towards higher mortality at 5 years in the PARTNER 2A trial (10), and greater risk for permanent pacemakers in some patients or with some devices. For some, these considerations may outweigh the lack of sternotomy and faster recovery with TAVR. Shared decision-making remains important to allow patients and their physicians to make informed decisions with greater mutual understanding.

In an effort to provide the best care for our patients, we must understand the benefits of potential interventions, including comparative advantages of one therapeutic option over another. Although we have endeavored to provide an interventional cardiologist's viewpoint on this topic, the success of this procedure and our ability to treat VHD in complex patients is well entrenched in the heart team decision-making process. That process involves a multi-disciplinary evaluation and recommendation which we hope merges the interventional cardiologist's and the cardiac surgeon's view on when SAVR should be offered as a preferred treatment in the TAVR era.

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Footnote

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