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VIEWPOINT
Valvular heart disease

Transcatheter vs surgical aortic valve implantation: age vs lifetime perspective

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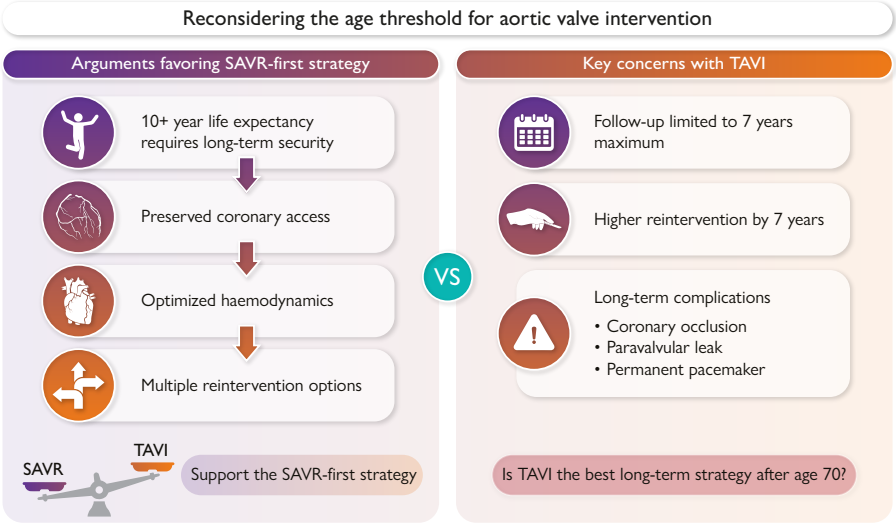
Graphical Abstract



The 2025 ESC/EACTS guidelines lowered the default age threshold for TAVI to ≥70 years in severe aortic stenosis. However, randomized trials in low-risk septuagenarians provide only 5–7 years of follow-up and show no evidence of TAVI superiority over SAVR. Potential higher long-term mortality and reintervention remain uncertain. In patients with >10-year life expectancy, a lifetime management strategy is essential. A SAVR-first approach preserves coronary access, optimizes haemodynamics, and maintains future reintervention options

SAVR, surgical aortic valve replacement; **TAVI**, transcatheter aortic valve implantation

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The 2025 European valvular heart disease (VHD) guidelines, jointly issued by the European Society of Cardiology (ESC) and the European Association for Cardiothoracic Surgery (EACTS), have lowered the default age threshold for transcatheter aortic valve implantation (TAVI) in patients with severe symptomatic trileaflet aortic stenosis (AS) from 75 to 70 years (Class 1 LoE A recommendation).[1] This reflects growing confidence in TAVI as a first-line option for younger, lower-risk patients. While randomized trials demonstrate noninferiority of TAVI compared to surgical aortic valve replacement (SAVR) at 5–7 years, the implications of this shift for patients with over 10 years of life expectancy merit scrutiny. For these individuals, a SAVR-first strategy may offer better long-term security by preserving coronary access, optimizing haemodynamics, and maintaining multiple options for future reintervention. In this viewpoint, we question whether current data support this guideline modification and offer arguments favouring a SAVR-first approach in such patients.

Evidence supporting expansion of TAVI

The PARTNER 3 trial evaluated TAVI in low-risk patients and demonstrated superiority of TAVI over SAVR in reducing the primary composite endpoint of death, stroke, or rehospitalization [hazards ratio (HR) 0.54, 95% CI 0.37–0.79] and death or disabling stroke (HR 0.34, 95% CI 0.12–0.97) at 1 year. After 7 years, the primary endpoint rate was similar between TAVI and SAVR (HR 0.87, 95% CI 0.70–1.08)[2] but favoured SAVR for death or disabling stroke (HR 1.31, 95% CI 0.96–1.78). In Evolut Low Risk (LR), TAVI was noninferior to SAVR for death or disabling stroke (risk difference −2.0%, 95% CI −4.5% to 0.4%) at 2 years. At 6 years, a non-significant difference in death or disabling stroke favouring SAVR was observed in Evolut LR (2.8%, 95% CI −1.9% to 7.6%), and reintervention rate was higher with TAVI at 6 and 7 years (HR 1.68, 95% CI 1.10–2.58).[3] The NOTION trial, a smaller study involving older valves and older patients (mean age 79 years) at low-intermediate risk, showed similar outcomes for death, stroke, or MI at 10 years, with lower structural valve deterioration but higher pacemaker rates after TAVI.[4] Collectively, these trials confirm the safety and effectiveness of TAVI in low-risk septuagenarians over 7–10 years.

Three trials have been published since the 2021 guidelines, all with only a 1-year follow-up at the time of guideline writing. The German DEDICATE-DZHK6 trial of 1414 patients at low- or intermediate-risk (mean age 74 years) found TAVI noninferior to SAVR for death or stroke at 1 year,[5] but it also reported the highest 1-year surgical mortality of 6.2% (vs 1%–3% in PARTNER 3/Evolut LR). The NOTION-2 trial, which included younger patients at low risk (mean age 71 years), failed to establish noninferiority of TAVI relative to SAVR for death, stroke, or rehospitalization (risk difference 3.1%; 95% CI, −2.7% to 8.8%).[6] In the 27% of patients with bicuspid valves, a signal of harm emerged with TAVI (HR 3.8, 95% CI 0.80–18.5).[6] The UK-TAVI trial, which enrolled older patients (median age 81 years) at low- to intermediate-risk, reported that TAVI was noninferior to surgery regarding all-cause mortality at 1 year.[7] However, unpublished 5-year follow-up uncovered 78% higher risk of stroke with TAVI (HR 1.78; 95% CI 1.16–2.73) (https://www.tctmd.com/news/stroke-risk-higher-tavi-vs-surgery-5-years-uk-tavi). Finally, a Bayesian hierarchical meta-analysis of studies with at least 5-year follow-up showed TAVI was associated with a higher risk of death and stroke in low- to intermediate-risk patients.[8]

Limitations of evidence

Thus, despite encouraging early results, several caveats temper enthusiasm. First, regarding follow-up duration, robust randomized data for low-risk patients only extend to 7 years. For 70-year-olds, whose life expectancy may surpass 15 years (https://www.ssa.gov/oact/STATS/table4c6.html), this is insufficient to guide lifetime management. PARTNER 3 recently published the most extensive follow-up in this cohort: although the null primary composite endpoint result is reassuring, the unfavourable lean on individual endpoints of death and disabling stroke or the combined endpoint of death or disabling stroke with TAVI raises a concern of 'catch-up' in adverse events, particularly if expanded to younger patients. Similarly, the increased risk of MI at 6 years and reintervention at 7 years in Evolut LR raises questions about long-term transcatheter valve durability. These data, along with the Bayesian meta-analysis[8] and the 5-year results of UK-TAVI, reinforce previous reports indicating that the early advantage of TAVI over SAVR might be attenuated or reversed with longer follow-up.[9]

In contemporary Western populations, a 70-year-old individual has a remaining life expectancy of approximately 15–16 years, meaning that many patients undergoing AVR at this age will likely outlive a single bioprosthetic valve. Registries and observational studies report acceptable perioperative risk and lower long-term mortality with redo-SAVR compared with TAVI-in-TAVI.[10] Registry data show that SAVR after TAVI is associated with a 74% higher risk of operative mortality compared to redo-SAVR,[11] thereby favouring SAVR as the first option. In contrast to redo-SAVR, TAVI-in-TAVI is technically demanding, restricted to high-volume centres, and data remain limited to short-to-midterm follow-up.[12]

In contrast to TAVI, the durability of surgical bioprosthetic valves is supported by decades of follow-up, extending beyond 20–30 years. Importantly, durability has been shown to depend on valve design, underscoring the need for long-term evaluation of newer technologies.

Randomized trials have included highly selected populations, excluding patients with bicuspid aortic valves and other anatomies less suitable for TAVI, thereby limiting their generalizability to real-world populations, where such anatomical exclusions are common.

The SAVR-first argument in patients with a life expectancy greater than 10 years

A surgical AVR first approach to lifetime management of severe AS offers several practical advantages:

(1) Preserving coronary access

Surgical bioprostheses, when properly sized and implanted, preserve coronary access for future interventions even after a

future 'valve-in-valve' (i.e. TAVI-in-SAVR) procedure. In contrast, transcatheter frames may block coronary ostia, and this risk increases after TAVI-in-TAVI due to the 'double cage' effect. One study found that future coronary angiography might be unfeasible in up to one-third of patients (23.6% in Sapien 3, 38.5% in Evolut Pro/R, and 41.1% in Acurate Neo).[13]

2) Optimizing haemodynamics for future interventions

Although technically demanding, SAVR allows for annular or root enlargement (ARE) enabling the placement of larger prostheses. This decreases the risk of prosthesis-patient mismatch and higher gradients during future TAVI-in-SAVR. Possible explanations for the improved outcomes with redo-SAVR include ARE and removal of the previous prosthesis (avoiding the 'Russian Doll Effect').

3) Flexibility in reinterventions

With a SAVR-first strategy, future options include TAVI-in-SAVR or redo-SAVR. Patients starting with TAVI may be limited to TAVI-in-TAVI; if unfeasible, TAVI explant becomes necessary—a procedure with high operative mortality (17%).[11] Two Food and Drug Administrated–mandated post-marketing studies offer sobering insights for outcomes of TAVI-in-TAVI or TAVI-in-SAVR procedures. In SAPIEN 3 registry (TAVI-in-TAVI), 30-day mortality was 4.3%, 1-year mortality was approximately 20%, and gradients remained higher than after the initial TAVI procedure (https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpma/pma_pas.cfm?t_id=762598&c_id=7115: FDA Post-Approval Study: SAPIEN 3 Redo-TAVR Registry, 2024). In the SAPIEN 3 ViV registry (TAVI-in-SAVR), 12-month mortality was 12%, with notable improvements in quality of life. Mean gradients were approximately 19 mmHg, highlighting the influence of surgical valve size. Reintervention was uncommon (https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpma/pma_pas.cfm?t_id=608841&c_id=4424: FDA Post-Approval Study: SAPIEN 3 Valve-in-Valve Registry, 2024).

Current guidelines do not address SAVR as a therapeutic option in patients aged >70 years. This omission is surprising given the absence of demonstrated superiority of TAVI, lack of evidence indicating harm with SAVR, and emerging longer-term data suggesting higher mortality and reintervention rates with transcatheter strategies in these patients. Moreover, excluding SAVR overlooks variations in local resources and healthcare systems.

4) Procedure-related complications

Surgical complications such as atrial fibrillation or bleeding are generally transient, whereas TAVI-related complications—including pacemaker implantation and paravalvular regurgitation—are often persistent and have cumulative adverse effects over time, of particular relevance in patients with longer life expectancies.[14]

The rationale for a SAVR-first strategy extends beyond haemodynamic considerations and includes preservation of coronary access, procedural feasibility of future interventions, avoidance of complex surgical explantation after TAVI, and mitigation of the long-term impact of non-transient complications associated with transcatheter therapy.

Conclusion

The 2025 European guideline recommendation to lower the age threshold for TAVI from 75 to 70 years reflects confidence in mid-term outcomes but extends beyond the scope of current evidence. No randomized trial has demonstrated superiority of TAVI over SAVR in low-risk septuagenarians, and follow-up remains insufficient to inform their lifetime management.

In younger fit patients, valve replacement should not be framed as a single procedural choice but as the beginning of a longitudinal strategy. Lifetime management is ideally informed by the patient's life expectancy, valve durability, and need for future reinterventions. The initial choice of surgical vs transcatheter procedure should anticipate the likelihood of subsequent procedures. A SAVR-first approach—particularly when combined with annular or root enlargement if needed—preserves coronary access, optimizes haemodynamics, and maintains multiple reintervention pathways, offering late structural advantages that randomized trials, focused on early endpoints, cannot capture.

Guideline recommendations that shape lifetime treatment pathways should rest on durable long-term data. Until such evidence exists, a default strategy of TAVI from age 70 upward cannot be considered definitively established.

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Declarations

Disclosure of Interest

Nothing to declare.

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