

Long-term mitral valve durability advantage with porcine valves

Clinical Insights

Introduction

Surgical bioprosthetic mitral valve replacement (MVR) remains an important treatment option for patients whose mitral valves are not amenable to durable repair, with both porcine and bovine pericardial valves widely used. However, comparative large-scale data evaluating long-term durability, hemodynamic performance, and structural valve deterioration (SVD) between modern porcine and bovine pericardial bioprosthetic valves remain limited.

Abbott porcine mitral valves and Edwards Lifesciences bovine pericardial mitral valves have each been used clinically for more than 20 years, yet direct long-term comparisons between these valve types have been limited. Understanding differences in durability is critical given the clinical implications of SVD, reoperation risk, and valve hemodynamics over time. A large retrospective analysis from Cleveland Clinic provides one of the most comprehensive direct comparisons of these two valve types and demonstrated a long-term durability advantage for porcine valves.

Demographics and baseline characteristics

Demographic and baseline characteristics	Epic™ mitral valves	Pericardial mitral valves
Average age	69 ± 12 years	68 ± 12 years
Female patients	53%	55%
Mitral stenosis	32%	33%
Endocarditis	8.6%	9.0%
Prior surgery	47%	49%
Urgent surgeries	42%	41%
Emergency surgeries	1.7%	1.7%



Study method

- This is a retrospective, single-center, two-arm comparative study using longitudinal follow-up extending to 15 years.
- The analysis included 6,789 all-comer adult patients undergoing surgical MVR with stented bioprosthetic valves between January 1, 2000 and January 1, 2024 at a single institution (Cleveland Clinic). Of these, 4,597 (68%) received porcine valves and 2,192 (32%) received bovine pericardial valves.
- To minimize confounding, a robust propensity score matching using 54 variables was applied, yielding a matched cohort of 1,853 patient pairs.
- Endpoints evaluated included all-cause mortality, mitral valve reoperation, and hemodynamic performance.

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Findings

Porcine valves demonstrated a **significantly lower** probability of reoperation due to SVD through long-term follow-up. At 10 years, the probability of SVD-related reoperation was 9.8% for porcine valves versus 14% for bovine valves. At 15 years, this increased to 34% vs 45%, corresponding to an 11% absolute risk difference (p=0.003).

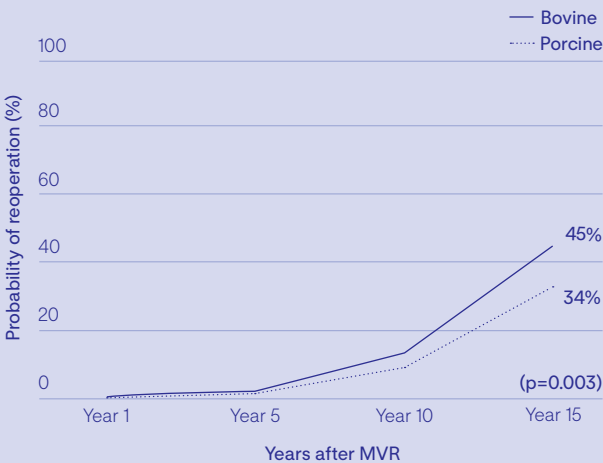
An analysis based on age demonstrated that the greatest difference in the predicted 15-year freedom from reoperation for SVD for porcine versus bovine pericardial valves was in patients <60 years of age.

The hemodynamic performance between the two groups was significantly different, with Epic™ mitral porcine valves performing better over the long-term. Mitral regurgitation with grade ≥2+ at 10 years was four times less in the porcine group (3%) compared with the bovine group (12%; p<0.0001). Mean mitral gradients at 10 years were approximately 20% lower in the porcine group (~6.6 mmHg) compared with bovine valves (~8.2 mmHg; p<0.001). Although there was a slightly lower gradient for bovine pericardial valves relative to porcine valves at implant, gradients increased for bovine pericardial valves and remained higher than porcine valves after approximately one year.

Long-term survival did not differ, with survival of 88% at one year, 68% at five years, 41% at 10 years, and approximately 20% at 15 years. While porcine valves demonstrated a slightly higher early risk of infective endocarditis-related reoperation, long-term endocarditis risk was similar between groups.

Study Finding	Porcine Valves	Bovine Pericardial Valves	P-Value
Study Utilization (2000–2024)	4,597 implants (matched at 1,853)	2,192 implants (matched at 1,853)	N/A
Long-Term Survival (15 yrs)	~20%	~20%	P=0.27
Late Hazard for SVD Reoperation	Significantly lower late hazard	Higher late hazard	N/A
Absolute Risk of SVD Reoperation (15 yrs)	34%	45%	(p=0.003)
Absolute Risk Reduction for SVD (15 yrs)	11% lower vs bovine	Reference	N/A
Mitral Regurgitation ≥2+ (10 yrs)	3%	12%	P<0.0001
Mean Mitral Gradient (10 yrs)	~6.6 mmHg	~8.2 mmHg	P<0.001
Age Interaction (<60 yrs) (10 yrs)	Lower SVD risk in younger patients	Higher SVD risk in younger patients	N/A

15-year reoperation due to SVD



Conclusions

In this large, propensity-matched cohort, porcine mitral valves demonstrated superior long-term durability, with an approximately 11% absolute reduction in SVD-related reoperation at 15 years compared with bovine pericardial valves. This reduction in SVD-related reoperation represents a clinically meaningful difference.

Porcine mitral valves were also associated with better long-term hemodynamic performance, including lower gradients and reduced mitral regurgitation, which may explain the superior durability compared to the bovine pericardial valves.

Both valve types demonstrated equivalent early safety and long-term survival, indicating that valve selection primarily influences long-term durability rather than mortality outcomes.

Overall, these findings support the better long-term durability of Epic™ mitral valves inclusive of all patients, **particularly in patients younger than 60 years of age**. With more patients receiving bioprosthetic valves it is critical to provide a valve with stable hemodynamics and excellent long-term durability.

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Rx Only

Important Safety Information

Epic™ Plus and Epic™ Plus Supra Porcine Tissue Valves

Indications for Use

The Epic™ Plus valve is indicated for patients requiring replacement of a diseased, damaged, or malfunctioning native aortic and/or mitral heart valve. It may also be used as a replacement for a previously implanted aortic and/or mitral prosthetic heart valve.

The Epic™ Plus Supra valve is indicated for patients requiring replacement of a diseased, damaged, or malfunctioning native aortic heart valve. It may also be used as a replacement for a previously implanted aortic prosthetic heart valve.

Contraindications

None known.

Potential Adverse Events

Adverse events potentially associated with the use of bioprosthetic heart valves (in alphabetical order) include: angina; cardiac arrhythmias; endocarditis; heart failure; hemolysis; hemolytic anemia; hemorrhage, anticoagulant/antiplatelet-related; leak, transvalvular or paravalvular; myocardial infarction; nonstructural dysfunction (entrapment by pannus or suture, inappropriate sizing or positioning, or other); prosthesis regurgitation; stroke; structural deterioration (calcification, leaflet tear, or other); thromboembolism; valve thrombosis.

It is possible that these complications could lead to: reoperation; explantation; permanent disability; death.

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1. Malas T, et al. Comparative Durability of Porcine and Bovine Mitral Valve Bioprostheses, *The Journal of Thoracic and Cardiovascular Surgery* (2026)

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