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Valve-in-Valve International Data VIVID

Long-term Outcomes After Transcatheter Aortic Valve Implantation in Failed Bioprosthetic Valves

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On behalf of Valve-in-Valve International Data (VIVID) Investigators

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Potential conflicts of interest

Danny Dvir, MD

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Introduction

- Long-term data after aortic valve-in-valve procedures is limited.
- Our objective was to perform a large-scale assessment of long-term survival and reinterventions after transcatheter aortic ViV.

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Methods

- Retrospective multicenter data collection.
- Included cases were performed before December 2014 (i.e. more than 5 years before).
- Small bioprosthetic valves were defined as those with true ID ≤ 20 mm.

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Selected Baseline characteristics

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	Aortic ViV (n = 1006)	Medtronic self-expandable valves (n = 523)	Edwards balloon-expandable valves (n = 435)	Other Valves (n = 48)	p-value
Age (years, mean ± SD)	77.7 ± 9.7	78.2 ± 9.3	77.2 ± 10.0	76.9 ± 10.4	0.25
Male	58.8%	54.9%	63.9%	54.2%	0.02
Valve type					0.005
Stented	81.3%	77.4%	85.8%	81.3%	
Stentless	18.8%	22.6%	14.2%	18.8%	
True ID (mm, mean ± SD)	19.9 ± 2.4	19.7 ± 2.5	20.3 ± 2.2	19.8 ± 2	0.001
Pre-existing severe PPM	6.2%	9.2%	3.6%	0%	0.002
Mechanism of bioprosthetic valve failure					0.46
Regurgitation	17.4%	18.1%	15.8%	25.0%	
Stenosis	37.9%	38.3%	37.4%	38.6%	
Mixed	44.7%	43.6%	46.9%	36.4%	
NYHA class					0.81
I	1.2%	1.5%	0.9%	0%	
II	8.7%	9.2%	8.2%	8.3%	
III	62.8%	61.6%	63.4%	70.8%	
IV	27.3%	27.7%	27.5%	20.8%	
Diabetes mellitus	27.3%	28.0%	26.5%	27.1%	0.88
Peripheral vascular disease	22.3%	16.3%	30.0%	18.8%	<0.001
Chronic kidney disease	54.5%	54.2%	55.0%	52.1%	0.92
EuroSCORE II (median [IQR])	12.7 [8.7-18.4]	13.3 [8.8-19.6]	12.4 [8.6-17.9]	11.6 [6.8-17.7]	0.14
STS Score (%, median [IQR])	7.3 [4.2-12.0]	7.8 [4.4-12.9]	7.2 [4.2-11.7]	5.5 [2.4-8.3]	0.001
LVEF (%, mean ± SD)	51.8 ± 13.1	52.0 ± 13.6	51.2 ± 12.7	56.2 ± 11.8	0.06

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Selected Clinical Outcomes

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	Aortic ViV (n = 1006)	Medtronic self-expandable valves (n = 523)	Edwards balloon-expandable valves (n = 435)	Other Valves (n = 48)	p-value
THV label size (mm, median [IQR])	23 [23-26]	26 (23-26)	23 [23-26]	23 [23-25]	<0.001
Access					<0.001
Transfemoral, n/N (%)	69.5%	91.2%	45.7%	47.9%	
Transapical, n/N (%)	24.9%	0.0%	52.2%	50%	
Subclavian, n/N (%)	1.9%	3.1%	0.7%	0.0%	
Transaortic, n/N (%)	2.3%	3.1%	1.4%	2.1%	
Other, n/N (%)	1.4%	2.7%	0.0%	0.0%	
Malposition, n/N (%)	6.5%	9.1%	3.6%	4.5%	0.003
Post-dilation, n/N (%)	14.3%	21.1%	4.7%	27.8%	<0.001
Second THV, n/N (%)	5.3%	6.7%	4.0%	2.1%	0.11
Permanent pacemaker needed, n/N (%)	7.5%	8.9%	6.2%	4.5%	0.26
Major Vascular complications	3.4%	3.8%	3.3%	0.0%	0.001
Major bleeding, n/N (%)	7.7%	5.9%	9.2%	12.2%	0.11
Major stroke, n/N (%)	1.9%	2.0%	1.7%	2.2%	0.91
Acute kidney injury, n/N (%)	7.8%	8.3%	7.5%	6.7%	0.86
Coronary obstruction, n/N (%)	2.3%	2.3%	2.1%	4.4%	0.61
Post-procedural hemodynamics					
LVEF (%, mean ± SD)	51.6 ± 11.9	51.7 ± 12.3	51.3 ± 11.4	53.8 ± 12.0	0.45
EOA (cm^2, mean ± SD)	1.49 ± 0.51	1.59 ± 0.50	1.39 ± 0.51	1.40 ± 0.57	<0.001
Max. gradient (mmHg, mean ± SD)	29.0 ± 14.9	27.1 ± 13.6	30.8 ± 15.8	34.7 ± 16.8	<0.001
Mean gradient (mmHg, mean ± SD)	16.3 ± 9.1	14.7 ± 8.2	17.7 ± 9.5	20.3 ± 10.9	<0.001

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Long-term survival after aortic ViV

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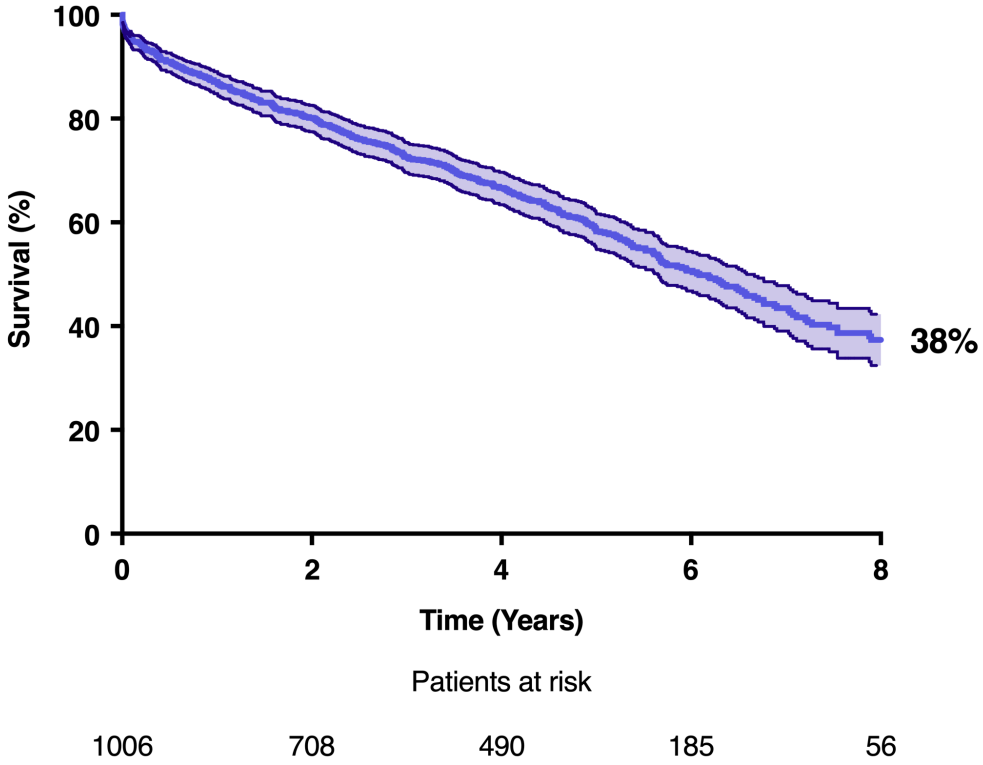

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Long-term survival after aortic ViV

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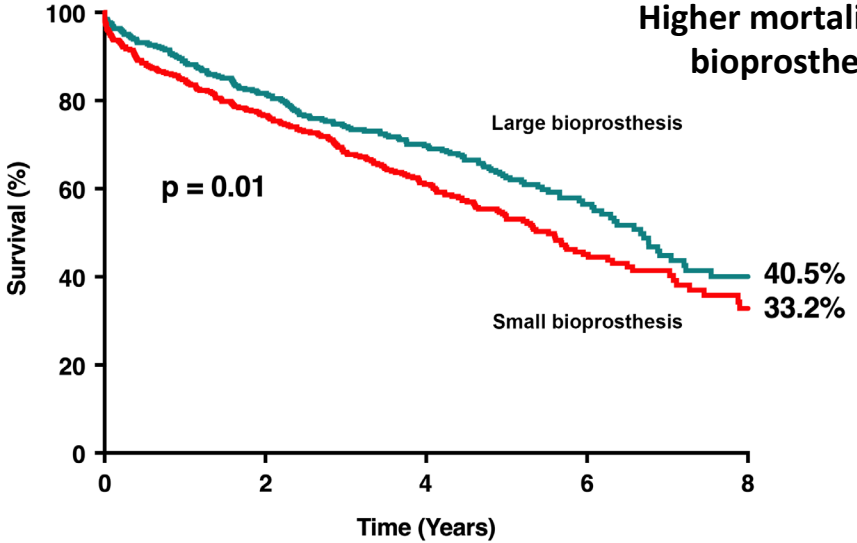

Patients at risk

Large bioprosthesis	387	279	201	78	27
Small bioprosthesis	450	304	204	75	22

Kaplan-Meier curves, unadjusted analysis

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Long-term survival after aortic ViV

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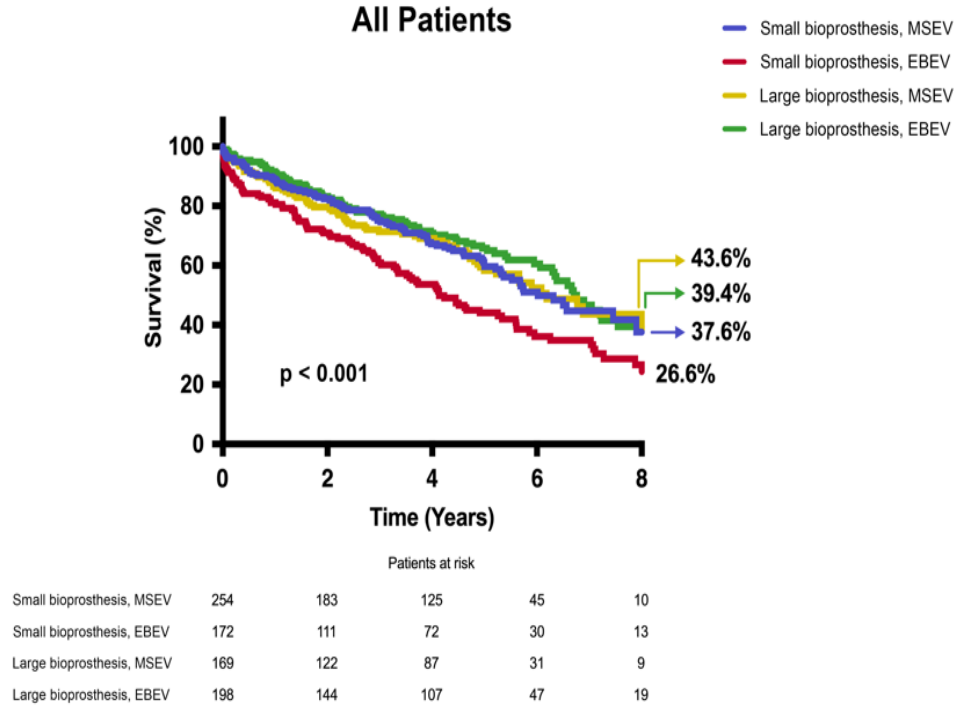

Kaplan-Meier curves, unadjusted analysis

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Long-term survival after aortic ViV

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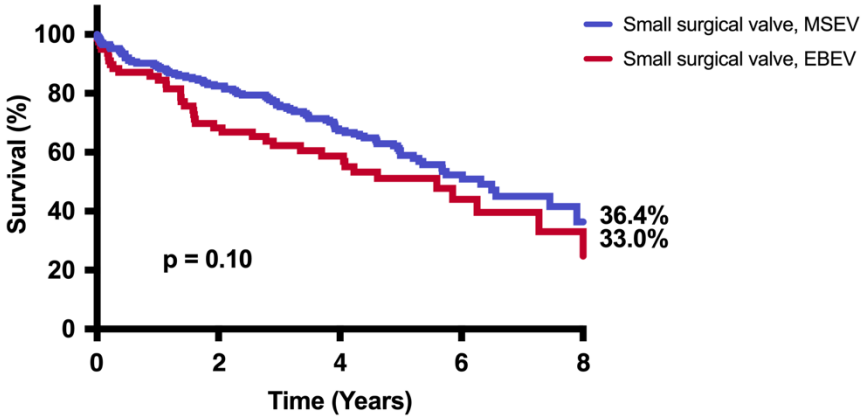
Transfemoral access only
Small surgical valve ViV



Patients at risk

Small surgical valve, MSEV	233	166	114	40	8
Small surgical valve, EBEV	79	47	34	11	5

Kaplan-Meier curves, unadjusted analysis

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Multivariable Analysis

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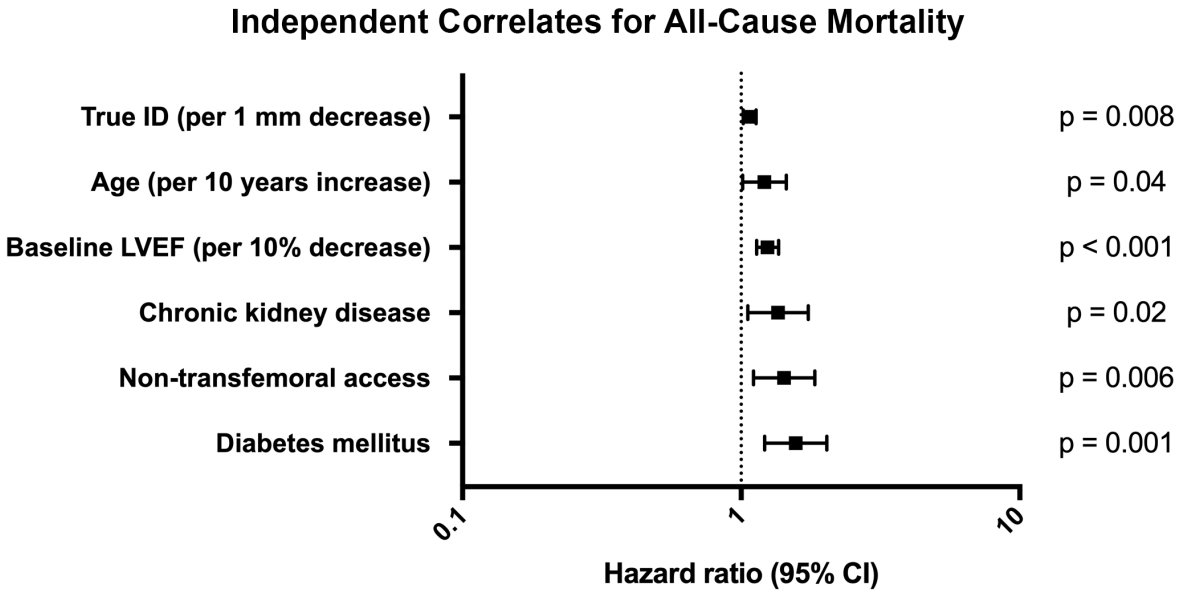

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Multivariable Analysis

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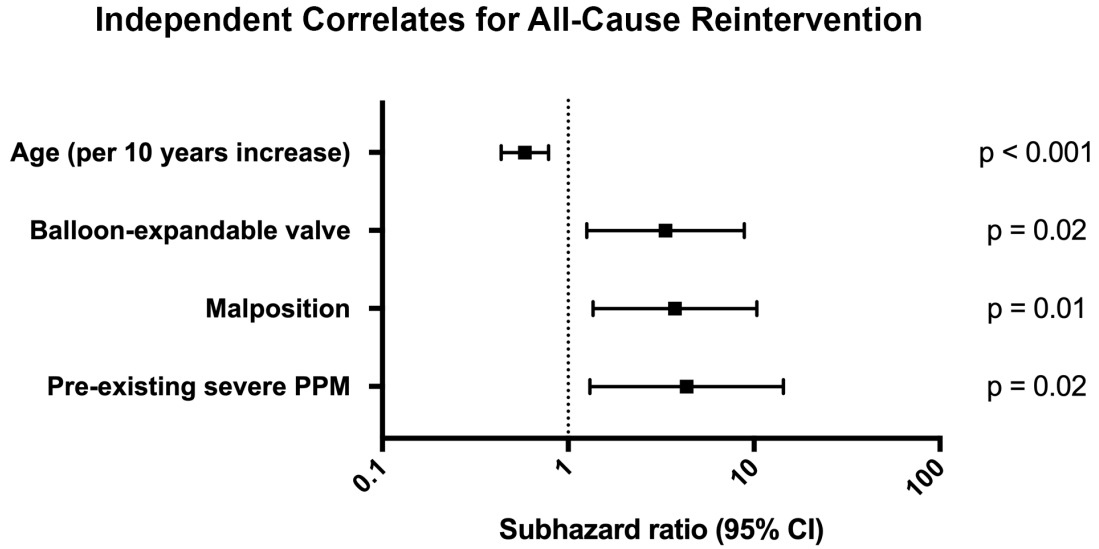

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Reintervention after aortic ViV

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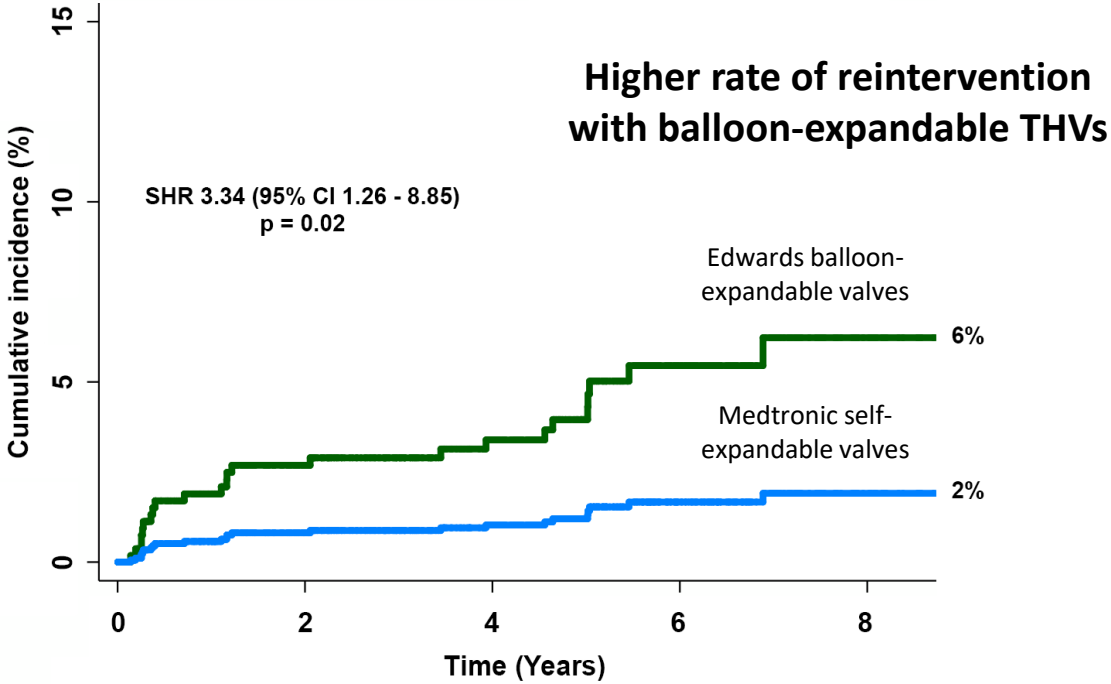

Fine and Gray cumulative incidence function curves showing the adjusted cumulative subhazard of all-cause reintervention

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Reintervention after aortic ViV

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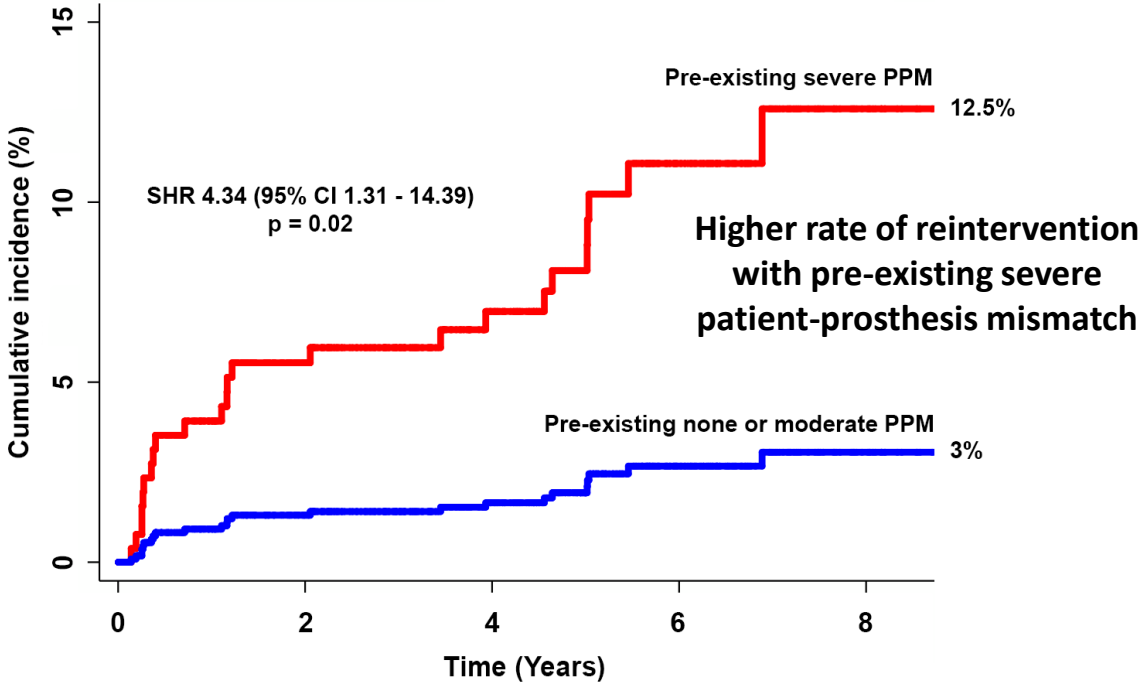

Fine and Gray cumulative incidence function curves showing the adjusted cumulative subhazard of all-cause reintervention

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Conclusions

- The size of the original failed valve may influence long-term mortality and the type of the transcatheter valve may influence the need for reintervention after aortic ViV.
- Small failed bioprosthetic valves were associated with higher mortality.
- Balloon-expandable transcatheter valves were associated with a higher reintervention rate.

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The essentials to remember

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Operator decisions during the original tissue valve implantation and/or during the ViV procedure may influence meaningful clinical outcomes

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