

Transcatheter Versus Surgical Aortic Valve Replacement in Patients Aged 50 to 65 Years

A Propensity Score-Matched Five-Year Study

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Disclosure of Relevant Financial Relationships

- Dr. Villablanca is a consultant for Edwards Lifesciences, Medtronic, Shockwave Medical, Abiomed, and AngioDynamics. Dr. Islam reports consulting for and institutional research grant support from Medtronic. Dr. Goldsweig reports speaking for Philips and Boston Scientific and consulting for Abbott, Occlutech, and Conformal Medical.
- No other authors report relationships with industry to declare.

Background

- Despite seven pivotal randomized trials, **TAVR** has been widely adopted for patients at all levels of surgical risk
- The role of **TAVR** in younger patients remains uncertain.
- Prior registry studies showing comparable early results but inferior long-term survival with TAVR in younger patients.

- Nelson JS, Maul TM, Wearden PD, et al. Aortic Valve Replacement in Young and Middle-Aged Adults: Current and Potential Roles of TAVR. *Annals of Thoracic Surgery*. 2021;112(1):132-138. doi:10.1016/j.athoracsur.2020.05.180
- Alabbadi S, Bowdish ME, Sallam A, et al. Transcatheter versus surgical aortic valve replacement in patients younger than 65 years in the United States. *Journal of Thoracic and Cardiovascular Surgery*. Published online 2025. doi:10.1016/j.jtcvs.2024.12.025
- Gupta T, DeVries JT, Huang HC, et al. Trends in Isolated and Combined Aortic Valve Replacement for Severe Aortic Stenosis in Patients Younger Than 65 Years. *Structural Heart*. 2025;9(8). doi:10.1016/j.shj.2025.100684

Methods

- The analysis was conducted using the TriNetX Research Network.
- Patients aged 50 to 65 years undergoing isolated TAVR or SAVR between January 1, 2015, and December 31, 2024.
- Propensity score-matching (PSM) 1:1 based upon sociodemographic and clinical profiles.

Study flow chart for patient selection and characteristics

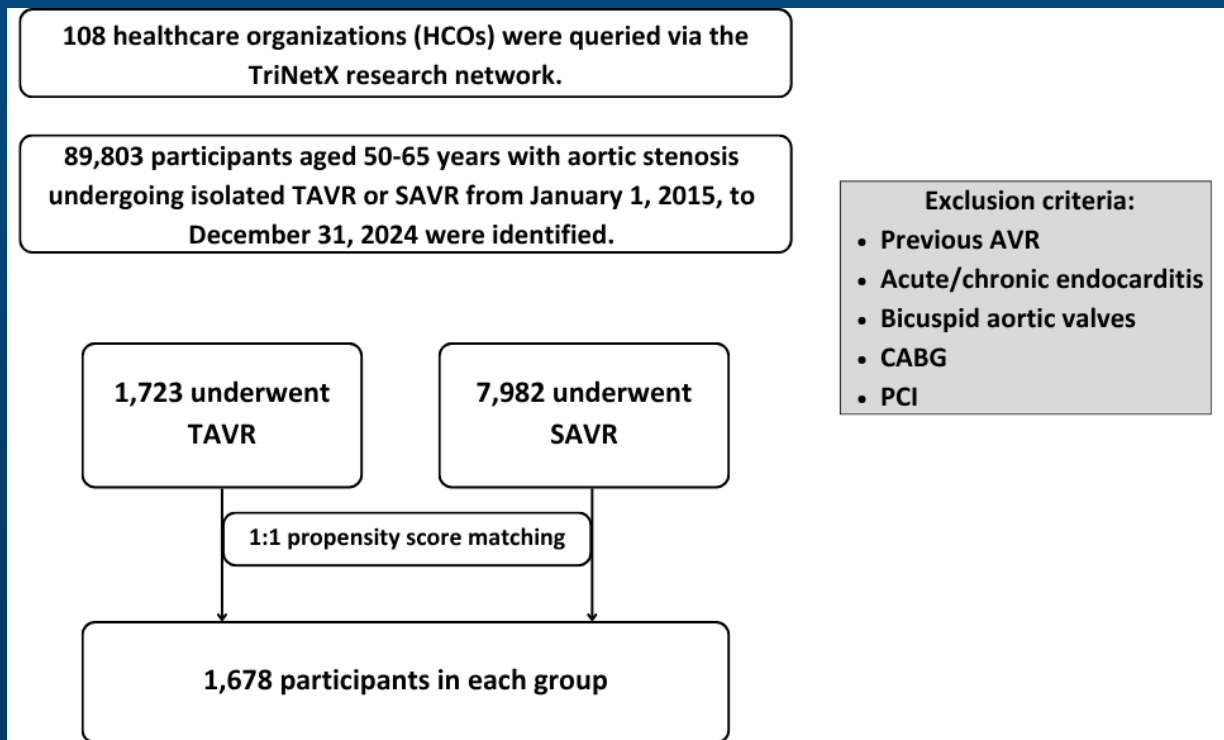


Table 1

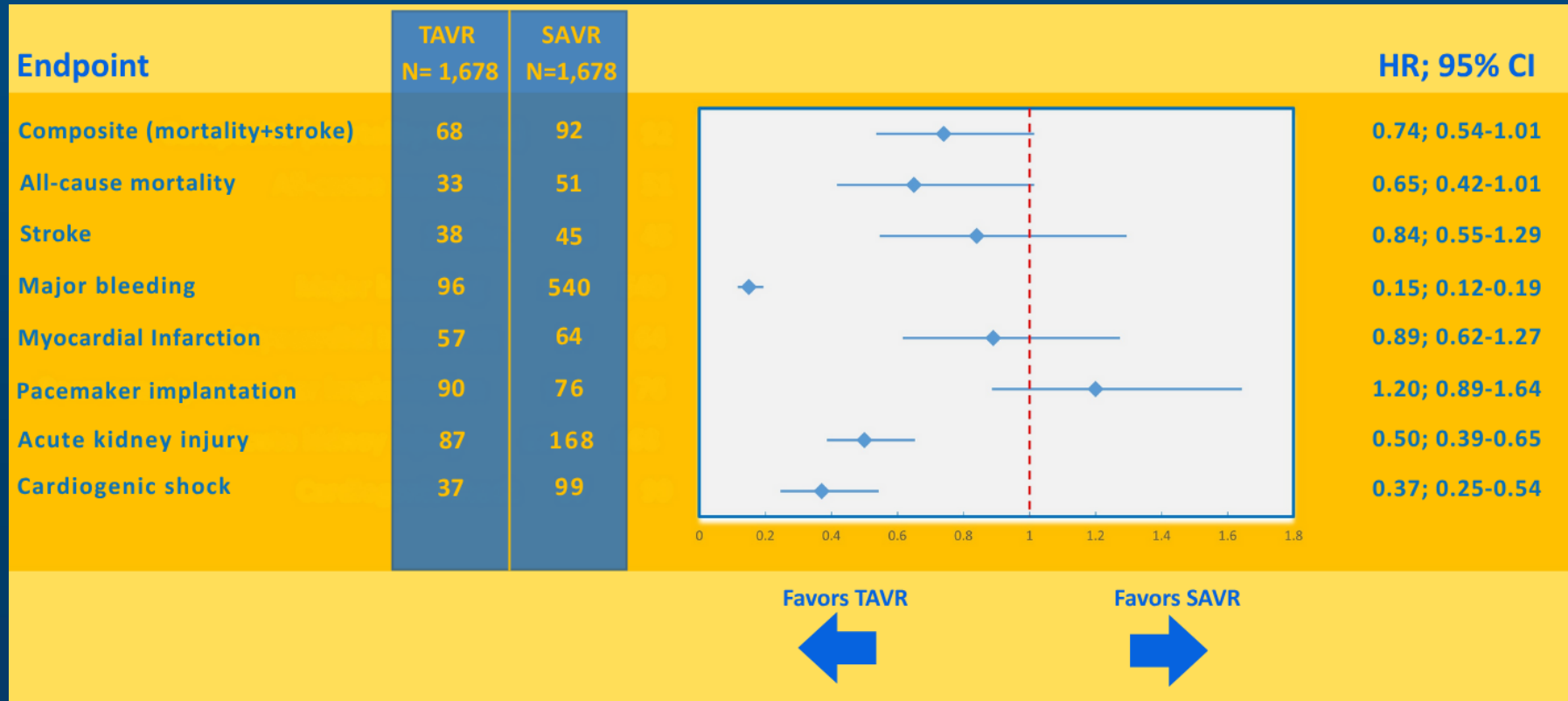
Baseline Characteristics after PSM

Baseline Variable	TAVR n = 1,678	SAVR n = 1,678	P Value
Age (years) mean±SD	57.5 ± 4.3	57.7 ± 4.2	0.17
Male, n(%)	1,037(61.8)	1,016(60.5)	0.46
Hypertension, n(%)	1,123(66.9)	1,113(66.3)	0.71
Diabetes mellitus, n(%)	691(41.2)	663(39.5)	0.33
Heart failure, n(%)	949(56.6)	916(54.6)	0.25
Cerebral infarction, n(%)	109(6.5)	93(5.5)	0.25
COPD, n(%)	323(19.2)	325(19.4)	0.93
BMI ≥ 30, n(%)	959(57.2)	960(57.2)	0.97

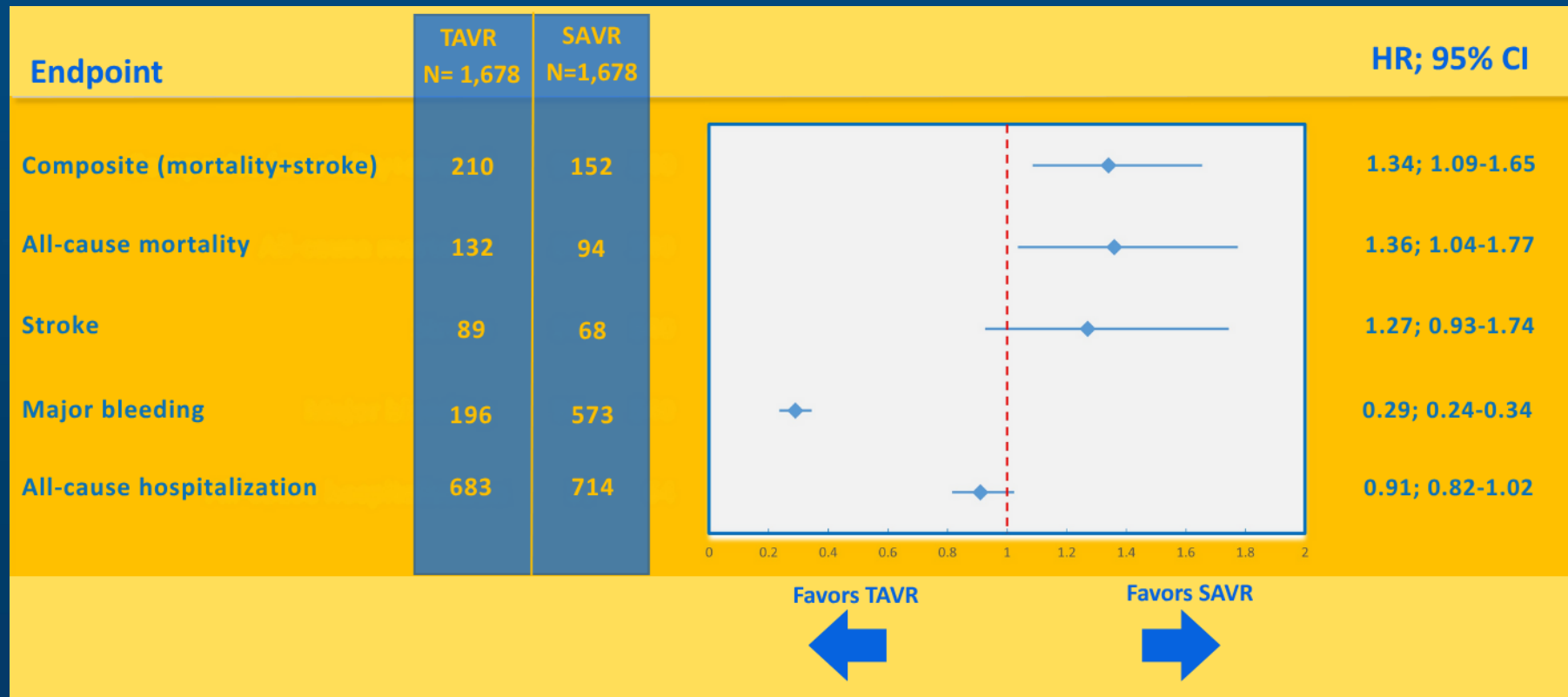
Results

- **30-days:** TAVR was associated with lower risks of major bleeding, AKI and cardiogenic shock.
- **1-year:** TAVR was associated with a higher risk of the composite (**all-cause mortality or ischemic stroke**) endpoint, higher mortality, and consistently lower risk of major bleeding.
- **5-year:** Composite endpoint and mortality remained significantly higher with TAVR. TAVR showed a higher risk of SVD and lower major bleeding.
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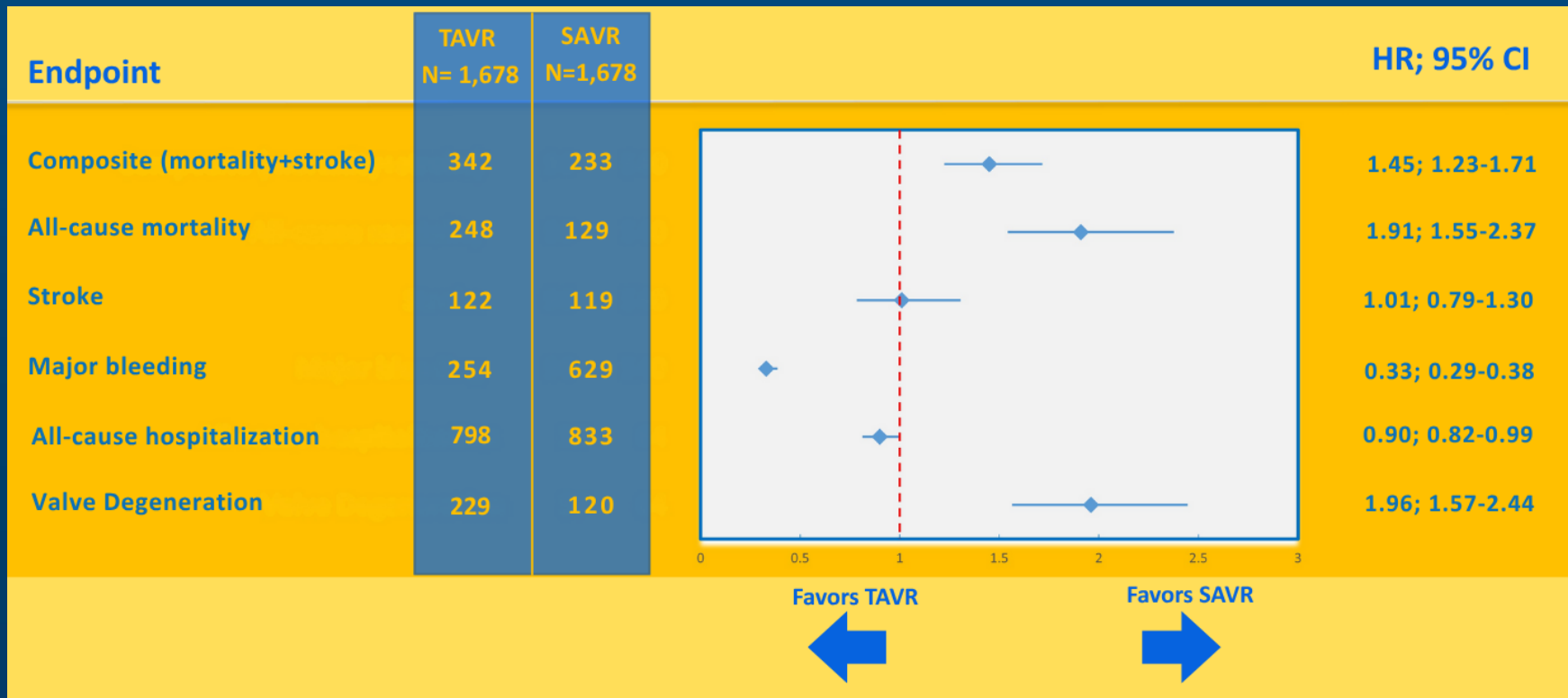
30-day outcomes



1-year outcomes



5-year outcomes



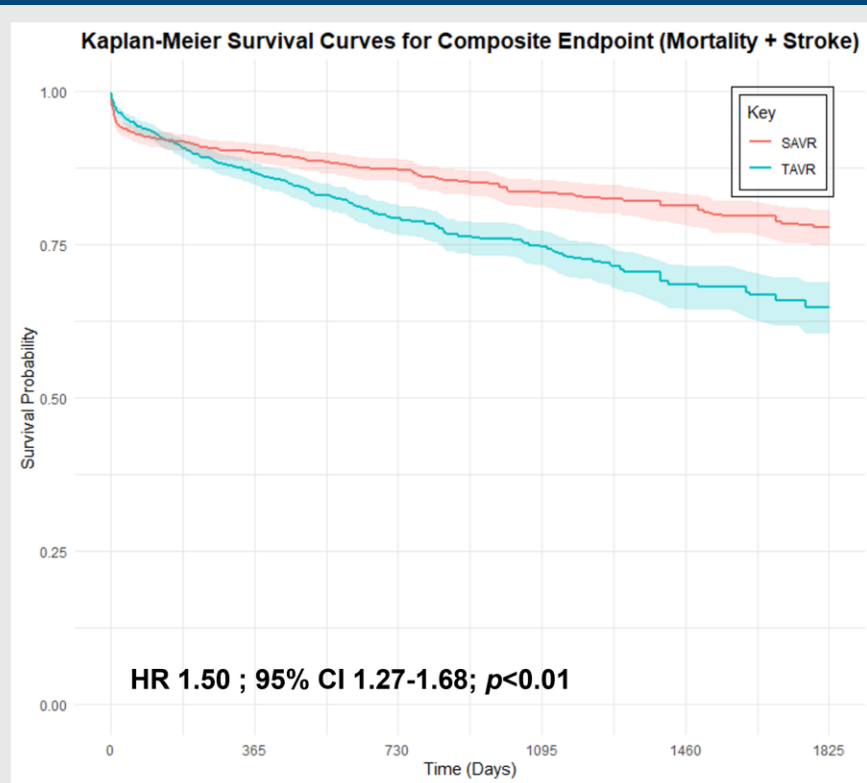


Figure. Kaplan-Meier survival curves for the composite outcome of all-cause mortality and stroke over five years among propensity-matched patients aged 50–65 years undergoing transcatheter (TAVR) versus surgical (SAVR) aortic valve replacement. Shaded areas represent 95% confidence intervals.

Limitations

- *Observational design*
- *Reliance on coded clinical data*
- *Lack of hemodynamic or STS risk score information (**may suggest sicker patients undergoing SAVR**), mechanical or bioprosthetic valves, as well as annular sizes.*

Conclusion/Summary/Take-home Message

- In patients aged 50 to 65 years, TAVR was associated with fewer early complications but higher long-term risks of mortality and SVD compared with SAVR.
- These results support existing guideline recommendations.
- Despite limitations, consistency of these findings with other datasets suggests that long-term risk with TAVR in this population remains a critical concern.