

Baseline Clinical Risk Modeling for 1-Year Mortality After TMVR

Development in a multicenter Tendyne™ cohort and projection to an independent MitraClip cohort

1 Background

- Risk stratification in patients undergoing transcatheter mitral valve replacement (TMVR) remains challenging.
- Conventional clinical risk scores were not developed for this population.
- It is uncertain how well routine baseline clinical and echocardiographic parameters capture mortality risk and generalize across transcatheter mitral interventions.



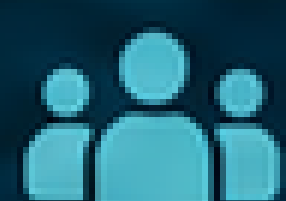
2 Methods



Development cohort: multicenter TMVR cohort treated with the Tendyne™ system (n = 134)

Baseline clinical risk model for 1-year all-cause mortality

- Routine preprocedural variables: age, sex, body mass index, atrial fibrillation, chronic obstructive pulmonary disease, renal function
- Structural LV parameter: indexed left ventricular end-diastolic diameter (LVEDDi)



Model performance assessed in complete cases (n = 68)



STS subset with available Society of Thoracic Surgeons scores (n = 65): comparison with STS-only model using identical samples



Transportability analysis: projection of the TMVR-derived baseline model onto an independent MitraClip cohort with harmonized baseline variables and complete 1-year follow-up (n = 48)

3 Results



TMVR cohort: good apparent discrimination for 1-year all-cause mortality (AUC 0.77) with good calibration.



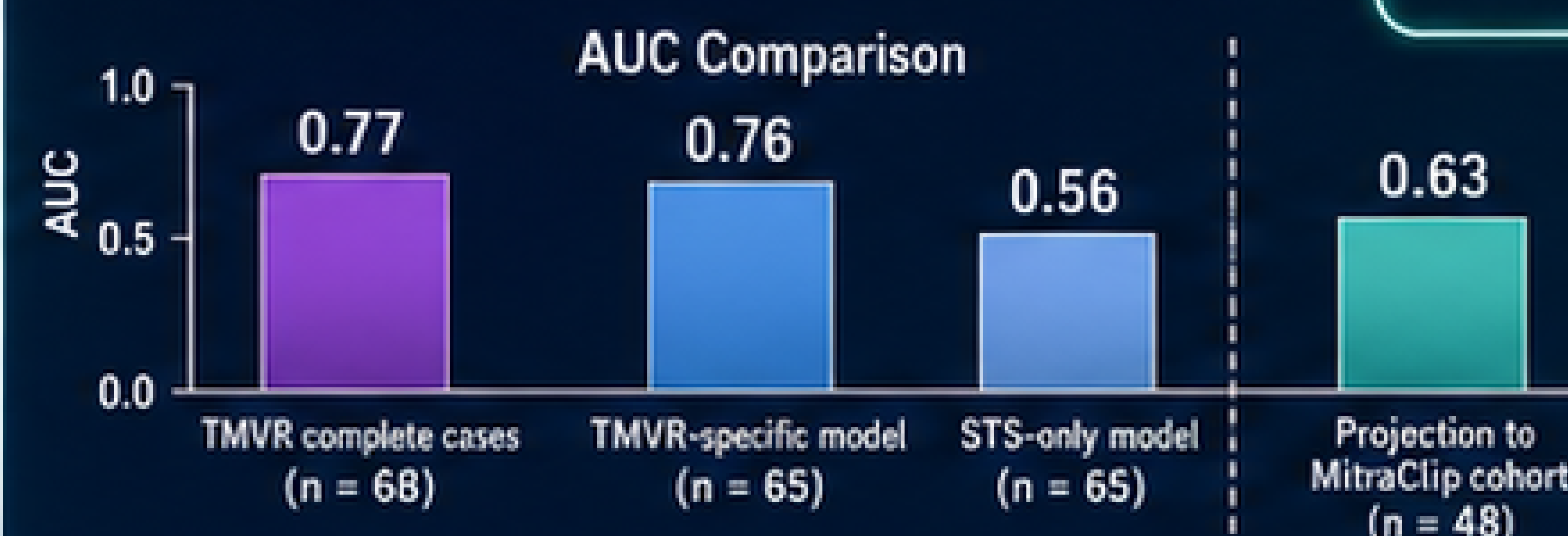
Among individual baseline variables, atrial fibrillation showed the strongest association with 1-year mortality.



STS subset: TMVR-specific baseline model incorporating LV geometry showed numerically higher discrimination than STS alone (AUC 0.76 vs. 0.56) and lower prediction error, although the AUC difference was not statistically significant.



MitraClip cohort: moderate discrimination when the TMVR-derived model was applied externally (AUC 0.63), with a broad distribution of predicted risks.



AUC

0.77

TMVR complete cases

AUC

0.76 vs. 0.56

TMVR-specific model vs. STS only

AUC

0.63

Projection to MitraClip cohort

★ Best individual predictor among baseline variables: atrial fibrillation

4 Conclusions



TMVR-specific modeling of routine baseline parameters, complemented by LV geometry, enables within-cohort risk stratification beyond conventional surgical risk scores.



Transportability across transcatheter mitral repair and replacement populations remains limited.



These findings highlight the constraints of purely baseline risk models and support the need for more comprehensive phenotyping strategies in this evolving field.



Abbreviations

TMVR = transcatheter mitral valve replacement
LVEDDi = indexed left ventricular end-diastolic diameter

STS = Society of Thoracic Surgeons
COPD = chronic obstructive pulmonary disease
AUC = area under the curve

TAKE-HOME MESSAGE

Routine baseline variables + LV geometry can stratify 1-year mortality risk in TMVR better than conventional surgical risk scores within the TMVR cohort, but generalizability to MitraClip patients is limited.