SUPPLEMENTAL MATERIAL

Table S1. rTOF Deceased Cohort—Demographic, Anatomic, Surgical, CMR, and Arrhythmia Characteristics Stratified by Cause of Death.

Variable	Cardiac death N=47	Noncardiac death N=24	Unknown N=28	p-value
Demographics				
Median age at repair, years	9.28 (6.36, 17.27)	6.58 (4.64, 13.51)	5.00 (2.28, 16.01)	0.22
Year of TOF repair ≤1985	37 (78.7%)	19 (79.2%)	20 (71.4%)	0.73
Median age at initial CMR, years	43.9 (32.9, 50.7)	39.0 (24.2, 48.4)	35.5 (23.5, 56.2)	0.51
Follow-up time, years	7.64 ± 3.98	7.35 ± 4.26	8.91 ± 4.31	0.33
Sex (male)	26 (55.3%)	14 (58.3%)	16 (57.1%)	0.97
Race				0.25
Hispanic	0 (0%)	0 (0%)	0 (0%)	
White	26 (55.3%)	9 (37.5%)	12 (42.9%)	
Black	1 (2.1%)	1 (4.2%)	2 (7.1%)	
Asian	1 (2.1%)	0 (0%)	0 (0%)	
Other	0 (0%)	2 (8.3%)	0 (0%)	
Unknown	19 (40.4%)	12 (50.0%)	14 (50.0%)	
BMI at CMR, kg/m^2	27.1 ± 5.5	26.5 ± 6.0	26.7 ± 6.0	0.93
Diagnosis				
TOF type				0.29
TOF/PS	33 (70.2%)	19 (79.2%)	24 (85.7%)	
TOF/PA	14 (29.8%)	5 (20.8%)	4 (14.3%)	
TOF/AV canal	0 (0%)	0 (0%)	0 (0%)	
Genetic anomaly	2 (4.3%)	3 (12.5%)	4 (14.3%)	0.28
Additional cardiovascular anomaly	19 (40.4%)	10 (41.7%)	14 (50.0%)	0.71
Noncardiac abnormality	16 (34.0%)	15 (62.5%)	14 (50.0%)	0.06
Prior Procedures				
Pre-TOF repair palliative shunt	27 (57.4%)	13 (54.2%)	14 (50.0%)	0.82
Initial TOF repair type				0.72
Transannular patch	13 (27.7%)	9 (37.5%)	9 (32.1%)	
RV-PA conduit	12 (25.5%)	5 (20.8%)	4 (14.3%)	
Nontransannular RVOT patch	8 (17.0%)	3 (12.5%)	8 (28.6%)	
Other/unknown	14 (29.8%)	7 (29.2%)	7 (25.0%)	
Post-repair cardiac procedures	32 (68.1%)	16 (66.7%)	21 (75.0%)	0.77
Post-repair PVR	31 (66.0%)	14 (58.3%)	13 (46.4%)	0.25
CMR Measurement				
RVEDVi, mL/m^2	156.9 ± 57.2	148.2 ± 55.1	163.3 ± 72.1	0.68
RVESVi, mL/m^2	94.3 ± 44.6	81.3 ± 39.6	102.2 ± 62.3	0.31

Variable	Cardiac death N=47	Noncardiac death N=24	Unknown N=28	p-value
RV EF, %	41.4 ± 9.8	47.1 ± 10.7	40.4 ± 12.4	0.06
RV mass index, g/m^2	38.1 ± 14.9	34.8 ± 17.2	42.8 ± 19.9	0.23
RV mass/volume ratio, g/mL	0.25 ± 0.09	0.24 ± 0.07	0.27 ± 0.09	0.32
RV VAC	1.57 ± 0.73	1.27 ± 0.71	1.77 ± 1.05	0.10
LVEDVi, mL/m^2	102.1 ± 40.6	86.2 ± 17.3	95.2 ± 29.5	0.17
LVESVi, mL/m^2	53.4 ± 36.8	37.9 ± 12.8	46.1 ± 21.8	0.10
LV EF, %	50.9 ± 11.6	56.4 ± 8.4	52.5 ± 15.2	0.20
LV mass, index, g/m^2	64.9 ± 23.5	55.3 ± 17.2	67.0 ± 21.7	0.12
LV mass/volume ratio, g/mL	0.66 ± 0.21	0.65 ± 0.19	0.73 ± 0.20	0.32
BVGFI	39.0 ± 9.2	46.3 ± 10.8	38.4 ± 10.9	0.009
RV/LV EDV ratio	1.66 ± 0.64	1.74 ± 0.63	1.84 ± 0.87	0.60
Arrhythmia Measurement				
Atrial arrhythmia	22 (46.8%)	7 (29.2%)	14 (50.0%)	0.26
Nonsustained VT	16 (34.0%)	4 (16.7%)	9 (32.1%)	0.29
Pacemaker	4 (8.5%)	0 (0%)	1 (3.6%)	0.28
ICD	7 (14.9%)	2 (8.3%)	4 (14.3%)	0.72
QRS duration, ms	165.0 ± 26.8	153.3 ± 23.1	155.3 ± 30.1	0.14

TOF indicates tetralogy of Fallot; CMR, cardiovascular magnetic resonance imaging; BMI, body mass index; PS, pulmonary stenosis; PA, pulmonary atresia; AV, atrioventricular; RV-PA, right ventricle-pulmonary artery; RVOT, right ventricular outflow tract; PVR, pulmonary valve replacement; RV, right ventricle; EDVi, end-diastolic volume index; ESVi, end systolic volume index; EF, ejection fraction; LV, left ventricle; BVGFI, biventricular global function index; VT, ventricular tachycardia; ICD, implantable cardioverter defibrillator.

Table S2. Kaplan-Meier Estimates of Survival by Risk Score Group.

	Survival (95% CI)			
	5-year rate	10-year rate	15-year rate	p-value
Development				
Low risk (score ≤ 4)	0.99 (0.98, 1.00)	0.97 (0.95, 0.98)	0.95 (0.93, 0.97)	<0.001
High risk (score > 4)	0.89 (0.83, 0.93)	0.74 (0.65, 0.81)	0.56 (0.45, 0.66)	
External Validation				
Low risk (score ≤ 4)	1.00 (1.00, 1.00)	0.96 (0.93, 0.98)	0.95 (0.91, 0.97)	<0.001
High risk (score > 4)	0.93 (0.85, 0.97)	0.83 (0.72, 0.90)	0.74 (0.61, 0.83)	

Model performance: c-index of 0.76 [95% CI, 0.70, 0.81] and 0.71 [95% CI, 0.62, 0.80] on development and external validation cohorts, respectively.

Table S3. Multivariable Cox Regression Model for the Composite Secondary Outcome in the Development Cohort.

Variable	HR	95% CI	p-value
Age at CMR, years	1.04	1.02, 1.05	<0.001
Additional cardiac procedures*	2.22	1.60, 3.08	<0.001
RV ESVi (mL/m^2)	1.08†	1.04, 1.12	<0.001
LV mass index (mL/m^2)	1.27†	1.15, 1.40	<0.001

* time-dependent covariate.
† per 10-unit increase

Sample size of n=1090 with 172 composite secondary outcome events. Model performance during development: c-index 0.72 [95% CI, 0.67, 0.76] and external validation: c-index 0.69 [95% CI, 0.61, 0.77].

HR indicates hazard ratio; CI, confidence interval; CMR, cardiac magnetic resonance; RV, right ventricle; LV, left ventricle; ESVi, end-systolic volume index; BSA, body surface area.

**Figure S1. Kaplan-Meier Estimated Survival in Repaired Tetralogy of Fallot Stratified by Cohort.**
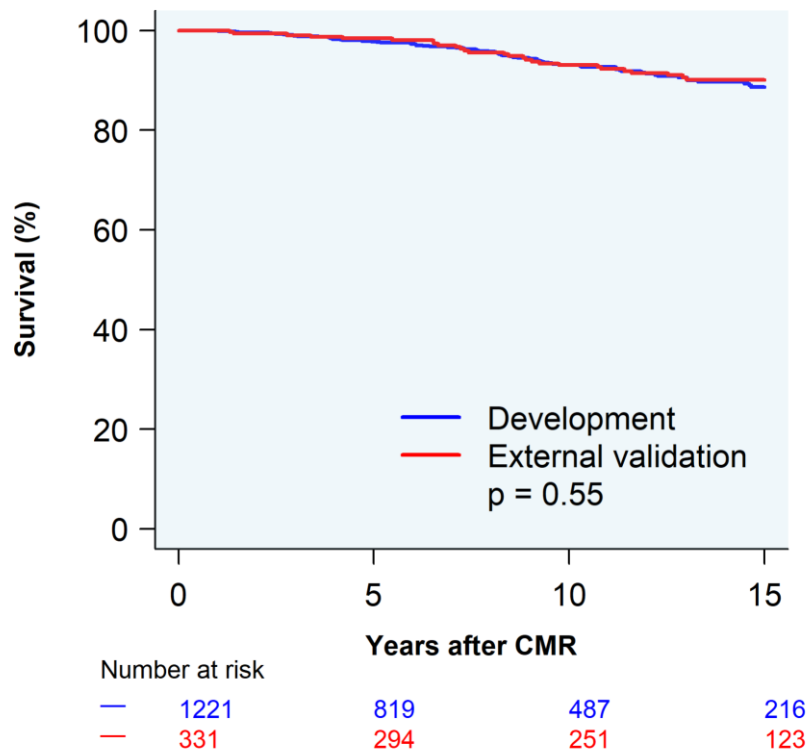
CMR indicates cardiac magnetic resonance.

**Figure S2. Survival of rTOF Patients After Repair in the Development and Validation Cohorts.**
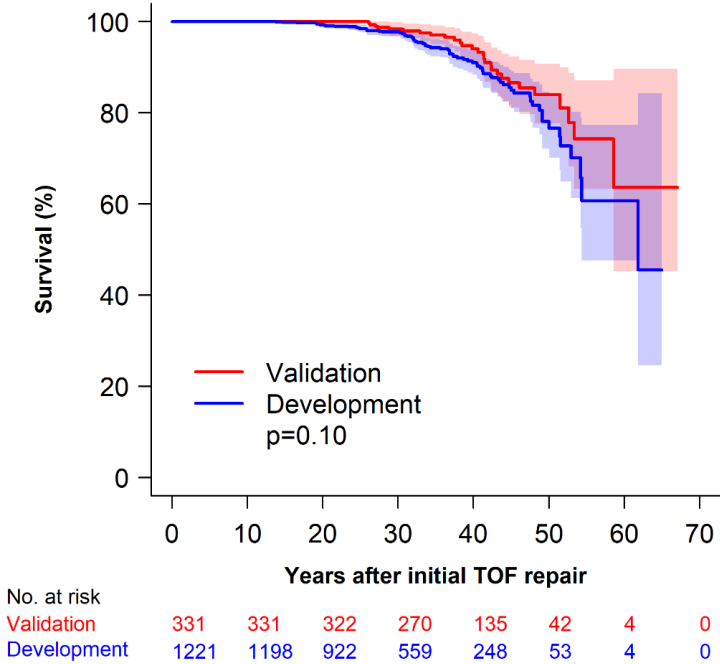
TOF indicates tetralogy of Fallot.

Figure S3. Kaplan-Meier Estimated Survival in Repaired Tetralogy of Fallot Deaths, Stratified by Cause of Death.
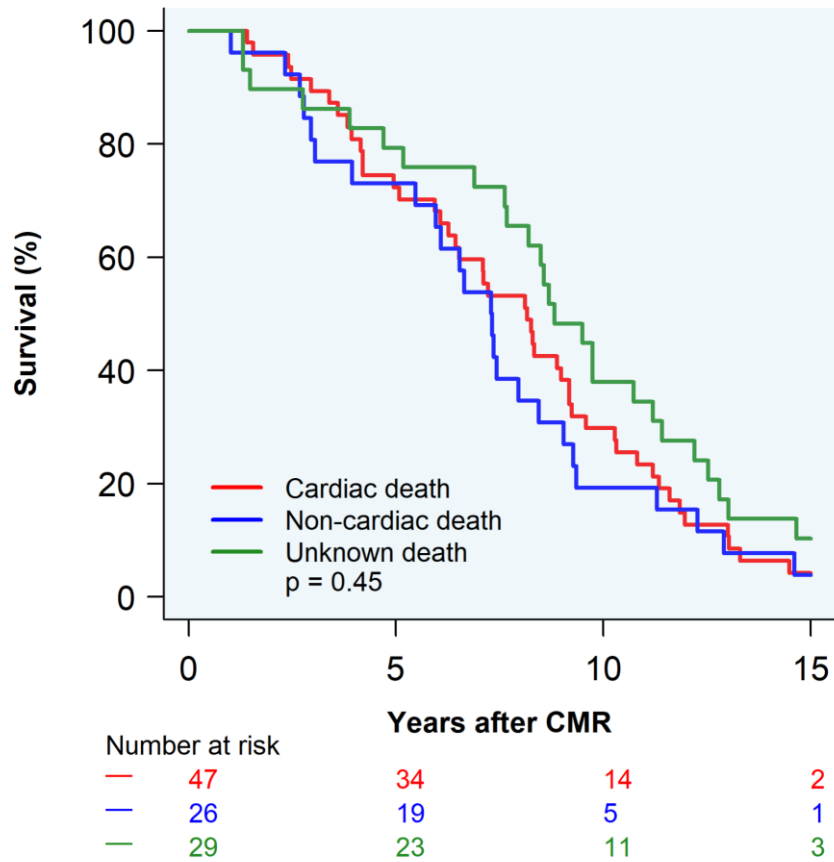

CMR indicates cardiac magnetic resonance.

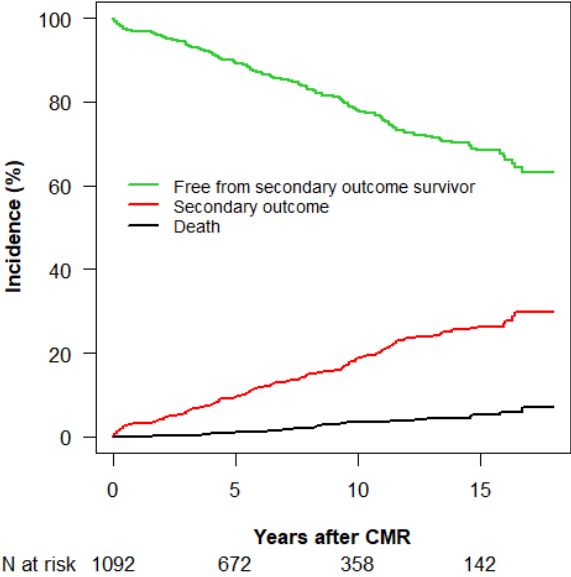**Figure S4. Histograms of Mortality Risk Scores in the Development and External Validation Cohorts.**
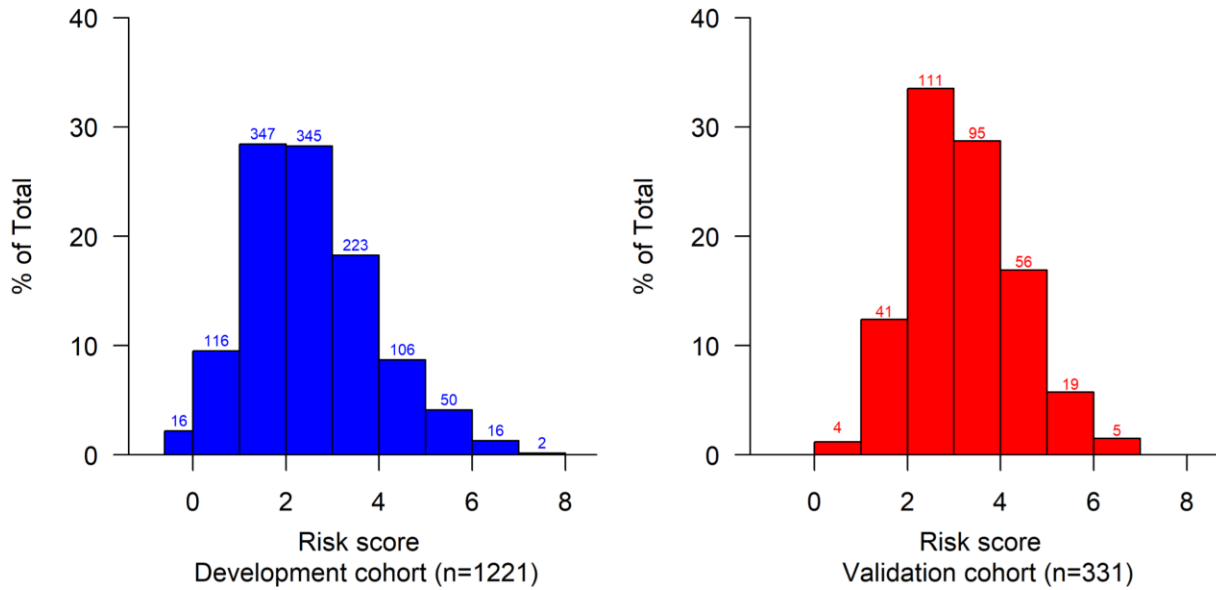
The distribution of risk scores within the development (left; blue) and external validation (right; red) cohorts, with a mean score of 2.52 ± 1.36 (range -0.6 to 7.7) in the development cohort and 3.22 ± 1.15 (range 0.5 to 6.5) in the external validation cohort. Note that negative risk scores can be achieved with BVGFI > 48 with otherwise low-risk factors (i.e., younger age at CMR, BMI < 30 kg/m^2, transannular patch repair, and normal RVESVi).

Figure S5. 10-Year Calibration Plots in the Development and External Validation Cohorts.
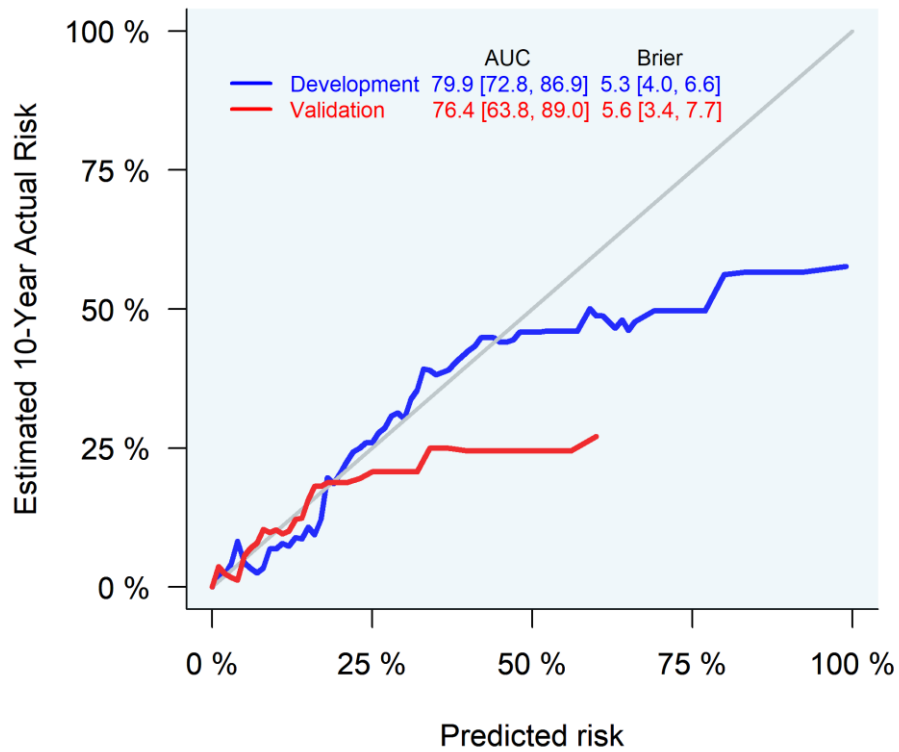
Calibration plots of predicted vs. actual 10-year mortality for development (blue) and validation (red) cohorts.
AUC indicates area under the curve.

Figure S6. Cumulative Incidence Functions for Study Outcomes in the Development Cohort.

CMR indicates cardiac magnetic resonance.