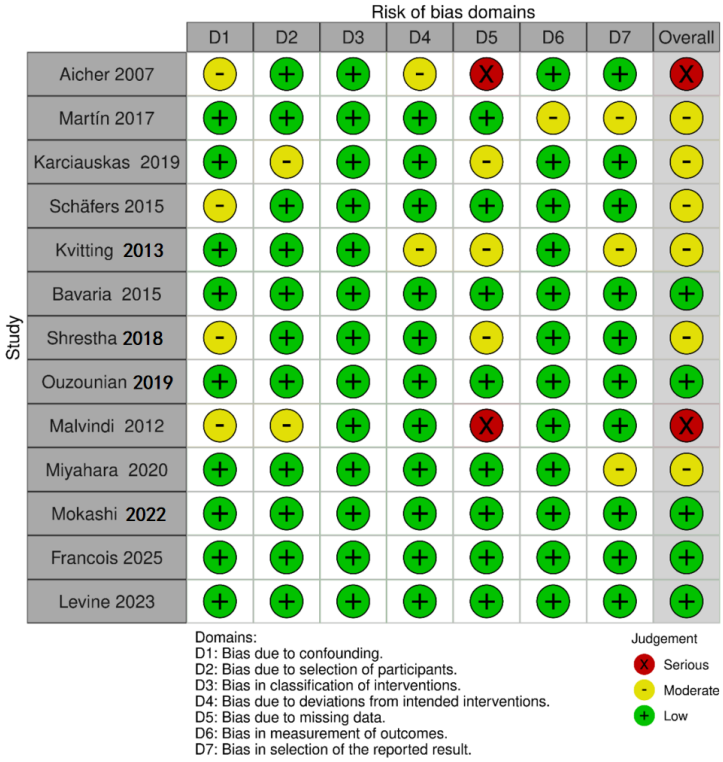
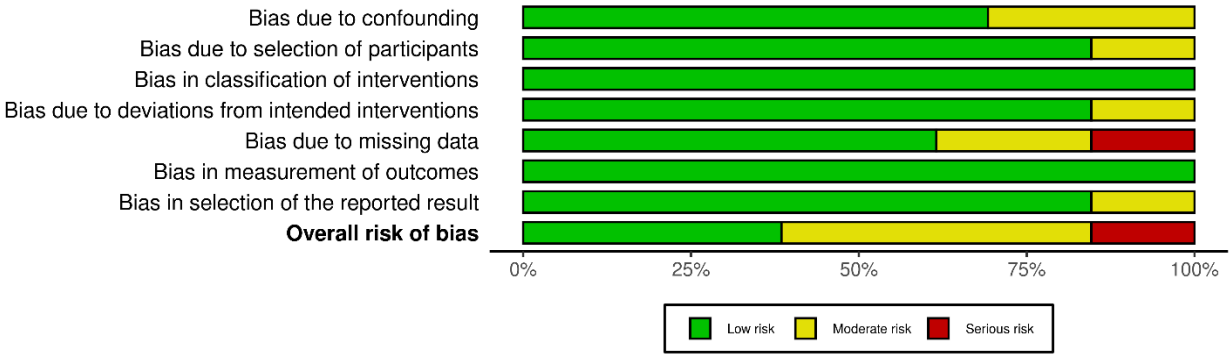
Figures and Tables



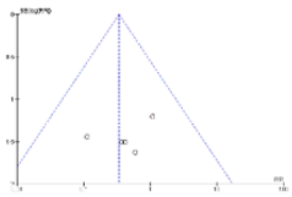
Supplementary Figure 1 Traffic light plot of risk of bias assessment for included studies using the Risk of Bias in Non-randomized Studies of Interventions tool, depicting judgments across seven domains for each of the 13 observational studies comparing valve-sparing aortic root replacement outcomes in bicuspid aortic valve *vs* tricuspid aortic valve patients.



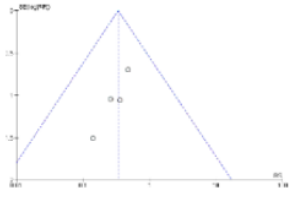
Supplementary Figure 2 Summary plot of risk of bias assessment using the Risk of Bias in Non-randomized Studies of Interventions tool, illustrating the proportion of

low, moderate, serious, and critical risk across seven domains for 13 studies on valve-sparing aortic root replacement outcomes in bicuspid aortic valve *vs* tricuspid aortic valve patients.

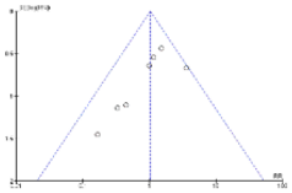
A **In-Hospital Mortality**



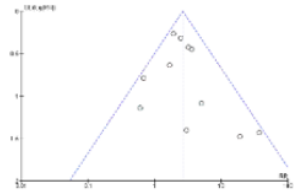
B **All-Cause Mortality**



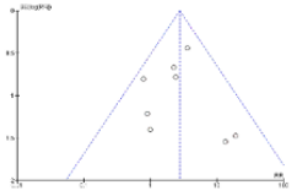
C **In-Hospital Reoperation**



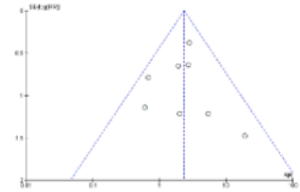
D **Overall Reintervention**



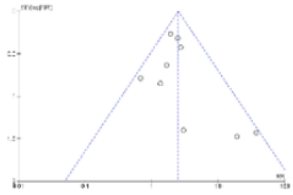
E **Short-Term Reintervention**



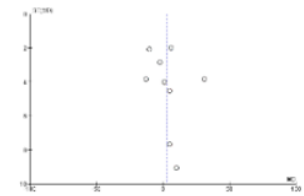
F **Mid-Term Reintervention**



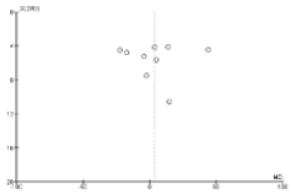
G **Long-Term Reintervention**



H **Aortic Cross-Clamp Time**



I **Cardiopulmonary Bypass Time**



Supplementary Figure 3 Funnel plots assessing publication bias for outcomes of valve-sparing aortic root replacement in bicuspid aortic valve *vs* tricuspid aortic valve patients. A: In-hospital mortality; B: All-cause mortality; C: In-hospital reoperation; D: Overall reintervention; E: Short-term reintervention; F: Mid-term reintervention; G: Long-term reintervention; H: Aortic cross-clamp time; I: Cardiopulmonary bypass time.

Supplementary Table 1 Summary of GRADE assessment and effect sizes for clinical outcomes in bicuspid aortic valve *vs* tricuspid aortic valve patients

Outcome	**Relative risk/mean differences (95%CI)**	***P* value**	**Heterogeneity (I^2)**	**Certainty of evidence**
In-hospital mortality	0.34 (0.10–1.14)	0.08	0%	Low
All-cause mortality	0.34 (0.13–0.86)	0.02	0%	Low
In-hospital reoperation	1.04 (0.64–1.69)	0.87	18%	Low
Overall reintervention	2.64 (1.96–3.55)	< 0.00001	22%	Moderate
Short-term reintervention	2.75 (1.64–4.62)	0.0001	0%	Moderate
Mid-term reintervention	2.32 (1.45–3.71)	0.0004	0%	Moderate
Long-term reintervention	2.50 (1.82–3.43)	< 0.00001	21%	Moderate
Aortic cross-clamp time	3.35 (-5.06 to 11.76)	0.43	93%	Very low
Cardiopulmonary bypass time	3.96 (-10.26 to 18.18)	0.59	94%	Very low

Supplementary Table 2 GRADE assessment of evidence certainty for outcomes of valve-sparing aortic root replacement in bicuspid aortic valve *vs* tricuspid aortic valve patients, including mortality, reintervention, and procedural time measures

Name of outcome	Number of studies	Study design	Risk of bias	Inconsistency	Imprecision	Indirectness	Effect size (RR/MD + 95%CI)	Certainty of evidence
In-hospital mortality	5	Observational	Not serious	Not serious (I^2 = 0%, P = 0.08, no heterogeneity)	Serious (wide 95%CI: 0.10–1.14, crossing 1)	Not serious	RR = 0.34 (95%CI: 0.10–1.14)	Low
All-cause mortality	4	Observational	Serious (serious risk in 1 study)	Not serious (I^2 = 0%, P = 0.02, no heterogeneity)	Not serious (narrow 95%CI: 0.13–0.86)	Not serious	RR = 0.34 (95%CI: 0.13–0.86)	Low
In-hospital reoperation	7	Observational	Not serious	Not serious (I^2 = 18%, P = 0.87, low heterogeneity)	Serious (wide 95%CI: 0.64–1.69, crossing 1)	Not serious	RR = 1.04 (95%CI: 0.64–1.69)	Low
Overall reintervention	11	Observational	Not serious	Not serious (I^2 = 22%, P < 0.00001, low heterogeneity)	Not serious (narrow 95%CI: 1.96–3.55)	Not serious	RR = 2.64 (95%CI: 1.96–3.55)	Moderate
Short-term reintervention	8	Observational	Not serious	Not serious (I^2 = 0%, P = 0.0001, no heterogeneity)	Not serious (narrow 95%CI: 1.64–4.62)	Not serious	RR = 2.75 (95%CI: 1.64–4.62)	Moderate
Mid-term reintervention	8	Observational	Not serious	Not serious (I^2 = 0%, P = 0.0004, no heterogeneity)	Not serious (narrow 95%CI: 1.45–3.71)	Not serious	RR = 2.32 (95%CI: 1.45–3.71)	Moderate
Long-term reintervention	9	Observational	Not serious	Not serious (I^2 = 21%, P < 0.00001, low heterogeneity)	Not serious (narrow 95%CI: 1.82–3.43)	Not serious	RR = 2.50 (95%CI: 1.82–3.43)	Moderate
Aortic cross-clamp time	9	Observational	Not serious	Serious (I^2 = 93%, P = 0.43, substantial heterogeneity)	Serious (wide 95%CI: -5.06 to 11.76, crossing 0)	Not serious	MD = 3.35 minutes (95%CI: -5.06 to 11.76)	Very low
Cardiopulmonary bypass time	9	Observational	Not serious	Serious (I^2 = 94%, P = 0.59, substantial heterogeneity)	Serious (wide 95%CI: -10.26 to 18.18, crossing 0)	Not serious	MD = 3.96 minutes (95%CI: -10.26 to 18.18)	Very low

MD: Mean differences; RR: Relative risk.