

Risk Scores for Prediction of Postoperative Atrial Fibrillation following Cardiac Surgery: A Systematic Review and Meta-Analysis

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Background

Postoperative atrial fibrillation (POAF) is a common complication after cardiac surgery and is associated with poor clinical outcomes. Improved prediction of POAF could facilitate targeted prophylaxis and detection. The objective of this systematic review and meta-analysis was to assess the ability of published risk scores to predict POAF in cardiac surgery patients.

Methods

We searched MEDLINE and Embase to June 2021. Pairs of reviewers independently screened studies and extracted data. We pooled area under receiver operating curves (AUCs) as well as adjusted odds ratios (ORs) from multivariable regression analyses using the generic inverse variance method and applied the DerSimonian and Laird method for the random effects model.

Results

From 7,829 citations, we included 102 studies reporting on 46 risk scores. Most scores were developed for other purposes (e.g. predicting mortality after cardiac surgery or stroke risk in AF patients) but exploratively used to predict POAF. Variable reporting limited our ability to pool data from many studies. Representing the 2 most frequently reported scores, both CHA₂DS₂-VASc (n=9; Pooled OR: 1.41, 95% CI: 1.14, 1.76; p=0.002, I²: 65%) and EuroSCORE (n=13; Pooled OR: 1.12, 95% CI: 1.07, 1.18; p<0.00001, I²: 81%) were associated with POAF after cardiac surgery. We observed modest discrimination based on pooled AUC with the CHA₂DS₂-VASc score (n=8; AUC 0.68, 95%CI 0.60-0.75), POAF Risk Score (n=7; AUC 0.66, 95%CI 0.63-0.68), EuroSCORE (n=3; AUC 0.63, 95%CI 0.58-0.68) and STS score (n=3; AUC 0.60, 95%CI 0.56-0.63).

Conclusion

Existing scores for POAF prediction show modest discrimination but include limited risk factors specific to POAF such as preoperative biomarkers, genetic profiles, and electrophysiologic characteristics. Population-specific risk scores accounting for these factors may improve the prediction of POAF in adult cardiac surgery patients.