

New-Onset Atrial Fibrillation and Related Comorbidities in Cardiac Valve Replacement Patients

Tatiana Aviles¹, Nikolai Jones¹, Vyom Patel¹, Andrei Feldiorean¹, Lawrence Judy¹, Dale Saxon^{1,2}

¹Indiana University School of Medicine – Evansville, ²Indiana University School of Medicine, Department of Anatomy and Cell Biology

Background and Objective:

Heart valve replacement is a mainstay in managing valvular disease but poses risk of thrombosis, bleeding, infection, and valve failure. New-onset atrial fibrillation (NOAF) is the most prevalent arrhythmia after cardiac surgery. This study analyzes NOAF in mechanical and bioprosthetic valve patients without prior arrhythmias and its association with age-related comorbidities: hypertension, hyperlipidemia, atherosclerosis, valve disease, and heart failure.

Methods:

Data collected from the IU School of Medicine-Evansville RWEdataLab (CRC/Sidus Insights Real-World Cardiology database). This 20+ year longitudinal dataset comprises over 3 million patients from 37,000 providers across all 50 U.S. states. Odds ratios were calculated for individual comorbidities in 20,000+ patients aged ≥ 49 who underwent heart valve replacement.

Results:

Odds ratios greater than 1 for NOAF were found for systolic heart failure (HFrEF) (2.010, 95% CI 1.83-2.20), diastolic heart failure (HFpEF) (1.768, 95% CI 1.63-1.92), mitral valve disease (1.645, 95% CI 1.54-1.75), and tricuspid valve disease (1.573, 95% CI 1.42-1.74). In contrast, hypertension (0.989, 95% CI 0.93-1.05), atherosclerosis (0.969, 95% CI 0.91-1.03), hyperlipidemia (0.823, 95% CI 0.77-0.88), and aortic valve disease (0.668, 95% CI 0.63-0.71) showed neutral or negative odds ratio.

Conclusion:

Prosthetic valve replacement in patients with mitral or tricuspid valve disease, or HFpEF/HFrEF, may be associated with NOAF development. This association of NOAF with concurrent atrial-involving valvular disease aligns with current literature linking atrial stretch as a predisposition for atrial fibrillation.

Clinical Impact and Implications:

Limitations include the use of an outpatient database and lack of detail regarding valve replacement type. The current literature indicates that thromboembolic risk peaks within 3–6 months post-surgery. The study results suggest that comorbidities, especially heart failure and valve disease are positively associated with NOAF, emphasizing the need for continued vigilance beyond the early postoperative period. Future research should examine how overlapping comorbidities and valve type influence NOAF.