

Evidence-to-Practice Gap in Atrial Fibrillation Management: A Population-Based Analysis of Concomitant Surgical Ablation in Ontario

Paola K. Montanhesi¹, Pierpaolo Fortunato², Syed M. A. Hassan¹, Emilie Belley-Cote³, Susan Brogly⁴,
Eric McArthur⁵, Beatrice Bacchi¹, Amit Garg⁵, Derrick Tam⁶, Richard Whitlock⁷, Gianluigi Bisleri¹.

(1) St. Michael's Hospital, University of Toronto, Toronto, ON, Canada, (2) Department of Medical and Surgical Sciences, University of Foggia, Foggia, Italy, (3) Public Health Research Institute, Hamilton, ON, Canada, (4) Kingston Health Sciences Centre, Queen's University, Kingston, ON, Canada, (5) ICES, Toronto, ON, Canada, (6) Sunnybrook Health Sciences Centre, University of Toronto, Toronto, ON, Canada, (7) Population Health Research Institute, Hamilton, ON, Canada.



BACKGROUND

Atrial fibrillation (AF) is the most common arrhythmia in patients undergoing cardiac surgery. Concomitant surgical ablation (SA) is recommended for first-time nonemergent mitral operations (Class I-A) and any first-time nonemergent nonmitral operation (Class I-B, NR). Nevertheless, the adoption of concomitant SA remains inconsistent. Therefore, we assessed the prevalence of preoperative AF and contemporary surgical management patterns in the province of Ontario, Canada.

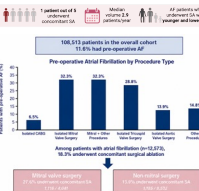
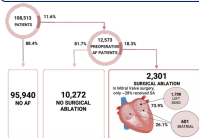


METHODS

We performed a population-based cohort study using ICES-linked administrative health databases in adults undergoing cardiac surgery from October 1, 2008, to March 1, 2019. Validated coding algorithms were used to identify diagnoses and procedures. Primary outcomes were to assess (1) the prevalence of preoperative AF, (2) the rate of concomitant SA, and (3) the distribution of left-sided versus bi-atrial ablation. Secondary outcome was to investigate factors associated with preoperative AF and SA selection and allocation. Non-continuous variables were presented as counts and percentages whereas continuous variables as mean $\pm$ SD and median with IQR, as appropriate. Baseline differences were compared across groups (AF vs no AF, SA vs no-SA, and left-sided vs bi-atrial ablation) using standardized mean differences (SMD) >0.10 considered meaningful difference. Multivariable logistic regression was used to identify factors independently associated with presence of AF, selection for SA and choice of lesion set, reported as odds ratios (OR) with 95% CI. A p-value of <0.05 was statistically significant. All analyses were performed at ICES using SAS software version 9.4 (SAS Institute Inc., Cary, NC).

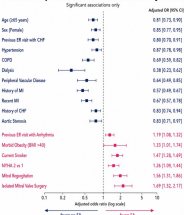


RESULTS



In the multivariable analysis, preoperative AF was independently associated with older age, greater cardiovascular comorbidity burden, prior healthcare utilization for arrhythmia and CHF-related care, mitral valve disease, worse functional status, and valve surgery. Paradoxically, patients selected for SA were younger and had lower comorbidity burden than untreated ones. Morbid obesity was the only factor associated with the choice of lesion-sets, favouring bi-atrial (OR 2.29 [1.40, 3.75], $p=0.001$).

Multivariable Analysis of Factors Associated With Concomitant Surgical Ablation



Factors Associated With Preoperative Atrial Fibrillation

Multivariable analysis, significant associations only

Lower likelihood of AF	Higher likelihood of AF
Demographics Female sex → OR 0.84 [0.80, 0.88]	Demographics - Age (per year) → OR 0.97 [0.97, 0.98] - Mitral regurgitation → OR 1.36 [1.04, 1.80] - Mitral stenosis → OR 1.43 [0.93, 2.18]
Clinical history / comorbidity - No EF visit with arrhythmia → OR 0.54 [0.45, 0.65] - No EF visit with CHF → OR 0.52 [0.42, 0.65] - Diabetes → OR 0.86 [0.80, 0.92] - Current smoker → OR 0.71 [0.52, 0.98] - Recent MI → OR 0.67 [0.52, 0.86]	Clinical history / comorbidity - No EF visit with arrhythmia → OR 0.54 [0.45, 0.65] - No EF visit with CHF → OR 0.52 [0.42, 0.65] - Diabetes → OR 0.86 [0.80, 0.92] - Current smoker → OR 0.71 [0.52, 0.98] - Recent MI → OR 0.67 [0.52, 0.86]
Valve disease Aortic stenosis → OR 0.83 [0.71, 0.97]	Valve disease Aortic stenosis → OR 0.83 [0.71, 0.97]
Procedure type Isolated CABG → OR 0.31 [0.21, 0.46]	Procedure type Isolated CABG → OR 0.31 [0.21, 0.46]



CONCLUSION

This large, real-world population-based study provides insight into prevalence of preoperative AF and its surgical treatment over the past decade, suggesting that concomitant SA remains possibly underused in the province of Ontario, particularly outside mitral surgery. These results suggest a persistent gap between available evidence and contemporary practice and open a window of opportunity for further optimization in the surgical management of AF.



REFERENCES

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