

UC Davis
Cardiovascular Medicine

Title

Effect of Sleep Apnea on Atrial Fibrillation and Atrial Flutter Recurrence Rates following Posterior Wall Isolation vs Conventional Ablation

Permalink

<https://escholarship.org/uc/item/67s0p190>

Authors

Maheshwary, Romir

Ovruchesky, Eric

Malhotra, Pankaj

et al.

Publication Date

2020

Data Availability

The data associated with this publication are not available for this reason: N/A

Effect of Sleep Apnea on Atrial Fibrillation and Atrial Flutter Recurrence Rates following Posterior Wall Isolation vs Conventional Ablation

Romir Maheshwary BS, Eric Ovruchesky BS, Pankaj Malhotra MD, Xin Zhang MD, Rakhee Makhija MD, Uma Srivatsa MD

INTRODUCTION

Obstructive Sleep Apnea (OSA) is a risk factor for both atrial fibrillation (AF) and atrial flutter (AFL). Non-pulmonary triggers have been described in patients with OSA.

Patients suffering with Paroxysmal Atrial Fibrillation refractory to antiarrhythmic medications are commonly treated with catheter radiofrequency-ablation. The most common location for ablation for AF would be the pulmonary veins as it approaches the left atrium. This has been the conventional ablation site. Another catheter based technique known as Posterior Wall Isolation (PWI), is also routinely used. Here, the posterior wall of the left atrium is ablated. PWI has shown mild efficacy in reducing recurrence rates of AF in patients without OSA. There has been work looking at the efficacy of radiofrequency ablation in patients with OSA. Following a review of the literature, we found that radiofrequency ablation was less effective in reducing recurrence of AF in OSA patients compared to control. There appeared to be a two-way relationship, however, where a return to sinus rhythm following catheter ablation, led to a decreased median AHI score or severity of sleep apnea.

In this study, we hoped to replicate these findings, looking at the recurrence of AF and AFL in OSA patients compared to control using the conventional pulmonary vein ablation site. We also wanted to compare the efficacy of posterior wall isolation in patients with sleep apnea, compared to control in patients who have Paroxysmal Atrial Fibrillation.

OBJECTIVES

To compare the rate of recurrence of Atrial Flutter and Atrial Fibrillation in patients with or without Obstructive Sleep Apnea.

To compare the rate of recurrence of Atrial Fibrillation in OSA patients vs Control following Posterior Wall Isolation and Conventional Ablation

MATERIALS AND METHODS

Through a retrospective, single center analysis we assessed patients screened for OSA then compared the groups with and without known OSA for comorbidities and risk factors that included age, sex, HTN, T2DM, CVD, stroke/TIA, CHF, CHADS2/VASC score and BMI (Table 1). Within our cohort, we retrospectively analyzed 219 patients who also had ablations at our center. We compared the effect of ablation on recurrence of AF and AFL in patients with and without documented sleep apnea. We also analyzed the posterior wall area, and effect of posterior wall isolation (PWI) vs Conventional Ablation (CA) on clinical outcomes.

Table 1: Baseline Characteristics of Entire Cohort n = 219

Age (years)	64.2 ± 10.3
Sex (Female %)	55
OSA+ (patient #)	64
OSA- (patient #)	155
Hypertension (%)	69
Diabetes (%)	22
CVD (%)	23
Stroke/TIA (%)	12.8
CHADS 2 VASC Score	2.4 ± 1.5
BMI	30 ± 5.2
Heart Failure (%)	25

RESULTS

Our study included 219 patients (Table 1); patients with OSA were more likely to have persistent atrial fibrillation (70% vs 50%) (p = 0.007). There was a trend towards higher recurrence of both AF (29% vs 25%) and AFL (17% vs 10%) at one year after conventional ablation in OSA patients (Figure 1). In the subset of patients undergoing PWI, there was no significant difference in posterior wall area measured between roof and floor lines by CT scan among the patients with and without OSA (18.2cm² vs 18.3cm², ns). In patients with OSA, AF recurrence in patients who had PWI was 25.6% vs 33.3% (ns) in CA. In patients without OSA, AF recurrence was 17% in those that received PWI vs 30% (p=0.09) in CA (Figure 2).

Figure 1: AF and AFL Recurrence in OSA+ vs OSA- Following Conventional Ablation

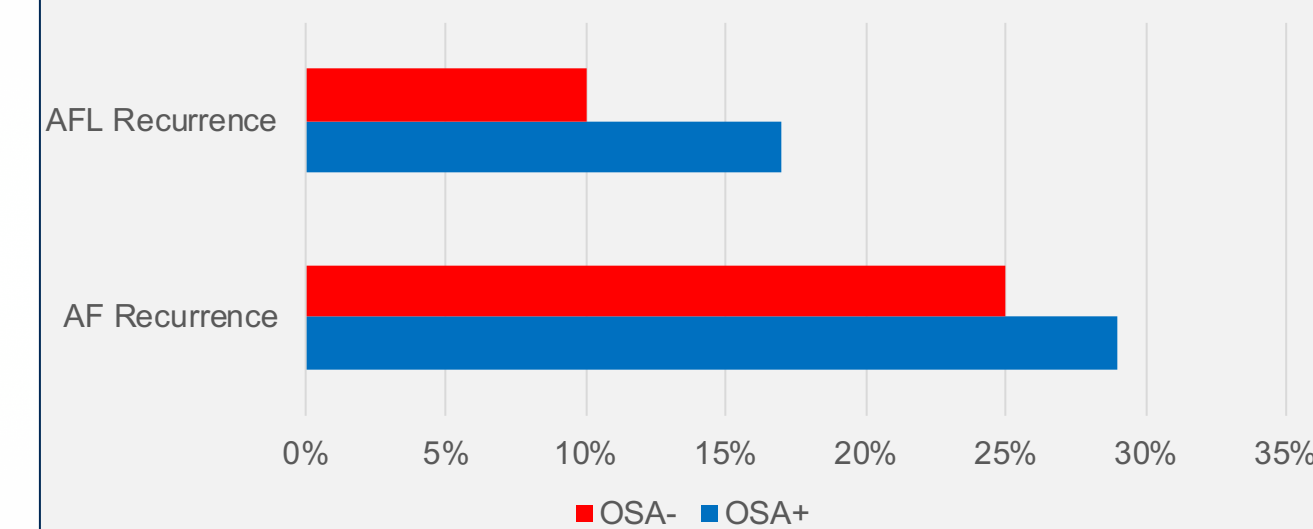


Figure 1: AFL and AF recurrence values were compared in OSA+ (n = 64) vs OSA- (n = 155) patients following 1 year after conventional ablation. AF recurrence was 29% (OSA+) vs 25% (OSA-) (p = ns). AFL recurrence was 17% (OSA+) vs 10% (OSA-) (p = ns).

Figure 2: AF Recurrence in OSA+ and OSA- Patients Following Posterior Wall Isolation vs Conventional Ablation

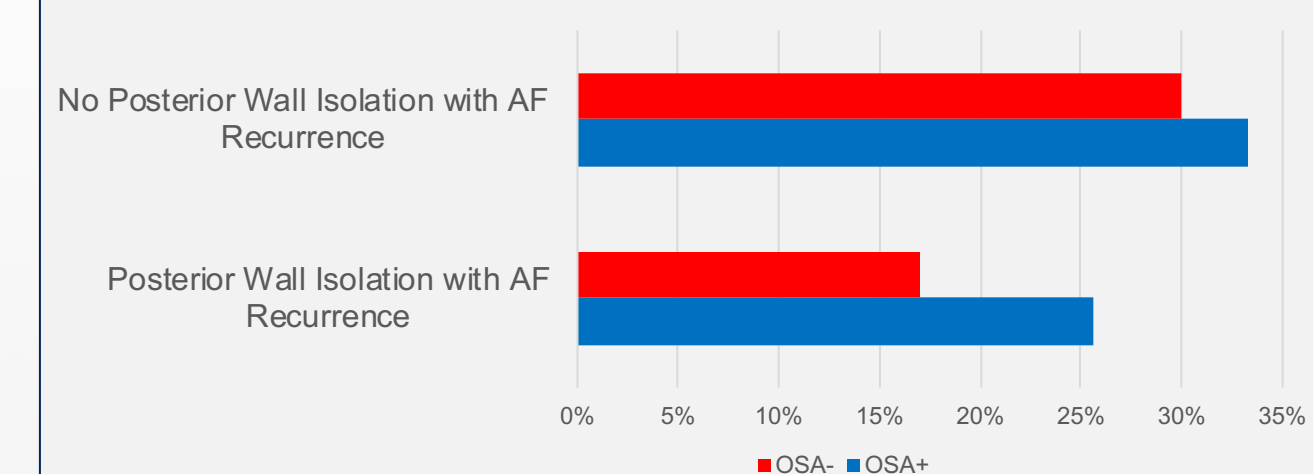


Figure 2: AF recurrence was compared 1 year following posterior wall isolation (PWI) vs Conventional Ablation in OSA+ patients and OSA- patients. AF recurrence in the OSA- group (n = 55) was 17% with PWI vs 30% w/ Conventional Ablation (p = 0.09). AF recurrence in the OSA+ group (n = 57) was 25.60% with PWI vs 33.30% w/ Conventional Ablation (p = ns).

CONCLUSIONS

Patients with Obstructive Sleep Apnea are more likely to have persistent atrial fibrillation (70% vs 50%) (p = 0.007). While there was no significant difference between the recurrence rates of AF and AFL between OSA+ and OSA- patients following conventional ablation, there was a trend suggesting sleep apnea may contribute to increased recurrence following one year post-ablation.

When comparing the efficacy of Posterior Wall Isolation in OSA- patients, we found a trend that would support the conclusion that PWI is more effective in those without OSA than those with OSA (17% recurrence with PWI vs 30% with CA) (p = 0.09). Further investigation into this subgroup with a larger sample size could potentially reveal a statistically significant difference. It could be plausible that patients with sleep apnea have a compromised circuitry in their left atrium making them less susceptible to posterior wall isolation.

In the future, we would like to expand the scope of this study. Not only would we like to increase our sample size for each subgroup, we would also like to analyze the recurrence of Atrial Flutter in OSA+ patients. We have already collected data looking at recurrence of both AFL and AF in multiple time points, 3, 6, and 12 months. We plan on comparing the effect of different ablation techniques for this cohort as well.

REFERENCES

- Dewire, Jane, and Hugh Calkins. "Impact of Obstructive Sleep Apnea on Outcomes of Catheter Ablation of Atrial Fibrillation." *Journal of atrial fibrillation* vol. 5, 5 777. 12 Feb. 2013, doi:10.4022/jafib.777
- He, X., Zhou, Y., Chen, Y. *et al.* Left atrial posterior wall isolation reduces the recurrence of atrial fibrillation: a meta-analysis. *J Interv Card Electrophysiol* **46**, 267–274 (2016). <https://doi.org/10.1007/s10840-016-0124-7>
- Kumar, Prabhat, et al. "Challenges and Outcomes of Posterior Wall Isolation for Ablation of Atrial Fibrillation." *Journal of the American Heart Association*, 23 Sept. 2016, www.ahajournals.org/doi/10.1161/JAHA.116.003885.
- Marulanda-Londoño, Erika, and Seemant Chaturvedi. "The Interplay between Obstructive Sleep Apnea and Atrial Fibrillation." *Frontiers in neurology* vol. 8 668. 11 Dec. 2017, doi:10.3389/fneur.2017.00668
- Nikolaos Dargès, et al. "Current ablation techniques for persistent atrial fibrillation: results of the European Heart Rhythm Association Survey", *EP Europace*, Volume 17, Issue 10, October 2015, Pages 1596–1600, <https://doi.org/10.1093/europace/euv323>

ACKNOWLEDGEMENTS/DISCLOSURES

N/A