

SLEEP APNEA 2020

Sleep apnea e fibrillazione atriale
trattata con ablazione transcatetere
nella pratica clinica

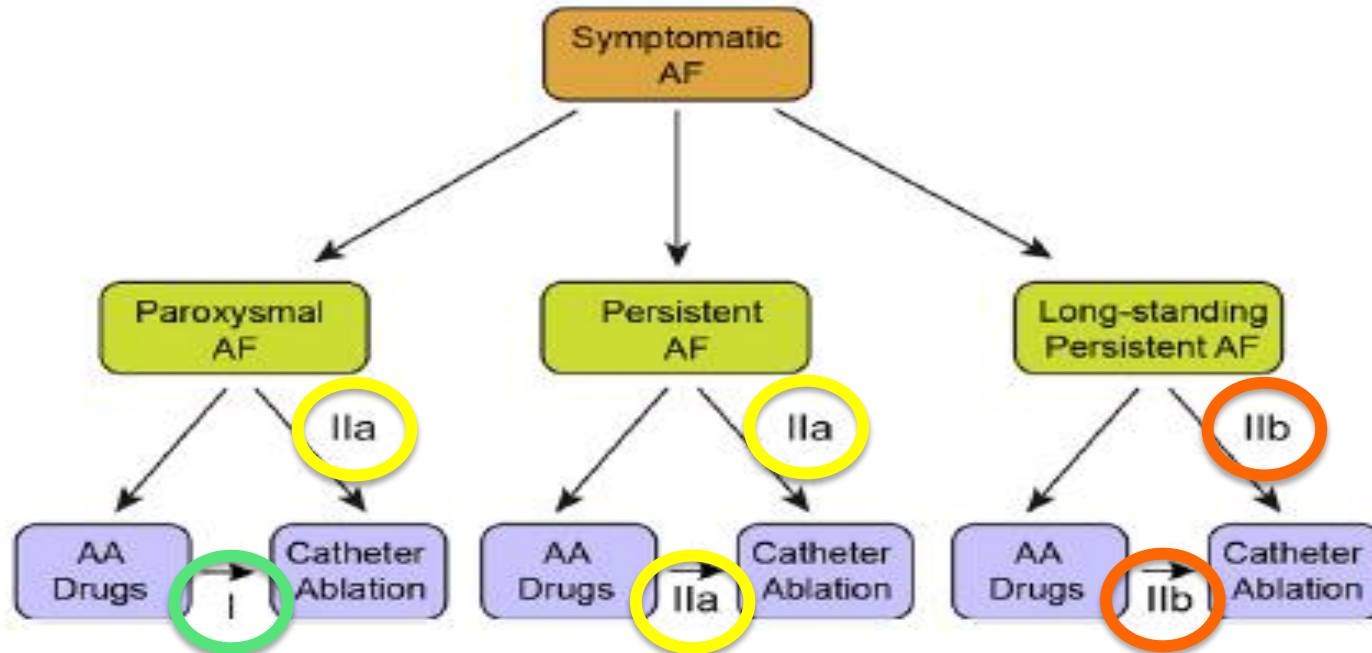
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U.O.C. di Cardiologia
Vicenza

2017 HRS/EHRA/ECAS/APHRS/SOLAECE expert consensus statement on catheter and surgical ablation of atrial fibrillation: Executive summary

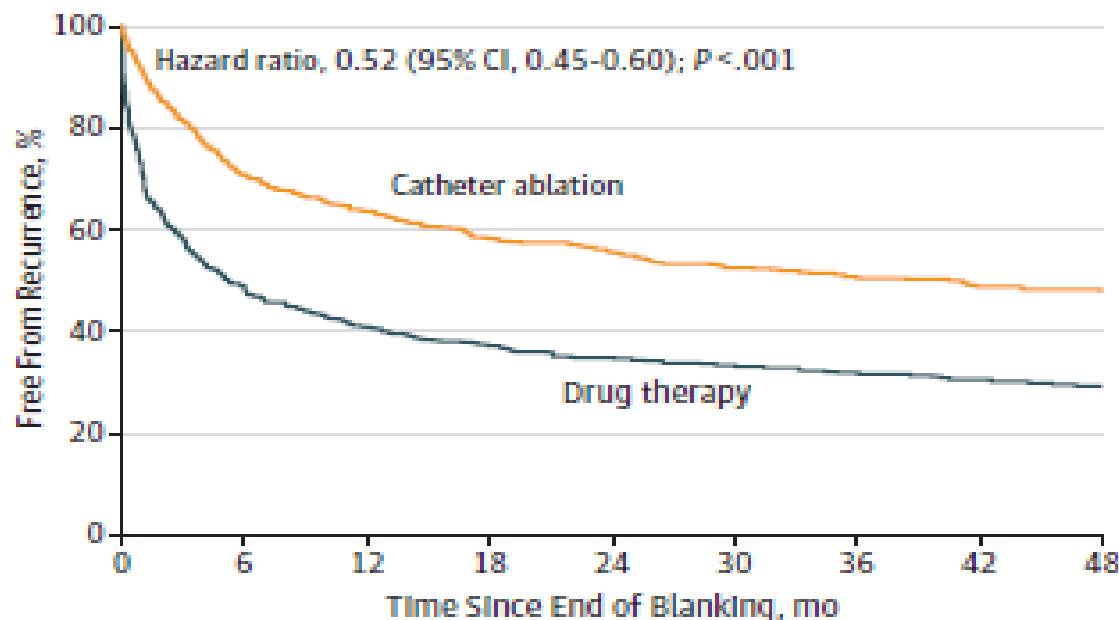


Indications for Catheter Ablation of Symptomatic Atrial Fibrillation





Atrial Fibrillation Ablation Efficacy



No. at risk									
Drug therapy	629	304	252	212	181	157	131	115	94
Catheter ablation	611	432	381	328	291	241	201	163	134

Atrial Fibrillation Ablation Efficacy

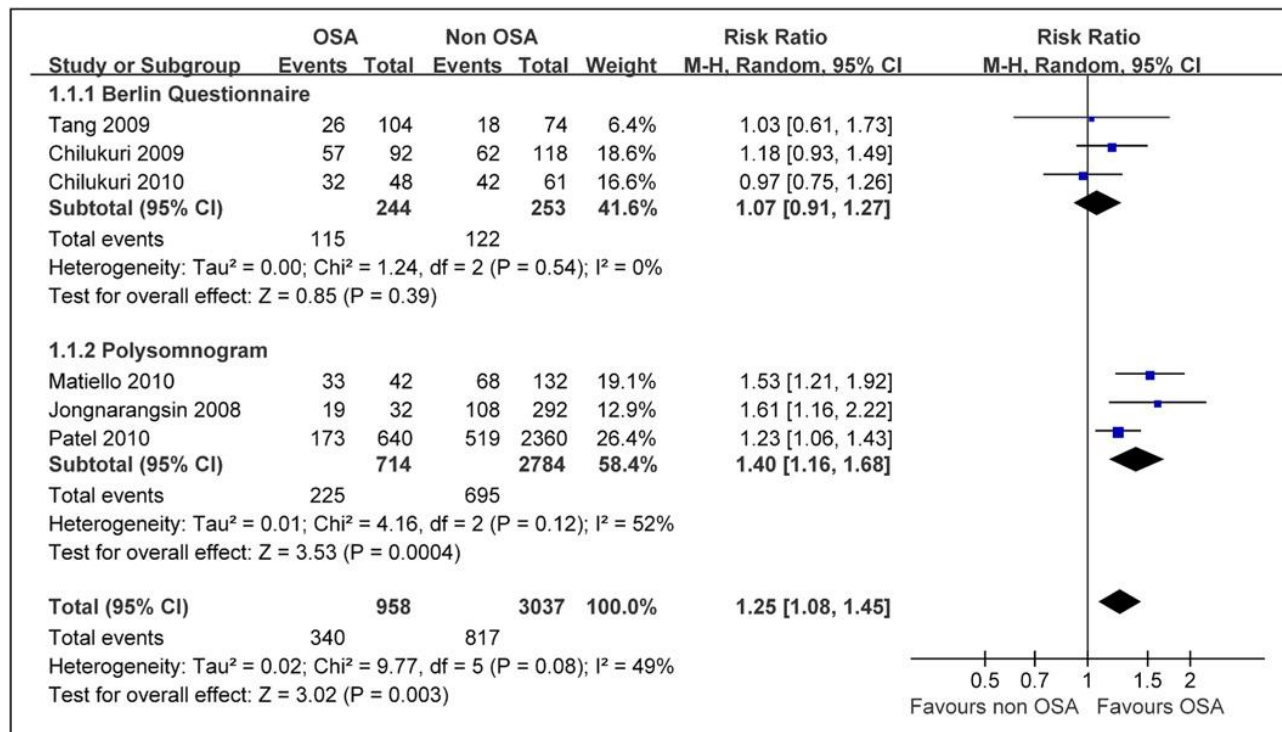


AF recurrence after 2 PVI

Prevalence of OSA and mean apnea–hypopnea index (AHI)

	Prevalence (%)	Mean AHI±SD (events/h)
Recurrence group	87*	27±22**
Control group	48*	12±16**
All	67	20±20

Meta-Analysis of Obstructive Sleep Apnea as Predictor of Atrial Fibrillation Recurrence After Catheter Ablation



OSA & AF

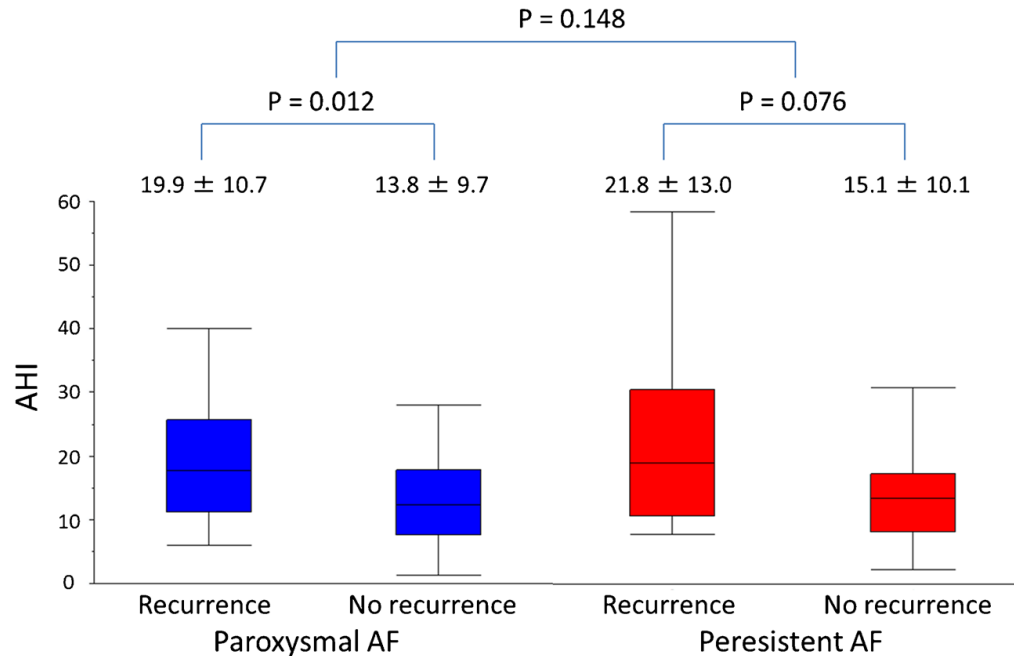


Table 1. Epidemiology and Response to Treatment

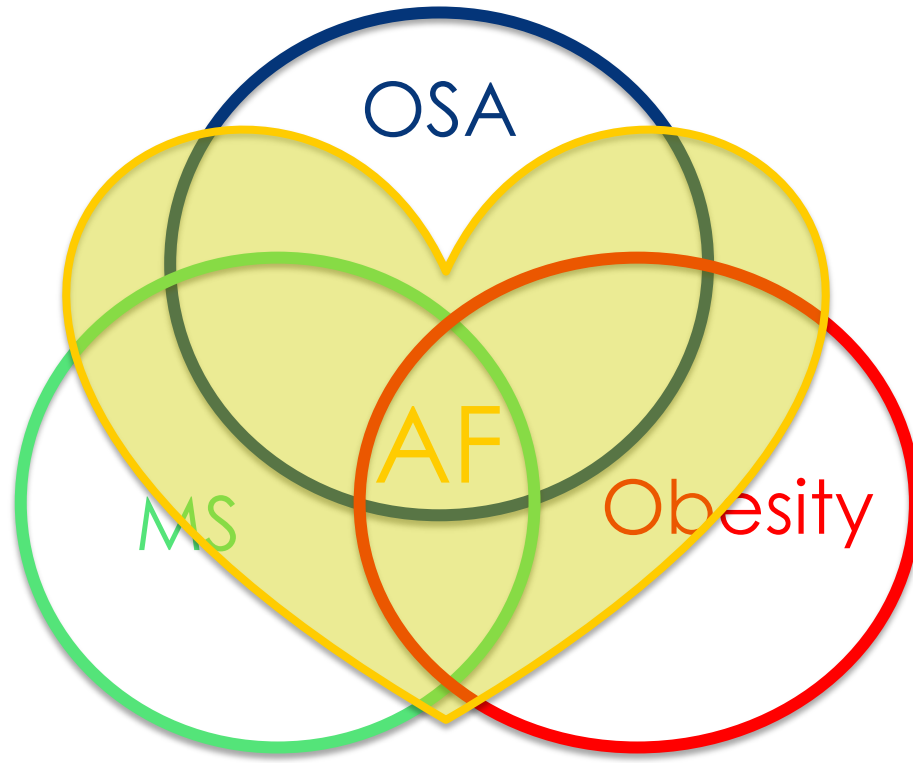
Condition	Prevalence in General Population	Prevalence in Patients with AF	Prevalence in Patients with OSA
OSA	3%-49%	21%-74%	100%
AF	0.9%	100%	4.8%
Recurrent AF after PVI	NA	23%-27%	31%-35%
Recurrent AF after cardioversion	NA	53%	82%
Response to antiarrhythmic drugs ^a	NA	39%	70%

There is a strong association between atrial fibrillation (AF) and obstructive sleep apnea (OSA), and it is estimated that 50% of patients with AF also have OSA

Apnea-hypopnea index as a predictor of atrial fibrillation recurrence following initial pulmonary vein isolation: usefulness of type-3 portable monitor for sleep-disordered breathing



Basic concept



More complex
patients

The association
between AF and OSA
may be related to
common risk factors
and a mutually-
perpetuating
pathophysiological
relationship between
these conditions.

Basic concept

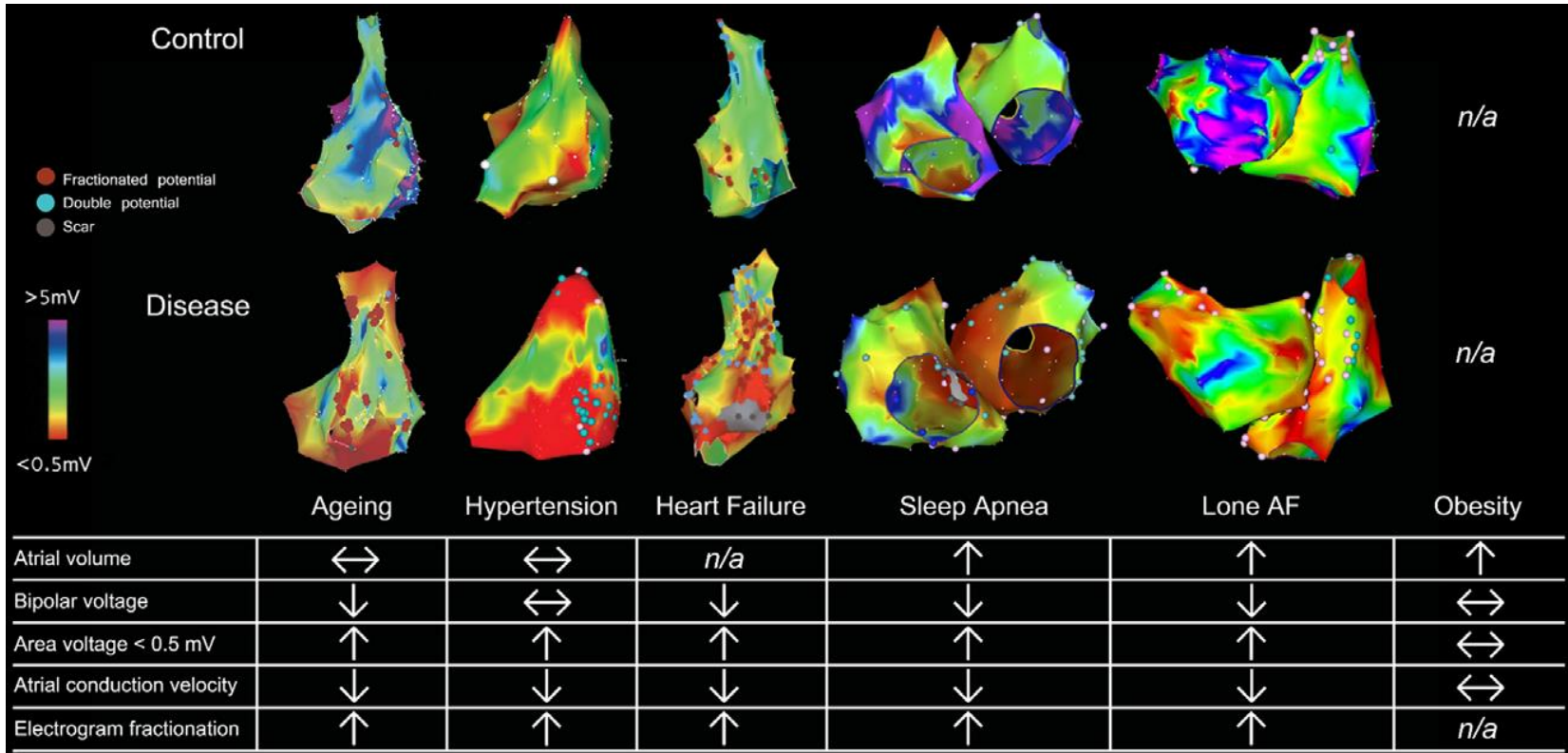


The coexistence of AF and OSA can be partially attributed to a common risk factor profile:

- ✓ advanced age
- ✓ hypertension,
- ✓ obesity
- ✓ diabetes
- ✓ structural heart disease

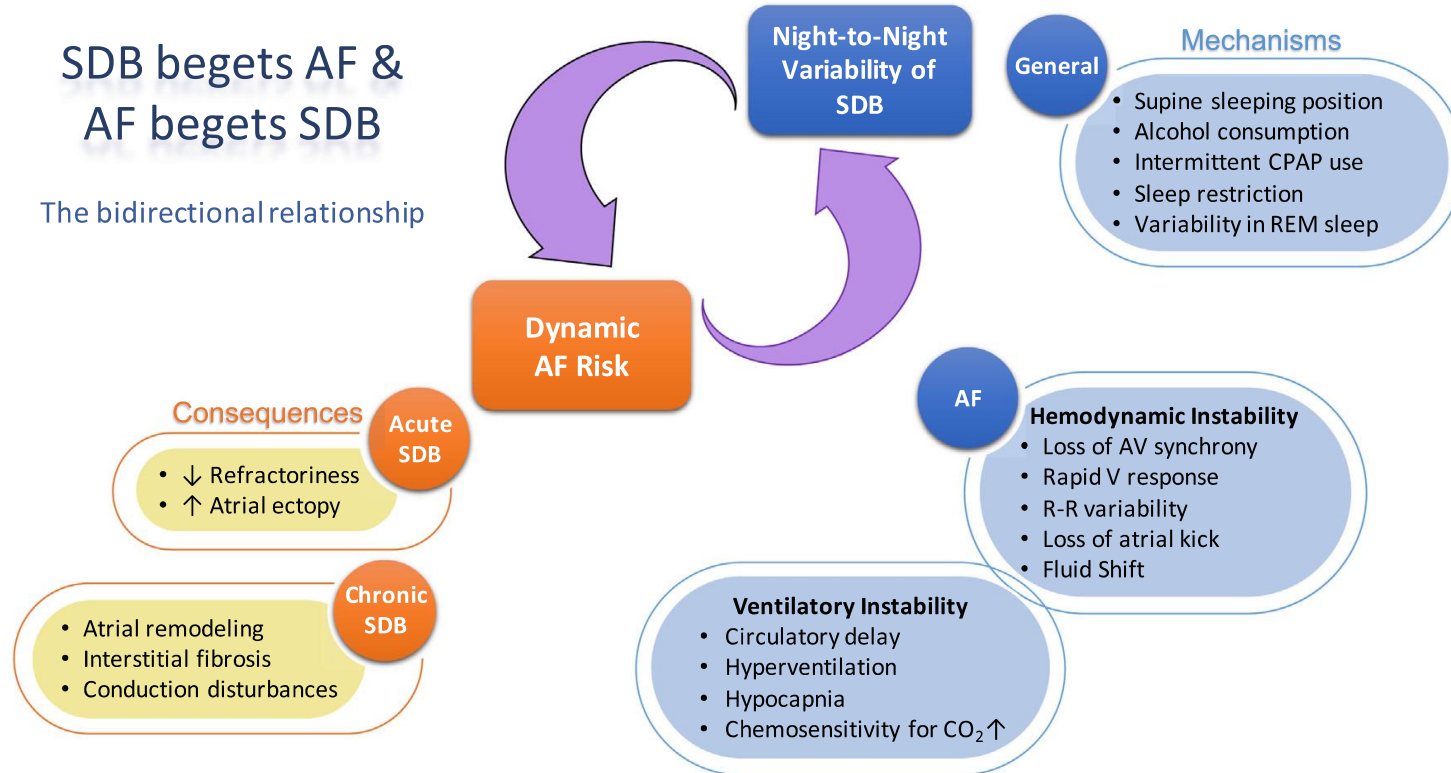
Cardiac electrical and
structural remodeling

Atrial remodeling

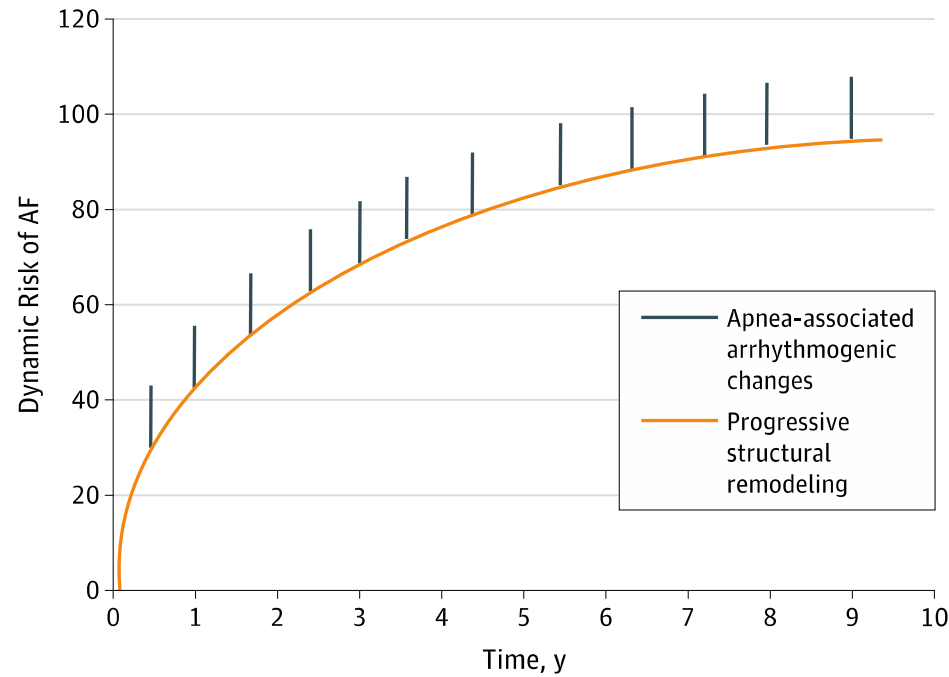


SDB begets AF & AF begets SDB

The bidirectional relationship



Progressive disease



OSA promotes AF via electrical and structural atrial remodeling



Acute Apnea-Associated Arrhythmogenic Changes

Acute atrial dilation

Sympathovagal activation

High-frequency desaturation and reoxygenation

Acute shortening in atrial refractoriness

Atrial extrasystole (trigger)

Intermittent conduction delay

Atrial Remodeling in Long-term OSA

Atrial stretch

Neurohumoral activation and oxidative stress

Progressive structural remodeling

Regional conduction slowing and reentry

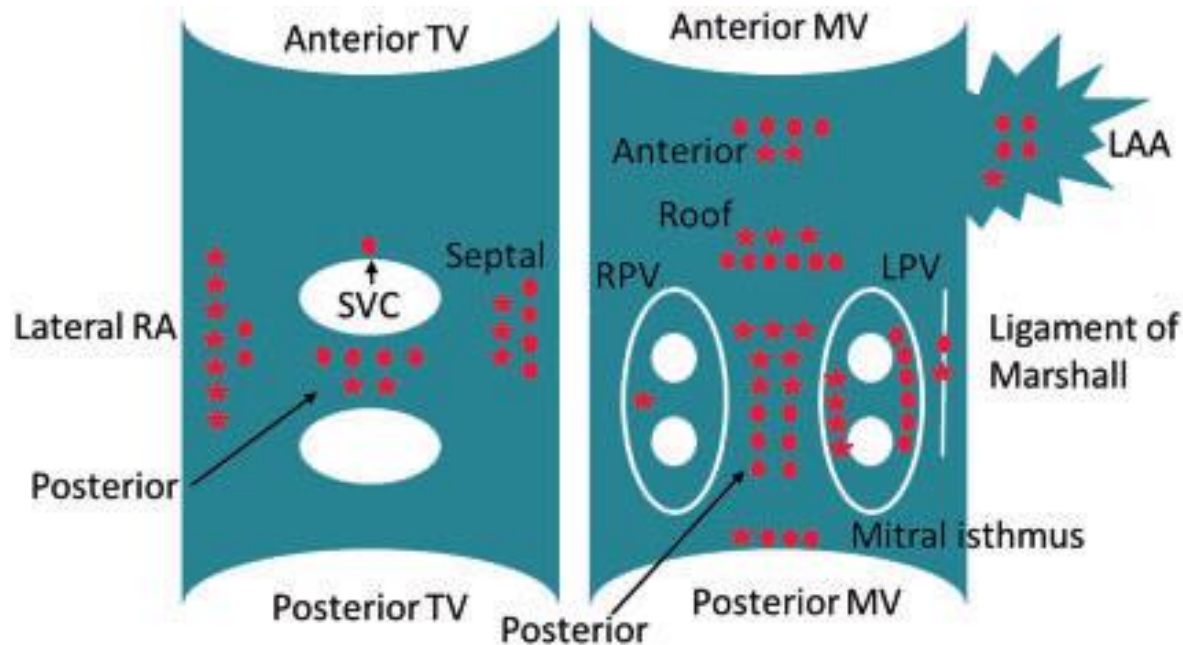
Concomitant conditions (hypertension, obesity, metabolic syndrome)

Atrial remodeling in obstructive sleep apnea: implications for atrial fibrillation

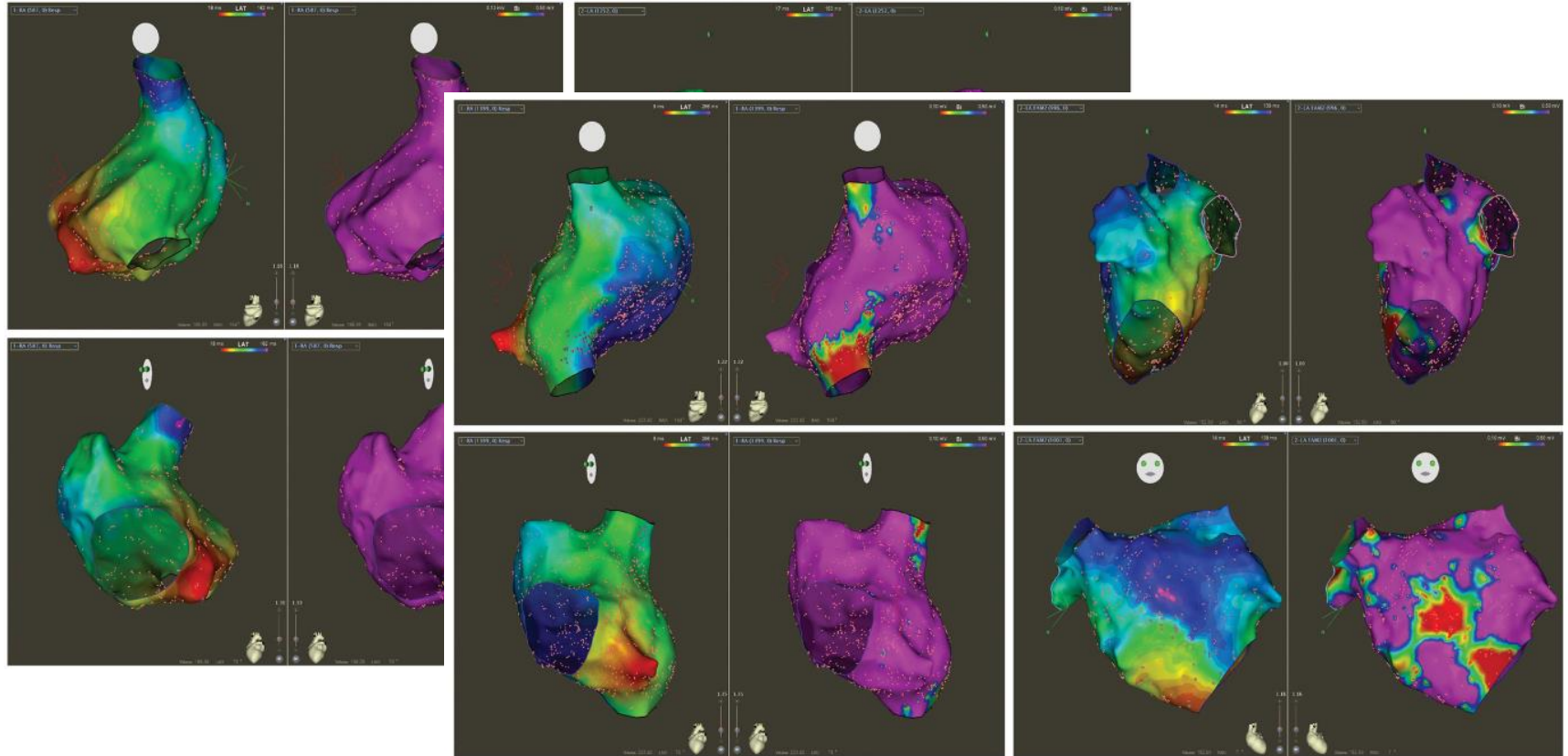


- ✓ intra-atrial conduction delay
- ✓ reduced atrial voltage
- ✓ presence of complex atrial electrograms
- ✓ electrical silence

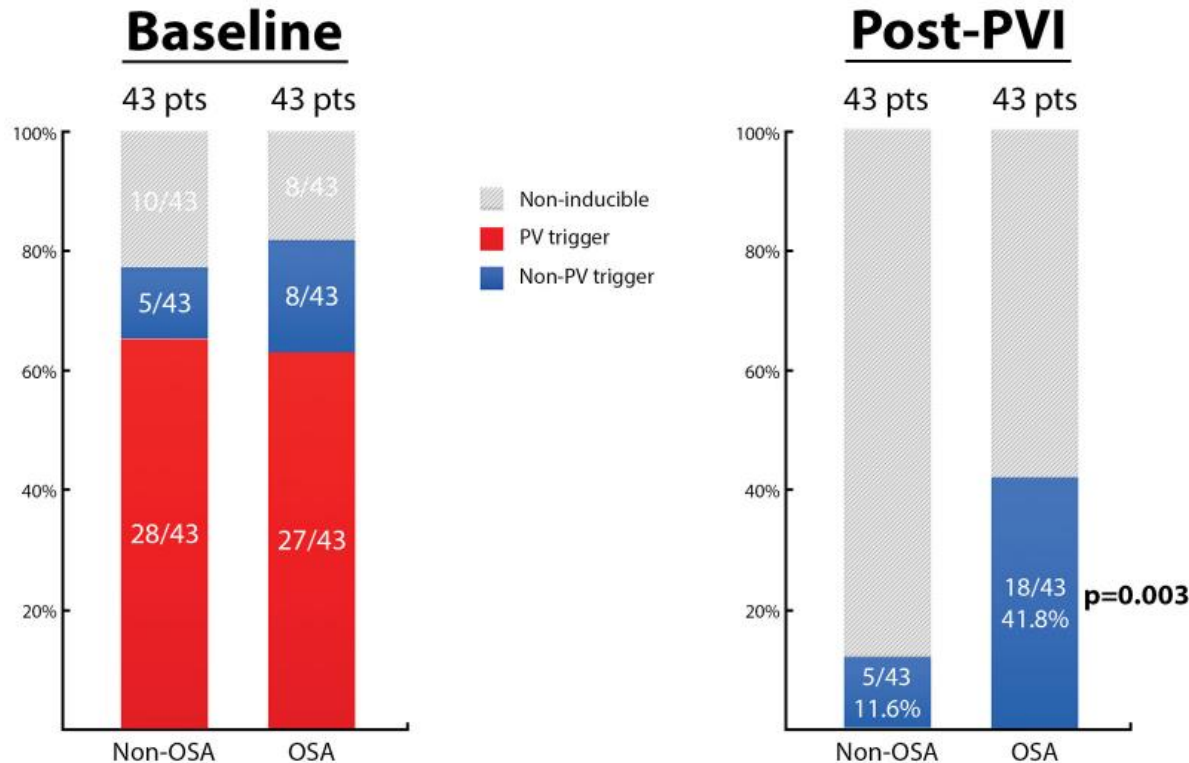
Obstructive sleep apnea is associated with increased rotor burden in patients undergoing focal impulse and rotor modification guided atrial fibrillation ablation



Atrial Substrate and Triggers of Paroxysmal Atrial Fibrillation in Patients with Obstructive Sleep Apnea



Atrial Substrate and Triggers of Paroxysmal Atrial Fibrillation in Patients with Obstructive Sleep Apnea



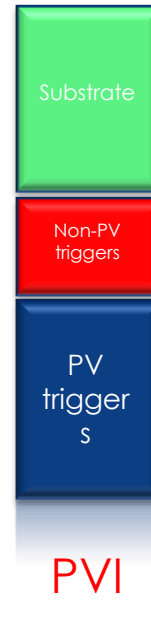
Ablation strategy



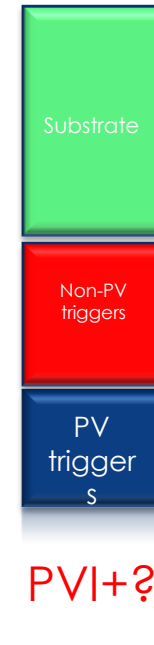
Parox-AF



Pers-AF



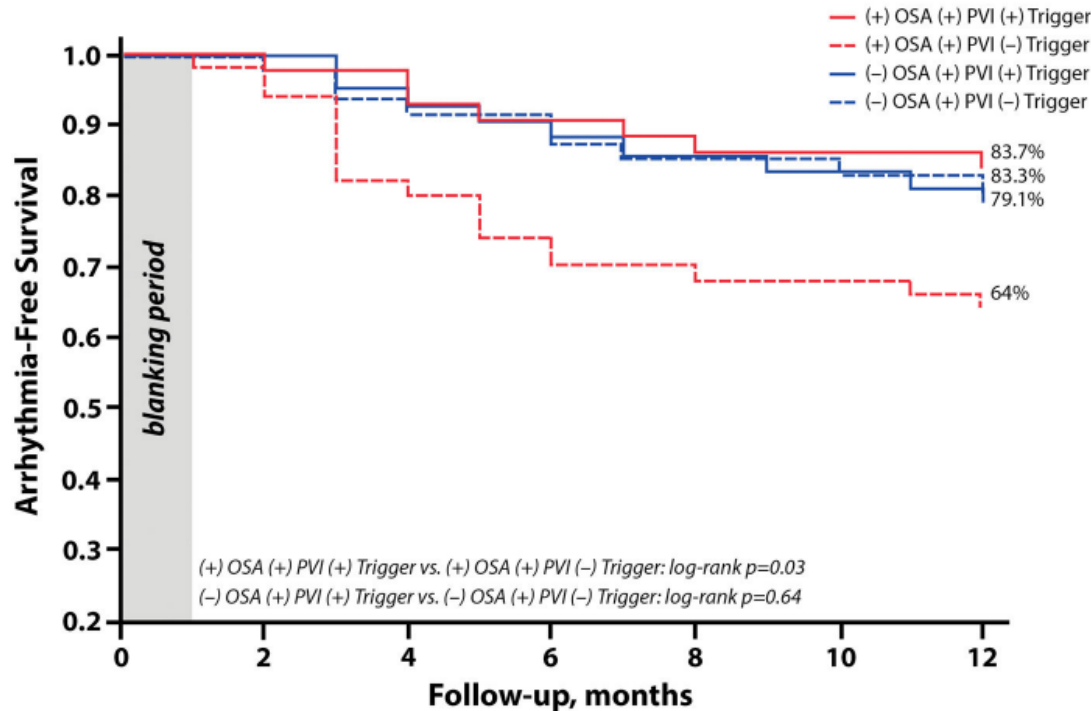
OSA-AF



Atrial Substrate and Triggers of Paroxysmal Atrial Fibrillation in Patients with Obstructive Sleep Apnea



Clinical outcome



OSA promotes AF via electrical and structural atrial remodeling



Acute Apnea-Associated Arrhythmogenic Changes

Acute atrial dilation

Sympathovagal activation

High-frequency desaturation and reoxygenation

Acute shortening in atrial refractoriness

Atrial extrasystole (trigger) RF

Intermittent conduction delay

Atrial Remodeling in Long-term OSA

Atrial stretch

Neurohumoral activation and oxidative stress

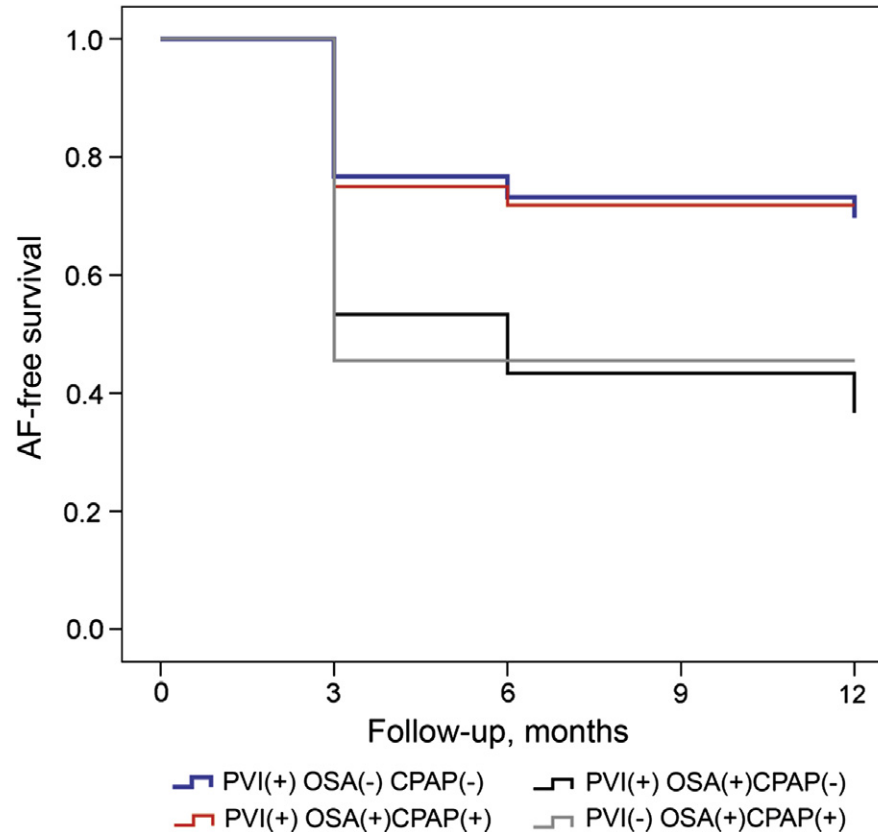
Progressive structural remodeling RF

Regional conduction slowing and reentry RF

Concomitant conditions (hypertension, obesity, metabolic syndrome)

CPAP

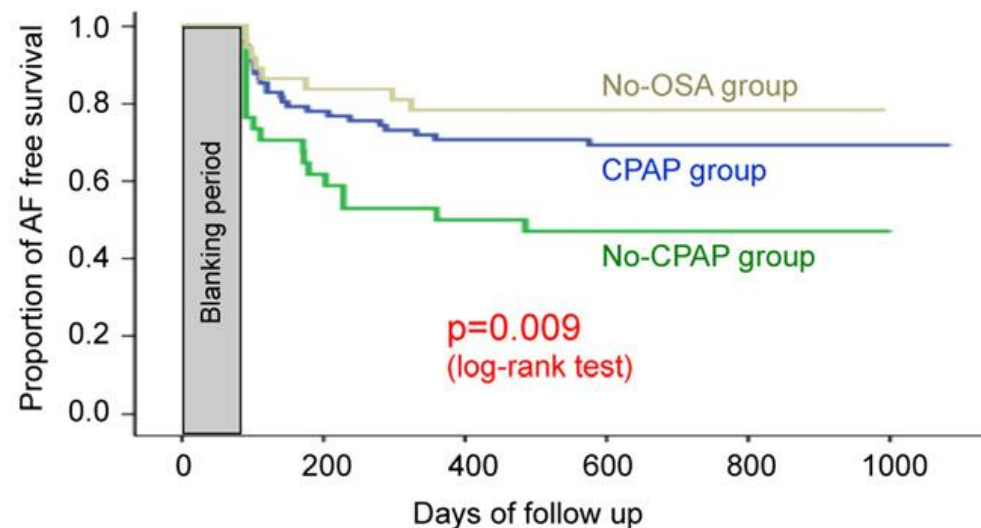
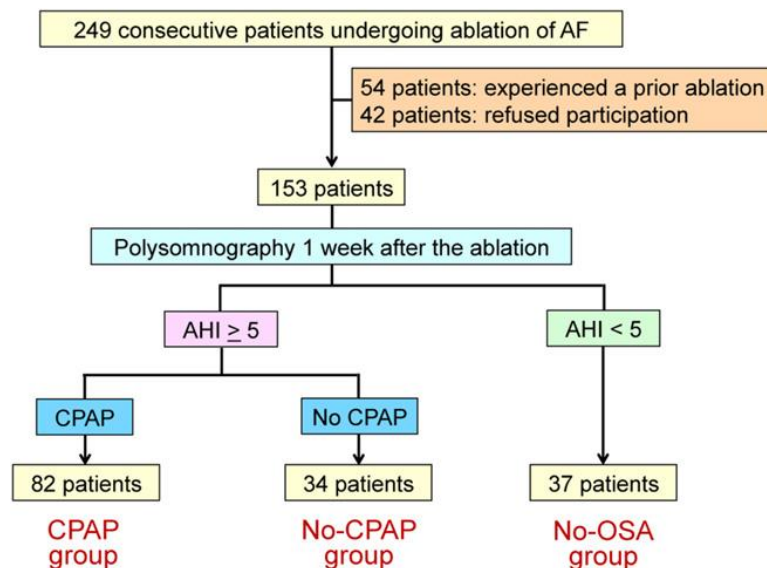
Treatment of Obstructive Sleep Apnea Reduces the Risk of Atrial Fibrillation Recurrence After Catheter Ablation



Conclusions

The presence of OSA with its associated electroanatomical atrial remodeling not only potentiates the risk to develop AF, but also limits the success of AF ablation. CPAP therapy may very well help mitigate these effects, improving the outcomes of PVI in the OSA patient population. The higher rates of recurrent AF following PVI seen in CPAP

Concomitant obstructive sleep apnea increases the recurrence of atrial fibrillation following radiofrequency catheter ablation of atrial fibrillation: Clinical impact of continuous positive airway pressure therapy



Safety and Efficacy of Pulmonary Vein Antral Isolation in Patients With Obstructive Sleep Apnea

The Impact of Continuous Positive Airway Pressure



Main findings:

- (1) the incidence of OSA in patients undergoing PVAI in this series was higher than that found in the general population.
- (2) OSA was independently associated with PVAI failure.
- (3) All patients treated with CPAP had higher PVAI success rates than patients not on CPAP.
- (4) Patients on CPAP had lower baseline CRP levels.
- (5) Patients with OSA did not have more complications.
- (6) Patients with OSA had more non-PV triggers.
- (7) Non-PV triggers, coronary artery disease, and AF type were predictors of procedural failure.
- (8) Patients not treated with CPAP and who had non-PV triggers were more likely to fail the procedure.

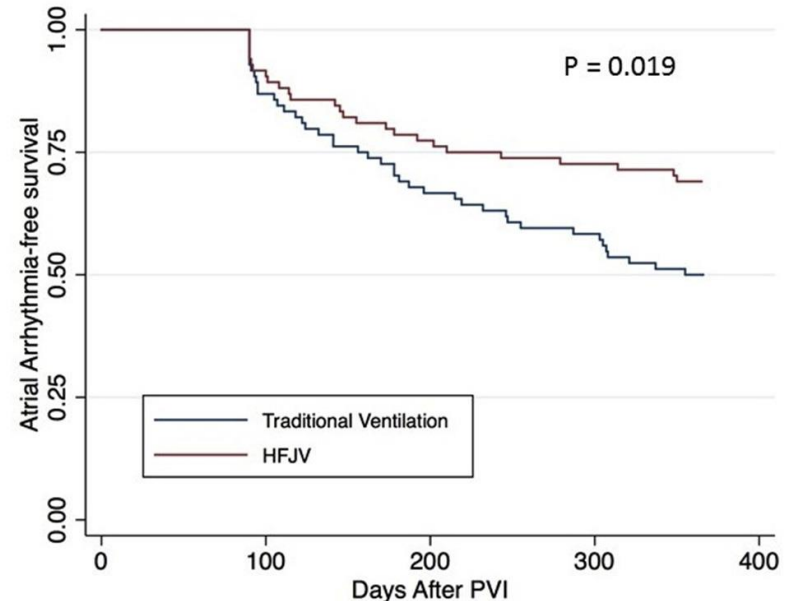
Sedation protocol



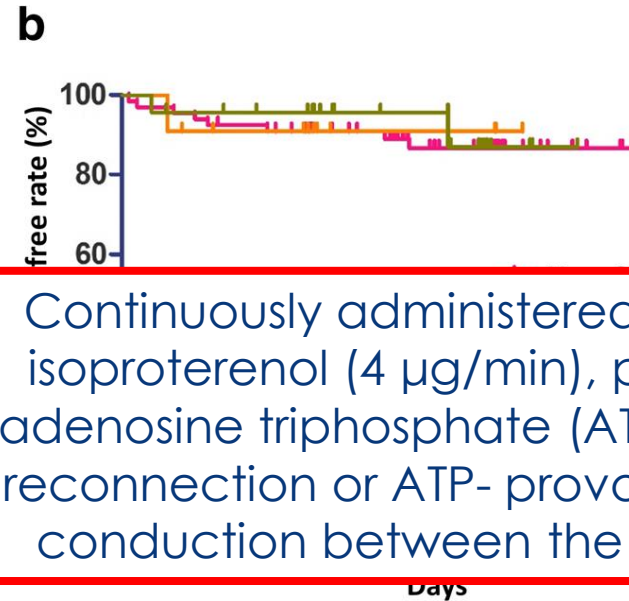
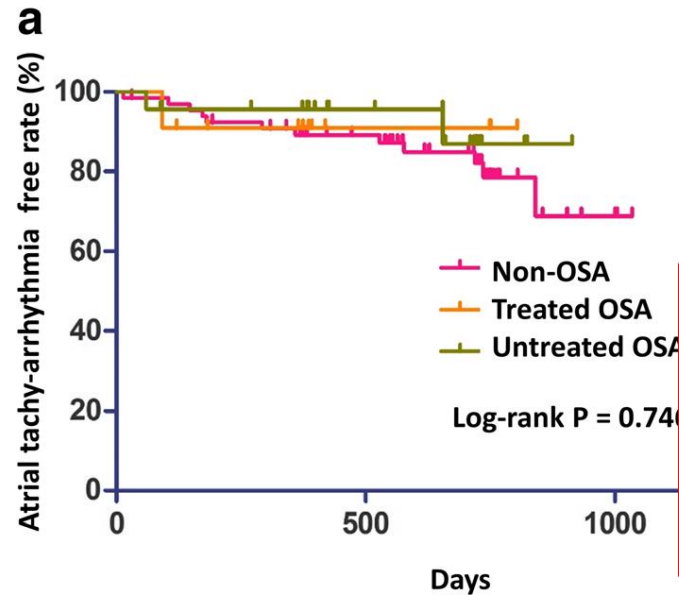
Recovery of PV conduction is a likely cause of recurrent AF following acutely successful PVI. Ablation catheter instability is one of the main reason of PV reconnection (*beating heart and heart movement due to breathing*).

Strategies to improve RF- mediated lesion delivery

1. ✓ **CF sensor**
2. ✓ **Deep sedation**
3. ✓ **Sedation**
- ✓ **General anesthesia**



The relationship between obstructive sleep apnea and recurrence of atrial fibrillation after pulmonary vein isolation using a contact force-sensing catheter

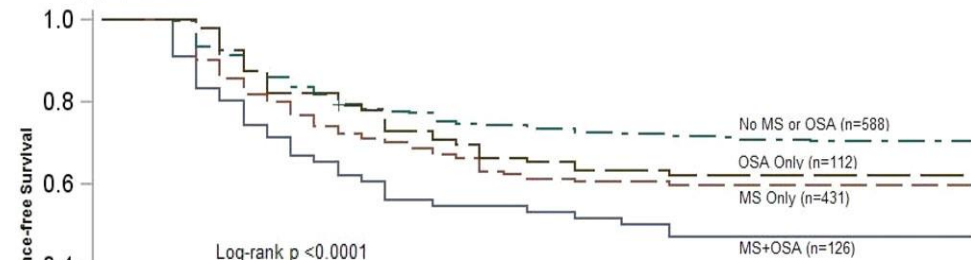
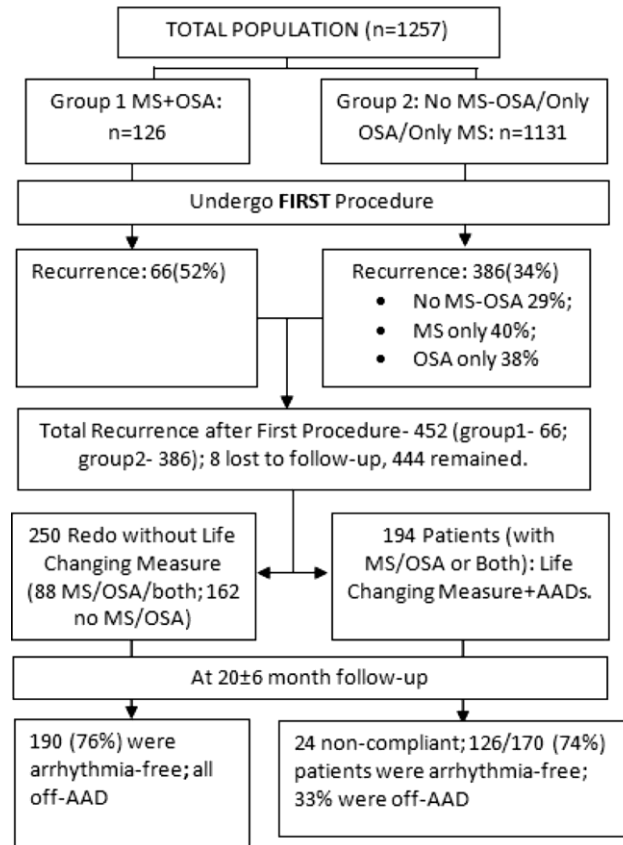


Continuously administered intravenous isoproterenol (4 $\mu\text{g}/\text{min}$), plus 40 mg of adenosine triphosphate (ATP) to exclude reconnection or ATP-provoked dormant conduction between the PVs and LA.

After 2 RF procedure with nonPV foci ablation with CF sensor and CPAP



Long-Term Outcome of Catheter Ablation in Atrial Fibrillation Patients with Coexistent Metabolic Syndrome and Obstructive Sleep Apnea: Impact of Repeat Procedures versus Lifestyle Changes



Conclusion

After a single procedure, AF patients with concomitant MS and OSA were significantly more prone to experience recurrences than their counterparts having only MS or OSA or none of these conditions. Moreover, in patients having frequent recurrences, repeat ablation with elimination of non-PV triggers was able to increase freedom from recurrent atrial arrhythmia. Additionally, in a select group of patients with infrequent arrhythmia, aggressive lifestyle change along with antiarrhythmic drugs was effective in providing arrhythmia-free survival.

Conclusions



- ✓ OSA is frequent in AF patients
- ✓ OSA reduce the efficacy of PVI
- ✓ Non PV foci are more frequent in OSA patients
- ✓ CPAP and Life style change reduce AF recurrences after PVI

Vicenza Protocol OSAS-PVI



- ✓ General anesthesia
- ✓ PVI + posterior wall isolation
- ✓ Isoproterenol challenge (20mcg/min)
- ✓ CPAP and Life style change during follow up

