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Long obstructive sleep apneas as a biomarker of atrial fibrillation

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Background: Even though obstructive sleep apnea (OSA) is strongly associated with atrial fibrillation (AF), the use of traditional OSA scoring by apnea hypopnea index (AHI) did not result in improved arrhythmia outcomes in recent randomized trials. Longer OSA episodes lead to stronger pro-arrhythmic changes, and whether very long OSA episodes are more prevalent in AF patients remains unknown.

Purpose: We hypothesized that AF patients with mild-moderate OSA manifest greater percentage of long (>20s), very long (>30s), and extremely long (>40s) OSA episodes, compared to control OSA patients matched to AHI, age and sex.

Methods: From patients studied with diagnostic polysomnography in our laboratory between 2016 and 2018, we selected 22 patients with mild-moderate untreated OSA of which 11 patients had history of paroxysmal AF and 11 patients did not have any cardiac history. The length, oxygen desaturation, and relationship to neighboring events was manually re-measured in all recorded apnea and hypopnea events.

Results: In the 22 included patients (age 62.5±9.1 years, AHI 12.8±6.1, 40% female) we recorded 1021 apneas: 508 in the AF group and 513 in the control group. AF patients had longer apneas compared to the patients without AF history (mean length 28.7±11.7s vs. 23.3±9.9s; $p<0.0001$). The proportion of apneas that were long (>20s), very long (>30s), and extremely long (>40s) was greater in the AF group as compared to the control (p=0.0039, p=0.0215, p=0.0104, respectively; see figure). The acute oxygen saturation drops (>2%) during apneas were comparable between the AF group and control groups (p=0.13), but the long (>20s) apneas were prone to greater oxygen desaturations.

Conclusions: While traditional scoring of OSA focuses on episodes lasting >10s, our data newly show that longer durations of OSA events are particularly prevalent in AF patients. These results, combined with recent mechanistic studies showing that longer apneas exert greater pro-arrhythmic effect on atrial conduction, suggest that novel scoring of OSA placing more weight on longer apneas should be explored, especially when screening and titrating OSA therapy in patients at risk of AF.