Sleep and Cardiac Tachyarrhythmia: Results from the Cross-Sectional Sleep Heart Health Study

Background:
Despite the well-known relationship between sleep disorders and general cardiovascular risk, relatively few studies have examined sleep quality and quality at pre-clinical levels in patients with cardiac arrhythmias (CA). Patients with CA have at a greatly elevated risk of stroke, sudden cardiac death, disability, and reduced quality of life. In this study, we therefore sought to elucidate the sleep-related predictors of arrhythmia by examining the relationship between objective (polysomnography assessed) and self-reported measures of sleep quality and quantity with CA.

Methods:
Baseline, comorbidity, electrocardiogram, and polysomnography data for all who participated in the Sleep Heart Health Study (age 44-90 y) was screened for this analysis. Participants with missing critical data were excluded from the final analysis. ECG data was utilized to find participants with cardiac arrhythmias. Exposure variables were categorized to blood oxygen saturation, sleep stages, and tertiles of sleep quality and quantity. Unadjusted and adjusted logistic regression was used to quantify the association between sleep and non-sleep related factors and arrhythmia.

Results:
Of the original SHHS sample, a total of 3,453 participants with complete variables of interest were included in the final analysis (mean age: 68.1± 10.6 Years, 54% male, 499 with arrhythmia (Atrial Tachyarrhythmia and Conduction Abnormalities), and 2,954 Controls). At the bivariate level, underweight (OR: 2.86, 95% CI: 1.1 – 7.2, P<0.0001), sleep time < 6 hours (OR: 2.58, 1.5-4.3, P<0.0001), % time in REM sleep (<17.6; OR: 1.53, 1.2-1.0, P<0.0001), sleep efficiency (<81; OR: 1.9, 1.5-2.3 ) and regular afternoon naps (OR:1.8, 1.3-2.4, P<0.0001) were significantly associated with CA. However, in age- and sex-adjusted analyses, only % time in REM sleep and minimum oxygen saturation during REM (OR: 0.97, 0.96-0.98, P=0.006, and; OR: 0.97, 0.96-0.98, P=0.001, respectively) were significantly associated with CA. However, in age- and sex-adjusted analyses, only % time in REM sleep and minimum oxygen saturation during REM (OR: 0.97, 0.96-0.98, P=0.006, and; OR: 0.97, 0.96-0.98, P=0.001, respectively) were significantly associated with CA.

Conclusion:
Preliminary analyses suggest differences in the sleep stages and oxygen delivery as potential targets for future work in the prevention and early management of CA. Further study is necessary to understand the nature of these relationships using longitudinal data with adjustment for traditional CA markers.