E-Poster

EP-483

Revealing Cardiovascular Risks in Suboptimal Health Populations from Nocturnal Hypoxemia Dynamic

Topic: Health Conditions (Nervous System, Musculoskeletal System, Cardiopulmonary System)

Yi En Lin[1], Albert C. Yang[2]

[1]*Department of Medical Research, Taipei Veteran General Hospital, Taipei, Taiwan, Taipei, Taiwan ROC*
[2]*Digital Medicine and Smart Healthcare Research Center, National Yang Ming Chiao Tung University, Taipei, Taiwan, Taipei, Taiwan ROC*

BACKGROUND

Cardiovascular diseases stand as one of the major contributors to disability worldwide, motivating extensive research to identify modifiable risk factors. Obstructive sleep apnea (OSA) has emerged as a critical concern, given its strong association with both cardiovascular complications. Furthermore, studies have shown that neurological populations are more likely to have OSA. Despite its clinical significance, OSA severity is typically defined using the apnea-hypopnea index (AHI) alone—an approach that may fail to capture crucial physiological processes, particularly around oxygen saturation patterns. This limitation becomes even more pertinent when considering the substantial proportion of individuals whose AHI does not reach the threshold for continuous positive airway pressure (CPAP) therapy yet may still face elevated health risks. In this retrospective analysis, we aimed to determine whether more detailed nocturnal oxygen saturation metrics—such as Q1 (lower quartile), Q2 (middle quartile), Q3 (upper quartile), mean, maximum (Max), minimum (Min), MF (median frequency of saturation), and spectral entropy (SpecEn), oxygen Desaturation Index (ODI), proportion of different saturation, and Lempel–Ziv complexity (LZC)—could serve as more precise indicators of long-term risk and preventive interventions.

METHODS

We analyzed data from the Sleep Heart Health Study, comprising 4,733 individuals aged 40 and older who underwent home-based polysomnography. Participants were categorized into no OSA (AHI < 5), mild OSA (5 ≤ AHI < 15), or moderate/severe OSA (AHI ≥ 15). We applied Cox proportional hazard models to evaluate associations between specific oxygen saturation parameters and adverse cardiovascular outcomes, including revascularization, angina, and congestive heart failure (CHF).

RESULTS

The moderate/severe OSA group included the highest proportion of female participants, and older age correlated with a greater burden of comorbidities. Q3 and Max were significantly linked to revascularization risk. Among moderate/severe OSA cases, Q2, Max, and Min were strongly associated with angina and heart failure. Higher Q2 demonstrated a protective effect, whereas elevated Max and Min heightened cardiovascular risk. These findings underscore the importance of specific nocturnal saturation metrics (Q2, Q3, Max, Min) in guiding risk assessment and management strategies across varying OSA severities.

CONCLUSION

Nocturnal sleep oxygen saturation provides critical insights into cardiovascular risk stratification beyond traditional AHI measures. Notably, individuals with normal AHI but abnormal oxygen saturation patterns still face significant cardiovascular risks, underscoring the need for attention of preventive interventions to these suboptimal health populations.

Statement of Disclosures

None

Corresponding Author:
Yi En Lin
Department of Medical Research, Taipei Veteran General Hospital, Taipei, Taiwan, Taipei, Taiwan ROC
Email: stars880527.y@nycu.edu.tw

Doi: 10.5606/archisprm.2026.EP-483