The effects of ambient temperature changes on the severity of obstructive sleep apnea and autonomic nervous system among adult patients

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Objective: To investigate if the sleep ambient temperature (Ta) will affect the severity and autonomic nervous system among obstructive sleep apnea (OSA) patients.

Methods: OSA participants (n=10) with the mean age was 30.8 years old were enrolled in this study. The 7-day sleep diary includes home ambient temperature and apnea-hypopnea index (AHI) will record. Participants will be required to stay in an experimental room with three Ta, including a relatively colder (Ta 16 °C), a comfortable (Ta 26 °C) and a warmer (Ta 30 °C) circumstances in random order. The changes in sleep-related and respiratory parameters will be evaluated by the polysomnography and wireless oximeter. ECG and the EEG signals were further used to analyze the heart rate variability (HRV) and the cortical activities, respectively.

Results: In the autonomic nerves system, the HF represents the parasympathetic activity increased in Ta 16 °C (p<0.05) and the LF/HF and LF% represent the sympathetic activity arose in Ta 30 °C (p<0.05). On the other hand, the respiratory data showed Ta 26 °C would have higher AHI during REM stage (AHI-REM) (p<0.05) and Ta 30 °C would have higher AHI during NREM stage (AHI-NREM), supine posture (p<0.05) and lowest overnight mean SpO2 both in the REM and NREM stages (p<0.05) compared with 16 °C. The temperature difference from Ta 26 °C showed correlation with AHI-NREM (*Pearson's correlation:* 0.411, p<0.05) and NREM-mean SpO2 (*Pearson's correlation:* -0.54, p=0.01).

Conclusion: Compared with Ta 26 °C, untreated OSA patients have higher parasympathetic activity and lower sympathetic activity at Ta 16 °C, but higher sympathetic activity and more severe AHI at Ta 30 °C.

中文題目：環境溫濕度變化於成人阻塞型睡眠呼吸中止症之嚴重程度及心率變異影響

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