



## Sleep body position correlates with cognitive performance in middle-old obstructive sleep apnea subjects



### To the Editor:

Dr. Ho-Joon Lee and colleagues describe the glymphatic system dysfunction in obstructive sleep apnea (OSA) patients using the DTI-ALPS index as a MRI marker [1]. DTI-ALPS index was significantly correlated with apnea-hypopnea (AHI,  $r = -0.427$ ;  $p = 0.042$ ) and oxygen desaturation index (ODI,  $r = -0.497$ ;  $p = 0.036$ ). This association could be misleading. The correlation coefficients appear weak. Other pathophysiological mechanisms can participate in this association. Humans exhibit different body posture during sleep states and sleep favors the lateral position probably to optimize the clearance of metabolic leftovers and interstitial solutes (i.e. amyloid beta protein) [2]. This observation could explain the controversy effect of continuous positive air pressure as preventive strategy treatment of dementia in OSA patients [3], because patient sleep positions are not taken in account.

In our cohort of 103 subjects (60 men), recruited between June 1, 2021 to December 31, 2021, there were 11 (10.5%) normal control subjects, 37 (35.2%) with mild, 27 (25.7%) moderate, and 28 (26.7%) severe OSA greater than 18-years-old (mean age $\pm$ SD:  $67 \pm 12$  years). There were not any correlation between AHI index ( $r = -0.016$ ;  $p = 0.873$ ) and ODI ( $r = -0.036$ ;  $p = 0.716$ ) and signs of cognitive impairment assessed by the Self-Administered Gerocognitive Exam (SAGE) [4]. On the contrary, SAGE scoring was positively correlated with minutes spent on right lateral ( $r = 0.344$ ;  $p < 0.001$ ) and prone ( $r = 0.235$ ;  $p = 0.019$ ) sleep posture but not with on left lateral one ( $r = 0.185$ ;  $p = 0.066$ ) and inversely correlated with time on supine sleep posture ( $r = -0.474$ ;  $p < 0.001$ ) also after adjusting for age, BMI, AHI and ODI. The right lateral and prone positions during sleep have apparently an advantage on cognition while supine one represents a disadvantage. Why is it? It is likely not simple, but rather a function of complex physiological adjustments to different head and body positions on glymphatic

system [5]. The posture should be considered in interpreting diagnostic imaging procedures to assess glymphatic dysfunction in humans [2]. In our opinion, Dr. Lee and colleagues should reanalyze their data controlling for body position to shed some light on the complex relationship between OSA, cognition and glymphatic system.

### References

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31 January 2022

Available online 16 June 2022

**Abbreviations:** OSA, obstructive sleep apnea; ODI, oxygen desaturation index; AHI, apnea hypopnea index; SAGE, Self-Administered Gerocognitive Exam; DTI-ALPS, Diffusion Tensor Image Along the Perivascular Space; BMI, Body Mass Index.

<https://doi.org/10.1016/j.sleepx.2022.100050>

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