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Letter to the Editor

Excessive daytime sleepiness, sympathetic nervous system activation and arterial stiffening in patients with mild-to-moderate obstructive sleep apnoea. Reply

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To Dr. Kawada, Department of Hygiene and Public Health, Nippon Medical School

We are grateful to Dr. Kawada for his comments [1] and interest in our work [2]. Multiple potential confounders of excessive daytime sleepiness (EDS) have been established besides obstructive sleep apnoea (OSA) and may include gender, age [3], sleep habits, psychiatric disorders, obesity, and diabetes [4]. In our study [2] selected patients without these factors were studied; they had high sleep efficiency during full polysomnographic sleep recording. However, in this sample of patients the respiratory disturbance index (RDI) did not correlate with the Epworth Sleepiness Scale (ESS) score (RDI 16.1 ± 7.1 vs $17.2 \pm 6.7/h$, $p = 0.59$, comparing “nonsleepy” (ESS ≤ 10) with “sleepy” (ESS ≥ 10) patients).

A multivariate regression analysis with adjustment for confounders (body mass index, apnoea/hypopnea index, and oxygen desaturation index) proved that the ESS, as a continuous variable, did not significantly predict the arterial stiffness derived index ($F = 2.41$, adjusted $R^2 = 0.028$, $p = 0.127$) and heart rate variability indices ($F = 0.34$, adjusted $R^2 = -0.014$, $p = 0.564$), which supports our conclusions.

Finally, it has been established that severe OSA is an independent cardiovascular (CV) risk factor [5]. Hence, we investigated mild-to-moderate OSA patients and whether there was any difference in markers of CV risk, including detectable signs of increased sympathetic nervous system activity and arterial stiffness, and whether this was related to EDS. Although our study is a “proof-of-principle study”, the results obtained were clear-cut and tested the hypothesis that mild-to-moderate OSA and EDS have a role in CV risk. Further stratification of OSA patients in terms of CV risk will help to focus future therapeutic strategies in these patients.

Author contributorship

These authors take responsibility for all aspects of the reliability and freedom from bias of the data presented and their discussed interpretation.

Conflicts of interest

The authors report no relationships that could be construed as a conflict of interest.

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References

- [1] T. Kawada, Excessive daytime sleepiness, sympathetic nervous system activation and arterial stiffening in patients with mild-to-moderate obstructive sleep apnoea, *Int. J. Cardiol.* 249 (2017) 414.
- [2] V. Bisogni, M.F. Pengo, P. Drakatos, G. Maiolino, B. Kent, G. Rossitto, et al., Excessive daytime sleepiness does not correlate with sympathetic nervous system activation and arterial stiffening in patients with mild-to-moderate obstructive sleep apnoea:

A proof-of-principle study, *Int. J. Cardiol.* 236 (2017) 458–461.

[3] E. Sforza, V. Pichot, M.S. Martin, J.C. Barthélémy, F. Roche, Prevalence and determinants of subjective sleepiness in healthy elderly with unrecognized obstructive sleep apnea, *Sleep Med.* 8 (2015) 981–986.