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Severe desaturations increase psychomotor vigilance task-based median reaction time and number of lapses in obstructive sleep apnoea patients

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Parameters considering characteristic properties of desaturations have a significant association with impaired vigilance, highlighting the importance of developing methods beyond the AHI for a more detailed assessment of OSA severity <http://bit.ly/2veqx9D9>

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ABSTRACT Current diagnostic parameters estimating obstructive sleep apnoea (OSA) severity have a poor connection to the psychomotor vigilance of OSA patients. Thus, we aimed to investigate how the severity of apnoeas, hypopnoeas and intermittent hypoxaemia is associated with impaired vigilance.

We retrospectively examined type I polysomnography data and corresponding psychomotor vigilance tasks (PVTs) of 743 consecutive OSA patients (apnoea–hypopnoea index (AHI) ≥ 5 events·h⁻¹). Conventional diagnostic parameters (*e.g.* AHI and oxygen desaturation index (ODI)) and novel parameters (*e.g.* desaturation severity and obstruction severity) incorporating duration of apnoeas and hypopnoeas as well as depth and duration of desaturations were assessed. Patients were grouped into quartiles based on PVT outcome variables. The odds of belonging to the worst-performing quartile were assessed. Analyses were performed for all PVT outcome variables using binomial logistic regression.

A relative 10% increase in median depth of desaturations elevated the odds (OR_{range} 1.20–1.37, $p < 0.05$) of prolonged mean and median reaction times as well as increased lapse count. Similarly, an increase in desaturation severity (OR_{range} 1.26–1.52, $p < 0.05$) associated with prolonged median reaction time. Female sex (OR_{range} 2.21–6.02, $p < 0.01$), Epworth Sleepiness Scale score (OR_{range} 1.05–1.07, $p < 0.01$) and older age (OR_{range} 1.01–1.05, $p < 0.05$) were significant risk factors in all analyses. In contrast, increases in conventional AHI, ODI and arousal index were not associated with deteriorated PVT performance.

These results show that our novel parameters describing the severity of intermittent hypoxaemia are significantly associated with increased risk of impaired PVT performance, whereas conventional OSA

severity and sleep fragmentation metrics are not. These results underline the importance of developing the assessment of OSA severity beyond the AHI.