New neural network enables easy screening of sleep apnea in patients with cerebrovascular disease

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A new neural network enables an easy and accurate assessment of sleep apnoea severity in patients with cerebrovascular disease. Credit: UEF / Raija Törrönen

Up to 90% of patients experiencing a stroke have sleep apnoea,

according to earlier studies conducted at Kuopio University Hospital. If left untreated, sleep apnoea can reduce the quality of life and rehabilitation of patients with stroke and increase the risk for recurrent cerebrovascular events.

"Although screening of [sleep apnoea](#) is recommended for patients with [cerebrovascular disease](#), it is rarely done in stroke units due to complicated measurement devices, time-consuming manual analysis, and [high costs](#)," SAYS researcher Akseli Leino from the University of Eastern Finland.

In the new study, researchers developed a [neural network](#) to assess the severity of sleep apnoea in patients with acute stroke and transient ischaemic attack (TIA) by using a simple nocturnal oxygen saturation signal. The apnoea-hypopnea index, which represents the number of apnoea and hypopnea events per hour, is commonly used in the diagnostics of sleep apnoea. When the researchers compared the results of manual scoring and those obtained using the new neural network, the median difference was only 1.45 events per hour. The neural network was also 78% accurate in classifying patients into four different categories on the basis of sleep apnoea severity (no sleep apnoea, mild, moderate, severe). The neural network was able to identify moderate and severe sleep apnoea, both of which require treatment, in patients with acute stroke or TIA with a 96% specificity and a 92% sensitivity.

"The neural network developed in the study enables an easy and cost-effective screening of sleep apnoea in [patients](#) with cerebrovascular disease in hospital wards and stroke units. The nocturnal oxygen saturation signal can be recorded with a simple finger pulse oximetry measurement, with no time-consuming manual analysis required," Medical Physicist Katja Myllymaa from Kuopio University Hospital SAYS.

More information: Akseli Leino et al. Neural network analysis of nocturnal SpO2 signal enables easy screening of sleep apnea in patients with acute cerebrovascular disease, *Sleep Medicine* (2020). DOI: 10.1016/j.sleep.2020.12.032

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