Is the Severity of Sleep Apnea Associated With Ischemic Stroke in the Elderly?

To the Editor:

We read with great interest the article by Munoz et al, who reported that severe sleep apnea defined as apnea-hypopnea index (AHI) $\geq 30$ significantly increased the risk of ischemic stroke in an elderly population (aged 70 to 100 years) independently of known confounding factors. If true, these findings may have enormous public health implications because almost 1 in 4 participants examined by Munoz et al fell into the category of severe sleep apnea. However, before any firm conclusions can be drawn from this study, the data presented in this article must be clarified.

The authors compared 6-year incidence of ischemic stroke between elderly with AHI $\geq 30$ and elderly with AHI <30 events/h, as documented by polysomnography. But the presented data on sleep apnea severity raise some important questions. The severity of sleep apnea is usually indexed by 2 measures, the rate of respiratory events—apneas and hypopneas—as used by the authors, and the degree of arterial oxygen desaturation during sleep. Arterial oxygen desaturation is generally quantified by either percent time spent below 90% saturation, or by the minimum saturation during sleep. Generally, severe sleep apnea as indexed by AHI is accompanied by severe oxygen desaturation.

The authors’ Table 2, which presents the sleep apnea data of participants with and without stroke, reveals significantly higher percentage of “severe” sleep apnea in participants with ischemic stroke (45% versus 23%; $P<0.033$). The data, however, for arterial oxygen desaturation are perplexing. The authors reported that participants with ischemic stroke spent 14.6 seconds with oxygen saturation <90% in comparison with 16.12 seconds in participants without stroke. Generally, time spent below 90% saturation is expressed either as percentage of time out of total sleep time, or as accumulated minutes below that threshold, but not in seconds. If this is not a mistake in units then neither group of participants had any measurable degree of oxygen desaturation during sleep, which questions the definition of severe sleep apnea in these participants. However, even if the authors mistakenly replaced the units it is still difficult to explain how the group having significantly more severe sleep apnea based on AHI spent less time with arterial oxygen saturation <90% than the group with mild or no sleep apnea. This is a crucial question because previous reports showed that intermittent hypoxia plays a major role in the pathogenesis of atherosclerotic processes in sleep apnea.1,2,3 Because the authors’ Table 2 does not provide standard deviations or any other measure of variability, and there is no information on the rate of apneas separately from that of hypopneas, it is very difficult to understand the discrepancy between the different measures of sleep apnea severity. Of note, the actual difference between the mean AHI values of the groups with and without stroke, although significant, was rather small, and both mean values were smaller than the 30-events/h cutoff point (28 versus 20.1 events/h). Previous reports showed that at least 44% of the elderly population have a respiratory disturbance index of at least 20.4

The second puzzling point in this article is the reported annual incidence of strokes in this population—11.28 per 1000 person-years—which as the authors themselves noted “is lower than in previous reports.” They speculated that the unexpected lower incidence could result from the fact that some of the old people died at home and therefore could not be registered in their hospital survey. The discrepancy between Munoz et al results and the previously published data cited in their article5 is not trivial nor a minor one. The incidence of ischemic stroke in the present study was close to 50% of that reported by Hollander et al (18.1 and 19.9 per 1000 person-years for men aged 75 to 79 and 80 to 84 years, respectively). This makes the authors’ explanation regarding the lower incidence in their study questionable. Because there were significant differences between the 810 participants of phase 1 of the study and the 429 people who agreed to continue to phase 2 and provided the data for the final analysis, a more plausible explanation is that of a selection bias of the studied sample.

In conclusion, before any decision is made to treat almost one fourth of the elderly population for sleep apnea syndrome, there is a need to better understand the results of this article.

Disclosures

P. Lavie is a founder and shareholder in Itamar Medical and SLP that produce medical devices for diagnosis of sleep apnea and in Sleep Medicine center and Sleep HealthCenters that provide diagnostic services for sleep apnea.

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