

Western University

Scholarship@Western

Paediatrics Publications

Paediatrics Department

1-1-2019

Effect of varying definitions of hypopnea on the calculation of the apnea-hypopnea index may depend upon the level of sympathetic activation: Results from a patient with posttraumatic stress disorder

Madhulika A. Gupta

Schulich School of Medicine & Dentistry, mbgupta@uwo.ca

Follow this and additional works at: <https://ir.lib.uwo.ca/paedpub>

Citation of this paper:

Gupta, Madhulika A., "Effect of varying definitions of hypopnea on the calculation of the apnea-hypopnea index may depend upon the level of sympathetic activation: Results from a patient with posttraumatic stress disorder" (2019). *Paediatrics Publications*. 1847.

<https://ir.lib.uwo.ca/paedpub/1847>

LETTERS TO THE EDITOR

Effect of Varying Definitions of Hypopnea on the Calculation of the Apnea-Hypopnea Index May Depend Upon the Level of Sympathetic Activation: Results From a Patient With Posttraumatic Stress Disorder

Madhulika A. Gupta, MD, MSc, RST, FAASM

Department of Psychiatry, Schulich School of Medicine and Dentistry, University of Western Ontario, London, Ontario, Canada

The review by Mansukhani and colleagues¹ of the effect of different hypopnea definitions on calculations of the apnea-hypopnea index (AHI) is highly clinically relevant. They included studies that used polysomnography or home sleep apnea testing (HSAT).¹ They further carried out a meta-analysis of studies that compared the 2007 Recommended or IA criteria of $\geq 30\%$ airflow reduction and $\geq 4\%$ oxyhemoglobin desaturation (4%OD) for hypopnea diagnosis,¹ against the reference standard of the 2012 Recommended or IA criteria requiring an airflow reduction of $\geq 30\%$ with $\geq 3\%$ oxyhemoglobin desaturation or an arousal (3%ODA).¹ Against the 3%ODA rule, the 4%OD rule demonstrated a sensitivity of 82.7% (95% CI 0.72–0.90) and specificity of 93.2% (95% CI 0.82–0.98).¹ The differences in AHI using the 2 criteria diminished with increasing OSA severity,¹ suggesting that with increasing OSA severity the majority of respiratory events are associated with $\geq 4\%$ oxyhemoglobin desaturation.

In the same issue I have reported a patient with posttraumatic stress disorder (PTSD),² a disorder associated with sympathetic activation, who underwent serial HSAT² (data from 22 HSAT were reported earlier²) and demonstrated a marked variation in her AHI.² The AHI in this patient² was recalculated using both the 3%ODA and 4%OD criteria. As expected, the 3%ODA criteria (which includes a lower oxyhemoglobin desaturation cutoff and arousals) yielded a higher AHI score with a mean \pm standard deviation difference (AHI3%ODA–AHI4%OD) in AHI scores of 4.56 ± 1.54 events/h (range 2–7.10 events/h). The difference score (AHI3%ODA–AHI4%OD) did not correlate significantly with OSA severity however correlated inversely with both the number of awakenings per hour (Pearson $r = -.460$, $P = .031$) and mean pulse rate during sleep (Pearson $r = -.436$, $P = .043$),² which are measures of sympathetic activation and resultant sleep fragmentation, and likely represent the culmination of several factors including bilateral interactions between OSA severity and underlying level of autonomic activation in the patient. It is conceivable that the underlying state of sympathetic activation which contributed to the variation of AHI was also associated with more arousals which further contributed to a higher AHI with the 3%ODA versus the 4%OD

rule; however, above a certain level of sympathetic activation there was greater ($\geq 4\%$) oxyhemoglobin desaturation with most apneas, resulting in a lower discrepancy in the AHI calculation using the 3%ODA versus 4%OD rules. This could be a factor in other disorders (eg, cardiovascular disease) that are associated with OSA and sympathetic activation. A lower discrepancy in AHI scores obtained with the 3%ODA versus 4%OD criteria, may therefore indicate greater underlying sympathetic activation in the patient, which can have additional treatment implications.

CITATION

Gupta MA. Effect of varying definitions of hypopnea on the calculation of the apnea-hypopnea index may depend upon the level of sympathetic activation: results from a patient with posttraumatic stress disorder. *J Clin Sleep Med*. 2019; 15(10):1555.

REFERENCES

1. Mansukhani MP, Kolla BP, Wang Z, Morgenthaler TI. Effect of varying definitions of hypopnea on the diagnosis and clinical outcomes of sleep-disordered breathing: a systematic review and meta-analysis. *J Clin Sleep Med*. 2019;15(5):687–696.
2. Gupta MA. Rapid eye movement sleep percentage and duration in posttraumatic stress disorder vary dynamically and inversely with indices of sympathetic activation during sleep and sleep fragmentation. *J Clin Sleep Med*. 2019;15(5):785–789.

SUBMISSION & CORRESPONDENCE INFORMATION

Submitted for publication July 9, 2019

Submitted in final revised form July 18, 2019

Accepted for publication July 19, 2019

Address correspondence to: Dr. Madhulika A. Gupta, 585 Springbank Drive, Suite 101, London, Ontario, Canada, N6J 1H3; Phone: (519) 641-1001; Fax: (519) 641-1033; Email: magupta@uwo.ca; magupta365@gmail.com

DISCLOSURE STATEMENT

The author reports no conflicts of interest.