ANALYSIS AND PERSPECTIVES

JCSM
Journal of Clinical Sleep Medicine

http://dx.doi.org/10.5664/jcsm.3434

COMMENTARY

Breathing Related Arousals: Call Them What You Want, but Please Count Them

Commentary on Krakow et al. Frequency and accuracy of "RERA" and "RDI" terms in the Journal of Clinical Sleep Medicine from 2006 through 2012. J Clin Sleep Med 2014;10:121-124.

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I welcome the opportunity to comment on Krakow et al.'s discussion of the use of RERAs and RDI in general and, specifically, as reported on in manuscripts published in the *Journal of Clinical Sleep Medicine*.[1] The authors make several very salient points about the confusing and contradictory terminology in the American Academy of Sleep Medicine (AASM) scoring manual, in CMS definitions, in the ICSD-2, and in the sleep literature. But while the authors are discussing RERAs and RDI, the real issue relates to a garbled hypopnea definition and outcomes for patients with sleep disordered breathing syndromes.

As the authors correctly point out, Dr. Guilleminault first described a phenomenon that we now frequently recognize in which a patient will have a disruption in their sleep, related to flow-limited breathing that does not result in a significant drop in oxygen saturation levels.[2] This finding was noted when they used esophageal pressure probes that demonstrated increased respiratory effort as the likely cause of the arousal. Indeed, it has been shown that arousals from sleep in the setting of disrupted breathing are most likely to be related to respiratory effort, not hypoxemia or hypercapnia.[3] Subsequently, Rapoport et al. developed a more responsive airflow sensor (NCPT) that uncovered these events without the need for a semi-invasive probe.[4] But the authors of this commentary should be careful not to confuse the event (a RERA) with the syndrome (UARS). When scoring sleep studies, RERAs are often seen mixed amongst other disordered breathing events but less frequently are they the only event that the patient suffers from. The controversy of whether to score or ignore RERAs stems from demonstrating that arousals and sleep disruption alone will result in adverse outcomes.

In my view, this controversy is more about what hypopnea definition to use—1A (1A definition—ALL of the following criteria are met: the peak signal excursions drop by ≥ 30% of pre-event baseline; the duration of the ≥ 30% drop in signal excursion is ≥ 10 seconds; and, there is a ≥ 3% oxygen desaturation from pre-event baseline or the event is associated with an arousal) or 1B (1B definition—ALL of the following criteria are met: the peak signal excursions drop by ≥ 30% of pre-event baseline; the duration of the ≥ 30% drop in signal excursion is ≥ 10 seconds; and there is a ≥ 4% oxygen desaturation from pre-event baseline).[5] If everyone (physicians, insurance companies, equipment manufacturers) would agree on the 1A definition, the vast majority of ambiguity would disappear. There would be very little need to score RERAs, as most of those events would be scored as hypopneas (reduced airflow/flow limitation terminating in an arousal). If there was still a desire or need to discern which type of outcome was present for individual events (arousal, oxygen desaturation, or both), the report can also generate the oxygen desaturation index (ODI). The issue about percent drop in signal excursion could be controversial, but this change would still include the vast majority of events—and we all know that the percent reduction in such a signal is difficult to accurately estimate.

With regards to the problems with RDI in the manuscripts—I would be very interested to know how many of the manuscripts utilize the "Chicago Criteria" scoring of hypopneas.[6] I suspect that most manuscripts use this criteria which is either a clear decrease (> 50%) from baseline in the airflow amplitude, or a clear amplitude reduction of a validated measure of breathing during sleep that does not reach the 50% but is associated with either an oxygen desaturation of ≥ 3% or an arousal. I am guessing most manuscripts use this criteria which is recommended for scoring research studies and will, for the most part, include arousal associated breathing events but still be considered in the AHI.

In addition, the authors here correctly point out that on one hand the rules state scoring RERAs or 1A hypopneas are "optional" (as of August 27, 2013, per the AASM, it is "acceptable" to use the 1B rule),[7] but then clearly recommend that when you are titrating CPAP, those events (that you may or may not score) should be eliminated for the "ideal" pressure. This is quite contradictory.

I applaud the authors for pointing out these inconsistencies in policy. The most recent revision of the respiratory rules in 2012 suggested that the 1A definition be used, but the field is still somewhat "hamstrung" by the CMS definition that does not include arousals and requires a 4% desaturation.[8] We as healthcare providers are in the position to provide what we believe is the right care for our patients; the Sleep Apnea Definitions (SAD) Taskforce recommended the 1A definition which includes arousals because they felt the evidence was strong enough based on studies demonstrating improved consistency in scoring arousals with the current montages, distressing symptoms that are associated with the sleep fragmentation,

improvement in those symptoms in patients treated with PAP, and an association with hypertension related to arousals and sympathetic nervous system activation.

I agree with Dr. Krakow et al. that the field needs to be consistent; let the science determine the right care for patients. The AASM should make a strong case to CMS and other insurers that the 1A definition is the right one based on the SAD Taskforce recommendations. This will go a long way to reduce the ambiguity in our polysomnography scoring, CPAP titrations, and patient management.

CITATION

Collop N. Breathing related arousals: call them what you want, but please count them. *J Clin Sleep Med* 2014;10(2):125-126.

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Submitted for publication January, 2014
Accepted for publication January, 2014
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DISCLOSURE STATEMENT

Dr. Collop has indicated no financial conflicts of interest.