

Podcast of the Journal of Clinical Sleep Medicine

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Welcome to the regular podcast of the *Journal of Clinical Sleep Medicine*. I am Dr. Stuart Quan, editor of the *Journal*. These podcasts are a regular feature of each issue of the *Journal* and can be downloaded at the *Journal's* website. Each podcast features summaries of important articles published in the current issue of the *Journal*, as well as occasional interviews with authors of these papers.

The first article to be highlighted in this podcast is entitled, "Pediatric Periodic Limb Movement Disorder: Sleep Symptom and Polysomnographic Correlates Compared to Obstructive Sleep Apnea," by Dr. Jeannine L. Gingras and colleagues from the University of North Carolina in Charlotte, NC and the University Illinois School of Medicine and Carle Foundation Hospital in Urbana, IL. Periodic limb movements in sleep are commonly observed on polysomnography in association with a number of conditions, including restless legs, narcolepsy and obstructive sleep apnea. However, the prevalence and clinical impact of periodic limb movement disorder, especially in children, is unknown. In contrast to periodic limb movements in sleep, periodic limb movement disorder is considered present when there are periodic limb movements in sleep, symptoms of a clinical sleep disturbance, and absence of another primary sleep disorder. This paper is a retrospective case series of children and adolescents with periodic limb movement disorder who were referred to a sleep medicine practice. They were evaluated by clinical examination, polysomnography and parent completion of a pediatric sleep questionnaire. The authors found that 66 of 468 consecutive children evaluated over a two year period were diagnosed with periodic limb movement disorder, which equates to a prevalence rate of 14%. 58% of the cases were boys, with an average age of eight years. In addition, in comparison to African-American children, Caucasian children were more likely to have periodic limb movement disorder than African Americans with the prevalence rate being 49% versus 26%. In comparison to children who had obstructive sleep apnea, children with periodic limb movement disorder were more likely to complain of difficulty falling and staying asleep, kicking in sleep, leg discomfort, parasomnias and a family history of restless leg syndrome. Periodic limb movement disorder children also were more likely to wake up and go to the parents' bed, talk in their sleep, wake up from nightmares, have frightening dreams and have episodes of screaming with difficulty to waken. In contrast, children with obstructive sleep apnea were more likely to have witnessed apnea and enuresis. Interestingly, daytime sleepiness was not different between the two groups. On polysomnography, in comparison to children

with obstructive sleep apnea, children with periodic limb movement disorder had more awakenings at night, as well as slightly more Stage 1 sleep. They also had more stage shifts and greater Stage 1 shifts. Interestingly, the overall arousal index, however, was greater in those with obstructive sleep apnea.

The authors conclude that this case series supports the presence of periodic limb movement disorder as a distinct pediatric sleep disorder with important clinical and polysomnographic correlates. The authors suggest that clinicians consider a diagnosis of periodic limb movement disorder during a pediatric sleep assessment and urge them not to dismiss the presence of periodic limb movements in sleep as an incidental polysomnographic finding.

The next paper to be reviewed in this podcast is entitled, "The Effects Of Altitude-Associated Central Sleep Apnea on the Diagnosis and Treatment of Obstructive Sleep Apnea: Comparative Data from Three Different Altitude Locations in the Mountain West." The authors are Dr. James F. Pagel and colleagues from the Department of Family Medicine, University of Colorado School of Medicine and Rocky Mountain Sleep Disorders in Pueblo, CO. Previous studies have demonstrated that central sleep apnea occurs in most normal individuals with ascent to altitude. It is unclear how the increased prevalence of central sleep apnea at high altitudes impacts the diagnosis and treatment of patients with obstructive sleep apnea. In this study, patients undergoing evaluation for obstructive sleep apnea at sleep disorders laboratories at three different altitudes were studied. The three locations' altitudes were 4,662 feet (1,421 meters), 5,930 feet (1,808 meters) and 7,100 feet (2,165 meters). The patients were all adults between the ages of 40-79 years and had undergone a split-night polysomnogram between 2007 and 2009. The split-night protocol differed from standard procedures in that supplemental oxygen was administered if there were significant amounts of central apnea observed during the CPAP titration. The CPAP titration protocol utilized in the study can be found in the online appendix for this paper which is located on the *Journal's* website.

There were 150 patients evaluated at both of the sites at the lower two altitudes and 142 patients at the site at the highest altitude. The development of central sleep apnea during the CPAP titration increased as a function of site altitude. It was 4.8 events per hour at the lowest-altitude site and then increased to 9.79 events per hour and 19.25 events per hour at the highest two sites, respectively. The authors noted that the need for repeat CPAP titration also increased as a function of altitude. At the lowest-altitude site the repeat-titration rate was 2.7% but was 10.7% at the highest-altitude site.

Using their unique CPAP-titration protocol, the authors found that 55 of 107, or 51%, of patients attained a satisfactory titration on their initial split-night protocol. In addition, 20 of 24 patients returned for a repeat CPAP titration and had a satisfactory result. Excluding patients that did not return, as recommended, for a repeat titration, the authors noted that a satisfactory titration was attained using their protocol in 75 of 79 (95%) of patients.

The authors conclude that development of central sleep apnea during CPAP titration is quite common at high altitudes. This leads to difficulty with positive airway pressure treatment. However, an alternative CPAP protocol utilizing oxygen appears to offer the promise of a better CPAP titration result.

The third paper to be highlighted in this podcast is entitled, "Zolpidem Ingestion, Automatism, and Sleep Driving: A Clinical and Legal Case Series," by Dr. J. Stephen Poceta from the Division of Neurology at Scripps Clinic in La Jolla, CA. Complex automatic behavior has been a known problem after ingestion of zolpidem. This case series describes automatic behavior and sleep driving after zolpidem ingestion and the clinical and legal ramifications associated with these behaviors. The author describes eight clinical cases and six legal consultations. In the clinical cases, four of the cases involved ingestion of zolpidem accidentally during the daytime but in three of the cases, the patient took their usual nighttime dose. Automatic behavior, confusion, amnesia, sleep driving, sleep eating and sleep walking were described. All of the legal cases involved sleep driving, for which the defendants were being prosecuted for possible felony driving-under-the-influence of alcohol charges. In some of the cases, other medications such as marijuana, alcohol and diphenhydramine were also involved. In most of the cases, as a result of the author's testimony, charges were reduced or the defendant was acquitted.

The paper cites five manifestations of Zolpidem-associated complex behaviors. They are: 1) poor motor control, dysarthria and ataxia; 2) responsiveness to the environment, apparent wakefulness to observers; 3) confusional ideation and irrational speech; 4) impaired or absent memory for the time period usually lasting three to five hours (antegrade amnesia); 5) onset and offset of symptoms over one to six hours. The author also emphasizes that there are potential risk factors for zolpidem-associated automatism and parasomnias. They include concomitant ingestion of alcohol or sedating medications, concomitant sleep disorders such as sleep apnea or periodic limb movements in sleep, a history of parasomnia, sedative hypnotic ingestion at times other than habitual bedtime, sedative hypnotic ingestion during an agitated state with decreased likelihood of sleep,

sedative hypnotic ingestion when sleep deprived, poor management of pill bottles and living alone. The authors suggest that clinicians should better understand and assess risk factors for zolpidem-associated complex behaviors.

The final article to be summarized in the podcast is entitled, "A Novel Therapy for REM-Sleep Behavior Disorder (RBD)," by Dr. Michael Howell and colleagues from the Department of Neurology, Department of Medicine, and Department of Psychiatry at the University of Minnesota in Minneapolis, MN. In REM-sleep behavior disorder, patients enact their dreams frequently through exhibiting punching- or kicking-type behavior with the possibility of personal injury or injury to their bed partner. The most common treatment is the use of clonazepam, but this is not always effective. In addition, clonazepam has a long half-life and can lead to daytime sedation, cognitive impairment and increased risk of falls. Although melatonin has recently been found to have some benefit, other therapies are needed for treatment of this sleep disorder. In this study, four consecutive patients with REM-sleep behavior disorder with continued symptoms despite treatment with clonazepam and melatonin were fitted with a customized, pressurized bed alarm. The alarm functioned by sensing when the patient either got out of bed or moved enough to initiate the alarm. When that occurred, a recorded voice emanated from a bedside speaker, calmly asking the patient to go back to sleep. The authors found that in all four patients, the frequency of nocturnal dream enactment events declined markedly and in three of the patients they appeared to resolve completely. Thus, it appears that this form of therapy may have potential in treating patients who are not responsive to conventional medical therapy for REM-sleep behavior disorder.

I would also like to call the listener's attention to two editorials in this issue of the *Journal* related to the future of sleep medicine. Both editorials address the issue of increasing use of portable monitoring to diagnose obstructive sleep apnea and the impact of this practice in clinical care and the practice of sleep medicine. The first editorial is by Dr. Alan Pack, entitled "Sleep Medicine: Strategies for Change," and the second is entitled "The Future of Sleep Medicine: Will You Be Part Of It?" by Drs. Nancy Collop and Samuel Fleishman, who are the current president and president-elect of the American Academy of Sleep Medicine.

This concludes the regular podcast of the *Journal of Clinical Sleep Medicine*. The listener is encouraged to read the contents of the *Journal* for additional information regarding each of the articles summarized in this podcast, as well as other papers published in this issue of the *Journal*.