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Video-Clinical Corners

Head jerks during sleep in a patient with obstructive sleep apnea

Jung-Ah Lim [a], Jin-Sun Jun [b, f], Tae-Won Yang [c], Byeongsu Park [d], Keun Tae Kim [e], Ha Eun Lee [f], Sang Kun Lee [f], Ki-Young Jung [f, *]

[a] Department of Neurology, Kangnam Sacred Heart Hospital, Hallym University College of Medicine, Seoul, South Korea
[b] Department of Neurosurgery, Seoul National University Hospital, Seoul, South Korea
[c] Department of Neurology, Gyeongsang National University Changwon Hospital, Gyeongsang National University School of Medicine, Changwon, South Korea
[d] Department of Neurology, Ulsan University Hospital, Ulsan University College of Medicine, Ulsan, South Korea
[e] Department of Neurology, Keimyung University Dongsan Medical Center, Daegu, South Korea
[f] Department of Neurology, Seoul National University Hospital, Seoul, South Korea

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1. Introduction

Head jerks during rapid eye movement (REM) sleep are common [1,2]. Although the mechanism is unclear, it is assumed to be physiologic because they occur frequently [1,2]. Various movements can occur during sleep, many of which are considered normal physiologic movements or normal variants thereof [3]. However, they may be associated with obstructive sleep apnea (OSA) and resolved by continuous positive airway pressure (CPAP) treatment [4–6]. Leg cramps (ie, a sleep-related movement disorder) are also relieved by CPAP treatment when accompanied by OSA [7,8]. Here, we report a case of head jerks associated with

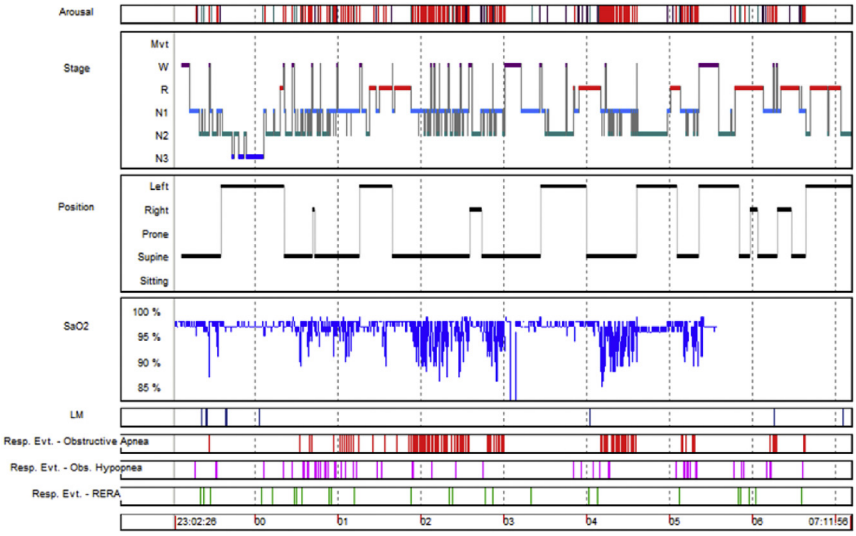

Fig. 1. The hypnogram of the patient.

* Corresponding author. Department of Neurology, Seoul National University Hospital, 101 Daehak-ro, Jongno-gu, Seoul, 03080, South Korea. Fax: +82 2 3672 7553.
E-mail address: jungky@snu.ac.kr (K.-Y. Jung).

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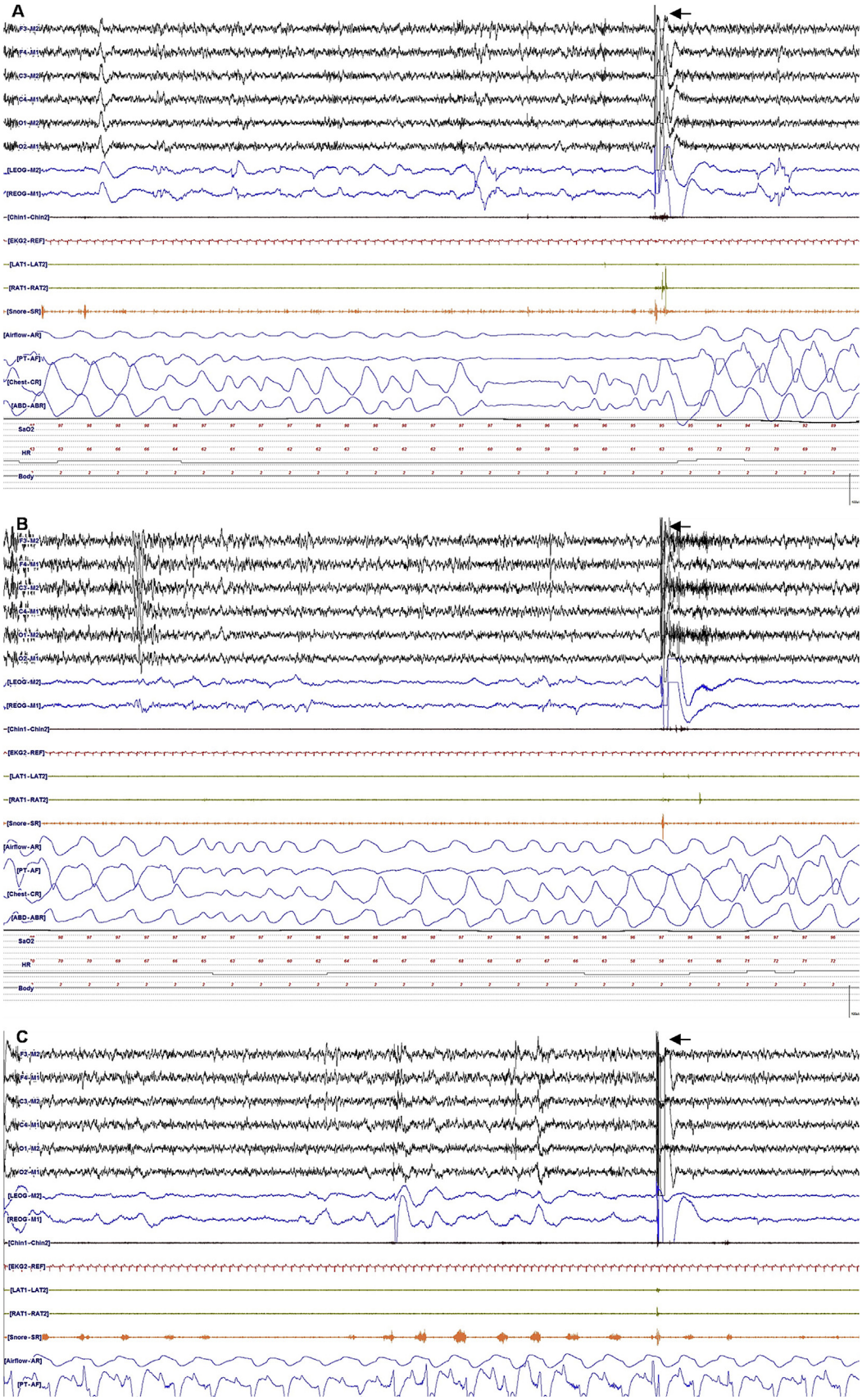

Fig. 2. Head jerks associated with respiratory events. These images represent a 90-s excerpt from overnight polysomnography. Neck jerks appear as short, striped, movement-induced electroencephalogram artifacts (arrows) [1]. The movements were associated with the following respiratory events: (A) apnea, (B) hypopnea, and (C) paradoxical breathing pattern with inspiratory airflow limitation.

respiratory events and paradoxical breathing with inspiratory airflow limitation successfully treated with CPAP.

2. Case description

A 23-year-old man without any past medical history presented with jerking movements of the head during sleep. Two months previously, his parents observed his head turning suddenly to the left or right during sleep. The patient and his parents denied any sleep-related vocalization or dream-enactment behaviors. He complained of excessive daytime sleepiness (EDS), with an Epworth Sleepiness Scale (ESS) score of 13, in addition to the reported snoring and apnea. He was not obese, had a body mass index of 22.1 kg/m^2, and had a small, receding jaw. The rest of the physical examination was unremarkable.

3. Video analysis

The patient underwent diagnostic polysomnography (PSG) for evaluation of the abnormal movements during sleep and sleep apnea. He had an Apnea/Hypopnea Index (AHI) of 21.6, an arousal Index of 27.4, and an oxyhemoglobin saturation nadir of 85% (Hypnogram, Fig. 1). The patient had moderate snoring and a paradoxical breathing pattern. Video recording and PSG revealed jerking movements of the neck, causing sudden turning of the head (Video). During his total sleep period, 75 head jerks were observed. The head jerk index (HJI), defined as the total head jerks per hour of total sleep time, was 10.3. The HJI during REM sleep was 23.9 and that during non-REM sleep was 5.8. Most movements were associated with respiratory events. Of the 75 head jerks, 24 (32.0%) followed apnea (Fig. 2A, Video), hypopnea (Fig. 2B, Video), or respiratory-effort-related arousal (RERA); whereas 39 (52.0%) linked to a paradoxical breathing pattern with inspiratory airflow limitation (Fig. 2C, Video). REM sleep without atonia was not observed.

The second PSG for CPAP titration showed dramatically reduced abnormal movements. With 8 cm of water, the apnea, hypopnea, and RERA were resolved, but snoring, paradoxical breathing, and head jerks were not completely eliminated. The patient had a total of 27 head jerks with an HJI of 3.0 and AHI of 3.7. After CPAP treatment, the movement frequency decreased and EDS improved.

Supplementary video related to this article can be found at https://doi.org/10.1016/j.sleep.2019.02.013.

4. Brief discussion

Although head jerks are considered physiologic motor events because they are common during REM sleep [1,2], excessive events may be the result of a pathologic condition. In a study analyzing head jerks in a sleep disorder cohort, the movements were present in 54.6% of patients but were considerably rare during non-REM sleep; the mean HJI was 0.04 ± 0.1 [1]. A study of healthy participants showed the median HJI of 2 (range 0.7–41.2, 90th percentile 8.8) [2]. Our patient had a high HJI of 10.3 during total sleep and 23.9 during REM sleep. Furthermore, he had movements frequently during non-REM sleep, with an HJI of 5.8.

Increased respiratory effort might have triggered the head jerks in this patient. The sternocleidomastoid (SCM) muscles rotate the head to the opposite side and assist inspiration as an accessory muscle of respiration. The SCM muscles are not active during quiet respiration and are only employed during maximal forced inspiration [9]. In this case, 52.0% of head jerks developed during paradoxical movement without definite arousal or hypoxemia. Therefore, increased respiratory effort might have triggered activation of the SCM muscles and induced head jerks. Previous studies have suggested an association between respiratory-related movements and respiratory arousal [4–6]. Arousal may have triggered the head jerks in our patient, but the relationship between arousal and head jerks in our patient was not evaluated because of movement artifacts in the electroencephalogram.

This is the first case of head jerks associated with obstructive respiratory events resolved by CPAP treatment. Head jerks are common motor events during REM sleep, but could be related to pathologic disorders when occurring frequently. Increased respiratory effort or RERA might have triggered the head jerks in our patient. Finally, additional studies are needed to determine the mechanism of head jerks and their relationship with respiratory events.

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Conflict of interest

The ICMJE Uniform Disclosure Form for Potential Conflicts of Interest associated with this article can be viewed by clicking on the following link: https://doi.org/10.1016/j.sleep.2019.02.013.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.sleep.2019.02.013.

References

[1] Frauscher B, Brandauer E, Gschliesser V, et al. A descriptive analysis of neck myoclonus during routine polysomnography. Sleep 2010;33:1091–6.
[2] Frauscher B, Gabelia D, Mitterling T, et al. Motor events during healthy sleep: a quantitative polysomnographic study. Sleep 2014;37:763–73. 73a–73b.
[3] Kryger MH, Roth T, Dement WC. Principles and practice of sleep medicine. 6th ed. Philadelphia, PA: Elsevier; 2016.
[4] Hoque R, DelRosso LM. Nocturnal hypermotor activity during apnea-related arousals. J Clin Sleep Med 2016;12:1305–7.
[5] Okura M, Tanaka M, Sugita H, et al. Obstructive sleep apnea syndrome aggravated propriospinal myoclonus at sleep onset. Sleep Med 2012;13:111–4.
[6] Gharagozlou P, Seyffert M, Santos R, et al. Rhythmic movement disorder associated with respiratory arousals and improved by CPAP titration in a patient with restless legs syndrome and sleep apnea. Sleep Med 2009;10:501–3.
[7] Westwood AJ, Spector AR, Auerbach SH. CPAP treats muscle cramps in patients with obstructive sleep apnea. J Clin Sleep Med 2014;10:691–2.
[8] Reddy PL, Grewal RP. Resolution of muscle cramps and fasciculations with treatment of sleep apnea. J Clin Neuromuscul Dis 2009;11:66–7.
[9] Campbell EJ. The role of the scalene and sternomastoid muscles in breathing in normal subjects; an electromyographic study. J Anat 1955;89:378–86.