Comparison between REM-related and positional obstructive sleep apnea

Hyun-Woo Kim, Ji Ye Jeon, Yong Seo Koo, Sang-Ahm Lee

Department of Neurology, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea

Abstract

Purpose : To document the clinical characteristics of REM-related obstructive sleep apnea (OSA) and supine-only OSA and identify the effects of sleep state and posture in each subtype.

Method : In this cross-sectional study, we evaluated 967 OSA adults. REM-related only OSA was defined as : 1) an overall AHI ≥ 5 /h, 2) a AHI REM to AHI NREM ratio >2, 3) a AHINREM < 15 /h regardless of positional tendency, and 4) not fulfill the criteria of positional OSA. Positional -only OSA was defined as 1) overall AHI ≥ 5 /h, 2) supine AHI to non-supine AHI ratio > 2, 3) non-supine AHI < 15 /h , and 4) not fulfill the criteria of REM-related OSA. And, fitting to both the criteria of REM-related and positional OSA was REM-related with positional OSA subtype. To compare demographic, clinical, and polysomnographic features among the three subtypes of OSA.

Result : Of the 967 patients, 36 (5.7%) and 460 (73.2%) fulfilled the criteria for REM-related only and positional only OSA. REM-related only OSA had higher proportions of women (38.9%) and BDI scores ≥ 10 (63.9%). Patients with positional only subtype had the most severe sleep apnea and the worst sleep architecture. In patients with REM-related only OSA, the effects of sleep posture were larger during REM sleep, and the effects of sleep state were also larger during supine sleep. However, in positional-only OSA, the postural effects regardless of sleep state were larger than the sleep state effects.

Conclusion : REM-related only OSA, positional only OSA and REM-related with positional OSA subtype have different clinical characteristics. The effects of sleep state and posture were similar in REM-related OSA. However, the effects of sleep posture were significantly larger than the sleep state effects in positional OSA.

Image

- Table 1. Comparisons of demographic, clinical, and polysomnographic findings among OSA subtypes depending on sleep state and posture

	REM related only (n=36)	REM + Positional (n=132)	Positional only (n=460)	p value
Female, n (%)	14 (38.9)	50 (37.9)	79 (17.2)	< 0.001
Age, year, mean (SD)	48.3 (11.6)	50.3 (10.1)	52.2 (11.6)	0.078
BMI, Kg/m^2, mean (SD)	27.3 (3.2)^b	25.1 (3.2)^a	25.2 (3.1)^a	0.001
Hypertension, n (%)	9 (25.0)	43 (32.6)	149 (32.4)	0.650
Type 2 diabetes, n (%)	4 (11.1)	7 (5.3)	40 (8.7)	0.361
ESS, mean (SD)	9.6 (5.6)	9.6 (5.5)	9.1 (5.2)	0.551
ESS ≥ 11, n (%)	15 (41.7)	53 (40.2)	159 (34.6)	0.388
BDI, mean (SD)	13.1 (8.7)	10.3 (6.8)	9.8 (7.3)	0.026
BDI ≥ 10, n (%)	23 (63.9)	68 (51.5)	200 (43.5)	0.025
STAI-S, mean (SD)	42.6 (10.7)	41.1 (10.2)	39.8 (10.1)	0.146
STAI-S ≥ 40, n (%)	22 (61.1)	70 (53.0)	236 (51.3)	0.412
SPI-2, mean (SD)	40.9 (19.6)	35.0 (18.2)	33.1 (16.7)	0.024
SF-36, mean (SD)	62.8 (22.9)	69.7 (18.5)	72.2 (18.4)	0.103
AHI, /h, median (IQR)	14.4 (9.7, 14.7)^a	12.7 (8.0, 15.2)^a	23.5 (15.8, 31.7)^b	< 0.001
5 ≤ AHI < 15, n (%)	19 (52.8)	97 (73.5)	103 (22.4)	< 0.001
15 ≤ AHI < 30, n (%)	17 (47.2)	33 (25.0)	219 (47.6)	
AHI ≥ 30, n (%)	0 (0)	2 (1.5)	138 (30.0)	
RDI, /hr, median (IQR)	21.8 (17.7, 27.1)^a	18.4 (13.8, 21.8)^a	30.0 (23.1, 38.4)^b	< 0.001
MinO$_2$Sat, %, median (IQR)	82.9 (78.0, 86.0)	84.0 (81.5, 88.0)	83.6 (79.0, 87.0)	0.065
ODI, /h, median (IQR)	13.5 (8.7, 16.8)^a	9.9 (6.1, 13.1)^a	18.7 (12.1, 27.8)^b	< 0.001
Sleep architecture				
Total sleep time, min, mean (SD)	349 (43.2)	356.5 (47.7)^b	342.0 (46.1)^a	0.009
N1 sleep, %, mean (SD)	20.4 (8.3)^a	18.8 (7.6)^a	29.8 (12.4)^b	< 0.001
N2 sleep, %, mean (SD)	47.0 (8.4)	50.6 (9.6)^b	45.1 (10.2)^a	< 0.001
N3 sleep, %, median (SD)	13.1 (7.3)^b	11.6 (8.8)^b	5.5 (0.6, 13.0)^a	< 0.001
REM sleep, %, mean (SD)	19.6 (6.1)	18.9 (5.2)^b	17.4 (5.9)^a	0.006
Sleep latency, min, median (IQR)	6.6 (1.2, 6.1)	7.1 (1.7, 7.4)	4.0 (2.0, 8.4)	0.800
Sleep efficiency, %, median (IQR)	89.4 (84.3, 97.6)	89.6 (86.3, 96.0)	90.5 (83.3, 95.4)	0.085
WASO, min, median (IQR)	35.7 (7.8, 53.3)	35.2 (12.0, 48.5)	29.4 (13.0, 55.2)	0.243

$^{a, b, c}$a statistically different set by Duncan's new multiple range test or Mann-Whitney U test with the Bonferroni correction, where in ea ch subset means have been found not to be significantly different from one another

Table 2. Effects of sleep state and posture on sleep apnea in the OSA subtypes (n=647)

Subtypes of OSA	AHI differences between supine and nonsupine posture, /h, median (IQR)		p value	AHI differences between REM and NREM sleep, /h, median (IQR)		p value
	REM sleep	NREM sleep		Supine sleep	Nonsupine sleep	
REM related only (n=30)	22.1 (12.4, 34.3)	3.8 (0.5, 7.7)	<0.001	41.5 (33.1, 51.0)	23.1 (11.1, 36.8)	<0.001
Positional only (n=292)	38.1 (23.9, 54.1)	33.1 (20.5, 44.1)	<0.001	8.8 (-3.3, 25.1)	3.8 (-1.5, 7.0)	<0.001
REM + Positional (n=110)	35.4 (23.5, 46.8)	11.5 (4.8, 15.5)	<0.001	30.7 (23.1, 39.1)	6.8 (0.0, 10.6)	<0.001

$^{a, b, c, d}$a statistically different set by Wilcoxon signed-rank test , where in each subset means have been found not to be significantly diff erent from one another

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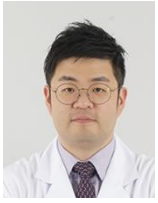
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Biography

Hyun-woo Kim is majoring in sleep and epilepsy in Seoul Asan Medical Center for fellow ship.
This is 2nd year for fellow ship, and he involved many study about sleep disorder and epilepsy with his colleague.

Email: hwkim24@gmail.com
Phone Number: +821050243176
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Notes/Comments: