

폐쇄성 수면무호흡증이 주기성 사지운동증에 미치는 영향

The Effects of Obstructive Sleep Apnea Syndrome on Periodic Limb Movements in Sleep

서천석¹ · 윤 탁¹ · 김의중² · 정도연¹

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■ ABSTRACT

Objectives: Periodic limb movements in sleep (PLMS) is a moderately prevalent disorder, of which pathophysiology remains largely unknown. PLMS has been reported to be common in patients with obstructive sleep apnea syndrome (OSAS), but reports on their relationship have been inconsistent in previous studies. Inconsistency of results may be attributable to insufficient number of the study subjects. We attempted to explore the influence of OSAS on PLMS in a large number of subjects.

Methods: Three hundred and twenty subjects (M : F = 192 : 128) with PLMS, as identified by the nocturnal polysomnography, were studied. Sample mean age was 53.1 (SD = 15.1) years and their mean periodic limb movement index (PLMI) is 25.2/hr (SD = 24.8). PLMS subjects were divided into two groups, based on the presence or absence of OSAS. Periodic limb movement indices and sleep parameters between two groups were analyzed to evaluate the effects of OSAS on PLMS.

Results: Each of PLMI and PLMI with arousal (PLMAI) correlated positively with age. PLMI of men was larger than that of women ($p < 0.01$). The presence of comorbid OSAS independently had influence on PLMI ($t = -2.20, p < 0.05$), but not PLMAI. There were no significant differences between the two groups in their PLMI, PLMAI and sleep parameters. However, the two groups differed in PLMI - correlated sleep parameters. In PLMS subjects with comorbid OSAS, PLMI was negatively correlated with each of slow wave sleep time and REM sleep time. In subjects without comorbid OSAS, PLMI was negatively correlated with sleep efficiency.

Conclusion: PLMS patients with OSAS turned out to have increased PLMI than those without OSAS. We suggest that OSAS patients may have subtle autonomic arousals and these arousals could, in part, express themselves as PLM. *Sleep Medicine and Psychophysiology 2000 ; 7(1) : 34-42*

Key words: Periodic limb movements in sleep · Obstructive sleep apnea syndrome · Autonomic arousal.

서 론

(periodic limb movements in sleep, PLMS) 20 40

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가
가
0.5 5
4
4 90
(1,2). 5
가
1953 Symonds가
(nocturnal myoclonus)

Lugaresi가 12.2%,
3.5%
(restless legs syndrome)

Coleman (1) ndrome) (14).
12%
(periodic movements in sleep) 65 40%
(15).
(periodic leg movements in sleep)
(16).
(periodic limb movements in sleep, PLMS) apnea syndrome, OSAS)
(18)가 18%가
가
(sup - (16).
raspinal descending inhibitor pathway)

(3) (4,5) Ancoli - Israel (17)
(Apnea Index, AI)
PET (positron emission tomography) (Periodic Limb Movements Arousal Index, PLMAI)
SPECT (single photon emission computed tomography) (rs=0.05). Hening (18)
D₂ - subtype 가
(striatum) (6,7). 가
가 20 40 가 (19-
가 21) 가
가 (8). (nasal continuous positive airway pressure, nCPAP,
(22)
(9,10). (23,24).
가
L - dopa bromocriptine (dopaminergic agonist) propoxyphene, oxydocone
(11 - 13)
11 가 50
5,000

(ASDA) (2,26)가

1 (periodic limb movement index, PLMI) (arousal) 2 K complex가 6 1

1. 연구대상 1996 2 2000 5 320

2. 연구방법 Grass model 78(Grass Instrument Co., USA) 10 20 (obstructive apnea) (oronasal airflow) (respiratory efforts) (hypopnea) 10 C3/A2, O1/A2, O2/A1, (outer) 가 10 50% (ap-nea index, AI) (respiratory disturbance index, RDI) 가 (thermocouple) 5 (modified lead II position) (Ohmeda®) 3. 통계분석 (sleep parameter) independent t- (one-way ANOVA) (EEG), (EOG), (chin EMG), (ECG), (breathing sound), (oral and nasal air flow), (chest movement), (abdominal movement), (limb movement), (arterial oxygen saturation) 가 (multivariate analysis of variance) (linear regression analysis) SPSS 10.0 for windows p<0.05(two-tailed) (PSDENT 1.2, Stanford, 1988) (25) (REM) Profox™(PROFOX Associates, Inc., 1994) 가 320 가 192 (60.0%),

가 128 (40.0%) , 53.1 , PLMI 가 (t = 15.1 . 5 86 . 3.121, p<0.01). , 가 60 125 (39.1%), 20 10 (3.1%) . . 149 (46.6%) , 17 (5.3%) , 4 (1.3%) (2). 가 (t = PLMI 25.2 (SD = 24.8) (t = 1.99, p<0.05) (t = PLMAI 3.4 (SD = 6.3) . 3.04, p<0.01) 가 . 80.7%(SD = 13.5) 14.7% (SD = 6.3) . 2.9%(SD = 6.1) . 가 18.9 (SD = 25.4), 126.9 (SD = 83.2) (1).

2. 전체 연구대상자의 연령, 성별과 주기성 사지운동 지표, 수면 지표간의 연관성

PLMI(r = 0.23, p<0.001), PLMAI(r = 0.12, p<0.05)

PLMAI가 가 PLMI 가

3. PLMI, PLMAI에 기여하는 변인

PLMI , , (t = 4.35, p<0.001)

(t = - 3.66, p<0.001),

(t = - 2.20, p<0.05)가 PLMI

(r = - 0.28, p<0.01), (r = - 0.48, p<0.01). 가 (r = 0.14, p<0.05).

PLMI PLMAI 가

PLMI가 PLMAI (t = - 1.07, p<0.05)

가 PLMI, PLMAI

Table 1. PLMS- and sleep-related parameters of the study subjects(n = 320)

	Mean	SD
PLMI	25.24	24.83
ARI	14.35	16.88
PLMAI	3.41	6.25
SE	80.67	13.52
SL	18.93	25.43
SWS	2.88	6.06
REM	14.66	6.32
REML	126.89	83.16

PLMS : periodic limb movements in sleep
 PLMI : periodic limb movement index, number of periodic limb movements per hour of sleep
 ARI : percentage of PLMS with arousal/total number of PLMS(%)
 PLMAI : number of periodic limb movements with arousal per hour of sleep
 SE : sleep efficiency, percentage of total sleep time/time in bed(%)
 SL : sleep latency(min)
 SWS : percentage of total slow wave sleep/sleep period time(%)
 REM : percentage of total REM sleep/sleep period time(%)
 REML : REM latency(min)

Table 2. Comparison of periodic limb movement indices and sleep parameters between male and female subjects

	Male(n = 192)		Female(n = 128)		†
	Mean	SD	Mean	SD	
PLMI	28.4	28.7	20.5	16.5	3.12*
ARI	14.4	18.0	14.3	15.0	0.03
PLMAI	3.6	6.1	3.1	6.4	0.83
SL	16.5	22.2	22.6	29.4	1.99**
SE	80.2	13.7	81.3	13.3	0.73
SWS	2.0	6.0	4.1	6.0	3.04*
REM	14.2	6.1	15.4	6.5	1.73
REML	124.9	85.3	130.0	80.1	0.53

* : p<0.01, ** : p<0.05

See Table 1 for abbreviations

가 가 PLMI
 PLMI, PLMAI 가
 (mean SaO₂), (lowest SaO₂)
 가
 가

4. 병발질환 여부에 따른 분류 및 각 군간의 비교

가 (SaO₂ : F = 20.20 df = (2,313), p < 0.001 ; LO₂ : F = 36.94, df = (2, 313), p < 0.001).

가 (n = 150), 가 (n = 149) PLMI PLMAI Pearson
 가 PLMI
 PLMAI
 (4).
 3 PLMI
 PLMAI가 가 in -
 dependent t - 가

Table 3. Comparison of periodic limb movement indices and sleep parameters among the diagnostic subgroups

	PLMS subjects without OSAS (n = 150)	PLMS subjects with OSAS (n = 149)
PLMI	27.7 ± 2.0	24.1 ± 2.0
ARI	14.5 ± 1.4	14.2 ± 1.4
PLMAI	3.6 ± 0.5	3.3 ± 0.5
SL	22.2 ± 2.1	17.9 ± 2.1
SE	79.0 ± 1.1	81.1 ± 1.1
SWS	2.7 ± 0.5	2.5 ± 0.5
REM	14.8 ± 0.5	14.5 ± 0.5
REML	138.5 ± 6.5	128.9 ± 6.5
SaO ₂	96.8 ± 1.8	95.4 ± 2.3
LO ₂	90.5 ± 6.3	83.1 ± 9.4

OSAS : obstructive sleep apnea syndrome
 SaO₂ : mean peripheral blood oxygen saturation in sleep (%)
 LO₂ : the lowest peripheral blood oxygen saturation in sleep (%)
 See Table 1 for other abbreviations

(r = -0.19, p < 0.05 ; r = -0.17, p < 0.05).
 가
 (r = 0.18, p < 0.05). PLMAI
 가
 가 PLMI
 (r = -0.28, p < 0.01). PLMAI
 (r = -0.24, p < 0.01),
 (r = 0.17, p < 0.05).

Table 4. Pearson correlations between periodic limb movement indices and sleep parameters in study subjects (n = 299)

	SE	SL	SWS	REM	REML	
REML	PLMS subjects without OSAS (n = 150)	-0.092	0.071	-0.192*	-0.173*	0.182*
	PLMS subjects with OSAS (n = 149)	-0.283**	0.124	-0.023	-0.065	-0.104
	Total (n = 299)	-0.179**	0.111*	-0.140*	-0.131*	0.106
PLMAI	PLMS subjects without OSAS (n = 150)	-0.092	0.071	-0.192*	-0.173*	0.182*
	PLMS subjects without OSAS (n = 150)	-0.136	0.000	0.005	0.007	0.015
	PLMS subjects with OSAS (n = 149)	-0.241**	0.171*	-0.040	-0.130	-0.004

* : p < 0.05*, ** : p < 0.01
 OSAS : obstructive sleep apnea syndrome
 See Table 1 for other abbreviations

가

가

(r = -0.16, p < 0.05).

t-
PLMI, PLMAI 가 t-
가

고 찰

t- 가

가 (14,27).

가 가

가 가

가 . Espinar - Sierra (19)

50 가 가

PLMI가 (28)

가 PLMI가 가 . Nicholas (29) (2,28)

가

가 가 (36).

가 (29,30). Warnes (37)

(28) 가

PLMI , PLMAI
. Warnes (37) (n=42)

가

가

(31) 가

가 가

가 가 가 (32).

가 (21) Yamashiro Kryger(22)
가 가 14

가

가

Montplaisir (33)

Nicholas (29) 가 (23,24) 가 . Yamashiro

가 Kryger(22)

(23) Fry (38). 40

Fry (23) (20,21)

Mccall (36) 가 Parrino (39)

Droste (31) 가

(37) (supine position) 가 가

Fry (23) 가

가 가 가 가 가 가 가

가 (24) PLMI 가

가 가

Yamashiro Kryger(22)

PLMI 가 요약

배 경: 가

가 가 가

가

(au - 방 법: 320 (192 , 128) 53.1 (SD=15.1)

tonomic arousal)

가 150 ,
 가 149
 21 . ,

결 과: (perio -
 dic limb movement index, PLMI) 25.2(SD =
 24.8) (periodic limb mov -
 ement arousal index, PLMAI) 3.4 (SD =6.
 3) . PLMI PLMAI
 가 . PLMI가 (p<0.
 01)
 . PLMI , , ,
 (t = 4.35, p<0.001) (t = - 3.66, p<0.001),
 (t = - 2.20, p<0.05) PLMI
 (n = 150),
 (n = 149) PLMI, PLMAI
 가 .
 PLMI 가 .
 PLMI가

결 론:

중심 단어 :

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