528

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INFLUENCE OF OBSTRUCTIVE SLEEP APNOEA SYNDROME ON NOCTURNAL POLYURIA; THE SEVERITY OF SAS IS NOT CORRELATED WITH THE SEVERITY OF NOCTURNAL POLYURIA.

Hypothesis / aims of study

Obstructive Sleep Apnoea Syndrome (OSAS) and obesity are known to be the risk factors of nocturia. Several reports suggested that upper airway obstruction due to OSAS cause negative intrathoracic pressures. Increased venous return by negative pressures cause right atrial and ventricle strain which leads to atrial natriuretic peptide (ANP) and finally cause diuresis during night and this can be alleviated by continuous positive airway pressure (CPAP) A strong correlation between obesity and OSAS are already well recognized and recently the high prevalence of nocturia in obese people was reported.
The purpose of this study is to investigate how OSAS, obesity and lower urinary tract symptoms (LUTS), especially nocturia and nocturnal polyuria are related.

Study design, materials and methods

A total of 8 female and 35 male patients suspected of OSAS by were enrolled in this study.
LUTS and SAS related QoL were evaluated with patient questionnaire including Epworth Sleepiness Scale(ESS), Pittsburgh Sleep Quality Index (PSQI), Core lower urinary tract Symptom Score (CLSS), International Prostate Symptom Score (I-PSS), Over Active Bladder Symptom Score(OABSS) and OAB-q. The Frequency-voiding chart (FVC) and Overnight polysomnography was performed to evaluate apnoea-hypoxia index (AHI) which reflects the severity of SAS.
The severity of obesity and body water distribution was evaluated by body impedance analysis at the time of awakening and at bedtime.
Differences between groups were assessed by t-tests and Mann-Whitney U tests. Linear regression was used to assess factors associated with AHI.

Results

The mean age was 62.6±12.8. The mean AHI was 44.8±40.7. The BMI was correlated with AHI (R^2=0.34 p=0.0003). Among the 43patients, 20 were classified as moderate SAS (AHI 15~30) and 23 were classified as severe SAS (AHI >30).
There was no significant correlation with the AHI and urinary frequency and urinary volume.
The patient questionnaire representing LUTS severity had no significant relationship with the degree of OSAS, except of bother due to nocturia.
Of the PSQI questionnaire, question 5c is a bothersome score about sleep disturbance due to nocturia. The odds ratio (OR) for sleep disturbance due to nocturia in severe SAS group relative to moderate SAS group was 5.0 [95% confidence interval (CI) = 0.75-33.2, p=0.08].

Interpretation of results

Patients with severe OSAS had relatively higher a risk of being bothered by nocturnal frequency. However, there was a discrepancy between actual number of void during night time and bothersome scores for nocturia obtained by subjective questionnaires.

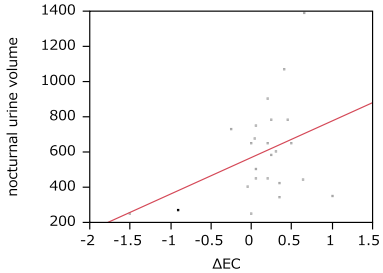
Concluding message

The severity of SAS was not correlated to the severity of nocturia and nocturnal polyuria despite the fact that self-assessment of bother score for nocturia was high in severe SAS patients .

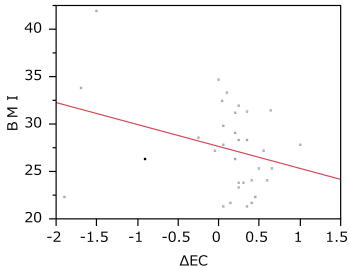
Table1. Result of body impedance analysis, FVC and self-assessment questionnaire

	AHI 15-30 (moderate OSAS)	*AHI>30 (severe OSAS)*	*P value*
Age	59.4±3.1	64.2±2.6	0.24
BMI	25.2±1.2	28.4±1.0	0.048*
ΔICF	0.78±0.72	0.68±0.59	0.91
ΔECF	0.17±0.18	-0.03±0.15	0.39
Daytime frequency	6.7±0.5	6.6±0.5	0.97
Nighttime frequency	1.58±0.3	1.07±0.3	0.22
Daytime urine volume	1212.1±116.0	962.3±122.1	0.15
Nighttime urine volume	770.0±126.3	565.0±131.9	0.28
24 hours urine production	1691.8±248	1050.3±231.9	0.07
PSQI Q.5c	1.75±0.3	2.5±0.3	0.09
CLSS Q.2	1.3±0.2	1.6±0.1	0.14
IPSS Q.7	1.4±0.3	1.9±0.3	0.25
OABSS Q.2	1.3±0.2	1.7±0.2	1.7
OAB-q Q.24	2.7±0.5	3.3±0.4	0.35
QOL score	2.6±0.4	3.5±0.3	0.12

Figure1. The association between extracellular fluid change in day and night (Δ ECF) and nocturnal urine volume and BMI.

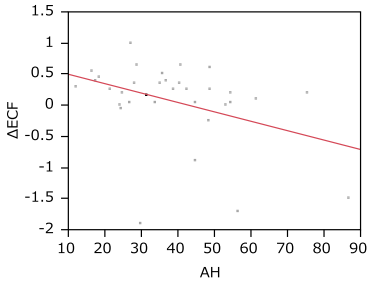


R^2=0.15

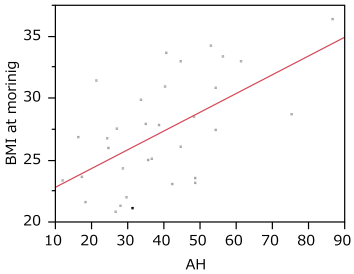


R^2=0.1

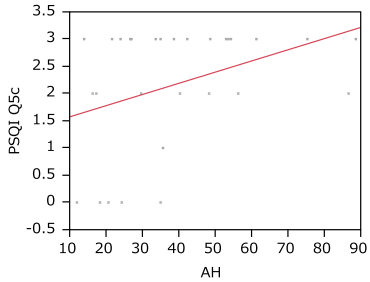
Figure2. AHI and ΔECF showed negative correlation. AHI had positive correlation with BMI and nocturia bother score in PSQI.



R^2=0.16



R^2=0.34



R^2=0.14

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