400. Metabolic and cardiovascular consequences of OSA II

P3863
Usefulness of SD-101 for screening of sleep apnea syndrome
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Objective: The SD-101 is a sheet-like device for screening of sleep apnea syndrome (SAS). It examines sleep disordered breathing by sensing the alterations of body loading corresponding to respiratory movement. Polysomnography (PSG) is the essential monitor for the diagnosis of SAS. However, PSG is not suitable for screening device for all people suspected of SAS. A simple and easy device is needed for screening of many SAS patients. For evaluation of the usefulness of SD-101 in more detail, the accurateness of SD-101 was examined about detection of hypopnea and apnea.

Subjects and methods: Forty four hospitalized patients were enrolled (aged 61.0±13.8, 37 males, Body mass index (BMI) 26.0±4.69kg/m²). They were examined by both PSG and SD-101. They were classified into two group, hypopnea group (Group H, 17 patients) and apnea group (Group A, 27 patients). Group H had hypopnea index accounted for more than 50% of Apnea Hypopnea Index (AHI). Group A had apnea index accounted for more than 50% and equal of AHI. We evaluated correlation between AHI of PSG with respiratory disturbance index (RDI) of SD-101 in each group.

Result: RDI of SD-101 had very close correlation with AHI of PSG (r 0.886 p<0.001). The sensitivity and specificity of the examination using SD-101 were 80% and 100%, respectively. RDI of SD-101 in Group H had lower correlation with AHI of PSG than RDI of SD-101 in Group A. Group H (r 0.548 p<0.05), Group A (r 0.886 p<0.001). The sensitivity of Group H (66.6%) was lower than that of Group A (88.0%).

Conclusion: RDI of SD-101 has very close correlation with AHI of PSG, however SD-101 may not detect hypopnea exactly in hypopnea predominant patients.

P3864
Effect of CPAP treatment on blood pressure levels in resistant hypertension. A multicenter randomized study from the Spanish sleep network (NCT00616265)
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Background: Only very few small studies have analyzed the role of CPAP treatment on blood pressure (BP) levels in patients with resistant hypertension (RH).

Objective: To evaluate the effect of CPAP treatment on BP levels in patients with RH
Methods: Multicenter-randomized study. 210 patients with RH (BP=130/80 mmHg despite 3 antihypertensive drugs) of unknown etiology, confirmed by 24h-ambulatory monitoring (AMPDA), and sleep apnea (AHI=15) were randomized to usual control plus CPAP (n=105) or usual control (n=105) both for three months. Variables derived from AMPDA including daytime and nighttime BP values and nocturnal patterns were compared intra- and inter-randomized groups. Good adherence to CPAP was considered as ≥4 hours/night.

Results: Mean age 57.9 (68% males). Mean AHI 40.4. 24-h systolic/diastolic blood pressure (SBP/DBP) 143/82.5 mmHg. 75% with no dipper pattern. Patients with CPAP (mean use: 5.9 h) experienced a net decrease of -5.5 mmHg in SBP (p<0.001) and -4.2 mmHg in DBP (p<0.001), especially in nocturnal SBP (-7.5 mmHg; p<0.001). There is a positive correlation between the increase used of CPAP in hours/night and the decrease in BP levels (r=0.25 (p=0.014). 28% of patients in CPAP group vs 17.5% in control group normalized their BP levels; p=0.045. More patients in CPAP group significantly recovered their dipper pattern, compared with control group (p=0.008).

Conclusions: CPAP treatment significantly decrease SBP and DBP levels and allowed the recovering of normal dipper pattern in patients with RH and sleep apnea. The magnitude of these effects correlate with the number of hours of CPAP use.

P3865
Association between sleep apnoea and cancer mortality. Longitudinal multicenter study in 5,467 patients from the Spanish cohort
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Objectives: The aim of the study was to evaluate the prevalence of hypertension (HT), diabetes mellitus (DM), hyperlipidemia (HL), and cardiovascular diseases (CVD) in the Japanese with proven OSA.

Methods: We retrospectively analyzed the data accrued in 1,000 patients who underwent the first time polysomnography (PSG) in their hospital from June 2001. They were 836 males and 164 females, the mean age of 54.5 years, the mean body mass index (BMI) of 26.0 kg/m2, and the mean apnea-hypopnea index (AHI) of 28.0. We examined the association between OSA and cardiovascular diseases, metabolic syndrome.

Results: 938 between 1,000 patients were diagnosed with OSA. 41.2% of patients with OSA had HT compared with 21.9% of patients without OSA. The OSA patients had 18.6% of DM, 45.3% of HL, 25.2% of liver dysfunction, 7.6% of CVD, comparing with 6.5% of DM, 29.0% of HL, 19.4% of liver dysfunction, and 13.3% of CVD in the non-OSA patients. In addition, the OSA patients treated with continuous positive airway pressure (CPAP) had 69.7% of HT, 23.8% of DM, 77.1% of HL, 40.7% of Liver dysfunction, and 21.2% of CVD. The blood pressure was reduced significantly by CPAP.

Conclusions: The risk of HT, DM, and CVD in OSA patients was almost two times more than those of non-OSA patients. We suggested that the OSA patients with higher severity OSA patients tended with a higher rate of complications.

P3868
Cystatin C and albuminuria as markers of kidney and cardiovascular diseases in obstructive sleep apnoea syndrome (OSAS)
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Obstructive sleep apnea (OSA) increases the risk of cardiovascular diseases and has been reported to be associated with a chronic kidney disease (CKD). The aim of our study was to assess the relations between indices of renal function (cystatin C, microalbuminuria, creatinine and OSA severity and obesity. We studied 238 OSA pts who had AHI ≥5/h in polysomnography: mean age 56.9±9.9y, AHI 38.9±21.7/h, ODI 44.8±27.8/h, BMI 33.5±4.8 kg/m². Serum cystatin C levels were measured in all patients, normal values were: under 50y old: Cy3C<0.29 μg/L, over 50y old: Cy3C<0.10 μg/L. CKD was diagnosed when plasma creatinine level was above 1.2 mg/dL.

Logistic regression analysis (LRA) revealed that increased Cy3C level was associated with elevated creatinine (OR=7.6, 95% CI=1.5–39.5, p<0.001) and obesity (OR 2.6, 95% CI 1.4–5.9, p=0.04) but not with AHI (OR=1.9, 95% CI=0.3–3.6, p=0.89). CKD was associated with severe OSA. AHI>30th (OR=7.97, 95% CI=1.5–41.6, p=0.013) and obesity (OR=3.1, 95% CI=1.2–8.1, p=0.016).

Conclusions: Cy3C should be considered as a biomarker that reflects clinically latent renal dysfunction. The chronic kidney disease was more frequent in obese subjects with severe OSA.

709s
Obstructive sleep apnea (OSA) is a respiratory disorder characterized by recurrent airflow obstruction caused by total or partial collapse of the upper airway. It is well known it is diminished in patients with obstructive sleep apnea. However, the analysis of different parts of the night and of the evolution within sleep stages in OSA patients has not yet been investigated.

Objectives: Evaluate and compare HRV in 3 intervals of each sleep stage in overnight polysomnographies in OSA and matched healthy controls.

We studied overnight polysomnographies of 6 untreated OSA patients (mean age 50±14 yr, apnea-hypopnea index (AHI) = 9.4±6 events per/hour) and 6 matched healthy controls. Time and non-linear analysis of R-R intervals (RRI) was performed of the minimum of 3 central 5-minute sample of stage II, III and REM sleep that was free of stage shifts, artifacts, arousals and apneas. Subsequently, we analyzed the evolution of these stages between OSA and controls.

Results: Comparing the 3 parts of each stage, we did not observed any difference intragroup (P>0.05). In addition, we only observed significant difference of RMMSSD index between OSA and controls (P<0.001) in the first REM stage. In contrast, when compared the average of 3 central 5-minute samples, we observed significant differences of mean RRI, RR tri index, TINN (ms), SD1 and SD2 between OSA and controls (P<0.05) in all stages.

Conclusions: The preliminary results showed that despite of any change in the HRV evolution through 3 intervals of each stage, the number of samples analyzed during the night may influence the results of HRV in overnight polysomnography.

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P3873
Urinary excretion of erythropoietin in sleep apnea-hypopnea syndrome

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Background: Synthesis of erythropoietin (EPO) is stimulated by tissue hypoxia. Anemia in obstructive sleep apnea–hypopnea syndrome (OSA–HS) is characterized by the presence of repeated episodes of hypoxemia.

 Aim: The objective of this study is to investigate whether hypoxemia induced by OSA could be a stimulus to increase EPO production.

Methods: The study was conducted in 24 patients being investigated for OSA. A full polysomnography through a night’s sleep was recorded and analyzed manually according to standard criteria. We determined the EPO levels in samples of first morning urine (sandwich ELISA technique). Serum creatinine, hematocrit and hemoglobin levels were additionally determined.

Results: Of the 24 patients studied, 18 were diagnosed from OSA (AHI>10) with the following results in severe OSA patients: Mean age 56±4 years (male 50%, female 50%), BMI 27±4 kg/m², 0.3 patients had severe OSA. The three groups were matched in age, gender, BMI and hypoxemia. AHI and lowest O2 saturation during sleep. Correlation between the AHI and lowest O2 saturation was significant (p<0.05) in all stages.

Conclusions: OSA patients showed increased urinary excretion of EPO and hemoglobin. Changes in EPO concentration are of low magnitude and non-linear. This response could be a protective mechanism against tissue hypoxia caused by OSA.

P3874
Left ventricular function assessment in patients with obstructive sleep apnea syndrome

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Background: There are conflicting data on the effect of obstructive sleep apnea syndrome (OSAS) on the cardiac structure and function in human subjects.

Aim: To assess the left ventricular functions and document prevalence of left ventricular dysfunction in patients with OSAS, and its relation to OSAS severity.

Patients and Methods: Forty patients with OSAS, diagnosed by complete polysomnography, underwent ECG and echocardiography using conventional mode and doppler tissue imaging to assess the function of the left ventricle.

Results: 11 patients had mild OSAS, 11 patients had moderate OSAS and 18 patients had severe OSAS. The three groups were matched in age, gender, BMI and incidence of systemic hypertension. Severe OSAS had significantly higher AHI, lowest oxygen saturation, average oxygen saturation, and desaturation time % of total sleep time (%<90). Pulmonary hypertension and left ventricular diastolic dysfunction were significantly higher in moderate and severe OSAS groups. No difference between groups was found in LV systolic function. Diastolic dysfunction parameters were better correlated with AHI and lowest oxygen saturation during sleep.

Conclusion: Assessment of left ventricular function is mandatory in OSAS patients even if they have no cardiac symptoms. Severe obstructive sleep apnea syndrome may result in left ventricular diastolic dysfunction. Doppler tissue imaging is a better echocardiographic tool for assessment of left ventricular diastolic dysfunction. Severity of left ventricular diastolic dysfunction is correlated with AHI and lowest O2 saturation during sleep.
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P3875
Cardiovascular regulation effects of CPAP therapy in obstructive sleep apnea patients with and without hypertension during daytime
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Obstructive sleep apnea can cause changes in cardiovascular regulation during the night and during daytime. Altered regulation may not be visible in absolute values of heart rate and blood pressure but in a changed coupling between the heart beat and the respiration. In a controlled randomized study we investigated effects of CPAP therapy on daytime cardiovascular regulation.

Twenty-eight patients with OSA in total, thereof 18 with arterial hypertension and 10 with normal blood pressure, were studied at baseline and at a follow up date with three months of CPAP. Ten age and sex matched healthy control subjects were investigated using the same protocol. All subjects underwent cardiorespiratory polysomnography. In addition we recorded 20 minutes quiet breathing at rest and a bicycle ergometry with ECG and blood pressure (Portapres). Cardiorespiratory coupling was investigated using symbolic coupling traces, a new developed technique which can reveal causality between signals.

The stress test showed a significant reduction of the diastolic blood pressure at a work load of 50W and 100W (p<0.05 and p<0.01, respectively) and a decrease of the heart rate recovery time after the stress test (p<0.05).

The results indicate a reduction of vascular resistance and sympathetic activity during daytime. The coupling analysis of the resting periods by means of symbolic coupling traces approach indicated an effect of the CPAP therapy on the baroreflex reaction in hypertensive patients where influences of the systolic blood pressure on the heart rate changed from pathological patterns to adaptive mechanisms of the normotensive patients (p<0.05).

P3876
Increased risk of obstructive sleep apnoea in patients with non-alcoholic fatty liver disease
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Background: Increasing prevalence of Obstructive Sleep Apnoea (OSA) and Non-alcoholic Fatty Liver Disease (NAFLD) are linked through the epidemic of obesity and metabolic syndrome. Patients with NAFLD often present with fatigue and daytime sleepiness and it has been postulated that intermittent hypoxia in OSA may accelerate liver cirrhosis in this group.

Aims: We hypothesised that OSA would be prevalent in patients with NAFLD. We aimed to determine whether those with OSA had different clinical or biochemical characteristics to the rest of the cohort.

Methods: We conducted a retrospective database and case note review of patients with known NAFLD. The database was reviewed for detailed liver investigations and notes examined for any clinical referral for sleep investigations and outcome.

Results: Liver database and case notes of 385 patients with biopsy proven NAFLD were examined. Forty-seven patients were referred to sleep services on clinical grounds (12%); 38 were found to have OSA, 10% of the whole cohort but 86% of those referred. Analysis of variance showed no difference between groups (those with OSA, those without OSA and those with no previous sleep investigations) in: baseline liver function, diabetes, body mass index, liver biopsy scores or any other marker of metabolic syndrome. Patients referred for sleep studies had higher ESS than those not referred (mean 13 vs 7, p<0.001) but there was no difference in ESS between those with or without OSA.

Conclusions: In a well-defined population of biopsy-proven NAFLD patients, OSA is common and mostly undiagnosed. There are no differences in the clinical characteristics of those referred for sleep studies and those not, other than ESS.