354. Physiology, obesity and the downstream effects of OSA

P3180
Surgery for obstructive sleep apnea: Sleep endoscopy determinants of outcome
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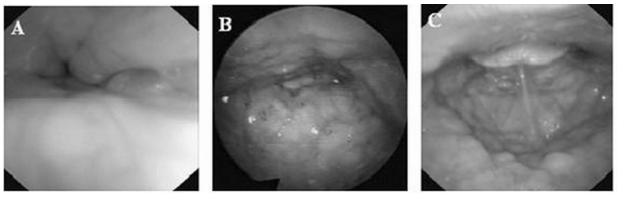
Although drug-induced sleep endoscopy (DISE) is often employed in order to determine the site of obstruction in patients with obstructive sleep apnea (OSA) who will undergo upper airway surgery, it remains unknown whether its findings are associated with surgical outcome. This study tested the hypothesis that DISE variables can predict the outcome of upper airway surgery.
Forty-nine OSA patients [41 men; mean apnea-hypopnea index (AHI) 30.9±18.5 events/h] underwent firstly DISE, secondly upper airway surgery, and thirdly follow-up polysomnography to assess surgical outcome.
Twenty-three patients (47%) were responders and twenty-nine non-responders (53%). Non-responders had a higher occurrence of complete or partial circumferential collapse at velum, and of complete antero-posterior collapse at tongue base or epiglottis, in comparison with responders. Multivariate logistic regression analysis revealed that, among baseline clinical characteristics and DISE findings, the presence of complete circumferential collapse at velum, and of complete antero-posterior collapse at tongue base were the only independent predictors of upper airway surgery failure.
Patterns of collapse on DISE associated with failure. A. complete circumferential collapse at velum. B. complete antero-posterior collapse at tongue base C. complete antero-posterior collapse at epiglottis.
In conclusion, DISE findings are predictors of upper airway surgery outcome in OSA.



P3181
BMI is not the driving factor in position dependent upper airway collapsibility in healthy subjects
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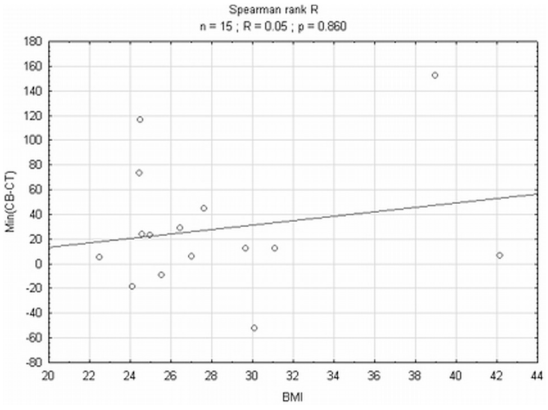
Introduction: In obstructive sleep apnea (OSA) patients, the minimal cross sectional area (CSA) of their upper airway (UA) correlates well with the severity of their pathology. However, since there is a correlation between body mass index (BMI) and severity of OSA in a population of OSA patients, it is not known if the minimal CSA is defined by the natural collapsibility of the UA or by the mass of the surrounding tissue. The objective of this study is to evaluate the influence of BMI on the position dependent changes in UA geometry assessed by CT imaging.
Materials and methods: A total of 20 normal subjects where 7 had a BMI<25, 6 had a BMI between 25 and 30 and 7 had a BMI>30 were included. 15 valid CBCT scans could be analyzed as the rotating gantry of the CBCT touched the shoulders of some subjects with a BMI>30, causing motion artifacts. The supine UA CT scans were performed using the GE VCT LightSpeed scanner and the upright CBCT scans were performed using the ISI i-CAT scanner.
Results: BMI was not a predictor for difference between the minimal CSA in a supine and upright posture (R=0.05, p=0.86) as seen in the figure.



Conclusions: It can be concluded that in a healthy population, the BMI has no influence on the position dependent collapsibility of the airway. This means that collapse of the UA in healthy subjects is mostly defined by the natural collapsibility of the subject's airway.

P3182
Clinical and polysomnographic determinants of snoring
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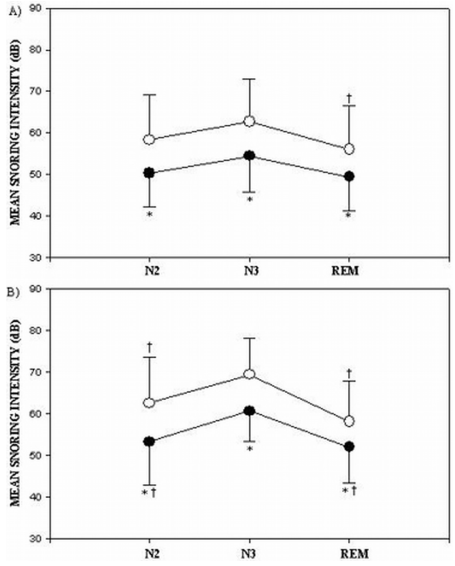
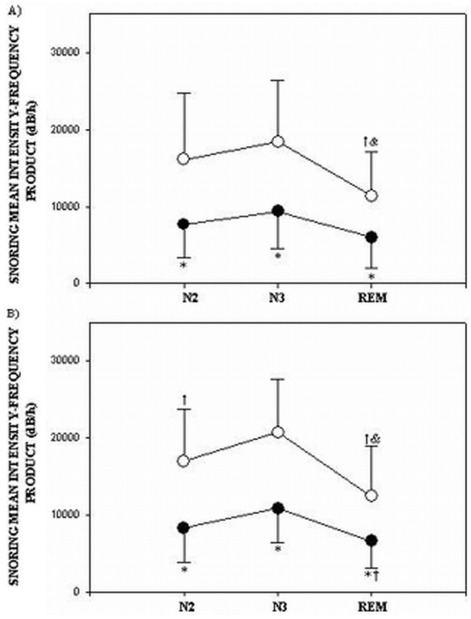
Snoring is considered one of the hallmarks of sleep-disordered breathing but its determinants remain obscure. We aimed to document positional dependency of snoring along with its association with clinical and polysomnographic variables.
48 apnoeic and 53 nonapnoeic snorers who slept in supine and lateral position in all sleep stages during overnight polysomnography were included. Snoring was quantified by measuring the mean sound intensity, snoring frequency and their product.
In apnoeic and nonapnoeic snorers, mean snoring intensity and mean intensity-frequency product were higher in supine than in lateral position and were also usually higher in N3 in comparison to REM and/or N2 stage in a given position.
Positional change in snoring intensity as expressed by the ratio of mean intensity in the supine to lateral position was independently and positively correlated with age and tonsils size in nonapnoeic snorers, and with body mass index, tonsils size, and apnoea-hypopnoea index in apnoeics.
Snoring is more prominent in supine position and in N3. Snoring positional dependence is determined by tonsils size and age in nonapnoeic snorers, and body mass and apnoea-hypopnoea indices in apnoeics.



Abstract P3182 – Figure 1



Abstract P3182 – Figure 2

P3183

Importance of Mallampati score as an independent predictor of obstructive sleep apnea

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Introduction: The Mallampatti Scoring System (MSS) was initially developed as a classification system of oro-pharyngeal opening and has been used to identify patients with potentially difficult intubation. We conducted this prospective study to assess the utility of MSS in diagnosing Obstructive Sleep Apnoea (OSA) and to predict the severity of OSA.
Materials and methods: This prospective study was carried out at a tertiary care sleep referral centre in Northern India. A total of 175 consecutive patients were enrolled and their symptoms and examination findings were noted. A special note was taken of their Mallampatti Score Severity. After overnight polysomnography, their Apnea-Hypopnoea Index (AHI) was correlated with the MSS.
Results: The average age of the study population was 47±6.2 years. Average BMI was calculated to be 31.2±8.4 kg/m^2 and overall AHI was 42±10. MSS was an independent predictor for presence of OSA but there was no significant correlation between severity of MSS and severity of OSA. On average, for every 1-point increase in the Mallampati score, the odds of having Obstructive Sleep Apnea increased more than 2-fold (odds ratio [per 1-point increase] = 2.5; $p < 0.05$). However with increase in severity of MSS, the AHI did not increase significantly.
Conclusion: MSS is an important predictor for presence and absence of OSA and can be an important screening tool as well as is an important part of pre-test physical examination. However, its role in predicting severity of OSA remains doubtful and needs further study.

P3184

Validation of respiratory inductive plethysmography in people with obesity hypoventilation syndrome

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The excessive chest and abdominal adiposity present in obesity hypoventilation syndrome (OHS) may reduce the accuracy of respiratory inductive plethysmography (RIP). The aim of the study was to validate RIP measures of ventilation in OHS against a clinical standard (spirometry). Measures of tidal volume (V_T), minute ventilation (V_E) and respiratory rate (RR) were obtained simultaneously from RIP (LifeShirt™) and a spirometer during two 40-minute air/supplemental O_2 breathing tests. 16 paired samples were obtained per subject. Using the Bland Altman method, bias was expressed as spirometer–RIP mean difference (MD), and as a percentage. Error was expressed as limits of agreement (LOA) and as a percentage. Differences between groups were assessed with independent samples t-tests. 162 viable paired samples were obtained from 13 subjects with OHS and 197 paired samples were obtained from 13 age- and gender-matched controls. Error of RIP measures was larger in subjects with OHS: V_T MD=3mL (1%), LOA=-216 to 222mL (±36%) compared with controls, MD=5mL (1%), LOA=-160 to 169mL (±20%); V_E: MD=0.2L/min (2%), LOA=-4.1 to 4.4L/min (±36%) in subjects with OHS compared with MD=0.1L/min (1%), LOA=-1.4 to 1.5L/min (±20%) for controls; and RR: MD=0.2br/min (2%), LOA=-5 to 5br/min (±27%) in subjects with OHS compared with MD=-0.1 br/min (1%), LOA=-1 to 1br/min (±12%) for controls. Between group differences were only statistically significant for RR ($p<0.05$). V_T %error correlated strongly with body mass index ($r_s=0.53$, $p<0.01$) and waist circumference ($r_s=0.61$, $p<0.01$). In conclusion, the accuracy of RIP is reduced in people with OHS, limiting its capacity for detecting small changes in ventilation.

P3185

Validation of raised serum bicarbonate for diagnosis of obesity hypoventilation syndrome

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Introduction: The need for early detection of Obesity Hypoventilation Syndrome (OHS) is clear because delay in the diagnosis and treatment is associated with significant morbidity and mortality.
Objective: To validate previously reported raised serum bicarbonate of 27 mmol/l for the diagnosis of OHS in obese patients attending sleep clinic.
Methods: A retrospective analysis of prospectively collected sleep clinic data on consecutive obese patients referred to sleep clinic from January 2009 to January 2011 to the North Middlesex University Hospital was performed. Subjects with suspected sleep disorders were evaluated according to our clinic protocol and capillary blood gases were measured in obese subjects (BMI> 30 kg/m^2).
Results: 525 consecutive patients (mean age 51.44±12.7, 65.71% males, mean BMI 34.59±8.1) were evaluated. A total of 344 (65.52%) were obese (mean age 52.29±12.4, 63.66% males) of which 128 (37.2%) were morbidly obese (BMI>40 kg/m^2). 275 (79.94%) obese patients were found to have OSAHS (AHI >5 +symptoms) with mean AHI 32.6±23.9 and ESS 11.7±5.8 and OHS was present in 71 (20.63%) with mean pCO2-6.9±1.1 kPa and HCO3-28.19±2.5 mmol/l. Using a previously suggested serum bicarbonate cutoff value of 27 mmol/l, logistic regression analysis showed serum bicarbonate > 27 mmol had 85% sensitivity and 90% specificity for diagnosis of OHS.
Conclusion: OHS is common (20.63%) in obese patients attending sleep clinic and a raised serum bicarbonate more than 27 mmol/l is a good predictor for diagnosis of OHS in our obese sleep clinic population.

P3186

Effects of supplemental O_2 on PCO_2 and ventilation in people with obesity hypoventilation syndrome

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Breathing 100% O_2 increases PCO_2 in some people with obesity hypoventilation syndrome (OHS). It is not known how lower concentrations of O_2 affect people

with OHS. This study investigated the effect of clinically relevant O_2 concentrations on PCO_2, pH and minute ventilation (V_E) in stable OHS patients pre and post treatment with positive airway pressure (PAP), and in controls. In a double-blind randomised crossover study, 14 subjects with OHS and 14 age- and gender-matched controls breathed inspired O_2 fractions (FiO_2) of 0.28 and 0.5, each for 20min, separated by a 45min washout. The OHS group were retested after 3 months of nocturnal PAP. Arterialised-venous PCO_2 and pH, and V_E were measured every 5min. Data were analysed with repeated measures ANOVA. In OHS pre-PAP, small rises in PCO_2 of 2.0±1.7mmHg; 3.7±3.2mmHg (both $p<0.01$) occurred after 20min of breathing FiO_2 0.28 and 0.5, respectively, with no significant difference between concentrations. pH fell accordingly, with FiO_2 0.5 inducing mild acidaemia (7.346±0.030, $p<0.01$). V_E fell below the room air baseline for both FiO_2 0.28 (-5±11%, $p<0.01$) and FiO_2 0.5 (-7±20%, $p<0.01$). The controls' responses differed significantly from the OHS group ($p<0.01$). PCO_2 and pH did not change significantly with either FiO_2 and mild hyperventilation occurred (V_E +1.3±19%, FiO_2 0.28; +12±17%, FiO_2 0.5). In OHS, O_2-induced PCO_2 rises tended to be smaller after PAP (1.3±2.3mmHg, FiO_2 0.28; and 0.9±1.7mmHg, FiO_2 0.5). Commonly used concentrations of O_2 caused hypoventilation, small PCO_2 rises and mild acidaemia in stable OHS. When providing supplemental O_2 for people with stable OHS, close monitoring and targeting of O_2 saturations is recommended.

P3187

Multiscale entropy analysis of RR time series obtained from polysomnographic recordings in wide age spectrum group

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Costs and complication of polysomnography lead to attempts to develop cheaper and simpler methods. The analysis of heart rate seems to be promising, however the heart rate's dynamics is biased by several physiological factors. The aim of that study was to check influence of age on multiscale entropy (MSE) of RR time series.

64 patients undergoing routine diagnostic in sleep lab were recruited (36 male, 28 female, age 1,5–63 yrs mean: 25,2±20 yrs, RDI: 0–4,9 1/h mean:1,9±1,5 1/h). The full night PSG (ASSM 2007) were performed. The R-R intervals were detected in recorded ECG signal (250Hz), and the multiscale entropy (Goldberg's MSE) was calculated (m=2, r=0.15, scale = 1–20).

We found high correlation between entropy in SE(1) and age (Fig. 1) in adults, however in the children group (age<15) there was no such relation.

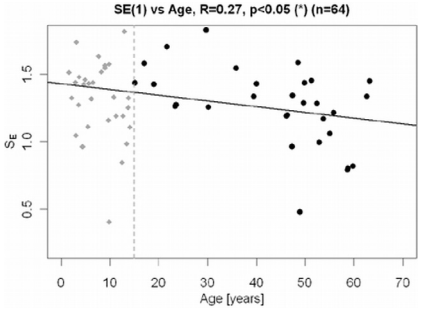

Figure 1

After removing subjects younger than 15yrs the correlation increase (R=0.58, $p<0.001$). Using MSE we found significant differences between the lowest and highest quartiles (Fig. 2)

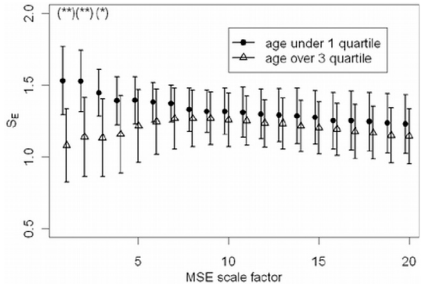

Figure 2

We conclude that entropy is biased by age in adults and the lack of such relation in young group needs further investigations.

P3188

Effect of nasal CPAP therapy on functional respiratory parameters and cardiopulmonary exercise test in obstructive sleep apnea syndrome

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Aim: Nasal CPAP treatment is an effective treatment modality for patients with OSAS. It can improve physical and mental functions by reducing daytime hypersomnolence, arousal index and sleep fragmentations. The purpose of this study was to evaluate whether pulmonary functions, exercise limitation confirmed with CPET and quality of life can be improved after eight weeks of nCPAP treatment.
Method: We evaluated our case group with physical examination, SF-36 health survey, body composition analysis before and after nCPAP treatment for 8 weeks. Spirometric flow rates, PImax, PEmax, lung volumes and exercise capasities with CPET were measured.
Results: 31 of 40 patiens (4 female, 27 male) completed the study. The mean age was 53.41±1.46, %51.6 of cases had comorbidities and the smoking history rate was %54.8. All of them had exercise limitation before treatment. After treatment there were increases in PImax-PEmax ($p<0.05$), VO2 peak (p:0.001), Load max (p:0.000), maximal heart rates (p:0.000), all SF-36 scores except pain ($p<0.05$) and a decrease in systolic blood pressure (p:0.005). We didn't see any changes in body compositions, spirometric flow rates except FEV1 and lung volumes.
Conclusion: OSAS may lead to exercise limitation. nCPAP treatment is effective in reducing exercise limitation, can help to control blood pressure and improves respiratory muscle strength. nCPAP can also improve the quality of life scores in OSA patients without any comorbidity or with comorbidities under control. Our findings may suggest that these changes are the results of improvements in patients' cardiac function, daytime somnolence and fitness.

P3189

End expiratory lung volume as a predictor of obstructive sleep apnea severity

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Background: One of the contributing factors to upper airway collaps in obstructive sleep apnea (OSA) is reduced end expiratory lungvolume (EELV) (Kapur, V.H. et al. Respiratory Care 2010;55). There is evidence for correlation of apnea hypopnea index (AHI) with EELV in supine position during sleep (Owens, R.L. et al. J App Physiol 2010;108:445-51). In respiratory function testing however, EELV is routinely measured in sitting position and during wake ($EELV_{sit}$).
Aims and objectives: To establish the relationship between $EELV_{sit}$ and OSA. We hypothesized that $EELV_{sit}$ may affect the severity of OSA.
Methods: In an observational study the relationship between $EELV_{sit}$ and OSA in 59 adult patients of Orbis Medical Centre, Sittard (The Netherlands) was assessed using a regression analysis. $EELV_{sit}$ was evaluated by helium dilution technique, and severity of OSA by apnea hypopnea index (AHI) based on polysomnography measurements. In addition $EELV_{sit}$ was compared to other predictors of OSA; Epworth sleepiness scale (ESS), Mallampati-score, body mass index (BMI), and neck- and abdominal circumference, by means of a multiple regression analysis.
Results: $EELV_{sit}$ was a predictor of AHI, R=-0,392 (p=0,003). Multiple regression analysis demonstrated that abdominal circumference explained 15,5% of variance of AHI, and together with $EELV_{sit}$ 23,4% of the variance of AHI was explained. Other predictors were not significant.
Conclusions: $EELV_{sit}$ contributes to the severity of OSA and might therefore be useful to differentiate between high and low risk patients for OSA in screening and diagnostics settings. Abdominal circumference also appeared to predict severity of OSA and had even more impact on AHI compared to $EELV_{sit}$.

P3190

Inflammatory processes and effects of continuous positive airway pressure (CPAP) in overlap syndrome

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Aim: We aimed to compare serum levels of the inflammatory mediators of C-Reactive Protein (CRP), Tumor Necrosis Factor-α (TNF-α) and Asymmetric-Dimethyl-Arginine (ADMA) in Chronic Obstructive Pulmonary Disease (COPD), Obstructive Sleep Apnea Syndrome (OSAS) and their coexistence called Overlap Syndrome (OVS). Also, we planned to investigate the changes of these mediators with the treatment of continuous positive airway pressure (CPAP) in OSAS and OVS patients.
Methods: CRP, TNF-α, ADMA levels were analyzed by ELISA method with the blood samples taken from patients with COPD (N=25), OVS (N=25) and moderate-severe stage OSAS (N=25) in the morning after polysomnography application and second blood samples taken from OSAS and OVS patients who underwent regular CPAP treatment throughout 3-6 weeks.
Results: In comparison of three groups prior to CPAP treatment, ADMA levels in OSAS group were significantly lower than in COPD group (p=0.009), but

CRP (p=0.478) and TNF-α (p=0.137) were similar among groups. On the basis of before-after CPAP treatment comparison, CRP levels in both OSAS and OVS groups decreased significantly (p=0.02, p=0.04), whereas TNF-α (p=0.980, p=0.144) and ADMA (p=0.321, p=0.282) levels did not display any statistical significant differences.
Conclusion: In OVS group, no significant difference was established in inflammatory mediators when compared to COPD and OSAS groups. After effective CPAP treatment, decrease in serum-CRP level in OVS and OSAS groups showed that CPAP is an effective treatment method for systemic inflammation. Nevertheless, further investigations examining the differences in ADMA, CRP and TNF-α level in patients with COPD, OSAS and OVS are required.

P3191
Effect of arterial hypertension, obesity and overnight desaturation on plasma uric acid concentration in obstructive sleep apnoea (OSA) patients
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OSA is often associated with obesity and metabolic syndrome. The aim of this study was to assess prevalence of hyperuricaemia in OSA patients and relations between elevated plasma uric acid (UA) and OSA severity, obesity and cardiovascular diseases. We studied 1144 OSA pts: AHI – 39.7±21.7, BMI – 34.2±6.4 kg/m^2, mean SaO_2 – 90.8±5.7%, T90 - 26.6±28.9%, Epworth score - 11.3±5.8 points. Hyperuricaemia [males: UA > 7 mg/dl (2005-2007) and > 8.5 mg/dl (since 2008), females: UA > 5.7 mg/dl (2005-2007) and > 6.2 mg/dl (since 2008) was found in 354 pts (30.9%) (different laboratory methods)]. Comparison of subjects with hyperuricaemia and normouricaemia is shown in table.

Variable	Normal UA (n=790; 69.1%)	Increased UA (n=354; 30.9%)	p
Age (years)	56.5±10.4	56.2±10.6	NS
BMI (kg/m^2)	33±6.1	36.9±6.4	p<0.0001
AHI (n/h)	38.5±21.5	42.2±21.8	p=0.02
T90 (%)	22.4±26.7	35.8±31.4	p<0.0001
Arterial hypertension (n/% of pts)	547 (69.2%)	299 (84.5%)	p<0.0001
Coronary artery disease (n/% of pts)	158 (20%)	99 (28%)	p=0.003
Heart failure (n/% of pts)	69 (8.7%)	59 (16.7%)	p<0.0001
Diabetes (n/% of pts)	154 (19.5%)	93 (26.3%)	p=0.01

Logistic regression analysis revealed that arterial hypertension, obesity (BMI > 30 vs ≤ 30 kg/m^2) and T90 > 30% were independent predictors of hyperuricaemia (OR-1.76; 95%CI – 1.23-2.51; p=0.002, OR-2.47; 95%CI – 1.67-3.65; p<0.0001 and OR-1.79; 95%CI – 1.34-2.40; p<0.0001, respectively) after adjusting for NT-proBNP, diabetes, heart failure, coronary artery disease, COPD and stroke.
Conclusions: Hyperuricaemia was frequent in OSA patients. Main predictors of hyperuricaemia were obesity, overnight desaturation time - T90> 30% and arterial hypertension.

P3192
The lymphocyte subset analysis in patients with arterial hypertension and severe obstructive sleep apnea syndrome
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Preliminary data of the study investigating peculiarities of inflammatory response and endothelial function in pts with arterial hypertension (AH) and obstructive sleep apnea syndrome (OSAS).
Aim: The aim was to evaluate the count of lymphocyte subset in pts with AH and OSAS.
Design and Methods: In 7 male pts with AH (office BP 151±5,2/91,4±8,4 mmHg) and severe OSAS (AHI 64,8±15) and otherwise healthy, aged 39±11 years phenotyping of lymphocytes was performed by flow cytometry (Cytomics FC500, Beckman Coulter, USA).

Parameters of cellular immunity in patients with AH and severe OSA

	Results	Normal values	p
CD3+	77,2±8,69	72,9±9,1	0,2398
CD3+/CD4+	45,8±7,58	42,6±8,4	0,3444
CD3+CD8+	26,7±7,37	25,0±6,0	0,4972
CD3-CD(16+56)	7,41±3,10	8,4±3,9	0,5235
CD3+CD(16+56)	7,64±5,22	5,0±2,3	0,0219
CD19+	13,2±8,45	10,8±5,7	0,3308
CD3+CD25+	3,21±1,17	3,5±1,5	0,6263
CD50+	97,8±2,34	90,0±10,0	0,0461
CD3-HLA-DR+	14,4±7,97	8,5±3,3	0,0007
CD3+HLA-DR+	2,65±1,64	6,0±3,1	0,0224
CD3+CD95+	32,3±10,7	42,0±9,0	0,0116
CD4/CD8	1,94±0,84	1,8±0,8	0,6680

Results: Pts with AH and severe OSAS were examined for levels for following parameters see the table.
The levels of D3-HLA-DR+ and CD3+CD(16+56) and CD 50+ were statistically higher vs average normal values, whilst CD3+HLA-DR+, CD3+CD95+ were significantly lower.
Conclusion: These data suggest, that both CD4+ and CD8+ T-cell compartments, as well as the regulation of CD95+ expression on T-cells, should be targeted for further study. Knowing of the underlying inflammatory mechanism could lead to understanding of disease progression and development of cardiovascular complications.

P3193
Cardiovascular diseases are responsible for increased plasma NT-proBNP level in obstructive sleep apnoea (OSA) patients
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Untreated OSA is a risk factor for cardiovascular morbidity and mortality. Brain natriuretic peptide (BNP) is a hormone secreted by the ventricles in response to heart overload. The aim of this study was to assess plasma NT-proBNP (inactive form of BNP) in OSA subjects and relationship between hormone level and OSA severity and complications. We studied 1145 OSA pts (859 males-75% and 286 females-25%), mean age - 56.4±10.4 years, AHI – 39.6±21.6, BMI - 34,2±6,4 kg/m^2. Increased NT-proBNP (> 125 pg/ml) was found in 294 subjects (25.7%). Comparison of OSA subjects with normal and elevated NT-proBNP is shown in the table.

Variable	Elevated NT-proBNP	Normal NT-proBNP	p
Age (years)	62.2±8.8	54.4±10.1	p<0.0001
BMI (kg/m^2)	34.7±7.2	34.1±6.1	NS
AHI (n/h)	37.9±20.1	40.2±22.1	NS
Mean SaO2 (%)	90.5±7.3	91±5	NS
Coronary artery disease (n/% of pts)	125 (42.5%)	134 (15.8%)	p<0.0001
Atrial fibrillation (n/% of pts)	59 (20.1%)	37 (4.3%)	p<0.0001
Heart failure (n/% of pts)	86 (29.2%)	44 (5.2%)	p<0.0001
Arterial hypertension (n/% of pts)	249 (84.7%)	594 (69.8%)	p<0.0001
Stroke (n/% of pts)	17 (5.8%)	26 (3.1%)	p=0.03
COPD (n/% of pts)	52 (17.7%)	90 (10.6%)	p=0.001

Logistic regression analysis revealed that heart failure (OR- 4.4; 95%CI – 4.09-4.74; p<0.0001), atrial fibrillation (OR-4.22; 95%CI – 3.89-4.58; p<0.0001), coronary artery disease (OR-2.29; 95%CI – 2.16-2.43; p<0.0001), arterial hypertension (OR-1.87; 95%CI – 1.75-2.0; p<0.0001) and COPD (OR- 1.37; 95%CI – 1.27-1.47; p<0.0001) were independent predictors of increased NT-proBNP after adjusting for BMI, diabetes, hyperuricaemia and stroke.
Conclusions: Increased plasma NT-proBNP concentration in OSA subjects was mainly related to cardiovascular diseases.

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Association between obstructive sleep apnea and elevated levels of B-type natriuretic peptide in a community based sample of women
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Background: Obstructive sleep apnea (OSA) is associated with an increased risk of cardiovascular disease and mortality. One contributory factor may be hemodynamic stress due to the negative intrathoracic pressure during each apnea. Type-B Natriuretic Peptide (BNP) is secreted by the cardiac ventricles in response to volume expansion and pressure load and we hypothesized that there would be an association between indices of obstructive sleep apnea in the night and levels of BNP in the morning.
Methods: From a community-based sample, 349 women underwent full-night polysomnography, anthropometric measurements and answered a questionnaire about medical conditions and current medication. The morning following the polysomnography, blood samples were drawn for analysis of plasma BNP, C-reactive protein, creatinine and hemoglobin.
Results: There was an increase in mean BNP as the severity of sleep apnea increased, increasing from a mean value of 8.5ng/L among women with an AHI of <5 to 18.0ng/L in women with an AHI of >30. Elevated BNP levels (>20ng/L) were found in 29.8% of the women, while 70.2% had normal levels. The odds ratio was 2.2 for elevated BNP levels for women with an AHI of 5-<15 in relation to women with an AHI of <5, 3.1 for women with an AHI of 15-<30 and 4.5 for women with an AHI of >30 after adjustment for age, BMI, systolic blood pressure, antihypertensive drugs and creatinine.

Conclusions: We found a dose-response relationship between the severity of sleep apnea during the night in women and the levels of BNP in the morning.

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The relationship between uric acid levels and mean platelet volume and metabolic syndrome in males with with obstructive sleep apnoea syndrome

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Aim: The aim of our study was to investigate the post-treatment changes in the level of UA and the relationship between serum uric acid (UA) levels and mean platelet volume (MPV) and metabolic syndrome in males with obstructive sleep apnoea syndrome (OSAS).
Material and methods: Seventy nine men who had been performed a single night polysomnography (PSG) (mean AHI=42.59±2.79 events/hour), were included to the study. Demographics characteristics, serum uric acid levels, MPV and PSG results were recorded. We divided patients in two groups according to 75 percentiles of UA levels: 1st with hyperuricaemia - UA≥ 6.86 mg/dL and 2nd with normouricaemia - UA < 6.86 mg/dL.
Results: There was a statistically positive correlation between UA (6.03±0.13 mg/dL) and AHI (p=0.037), BMI (p=0.013), waist circumference (p=0.027), O_2 desaturation % (p=0.047). Subjects with hyperuricaemia had higher AHI, BMI, (p<0.05), waist circumference (p<0.01), neck circumference, oxygen saturation index (ODI), O_2 desaturation % and triglyceride. The duration of REM decreased and Stage 1 and 3 increased. The UA and MPV were found higher in patients with MS and OSAS and UA levels decreased after CPAP treatments. However, ODI and MPV were included to the model to estimate AHI at stepwise regression analysis (R square %89, p<0.001).
Conclusion: This study showed that obesity was the determinant of hyperuricemia and high levels of UA was found with MS and OSAS. The levels were decreased after CPAP therapy. An also, it is thought that high levels UA and MPV are associated with cardiovascular complications in OSAS.

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Adaptive servo ventilation in the treatment of central sleep apnea related to ischemic stroke

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Background: Adaptive Servo Ventilation (ASV) is a well-established treatment of central sleep apnea (CSA) related to chronic heart failure (CHF). So far, only few studies have evaluated effectiveness and compliance of ASV in patients with CSA of other etiologies. Therefore, we analyzed ASV in CSA following ischemic stroke.
Methods: Retrospective analysis of ASV treatment in stroke patients with CSA between 2005 and 2011. Patients with acute stroke (<1 month) or diagnosis of CHF were excluded. Demographic, clinical (including Epworth sleepiness scale; ESS), polygraphic/polysomnographic, ventilator setting and compliance data were collected.
Results: Fifteen out of 123 patients treated with ASV suffered from CSA or complex sleep apnea related to ischemic stroke (median time from stroke 11 month). 13/15 patients were pretreated with positive pressure ventilation without clinical success (CPAP: 11/15; BiPAP: 2/15). Indication for ASV was complex sleep apnea in 6 patients, CSA/Cheyne-Stokes-Breathing in 5 patients, and mixed sleep apnea in 4 patients. At follow up after 66.3±42.0 days, mean daily use of ASV was 5.4±2.4/h per night. ASV significantly improved AHI (46.7±24.3 to 8.5±12.0/h, p=0.001). ESS was reduced from 8.7±5.7 to 5.6±2.5 (p=0.08).
Conclusion: Our data clearly suggests that ASV is a well-tolerated and clinically effective treatment in patients suffering from CSA related to ischemic stroke. Prospective randomized trials are warranted to establish ASV in the treatment of stroke related central sleep apnea.

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Relationship between NT-proBNP level, echocardiographic parameters and cardiovascular diseases in patients with obstructive sleep apnoea (OSA)

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Brain natriuretic peptide (BNP) is a hormone secreted by the ventricles in response to heart overload. The aim of this study was to assess prevalence of elevated NT-proBNP (inactive form of BNP) level in OSA patients and its relations to echocardiographic parameters and OSA-asociated cardiovascular complications. We studied 87 OSA pts, mean AHI was 43.2±24.1, age - 57.5±10.6 yrs, mean plasma NT-proBNP level was 198.5±357.3 pg/ml. Elevated NT-proBNP concentration was found in 34 pts with OSA. Comparison of OSA pts with normal and elevated NT-proBNP level is shown in a table below.
Elevated NT-proBNP level was found in 39.8% OSA subjects. Logistic regression analysis revealed that elevated NT-proBNP level (>125pg/ml) did not correlate with studied echocardiographic parameters in OSA pts (p>0.05). NT-proBNP level negatively correlated with AHI (r =-0.25, p=0,02). Elevated NT-proBNP concetration indicated at increased risk of coronary artery disease (OR = 12.94, 95%CI = 2.4-68.5, p<0.01).
Conclusions: Increased plasma concentration of NT-proBNP was not related to echocardiographic parameters, but it was associated with occurrence of CAD in OSA subjects.

Variable	Normal NT-proBNP	Elevated NT-proBNP	p
RV (mm)	28.3±3.3	27.8±3.8	NS
IVS-t (mm)	12±2	11.4±2.1	NS
LV (mm)	53.2±5.6	53.3±7.7	NS
PWt (mm)	11.4±1.6	10.7±1.6	NS
La (mm)	38±4.1	39.9±6.7	NS
AcT (ms)	108.7±16.8	103.4±22	NS
TVPG (mmHg)	26.7±5.1	29.8±7.5	NS
AHI (n/h)	48.1±25.8	35.3±19.3	p=0.03
Coronary Artery Disease – CAD (n/%)	12 (22.6%)	21 (63.6%)	p=0.001
Arterial Hypertension – AH (n/%)	39 (73.6%)	27 (81.8%)	NS
Heart Failure – HF (n/%)	10 (18.9%)	11 (33.3%)	NS