221. Obstructive sleep apnoea: the heart and the brain

P1737

Transvenous phrenic nerve stimulation improves Cheyne-Stokes respiration in patients with chronic heart failure

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Background: Cheyne-Stokes respiration (CSR) may accelerate progression of congestive heart failure (CHF) and is associated with poor survival. Phrenic nerve stimulation (PNS) may interrupt CSR and improve CHF outcomes. We report the first clinical use of transvenous PNS in CHF patients with CSR.
Methods: 23 CHF patients with central sleep apnea and CSR were enrolled. A single stimulation lead was placed at the junction between the superior vena cava and brachiocephalic vein or in the left pericardiophrenic vein. PNS stimulation was performed using the Eupnea System software. Respiratory properties were assessed prior to and post-PNS. PNS was assessed at a maximum of 10 mA.
Results: No adverse events were seen under maximum normal stimulation parameters for a maximum single 12 hour sleep cycle. Phrenic nerve stimulation was able to reproducibly slow the rate of breathing in a predictable manner and raise end-tidal expiratory CO_2. When PNS was applied following a series of central sleep apneic events, a trend towards stabilization of breathing and heart rate, as well as improvement in oxygen saturation, was seen.There was a significant improvement in indices of apnea/hypopnea, central apnea, oxygen saturation and sleep efficiency after PNS versus pre-PNS (all P <0.01).
Conclusion: Unilateral transvenous PNS proved to be a safe and feasible treatment and by effectively improving CSR.

P1738

Heart rate turbulence: In patients with obstructive sleep apnea without coronary artery diseases

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Background: Obstructive sleep apnea syndrome (OSAS) is a common disorder associated with an increased risk of cardiovascular disease and stroke. This study was conducted to demonstrate the effects of OSAS on baroregulatory function by using heart rate turbulence (HRT) parameters.
Methods: Sixty four OSAS patients without coronary artery disease (CAD) and 30 healthy subjects were enrolled in this study. HRT analysis (TO: turbulence onset and TS: turbulence slope) was obtained from 24-hour ECG recordings. The values of HRT were compared between two groups along with basic clinical, echocardiographic and Holter parameters. Besides, the relationship between HRT and apnea-hypopnea index (AHI) was analyzed.
Results: The mean value of TO was significantly higher in the OSAS group than in the control group ($p< 0.001$). The mean values of TS were not significantly different between the two groups. The value of AHI was positively correlated with the value of TO ($r = 0.845$, $p < 0.001$).

Table 1. The comparison of two groups

	OSAS group (n=64)	Control group (n=30)	p value
Age (yrs)	49.9±6.6	42.0±6.1	N.S.
Gender (male)	54.7%	53.3%	N.S.
BMI	25.54±3.17	24.86±3.22	N.S.
TO	0.89±0.50	0.08±0.06	p<0.001
TS	2.41±3.06	3.14±2.33	p=0.212

Discussion: As the OSAS worsens, the cardiac rhythm disorders become more prominent. The impairment of cardiovascular autonomic system in OSAS patient without CAD may be a possible component of deleterious effect of OSAS.
Conclusion: The impaired autonomic cardiac control may in part explain the mechanism promoting arrhythmias and sudden death in OSAS subjects. To achieve a meaningful reduction in mortality, OSAS must be targeted for treatment.

P1739

Effect of time on test on driving simulator performance in patients with obstructive sleep apnoea (OSAS)

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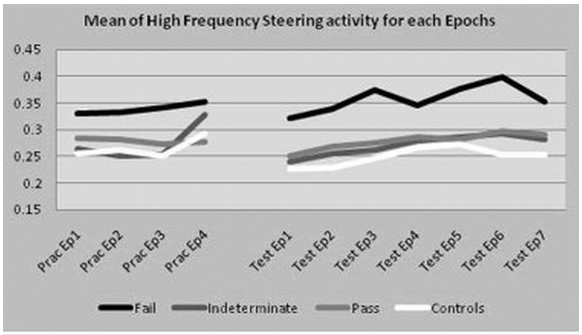
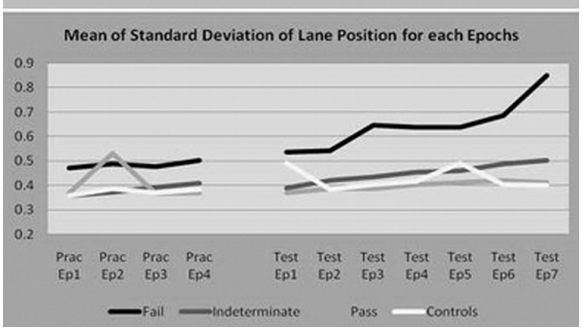
Introduction: A sophisticated office based driving simulator (MiniSim) is being developed to assess driving performance in OSAS. We have shown in a credible way that a failure on the simulator can be accurately predicted from continuously recorded variables. We have now explored the way these variables change over time.
Methods: After a practice run, 72 patients (Age 53±10,ESS 12±6,ODI 39±21) & 17 controls completed 50 minutes motorway driving (7 epochs) on the MiniSim. Two situations were programmed that required evasive action to avoid a crash; minor & major events. A "fail" was defined by an unprovoked crash or crash at the minor event. A crash at the major event was deemed as "indeterminate", the rest were deemed to have "passed". Continuous driving parameters including High Frequency Steering (HFS) and lane position (SDLP) for these three categories were plotted against time & data from the controls were added to the plot.
Results: Performance worsens with time in all patients with OSAS but the progression is worse in the subgroup who fail the simulator test.They also perform worse than others from the beginning ($p<0.0001$ in epoch 1).





Conclusion: These data suggest that patients who will crash during simulated driving can be identified early in the run, which has implications for the duration of the test. Furthermore the consistency of the abnormalities suggests that these are not chance phenomena.

P1740

Neurocognitive disorders in children with sleep-disordered breathing

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Aims: To compare the presence of neurocognitive disorders in children with Obstructive Sleep Apnea Syndrome (OSAS) or Primary Snoring (PS) and normal controls, and to investigate their correlation with duration of Sleep-Disordered Breathing (SDB).
Methods: 137 subjects (M/F 70/67; mean age 9.47±2.35 yrs) were studied: 58 children with SDB (19% PS,43.1% minimum OSAS,37.9% moderate-severe OSAS) and 79 control children. The SDB group underwent clinical evaluation, polysomnography and neurocognitive assessment based on Wechsler Intelligence Scale for Children (WISC-R). The control group was studied through a medical questionnaire and WISC-R.
Results: Verbal Intelligence Quotient (VIQ), Performance Intelligence Quotient (PIQ) and Full-Scale Intelligence Quotient (FSIQ) were lower in SDB group than in control children (VIQ: 94.55±13.74 vs 115.84±10.63; PIQ: 100.10±13.25 vs 118.24±11.79; FSIQ: 96.66±11.66 vs 110.08±11.17) ($p<0.001$). On the basis of the presence of cognitive impairment (defined arbitrarily by a FSIQ <mean FSIQ $_{\text{standard population}}$ − 2SD),SDB group was subdivided in: Group A: 15 children with SDB and cognitive impairment; Group B: 43 children with SDB without cognitive impairment. The age of onset was earlier in Group A than in Group B (3.64±2.65 yrs vs 5.29±3.64 yrs; $p<0.05$); duration of disease was longer in group A than in Group B (5.21±2.57 yrs vs 3.44±2.43 yrs; $p<0.02$).
Conclusions: The incidence of neurocognitive disorders was greater in children with SDB than in controls. A significant correlation was present between neurocognitive impairment and both SDB's age of onset and duration of disease suggesting that early onset and a long duration of disease are the major risk factor.

P1741

Mean platelet volume in obstructive sleep apnea patients. Another link to cardiovascular disease?

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Pobjective and aims: Various studies have examined the association between Obstructive Sleep Apnea (OSA) and cardiovascular risk. Mean Platelet Volume (MPV) has been evaluated as a potential marker of cardiovascular risk in several lines of patients. The aim of this study was to evaluate MPV in relation to OSA severity, as well as to investigate the associations between MPV and anthropometric characteristics and parameters of breathing function during sleep.
Materials and methods: This study included 699 subjects with suspected sleep apnea, who were all evaluated by Epworth Sleepiness Scale (ESS), physical examination and polysomnography. According to Apnea-Hypopnea Index (AHI), patients were divided into 4 groups: Group A (n=156) with AHI<5/h; Group B (n=137) AHI: 5-14.9/h; Group C (n=100) AHI: 15-29.9/h and Group D (n=303) AHI ≥30/h. MPV (blood samples anticoagulated with sodium citrate) was measured in two blood cell counters (Sysmex SF-3000 and Sysmex XE 2100).
Results: MPV was significantly higher in group D (mean value 11.7±1.2) than in groups A (9.9±1.2), B (9.9±1.6), and C (10.8±1.8) ($p<0.001$). In all patients, significant correlations were shown between MPV and AHI ($p<0.001$), average SpO_2 ($p<0.001$), minimum SpO_2 ($p<0.001$), t<90 ($p<0.001$), Arousal Index ($p<0.001$) and ESS ($p=0.002$), while regression analysis revealed no association between MPV and BMI ($p=0.855$) or age ($p=0.774$).
Conclusions: MPV is higher in patients with severe OSA and is correlated with various indices of breathing function during sleep, suggesting a role in the pathogenesis of cardiovascular risk in OSA patients.

P1742

Prevalence and predictors of arrhythmia in patients with obstructive sleep apnea (OSA)

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Background: Very limited number of studies has addressed cardiac arrhythmias in OSA patients.
Objectives: To estimate the prevalence and types of arrhythmias in OSA patients and to try to detect predictors for arrhythmia in this group of patients.
Methods: In this case-control study, polysomnography (PSG) of all patients with and without OSA were reviewed by physicians who were blinded to the existing sleep disorder for the presence of arrhythmia.
Results: The study comprised 257 OSA patients and 99 non-OSA patients (control group). OSA patients had a mean age 47.9±13.5 years, body mass index of 35.7±9.5 kg/m^2, apnea hypopnea index (AHI) of 42.4±36.9/hr, and males represented 60.7% of the group. The prevalence of arrhythmia in OSA patients was higher than that in the non-OSA group (24.5% vs. 12.1%, $p = 0.01$). Among OSA patients, premature atrial contraction was present in 10.1%, premature ventricular contraction in 16.3% and atrial fibrillation in 4 patients (1.6%). OSA patients with arrhythmias were significantly older (53.5±15.3 years vs. 46±12.4 years; $p<0.05$), heavier (38.3±9.1 kg/m^{2}vs. 34.9±9.5 kg/m^2; $p<0.05$), had lower average nocturnal O2 saturation (91.4±6.8% vs. 93.6±5.6%; $p<0.05$), and spent longer time with O2 saturation <90% (22.6±36.1 minutes vs. 11.2±25.2minutes; $p<0.05$). OSA patients with arrhythmias had a higher prevalence of hypertension and ischemic heart disease. Multivariate logistic regression analysis identified ischemic heart disease as the only predictor of arrhythmias (OR 2.364, CI:1.004-5.592, $p<0.05$).
Conclusions: Arrhythmia was more prevalent among OSA patients with longer periods of hypoxemia and those with ischemic heart disease.

P1743

Effects of auto-servo ventilation on cardiovascular function in patients with congestive heart failure and sleep-disordered breathing – A multicenter randomised controlled trial

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Background: Auto-servo ventilation (ASV) has been shown to effectively suppress sleep-disordered breathing (SDB) in patients with congestive heart failure (CHF). However, the effects of ASV on cardiac function, daytime activity and quality of life are unclear (QOL).
Methods: Patients with stable optimised CHF (Left ventricular ejection fraction (LVEF) ≤40%) and SDB (Apnoea-Hypopnoea Index (AHI) ≥20/hour) were randomised to either ASV (BiPAP ASV, Philips Respironics, n=37) or the control-group (n=35). LVEF (primary endpoint of the study, echocardiography), AHI (polysomnography scored in one core lab), B-type natriuretic peptide (NT-proBNP), daytime activity duration (actigraphy) and QOL (SF-36) were assessed at baseline and 3 months.
Results: Significantly larger reduction in AHI was observed in the ASV-group (average daily ASV use was 4.47±2.93 hours/day) than in the control group (-39±16 vs. -1±13/hour, $p<0.001$). Both groups showed similar significant increase of LVEF (+3.4±5 vs. +3.5±6%, $p=0.9$). In the ASV-group the reduction of NT-proBNP (-360±569 versus +135±625 ng/ml) and the increase of daytime activity duration (+14±52 vs. -24±41 min) was significantly greater than in the control group ($p=0.01$ for both comparisons). Significant improvement was seen in 3 of 8 domains of the SF-36 questionnaire in the ASV-group.
Conclusions: ASV in CHF patients with SDB reduces NT-proBNP levels as a surrogate for improvement of cardiac function. Such changes were not associated with significant changes in LVEF. Patients on ASV improved their activity periods during the day and some domains of QOL.

P1744

Effect of auto servo-ventilation (ASV) and continuous positive airway pressure (CPAP) on B-type natriuretic peptide (NT-proBNP) in patients with co-existing obstructive (OSA) and central sleep apnea (CSA) in heart failure (HF)

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Introduction: The optimal ventilatory mode for patients with co-existing OSA and CSA in HF is unclear. We investigated the effects of ASV and CPAP therapy on NT-proBNP, a marker of HF severity.
Methods: 70 patients (66.3±9.1 y., 31.3±6.0 kg/m^2) with <80% Cheyne-Stokes respiration and 20-50% obstructive disturbances were randomly assigned to either ASV or CPAP treatment (BiPAP autoSV, Philips-Respironics). Polysomnographic parameters and NT-proBNP levels were measured at baseline and after 12 months. Data of patients who used their device during the whole period were analyzed (26 ASV, 25 CPAP). For further analysis, patients were divided into responders (AHI<10/h and <50% below baseline AHI) and non-responders.
Results: AHI significantly improved in both groups (ASV: 48.0±25.0 vs. 6.9±6.8/h, $p<0.001$, CPAP: 41.6±15.4 vs. 11.4±9.6/h, $p<0.001$). ASV was superior in reducing central disturbances (5.0±5.9 vs. 9.1±8.2, $p<0.05$). NT-proBNP was similar at baseline and improved after 12 months only in the ASV group (ASV: 537±892 vs. 241±315ng/L, CPAP: 687±979 vs. 876±1882 ng/L,

p<0.05). There were 32 responders (19 ASV, 13 CPAP) and 19 non-responders (7 ASV, 12 CPAP). NT-proBNP among responders was lower after treatment (214±236 vs. 1016±2121, p=0.07).
Conclusions: Effective treatment of co-existing OSA and CSA with ASV improves NT-proBNP levels, suggesting a relief of cardiac load. This may be related to a more efficient reduction of central disturbances in this group of patients compared to CPAP.

P1745
Adaptive servoventilation reduces the risk of malignant arrhythmic events in patients with congestive heart failure and Cheyne-Stokes respiration
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Cheyne-Stokes respiration (CSR) is an independent risk factor for malignant arrhythmias in patients (pts) with congestive heart failure (CHF). The aim of this study was to investigate whether treatment of CSR with Adaptive Servoventilation (ASV) reduced the risk of malignant arrhythmic events in pts with CHF.
403 pts with CHF (LVEF ≤ 45%, NYHA-class ≥ 2) and an implanted CRT-D or ICD device underwent overnight polygraphy with 221 having mild or no CSR (Apnea Hypopnea Index (AHI) < 15/h), and 182 having moderate to severe CSR (AHI > 15/h). Those with CSR were offered therapy with ASV accepted by 96 and rejected by 86 pts. During follow-up (48 months) CRT or ICD monitored ventricular arrhythmias and cardioversion events were recorded in addition to clinical and physiologic measures of heart failure severity.
Event-free survival from a) appropriately monitored ventricular arrhythmias and b) appropriate cardioverter-defibrillator therapies was shorter in the untreated CSR group compared to the treated CSR and the no CSR group. Stepwise Cox proportional hazard regression analysis showed untreated CSR (a: HR 1.99, 95%CI 1.46-2.72, p<0.001; b: HR 2.19, 95%CI 1.42-3.37, p<0.001), but not treated CSR (a: HR 1.06, 95%CI 0.74-1.50; p=0.77; b: HR 1.21, 95%CI 0.75-1.93, p=0.43) was an independent risk factor.
Conclusion: In pts with CHF and CRT/ICD the presence of untreated CSR is a risk factor for malignant arrhythmias. Treatment of CSR with ASV mitigates the risk. If present, CSR appears a therapeutic target for pts with CHF at risk of malignant arrhythmias.

P1746
French national prospective registry of sleep apnea (RESAS): Determinants of hypertension and cardiac failure in 3093 obese patients
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Rationale: Both obesity and obstructive sleep apnea (OSA) are risk factors for hypertension (HT) and chronic heart failure (CHF). The association between OSA and COPD (overlap syndrome) and the obesity hypoventilation syndrome (OHS) have been proposed as leading to enhanced cardiovascular risk.
Methods: 3093 obese subjects (IMC>30kg/m^2) referred for suspicion of OSA were prospectively assessed by sleep studies, lung function tests and blood gazes. For the whole group, mean age was 57±13 years with 66% of men, mean BMI: 36.8±6.2 kg/m^2, 52.8% of the subjects being hypertensive and 3.23% suffering from CHF. 926 of the 3093 did not exhibit OSA or COPD.
Results: In multivariate analysis, prevalent hypertension was associated with OSA (Odd ratio (OR): 1.23 (confidence intervals (CI): 1.04-1.45), p=0.015), ≥2 nocturia episodes per night (OR: 1.295 (CI: 1.10-1.52), p<0.01), type 2 diabetes (OR: 2.12 (CI: 1.56-2.88), p<0.01), hypercholesterolemia (OR: 1.94 (CI: 1.6-2.34), p<0.01), reduced physical activity (OR: 1.25 (CI: 1.04-1.49), p<0.01), each one unit increase in BMI increase (OR: 1.025 (CI: 1.01-1.04), p<0.01), each one unit increase in age (OR: 1.06 (CI: 1.04-1.07), p<0.01). In multivariate analysis, cardiac failure was explained by diurnal hypoventilation (OR: 2.64 (CI: 1.67-4.29), p<0.01), reduced physical activity (OR: 3.73 (CI: 2.44-5.7), p<0.01), former smoking (OR: 1.63 (CI: 1.06-2.51), p=0.025), and each one unit increase in age (OR: 1.07 (CI: 1.03-1.11), p<0.01).
Conclusions: Sleep apnea was linked with HT independently of other classical cardiovascular risk factors. Diurnal hypoventilation was highly predictive of cardiac failure.

P1747
Neurocognitive profile of children with congenital central hypoventilation syndrome (CCHS)
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Congenital Central Hypoventilation Syndrome (CCHS) is a rare disorder of severe central autonomic respiratory control and global dysfunction of autonomous system. Patients present with severe apnoeas and alveolar hypoventilation at birth, requiring ventilatory support for lifetime. PHOX-2B gene mutation is found in most patients. The present study examines the neuropsychological profile of children with PHOX-2B mutation confirmed neonatal onset CCHS.
Methods: During their follow-up in the French Center of Reference of CCHS in Paris, France, 16 children (mean age 8.9 yrs ± 8.1) underwent neurocognitive assessment. Verbal functions, visuoperceptive reasoning, memory and visuographic speed were evaluated. Furthermore, visuospatial treatment and attention and executive functions were tested for 9 children.
Results: For the whole group, mean general intelligence index (75,9) was lower than that of the general population. However, a large variance was observed (SD 20,6) as well as a broad range of intellectual abilities. Memory difficulties were observed among 38% of the children and a slower cognitive treatment in 33%. In addition, attention deficits and visuospatial disorders were present in 67% and 66% of them respectively.
Conclusions: Children with CCHS are at risk to develop neurocognitive deficits, especially in memory, attention and visuospatial treatment. Factors underlying these abnormalities are to be determined. Neurocognitive monitoring should be included in long-term follow-up of CCHS.

P1748
The use of occlusal splint can change autonomic cardiac modulation in bruxers?
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Introduction: Sleep bruxism was recently classified as a sleep related movement disorder and it been linked to emotional alterations, arousals and neurological systems.
Objective: To evaluate the alteration in heart rate variability (HRV) in bruxers prior and after 1 month of occlusal splint (OS) usage.
Methods: Thirteen consecutive patients were enrolled in the study. Patients related masseter, temporalis, cervical and headache pain. Clinical diagnosis of SB was made considering the presence of tooth wear, the presence of hypertrophy of masseter and/or temporalis muscles and sleep bruxism events related by partners. Upper and lower stone casts were made to analyze tooth wear degree and location. The T-test for paired observation and Wilcoxon test for non paired observations was used to analyze the impact of OS on HRV.
Results: All TMD symptoms were decrease after first month of OS usage. The HRV assessed by NES showed that the RR interval improved from 801.0±28.0 to 833.0±30.0 but was not significant. The frequency–domain parameter was not significant for both Fast Fourrier Transform and Wavelet spectral method in both parasympathetic and sympathetic area. Low frequency and High frequency did not alter post 1 month of OS usage.
Conclusion: Occlusal splint reduced all TMD symptoms related prior treatment. HRV was not changed, maybe due to the short period of the study, one month, of OS usage. Further evaluation with a longer period of treatment is needed.

P1749
SAHS and stroke. CPAP compliance and new stroke events
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Aim: To describe CPAP compliance and new ischemic stroke events in SAHS post stroke patients.
Methods and participants: Prospective observational study. Inclusion criteria: patients suffered from stroke event from January 2000 until November 2010 and posterior SAHS diagnosis with 3 months follow up. Two groups were defined: group 1, patients with current CPAP use and group 2, patients with no CPAP treatment. All were evaluated for new stroke events. SAHS, was defined as AHI (apnea + hypopnea per hour of sleep/recording) ≥ 10 and severe as AHI >30. Bivariate analysis was performed to evaluate differences between groups, and multivariate of COX proportional risks to review new stroke and variables as sex, age, BMI, neck circumference, Epworth scale, ODI,% time saturation under 90%, AIH, cigarette smoking and hypertension.
Results: 110 patients were included, 85 men (77%), mean age 62±10.7 SD. Group 1 and group 2 were 62 and 48 patients, respectively. New events incidence in

group 1 was 16 (26%) and 11 (23%) in group 2, they were no significant statistic differences (p=0.72). The statistically significant variables in multivariate analysis were neck circumference OR [0.87 (IC95% 0.76-0.99; p=0.04)] and BMI OR [0.86 (IC95% 0.75-0.98; p=0.02)]. The survival analysis results are:

	Mean age (± SD)	Median survival	P (Log rank)
Group 1	62.65±9.76	*	0.012
Group 2	64.04±12.36	*	0.012

*Not reached.

The stroke event free time until new event in group 1 was 31.4 months ± 22.6 SD, and in group 2, 25.32 months ±13.9 SD, without statistical significance.
Conclusions: New stroke development is not associated with CPAP compliance, however it seems to have longer survival probability in CPAP compliant patients.

P1750
Gender-dependent characteristics of sleep-disordered breathing in chronic heart failure
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Background: Sleep-disordered breathing (SDB) is common in patients with chronic heart failure (CHF) and influences the progression of the disease. Large multi-centre studies are missing yet.
Methods: In the ongoing prospective multi-centre SchlaHF registry we studied so far 1,273 CHF patients diagnosed by gold standard polysomnography (PSG). New York Heart Association (NYHA) class was ≥II and left-ventricular ejection fraction (LVEF) ≤45%. Patients were screened with a two-channel device and referred to a sleep laboratory in case of suspected SDB. Using PSG we studied sleep and SDB characteristics in these referred CHF patients. SDB was defined as apnea-hypopnea index (AHI) >15/h.
Results: Gender-dependent sleep efficiency was similar in central sleep apnea (CSA) (m: 75.6%, f: 76.2%, n.s.), obstructive sleep apnea (OSA) (m: 73.8%, f: 70.4%, n.s.) and in patients without SDB (m: 76.0%, f: 73.9%, n.s.). The same results we found for sleep duration in CSA (m: 317min, f: 324min, n.s.), OSA (m: 313min, f: 294min, n.s.) and no SDB (m: 320min, f: 312min, n.s.). We studied AHI in CSA (m: 38.1/h, f: 32.6/h, n.s.), OSA (m: 38.0/h, f: 34.9/h, n.s.) and in patients without SDB (m: 8.5/h, f: 9.0/h, n.s.). Significant gender-dependent differences were found in the respiratory subindices: apnea-index (AI) in CSA (m: 23.8/h, f: 14.5/h, p<0.05), OSA (m: 22.4/h, f: 14.5/h, p<0.05) and in patients without SDB (m: 3.7/h, f: 3.2/h, n.s).
Conclusions: In the SchlaHF registry sleep duration and sleep efficiency were similar both in men and women regarding CSA, OSA and patients without SDB. Gender-dependent differences were found in the subindices AI and HI.

P1751
The impact of obstructive sleep apnea syndrome on cardiovascular system in children
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Introduction: Obstructive Sleep Apnea Syndrome (OSAS) has been shown to be an independent risk factor for cardiovascular disease in adults. However, few data are known about the effect of OSAS on cardiovascular system in children.
Aims: To investigate clinical and laboratory parameters associated with cardiovascular disease in children with OSAS.
Methods: Seventeen subjects, aged 5 to 12 years (mean age 9,24±2,19 years), referring for evaluation of systematic snoring (≥4 nights/week), underwent overnight polysomnography,evaluation of blood pressure, lipidaemic profile and complete echocardiographic assessment. According to the Apnea Hypopnea Index (AHI) subjects were divided into three groups: A. primary snoring (AHI<1, n=1), B. mild OSAS (AHI= 1-5, n=12), C. moderate-severe OSAS (AHI >5, n=4).
Results: There were no significantly differences in age, sex, heart rate, systolic and diastolic blood pressure and lipidaemic profile among the groups (p≥0.05).Right ventricular dimension (Right Ventricular end-Diastolic dimension -RVDd) and left ventricular dimensions (Left Ventricular end-Diastolic dimension – LVDd, Left Ventricular diastolic mass – LVdmass, Left Ventricular Posterior Wall diastolic –LVPWd, IntraVenticular Septum diastolic – IVSd)), were not statistically significant different between the three groups and were within normal limits. RVDd was higher in OSAS patients (p=0,096) than in controls.
Conclusion: The present study suggests that young patients with systematic snoring have no echocardiographic evidences of cardiac dysfunction. Nevertheless, there is a correlation of increased right ventricular dimension, although not statistically significant, in patients with OSAS.

P1752
Effect of disease severity on heart rate recovery following laboratory and field exercise testing in patients with obstructive sleep apnea (OSA): A comparative study
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Introduction: It is known that patients with Obstructive Sleep Apnea (OSA) have increased activity of the sympathetic nervous system and decreased activity of the parasympathetic nervous system. Heart rate recovery in the first minute after exercise (HRR_1) is often used as an index to stratify risk factor for cardiovascular mortality in OSA patients.
Methods: We studied twenty five patients by polysomnography in the laboratory. Ten patients diagnosed with moderate OSA (15<AHI<30), ten patients diagnosed with severe OSA (AHI>30) and five participants were normal (AHI<5). HRR_1 following cessation of incremental exercise to the limit of tolerance on the cycle ergometer and after termination of a six minute walking test (6MWT) was assessed by a Nonin pulse oximeter worn on the wrist in all patients and controls.
Results: There was a significant (p<0.05) difference in HRR_1 after the maximal incremental test among severe and moderate OSA patients and healthy controls (by 18±5 and 25±5 and 34±4 beats/min, respectively). Similarly, HRR_1 after the 6MWT was different between the two patient groups (severe by 15±5 and moderate by 19±4 beats/min) and normal subjects (28±5). There was no difference in the magnitude of HRR_1 between the two exercise tests across the three groups.
Conclusion: The more advanced the disease severity of OSA the slower was the recovery of heart rate after the exercise. The 6MWT reflects equally well to the incremental maximal test the sluggishness in heart rate recovery and hence it can be used alternatively to the maximal exercise test to detect the likelihood of cardiovascular risk in patients with OSA.

P1753
Impact of obstructive sleep apnea on diastolic function
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The association of obstructive sleep apnea (OSA) with diastolic dysfunction is unclear. We investigated whether OSA independently affects diastolic function in a primary care cohort of patients with cardiovascular risk factors.
378 study participants with risk factors for diastolic dysfunction (e. g. hypertension, diabetes, heart failure) from the germanwide DIAST-CHF cohort were prospectively included into this substudy and a polygraphy was performed in all patients. Diastolic dysfunction was assessed by comprehensive echocardiography including tissue Doppler.
Patients with more episodes of central sleep apnea than obstructive sleep apnea were excluded from further analysis (n=14). In the remaining subjects, 22.8% had an AHI > 15/h. The prevalence of diastolic dysfunction increased from 75.0% (none) to 81.8% (mild) to 90.2% (severe sleep apnea), p=0.020. The degree of diastolic dysfunction also increased with sleep apnea severity. In univariate regression analysis, age, AHI > 15, heart rate, body mass index, systolic blood pressure and left ventricular mass were associated with diastolic dysfunction. In multivariate regression analysis, only age, AHI > 15 and heart rate were independently associated with diastolic dysfunction.
In conclusion OSA is independently associated with diastolic dysfunction in patients with risk factors for diastolic dysfunction.
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P1754
Early cardiovascular disease markers in "healthy" OSA patients are correlated with sympathetic activity
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Rationale: Obstructive sleep apnea syndrome (OSAS) is associated with high Sympathetic activity (SA) and a subsequent risk of hypertension and atheroscle-

rosis. Objectives were to assess SA and its impact on early cardiovascular disease markers.

Methods: In 25 otherwise healthy OSA and 13 aged-matched controls we measured SA by direct peroneal microneurography: Muscle Sympathetic Nerve Activity (MSNA). All subjects underwent a full polysomnography, 24h Ambulatory Blood Pressure Monitoring (ABPM), arterial stiffness by Pulse Wave Velocity (PWV), vascular reactivity by Peripheral Arterial Tone (PAT) and early atherosclerosis by arterial carotid Intima Media Thickness (IMT). Preliminary data in 7 OSA and 7 controls were obtained after 6 month (CPAP for OSA).

Results: OSA patients (BMI 25.9±2.8 kg/m^2; AHI 38.8±20.4/h; Age 53±11 yrs) and healthy controls (BMI 23.9±2.6 kg/m^2; AHI 7.9±5.8/h; Age 48±13 yrs). They were comparable for all but for BMI ($p<0.05$). At baseline SA was higher in OSA than in controls 39.8±9.4 vs 30.6±7.3 bursts/min $p<0.01$). SA was correlated with OSAS severity (mean nocturnal SaO_2, -0.401 $p<0.05$). SA also correlated with cardiovascular markers, vascular reactivity PAT (-0.354 $p<0.05$), systolic and diastolic office (0.406 $p<0.05$ and 0.536 $p<0.001$) and ABPM blood pressure (0.4 $p<0.05$ and 0.514 $p<0.01$), and IMT (0.464 $p<0.01$). 6-month CPAP treatment induced a significant reduction in SA -10.3±8.1 vs 1.5±5.9, bursts/min $p<0.01$).

Conclusion: Early cardiovascular disease markers are correlated with SA, supporting the fact that SA is likely to play a significant role in the cardiovascular morbidity of OSA patients.