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Assessment of the prevalence of obstructive sleep apnea in patients with undiagnosed chronic cough

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Background: Recent reports have suggested an association between chronic cough and obstructive sleep apnea (OSA). There is also evidence that treatment of sleep apnea can improve chronic cough.
Objective: Is to assess the prevalence of OSA in patients with undiagnosed chronic cough and the effect of using CPAP therapy on the improvement of cough in those patients.
Methods: The present study included 100 non smoker patients complaining of cough for more than 8 weeks without obvious diagnosis, after exclusion of any parenchymal lung or mediastinal diseases using chest X-ray, CT chest, pulmonary function testing, and methacholine challenge test to exclude cough variant asthma, patients undergone full polysomnography to screen for OSA and in whom proved to have the diagnosis, CPAP was tried for 2 weeks then follow up of the cough frequency and severity was done.
Results: The study included 100 patients, with 60% females and 40% males, the duration of cough in weeks was 18.16±6.01 weeks, the most common cause of cough was gastroesophageal reflux disease (GERD) which was present in 70% of cases followed by upper airway cough syndrome (UACS) which was present in 50% of cases, OSA was present in 25% of patients in association with GERD in 15 patients and in association with UACS in 10 patients (10%). There was significant improvement of cough after using CPAP for 2 weeks (visual analogue scale (VAS) dropped from 82.4±8.6 mm to 7.4±5.11 mm after use of CPAP).
Conclusion: OSA should be ruled out in patients with undiagnosed chronic cough as it is a common finding. CPAP seems to be an effective tool in treating those patients.

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Health, social and economic consequences of sleep disordered breathing: A controlled national study evaluating the societal effect on patients and their partners

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The objective direct and indirect costs of obstructive sleep apnea (OSA) and obesity hypoventilation syndrome (OHS) on patients and their partners are incompletely described.
Using data from the Danish National Patient Registry (1998-2010), 30278 OSA and 1562 OHS patients and their partners were identified. Four matched citizens based on age, gender and social status matched served as controls.

Direct costs were extracted from the Danish Ministry of Health, Danish Medicines Agency and National Health Security, and indirect costs from the Coherent Social Statistics.
66.2%/63.4% of all OSA/OHS patients was co-living versus 65.4%/65.6% of controls. OSA/OHS showed higher rates of health-related primary and secondary care, medication, unemployment, and other socioeconomic costs. The income level of OSA/OHS patients were lower. The annual mean excess total direct and indirect health-related cost for each patient was €2821 before and €5060 ($p<0.001$) after an OSA diagnosis and €10463 before and €15001 after an OHS diagnose.
Partner's total health expenses and the public transfer income were higher, whereas the employment rate and income level were lower than controls. The annual mean excess total cost for each partner was €2639 before diagnosis and €3058 ($p<0.001$) after the pts OSA diagnosis, €3523 before and €4068 ($p<0.001$) after the pts OHS diagnose,
These effects were present 11 years prior to an OSA/OHS diagnose in patients and partners, and increased with disease advancement.
OSA and especially OHS are associated with a major health and social effect affected employment and income level affecting the patients and partners.

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Prevalence of sleep apnoea, sleepiness and behavioural/emotional disturbances in adults with Down's syndrome in Scotland

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Introduction: Adults with Down's syndrome (DS) are predisposed to sleep apnoea (SA). Prevalence is, as yet, unknown.
Aims and objectives: To assess prevalence of SA, sleepiness and behavioural and emotional disturbances in adults with DS in Scotland.
Methods: A sleep questionnaire, including the pictorial Epworth Sleepiness Scale (pESS) and subscales of the Developmental Behaviour Checklist for Adults (DBC-A), was sent to 650 adults (age ≥16yrs) with DS.
All respondents were offered sleep studies (Embletta® Gold, Embla Systems LLC). Standard statistical analysis was undertaken.
Results: Response rate was 42% (246 valid). 16 respondents had existing SA; 11 were treated. Mean age was 31±11 years. BMI was 30±7 kg/m^2, higher in females (p=0.009). Mean pESS score was 7±5, with males sleepier (p=0.016). 176 respondents reported snoring; 85 snored often or frequently. 60 reported apnoeas. To date, 23 patients (15 males) have had sleep studies, 20 being valid. Mean age was 26±9 yrs. Mean BMI was 30±7 kg/m^2; females were heavier (p=0.001). Median AH (apnoeas+hypopnoeas per hour in bed) was 28.6 (IQR 14.8-48.2). Median ODI (≥4% O_2 desaturations per hour in bed) was 6.5 (IQR 2.1-30.9). Snorers scored higher on pESS (r=0.459, p=0.042) and DBC-A disruptive subscale (r=0.463, p=0.040). BMI correlated with the anxiety/antisocial subscale (r=0.606, p=0.010).
Conclusion: This is the first population survey of SA in DS adults. Females were less sleepy than males, despite being more obese. Snoring was associated with sleepiness and disruptive behaviour. Heavier patients were more anxious. The study is ongoing.
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P1880

Menstrual status in women and sleep-related outcomes

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Background: There is limited knowledge about how menstrual status may influence sleep related outcomes. We aimed to investigate whether irregular menstruation and menopause affect sleep related symptoms including insomnia and gastroesophageal reflux,
Methods: A population-based sample of 8588 women aged 25-55 years answering the Respiratory Health In Northern Europe (RHINE) postal questionnaire were analyzed. Logistic regression models were adjusted for BMI, age, smoking history and socioeconomic status.
Results: Women reporting irregular menstruations had significantly more sleep-related symptoms (reflux after going to bed OR=1.67 [1.30–2.15], difficulty falling asleep (DIS) 1.42 [1.11–1.80], difficulty maintaining sleep (DMS) 1.44 [1.23–1.70], excessive daytime sleepiness (EDS) 1.27 [1.08–1.48] and early morning awakening (EMA) 1.45 [1.15–1.82]) than women menstruating regularly. Menopausal women had significantly higher risk of sleep-related symptoms (reflux after going to bed OR=1.43 [1.07–1.90], DIS 2.04 [1.58–2.63], DMS 1.87 [1.57–2.23], EDS 1.44 [1.21–1.73] and EMA 1.73 [1.38–2.17]) than premenopausal women.
Conclusions: Sleep quality among women was significantly related to menstrual status; women with irregular menstruations and menopausal women suffered from more sleep-related symptoms with insomnia and gastroesophageal reflux.

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Sleep pattern changes in patients with liver cirrhosis

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Background: Liver cirrhosis is a major cause of mortality worldwide. One of the least studied complications of liver cirrhosis is the disturbed sleep pattern.
Methods: This study included two groups; the first group consisted of 30 patients diagnosed as liver cirrhosis based on abdominal ultrasound and liver biopsy and the second group consisted of 10 healthy subjects served as controls. Epworth sleepiness score (ESS) was calculated for every patient and all patients were subjected to complete overnight polysomnography to detect sleep disturbances among all participants.
Results: Our results showed that cirrhotic patients had ESS, AHI (apnea hypopnea index) and OSA (obstructive sleep apnea) significantly higher than the control group [16.4±2.6 vs 11.1±1.8, P = 0.0001; 10.9±8.5 vs 2.4±1.6, P = 0.005 and 3.1±3.1 vs 1.1±0.9, P = 0.03 respectively]. The percentage of sleep efficiency was significantly lower in cirrhotic patients than the control group [61.9±12.9 vs 73.1±7.6 (P = 0.02)]. Also, the percentages of S1, S3-4 and REM sleep in relation to the total sleep time were significantly higher in the cirrhotic patients than the control group (P = 0.01, 0.02 and 0.06 respectively) while the percentage of S2 was significantly lower (P = 0.02). Cirrhotic patients of Child class C had ESS, AHI and OSA significantly higher and sleep efficiency significantly lower than cirrhotic patients of classes A and B (P = 0.001 for all). Cirrhotic patients with tense ascites had ESS, AHI and OSA significantly higher and sleep efficiency lower than patients with mild, moderate, or no ascites (P = 0.001 for all).
Conclusion: This study revealed that cirrhotic patients had disturbed sleep pattern, correlating with the degree of cirrhosis.

P1882

In sleep apnea patients nonalcoholic fatty liver disease (NAFLD) is associated with the severity of intermittent hypoxia and more severe endothelial dysfunction

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Introduction: Nonalcoholic fatty liver disease (NAFLD) begins with the accumulation of triglycerides in the liver and elicits an inflammatory response that can progress to cardiovascular complications, cirrhosis and liver cancer. Intermittent hypoxia is a potential contributing factor but NAFLD has not been investigated in an unselected obstructive sleep apnea (OSA) population. Beyond liver biopsy, there are non invasive validated tools allowing a screening of NAFLD in large populations.
Aims: (i) To use non-invasive blood tests (Steatotest®, NASHtest® and Fibrotest®) to evaluate steatosis, Nonalcoholic Steato hepatitis (NASH) and fibrosis in a large cohort of OSA (II) To assess endothelial function by peripheral arterial tone (PAT).
Patients: 226 subjects referred for suspicion of OSA were included (men: 55%, median age: 56 years, mean BMI: 34 kg/m^2).
Results: 61.5% of OSA patients exhibited advanced steatosis. By multivariate analysis, triglycerides ($p<0.0001$), insulin resistance (p=0.0004) and nocturnal cumulative time spent <90% of SaO2 (CT90) (p=0.01) were independent factors for liver steatosis. 38% of OSA displayed NASH (N1 or N2 with NASHtest®). CT90 was significantly associated with NASH (p=0.035) but this became non significant in multivariate analysis. Endothelial function was more impaired in OSA patients with advanced steatosis (p=0.04) and NASH (p=0.013).
Discussion/Conclusion: In a large unselected population of OSA, the severity of intermittent hypoxia was independently associated with steatosis. Endothelial dysfunction was more severely impaired in OSA patients demonstrating NAFLD.

P1883

Noninvasive evaluation of hepatic steatosis and fibrosis in OSA patients at diagnosis

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In morbidly obese patients, non-alcoholic fatty liver disease (NAFLD) frequently occurs in patients with obstructive sleep apnea (OSA) compared to patients without OSA, and OSA may play a role in the pathogenesis of steatohepatitis. We non-invasively assessed hepatic steatosis (ultrasound) and fibrosis (Fibroscan elastometry) in 20 consecutive patients (mean age±SD: 48±11 yr; BMI: 34.9±5.9 kg/m^2; 4 women) with newly diagnosed OSA and no history or serologic evidence of hepatic disease. Inclusion criteria were: alcohol consumption <30 g/die, no use of statins or other lipid-lowering drugs. Patients underwent nocturnal 8-channel monitoring, venous blood sampling (hepatic function tests, fasting blood insulin and glucose, serum lipids), hepatic ultrasound evaluation, and Fibroscan elastometry. Severe OSA was found in most patients (mean AHI±SD 52±22 events/h; mean nocturnal SaO2 90.7±3.8%; Epworth Sleepiness Scale score 12.7±4.9). Twelve patients showed the metabolic syndrome (MetS, NCEP-ATP III). Three patients showed increased serum ALT (>40 U.I.); they were significantly younger (age 36.7±1.5 vs. 50.3±11.1 yr) and more obese (BMI 40.9±8.2 vs 33.8±5.0 kg/m^2) than the rest of the sample. Hepatic steatosis (n=19) was mild in 4 patients, moderate in 1, and severe in 14; all patients with increased ALT showed severe steatosis. Severe steatosis occcured in most patients with MetS and tended to be associated with severe OSA. Fibroscan elastometry (n=14) gave an average value of 6.2±2.3 (normal <5, fibrosis >12). Therefore, noninvasive evaluation revealed a trend for hepatic steatosis to be associated with severe OSA and obesity, while hepatic fibrosis appeared absent or mild in our patients.

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Resting energy expenditure in patients with obstructive sleep apnea

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Introduction: Obstructive sleep apnea (OSA) may contribute to increases in resting energy expenditure (REE) through hypoxia-related sympathetic activation and hormonal dysregulation. The reports on REE in OSA are scarce, and are confounded by body weight and gender differences.
Aim: We assessed REE adjusted for fat-free mass (FFM) in male patients with OSA and hypothesized that REE/FFM ratio is related to indices of OSA severity.
Methods: 26 male subjects (age 48.4±11.3 years) evaluated for suspected OSA underwent overnight polysomnography. Body composition was assessed by tetrapolar bioimpedance method and REE by indirect calorimetry. REE/FFM ratio was compared between 16 patients with severe OSA [apnea-hypopnea index (AHI)>30; mean AHI 60.8±20.1 events/hour] and 10 control subjects (AHI<15; mean AHI 10.7±4.4).
Results: Patients with severe OSA had increased REE/FFM compared to controls (30.4±3.1 versus 27.3±4.0 kcal/kg/24 h, p=0.033). In univariate analyses, REE/FFM was directly related to AHI, oxygen desaturation index (ODI) and arousal index (R=0.486, p=0.012; R=0.561, p=0.003; R=0.482, p=0.013, respectively). In multivariate analysis, only ODI remained an independent predictor of REE/FFM after adjustments for age, body mass index, AHI and arousal index (p=0.027, R^2=0.438).
Conclusion: Resting metabolic rate was increased in patients with severe OSA and correlated with indices of OSA severity. The independent predictive value of ODI suggests a possible role for intermittent hypoxia in the regulation of energy metabolism in OSA.
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Impairment of endothelial function by chronic intermittent hypoxia in ApoE-/- mice – Implications for anti-inflammatory and anti-oxidative treatment

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Background: In our present study we sought to determine the influence of intermittent hypoxia on the endothelial function and to prove the reversibility of hypoxia-associated vascular changes under anti-inflammatory (infliximab) and anti-oxidative (L-glutathione) therapy.
Methods: 36 ApoE-/- mice fed a high-cholesterol diet were divided into 4 groups: 1-3 under intermittent hypoxia 8 h/day for 6 weeks. Additionally, groups 2 and 3 were injected intraperitoneally with infliximab (1x week) and L-glutathione (3x week), respectively. Group 4 under normoxia= control. Endothelial-dependent vasorelaxation was measured by an organ bath technique. In cell culture experiments from spleen cells, the percentage of Dil-LDL/lectin double positive cells and the number of colony forming units in late outgrowth endothelial progenitor cells were analyzed by fluorescence and light microscopy, resp. Sca1/flk1 positive cells in bone marrow were counted by flow cytometry.
Results: Endothelial-dependent vasorelaxation was significantly decreased under hypoxia (73±6% vs. control: 45±6%); infliximab and L-glutathione normalized endothelial function (47±6%, 47±9%, resp.). The numbers of Dil-LDL/lectin+ cells and colony forming units were significantly higher in hypoxia compared to other groups. The percentage of sca1/flk1+ cells was increased in hypoxia vs. control and it was reduced in both drug groups (p<0.05).
Conclusions: Obstructive sleep apnoea may contribute to atherosclerosis via intermittent hypoxia-induced impairment of endothelial-dependent vasorelaxation. Infliximab and L-glutathione improve endothelial function and restore endothelial homeostasis.

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Effects of CETP and APOE polymorphisms on lipoprotein levels in patients with obstructive sleep apnea

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Rationale: Cholesterol ester transfer protein (CETP) and apoliprotein E (APOE) polymorphisms were related to serum lipids in association studies. In a mouse model of obstructive sleep apnea (OSA) hypoxia inhibited clearance of triglyceride-rich lipoproteins. Since hypoxia might interfere with genetic background to affect lipid levels, we examined effects of interactions between CETP and APOE variants and hypoxia on serum lipids in OSA patients.
Methods: 634 adult subjects evaluated for suspected OSA underwent overnight polysomnography. The association of HDL-cholesterol (HDLC), triglycerides (TG) and LDL-cholesterol (LDLC) with OSA-related hypoxia reflected by oxygen desaturation index (ODI) was examined and adjusted for relevant covariates.
Findings: Patients were 69.1% male (age 51.1±11.2 years, apnoea-hypopnoea index 30.4±29.9). In univariate analyses, HDLC was related to the both ODI and CETP polymorphism (R=-0.196, p<0.001; R=0.123, p=0.002). In multivariate analysis only CETP genotype remained associated with HDLC (R^2=0.185, p=0.002) and no interaction between CETP variant and ODI was observed. In contrast, TG were related to ODI and APOE polymorphism in the univariate analyses (R=0.284, p<0.001; R=0.100, p=0.013), and also after adjustments (R^2=0.382, p=0.046, p=0.002). Significant interaction between APOE genotype and ODI was observed with respect to TG levels (p=0.010 for the interaction term APOE*ODI).
Conclusion: Our findings support the role of CETP and APOE polymorphisms in atherogenic dyslipidaemia in OSA patients, and suggest the presence of an interaction between hypoxia and APOE genotype to affect TG levels.
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Sleep duration and obesity in women – A 10 year prospective study

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Background: Obesity is highly related to obstructive sleep apnea syndrome. Research has shown that one potential cause of obesity may be short sleep duration.
Aim: The aim was to assess how sleep duration and obesity is related over a 10 year period, in a population-based sample of women.
Methods: A total of 5,003 non-pregnant women (response rate 80%) >=30 years, answered a 10-year follow-up questionnaire. The questionnaire included questions on sleep duration, weight, height, waist circumference, snoring and life style factors. Regression analysis was performed to analyze independent associations between sleep duration and measures of obesity.
Results: In the whole population 31% (n=2,127) of the women had increased their weight by at least 15 kg, 37% (n=2,549) had a BMI>=30 kg/m^2 and 52% were centrally obese (waist circumference ≥88cm). Both short (<6h) (OR=1.38; 95%CI 1.06-1.80) and long sleep duration (≥9h) (1.86; 1.32-2.62) showed to be risk factors for general obesity (BMI≥30 kg/m^2) after controlling for confounders. When dividing the women by age both short and long sleep duration were risk factors in the younger age group (age at baseline <40 years). In women above age 40 years at baseline only long sleep duration remained as a risk factor for general obesity after controlling for confounders. In addition, short sleep duration was shown as a risk factor for central obesity after adjustments (1.46; 1.002-2.14) in younger women, whereas long sleep duration was a risk factor in women age ≥40 years (1.86; 1.17-2.96).
Conclusion: Both short and long sleeping women had a greater risk of general obesity compared with normal sleepers (6-9h). Young short sleepers were also more at risk for central obesity.

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Obstructive sleep apnea and metabolic syndrome in thin patients; characteristics and comparation with patients with overweight and obesity

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Objective: We wanted to know the prevalence of obstructive sleep apnea(OSA)and metabolic syndrome (MS) in thin patients and their characteristics. We also wanted to know if there were differences with overweight and obese.
Methods: We studied the patients that were referred to our sleep laboratory, from January to December 2009. OSAS was diagnosed when apnea hipopnea index (AHI)was>5. MS was diagnosed according to the International Diabetes Federation criteria. The patients were distributed in 3 groups according to BMI: normal or thin (BMI<25), overweight (25-29,9) and obesity (≥30).
Results: We studied 475 patients: 7,6% thin, 36% overweight and 56,4% obese.In the thin's group, most were women, snorers, non-smokers and don't drink alcohol. We diagnosed of OSA 428 (90,1%): in thin 77,7%, in overweight 84,79% and in obese 91,4%. Thin patients with OSA were mostly mild OSA, in overweight mostly moderate and in obese severe.There were differences between OSA's diagnose and categorized BMI. We diagnosed of MS 288 (64,4%): in the thin's group 33,3%, in overweight 43,94% and in obese 80,93%. We found more probability of MS (p<0,001) with BMI's increase.There were differences between thin's group and the others, thin patients were younger with minor neck and waist perimeter (p=0,021; p<0,001; p<0,001). OSA and MS prevalence in the thin's group was 22% and in obese 70,52%. OSA in thin patients was related with gender (p=0,039 women had less risk) and age(p=0,045 OSA were older).
Conclusions: OSA's prevalence in thin patients is minor.
OSA and MS' prevalence in thin patients is minor than in obese.
Thin patients were most women, younger and without toxic habits.
OSA and MS were not related in thin patients.

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EEG time-frequency maps during respiratory-related cortical activation in humans

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Introduction: Event-locked averaging of EEG recordings has demonstrated that preinspiratory potentials precede inspiration during respiratory-related cortical activation. However, this procedure relies on assumptions of on-going brain activity and is highly susceptible to low frequency artifacts. Frequency analysis is an alternative method of assessing EEG activity, but it is not known if this method can identify respiratory-related cortical activation.
Aim: The aim of this study was to compare time-frequency maps during different respiratory 'tasks'.
Methods: Healthy subjects (n=6) performed 3 conditions: quiet breathing (QB), self-paced voluntary sniffs and ventilation with an inspiratory threshold load (ITL; ~23 cmH_20, range 18-25 cmH_20). EEG recordings were made from 32 channels. Time-frequency maps were computed for each subject and condition for recordings from Fz, FCz, Cz, C3 and C4. Contrasts between conditions were performed by T score calculation with statistical analysis by clustering permutation.
Results: There were differences in cortical activation (alpha band, 8-13Hz) prior to the onset of inspiratory flow on Fz, C3 and C4 between QB and sniffs (p< 0.1) and on C4 between QB and ITL (p< 0.1).
Conclusions: Time-frequency maps varied between different respiratory conditions which suggests they can discriminate differences in cortical activation related to the control of respiration. Furthermore, we can identify the specific frequency components, in addition to time-locked changes in EEG. Analysis of EEG activity above 5Hz may lessen the effect of artifacts on physiological interpretation and increase the feasibility of EEG recordings to assess cortical activation in the clinical setting.

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Manipulating cerebral blood flow affects central sleep apnea at high altitude

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Background: There is an almost universal (>90%) occurrence of central sleep apnea (CSA) in newcomers to high altitude (>5000 m). However, the key factors that determine the severity of CSA upon arrival to high altitude and during acclimatization are not well understood. We hypothesized that cerebral blood flow (CBF) was an important component in the etiology of CSA at high altitude.
Aim: To measure the effects of altering cerebral blood flow (CBF) on central sleep apnoea (CSA) at high altitude.
Methods: 12 normal volunteers aged 30±10 years were studied 6-9 days after arrival at 5,050 metres. After control measurements they received ivi Acetazolamide (Acet) 10mgs/kg or oral Indomethacin (Indo) 100mgs with placebo controls in a randomized order on separate nights. Ventilatory Responses (VRs), ABGs, Apnea-Hypopnea Index (AHI) during the first 3 hours of sleep by polysomnography (PSG) and CBF by transcranial Doppler were recorded. AHI was also measured upon arrival and after 12-15 days to control for acclimatization.
Results: CBF rose by 28% with Acet and fell by 23% with Indo. PaCO2 rose from 28±4 to 31±3 mm Hg with Acet (p<0.001), whereas, ABGs were unchanged with Indo. VRs were unchanged with Acet but Indo increased Hypercapnic VR by 43% (p <0.05). AHI was halved by Acet (89 to 47/hr, (p <0.001), but increased 25% with Indo (89 to 112/hr, p <0.05).
Conclusions: Indomethacin reduced CBF and increased Hypercapnic VR and CSA during the first 3 hours of sleep. Whereas Acetazolamide increased CBF but had no effect on VRs yet reduced CSA severity. These results highlight the link between CBF and CSA at high altitude.
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P1891

Sleepiness influences cytotoxic lymphocytes independent of respiratory events

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Introduction: Obstructive sleep apnoeas have been shown to stimulate the immune system. However, the relevance of sleepiness is less clear. We investigated the influence of objective sleepiness (OS) on the expression of the cytotoxic proteins granzyzme-B (GrB) and perforin (P) in peripheral blood lymphocytes (PBL).
Methods: 43 participants performed polysomnography followed by the pupillary sleepiness test (PST®). PBL were stained for CD8, gamma delta cells (gd cells), natural killer cells (NK), P and GrB and analysed by flow cytometry. Results are shown as means (± SEM).
Results: 29 probands were not sleepy (NS) (pupillary unrest index=PUI< 6,8). 14 patients were sleepy (PUI> 9,8). Results were not statistically significantly different for: age, BMI, AHI, ODI or oxygen saturation < 90%. In NS we found a higher percentage of P in CD8+ 36,3±3,0 vs. 27,3±4,4 and gd cells 39,1±3,5 vs. 27,3±5,0, but results failed to reach statistical significance (p=0,07 and 0,06, respectively). Results for GrB are listed below.

Percentage of Gr-B+ cells

	% of GrB+ cells	CD8GrB/CD8	gdGrB/gd	NKGrB/NK
PUI <6,8	24.8 (1.8)	46.3 (14.9)	42.3 (3.6)	80.1 (3.3)
PUI>9,8	19.9 (1.3)	35.5 (4.5)	23.4 (3.9)	82.2 (3.8)

GrB+ cells (±SE). Total percentage of GrB+ cells (p: 0.04) and GrB+ gd cells (p<0.001) were significantly lower in sleepy subjects.

Discussion:
In these preliminary results we show that OS influences cytotoxic PBL independently of the respiratory events. The PST uses the balance between sympathetic and vagal activity on the pupil. These results could indicate that GrB and P are increased in presence of daytime sympathetic activation.
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P1892

Clinical significance of sleep-disordered breathing (SDB) and obstructive sleep apnea (OSA) in patient with pituitary adenomas

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A pituitary adenoma(PA) causes different symptoms, depending on its size and location and on the type of hormone that is being made. SDB and OSA are atypical presentation of PA secreting ACTH and GH. However, the non-secreting adenomas may cause alterations of sleep architecture. The aim of the study was to evaluate clinical and sleep characteristics in a group of patients with functioning (FPA) and non-functioning pituitary adenomas (NFP). We recruited 6 pts with SDB and PA. Physical and anthropometric examination were performed ES score and BMQ modified has been used to diagnose sleep disorders symptoms. SDB were studied by means of overnight polysomnographic study in our sleep lab.The scoring criteria were according to event definition by AASM. SDB were documented in 6 pts (3 M, mean age 50.8 yrs and mean BMI 35), with PA. Three NFPA, two patients with FPA and one with acromegaly, were diagnosed after neurosurgery resection. ESS mean reported were 10, mean SaO_2 was 93±5% and AH index were 6.7±1.7, with a prevalence of obstructive events. ODI mean 7.8±1.2., REM sleep duration mean 15.4±6.8% of total sleep time and SWS mean was 22.4±11.1%. In acromegaly patient, was found a worsening of sleep

parameters compared to other patients (AHI 18.4; AHI supine 29.6; ODI 12.7), successfully treated with CPAP therapy.SDB in patients with FPAand NFPA are underdiagnosed. Although the patients with NFPA and Cushing's syndrome were affected by a mild OSA, they reported sleepiness symptoms.Expert consultation and a multidisciplinary approach to sleep disordered are needed in patients with PA.

P1893

Reactive and proactive control of cognitive functions in obstructive sleep apnea

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Neuropsychological studies dissociated two types of cognitive control functions: reactive control and proactive control (Braver, T. *et al.* Trends in Cognitive Sciences 2012; 16: 106-113). Although, obstructive sleep apnea (OSA) is associated with cognitive decrement, there is an ongoing debate on whether these include detrimental performance in conflict tasks (Verstraeten, E. *et al.* Sleep. 2004; 15;27(4):685-93.). In this study, we investigated reactive and proactive control of cognitive functions in OSA patients.

In this ongoing study data from 21 participants were evaluated. Participants grouped according to Apnea-Hypopnea Index (AHI) in to two, such that Group A's AHI>30 (n=13), and Group B's AHI≤15 (n=8). They were participated in Flanker and Simon to measure reactive control and Stroop to measure proactive control. Stimulus presentation and data collection was done automatically on a standard monitor and PC.

In Group A patients (with severe OSA), reactive control observed with Flanker task was significantly different compared to performance of Group B participants (normal and patients with mild OSA). However, other test did not revealed any significant difference.

Comparison of Cognitive Control Performance In Groups

Control Index	Group A (AHI >30)	Group B (AHI ≤15)	p
Flanker Reactive Control Index (msec)	–47.93	57.62	<0.001
Simon Reactive Control Index (msec)	51.27	65.05	=0.59
Stroop Proactive Control Index (msec)	94.15	59.34	=0.72

In conclusion, these preliminary results suggested that while proactive control is intact in severe OSA patients, reactive control declines when control is triggered by stimulus-stimulus conflict.

P1894

Overactive bladder in women with sleep apnoea-hipopnea syndrome

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Introduction: Overactive Bladder Syndrome (OAB) is characterized by urgency to urinate, which may be accompanied by increased frequency, nocturia and incontinence. Although nocturia is a common symptom in the setting of sleep apnea-hypopnea syndrome (OSA), the association between OAB and OSA is not well known. The aim of this study was to analyze the presence of OAB in female patients diagnosed from OSA.

Methods: Seventy-two consecutive female patients referred for polysomnography (PSG) for suspected OSA were included. All patients fulfilled the spanish validated version of the "Bladder Control Self-Assessment Questionnarie" (B-SAQ). The B-SAQ consists of 2 subscales: "symptoms", consisting of 4 items (urgency, frequency, nocturia and incontinence) and "discomfort" in which it is established the degree of distress associated with symptoms (from 0 to 3).

Results: The scores of "Symptoms" and "Discomfort" were significantly higher in patients who were diagnosed OSA.

	IAH <5	IAH >5	p
N	10	62	
Age*	50 (46–63)	54 (43–63)	0.8
BMI*	26.6 (23.8–39.2)	35.3 (31.8–43.3)	0.052
B-SAQ Symptoms*	3 (1–4)	5 (2–7)	0.027
B-SAQ Discomfort*	1 (0–1)	4 (2–7)	0.002

*Median (interquartile range).

Patients with OSA scored significantly higher for symptoms of urgency, nocturia and incontinence and 4 items of "Discomfort". The AHI was significantly correlated with the score of "Symptoms" (r = 0.297, p= 0.013) and that of "Discomfort" (r= 0.258, p= 0.03). There was no significant correlation between the BMI and the B-SAQ.

Conclusions: Obstructive sleep apnea is associated with overactive bladder syndrome in women. The Bladder Control Self-Assessment Questionnarie is a valid instrument to assess overactive bladder in patients with OSA.