101. Technology, screening and questionnaires in OSA

P899

Positional obstructive sleep apnea (OSA) and automatic positive airway pressure (APAP) therapy

Ana Rita Dias[1], Cristina Martinho[1], Ana Marta Silva[1], Catarina Leitão[1], Liliana Almeida[1], Marta Escaleira[1], Vanessa Cardoso[1], Rita Pinto Basto[1], Paula Pinto[2], Cristina Bárbara[2]. *[1]Pulmonology Department II, CHLN - Pulido Valente Hospital, Lisbon, Portugal; [2]Pulmonology Department II, CHLN - Pulido Valente Hospital; Medical Sciences Faculty; CEDOC, Lisbon, Portugal*

Introduction: Recent studies have shown that respiratory events that occur during sleep in supine position have a high prevalence in mild and moderate OSA patients.
Objectives: To determine the prevalence of positional OSA in patients with mild to moderate OSA; Compare biometric characteristics and response to APAP between positional and nonpositional OSA patients.
Methods: 404 polysomnographies (Embla S7000) were analyzed by an experienced technician.
Positional OSA was considered when AHI normalized in the nonsupine position (AHI $\leq$ 5 events per hour of sleep). Patients who adapted APAP were evaluated one month after starting treatment.
Results: We studied 126 patients, 65% male, with a mean age of 53$\pm$11.7 years and a mean RDI of 14.3$\pm$6.1 respiratory events/hour.
Prevalence of positional OSA was 53.2% in the total group (56.8% in mild patients and 48% in moderate patients).
Thirty four out of 66 patients with positional OSA adapted APAP, 22 (64.7%) had no compliance to therapy and 12 (35.3%) had a mean compliance rate of more than 4.5 hours.

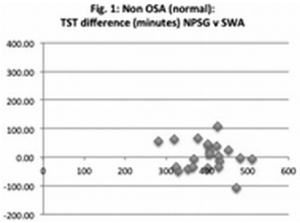
Concerning APAP parameters, the 95-percentile pressure (P95) was lower in patients with positional OSA (p=0.003). Leaks and residual AHI were not different between the two groups.
Conclusion: We found a high prevalence of positional OSA in patients with mild to moderate OSA.
Most patients with positional OSA were not compliant to therapy with APAP (64.7%). So, despite continuous positive airway pressure is considered the gold standard treatment of OSA, patients who did not have compliance should be encouraged for positional therapy.

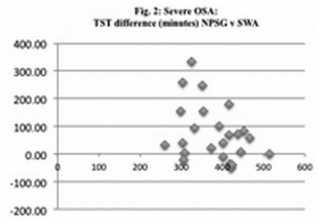
P900
Automatic computation of apnea – Hipopnea index in patients with sleep apnea based on multivariate adaptive regression splines
Felix del Campo[1], Roberto Hornero[2], Victor J. Marcos[2], Daniel Alvarez[2], María Gonzalez[3]. *[1]Medicina, Dermatología y Toxicología, Universidad de Valladolid, Valladolid, Spain; [2]Biomedical Engineering Group, E.T.S.I. Telecomunicación, University of Valladolid, Spain; [3]Servicio Neumología, Hospital Río Hortega, Valladolid, Spain*

Nocturnal polysomnography (PSG) is the gold standard for SAHS diagnosis. Despite its high diagnostic performance, PSG presents some drawbacks since it is complex, expensive and time-consuming. Simplified diagnostic techniques are desirable.
This study proposes a novel method to estimate the AHI based on automated analysis of oxygen saturation data using signal-processing methods as multivariate adaptive regression splines (MARS).
Patients and methods: 240 patients were included in the study. The patients were randomly divided into a training set with 96 patients (32 non SAHS and 64 SAHS) and a test set (60%) with 144 patients (48 non-SAHS and 96 SAHS). Oximetric recordings were parameterized by means of 14 characteristics from four feature subsets: time domain statistics, frequency domain statistics, spectral and nonlinear feature. Regression analysis was performed to estimate the functional relationship between the extracted features and the AHI. Multiple linear regression (MLR) and MARS were evaluated.
Results: The MARS algorithm achieved the highest performance with an intraclass correlation coefficient (ICC) of 0.90 (0,87-0,93). and MLR of 0.80 (0,74-0,85). The highest accuracy of both algorithms was achieved for a decision threshold of 30 h-1, which represents a more conservative definition of SAHS. The MARS provided a correct decision rate of 93.75% (97.70 – 89.80) whereas the MLR model achieved 90.28 (95.12 – 85.44).Fig. 1 show Bland-Altman plots for MLR and MLP models.
Conclusions: The proposed MLP-based method could be used as an accurate method for SAHS diagnosis. Our results indicate a high agreement between actual and predicted AHI by MARS.

P901
Correlation of total sleep time (TST) by SenseWear Armband (SWA®) and nocturnal polysomnography (NPSG), in a population with and without OSA
A. O'Brien, A. McGowan, L. Stewart, K. Fennell, K. Bolger, J. Faul, L. Cormican. *Dept. of Respiratory and Sleep Diagnostics, Connolly Hospital, Dublin 15, Ireland*

Portable devices that determine TST may act as an adjunct to level 3 diagnostic tests for OSA. The SWA is such and measures TST using a proprietary algorithm. Calculation of TST could improve the accuracy of a level 3 diagnostic device.
Aim: Correlation of TST by SWA and NPSG, in a population with and without sleep apnoea.
89 consecutive patients undergoing NPSG because of a suspicion of OSA wore an SWA on the same night. Patients were stratified by the presence and severity of OSA. Correlation coefficient for TST were determined between SWA and NPSG for all subjects and in the OSA subgroups.
The prevalence of a normal PSG, mild moderate and severe OSA was 22 (24.7%), 31 (34.8%), 12 (13.4%) and 24 (26.9%) of 89 subjects. and the respective correlation coefficients were r=0.68, 0.74, 0.85 and 0.25. Clinically important differences are presented with Bland Altman plots (Fig. 1 & 2).





Correlation of TST between the two methods was weakest in those with severe OSA. The determination of TST by SWA in a population with severe OSA is likely to be unreliable. NPSG remains the gold standard for determination of TST.

P902
The "Sleep-Disordered Breathing in Patients with Neuromuscular Disease" questionnaire (SiNQ-5) – Clinical usefulness in a tertiary referral centre
Michelle Ramsay[1,2], Panagis Drakatos[1], Martino Pengo[1], Chris Kosky[3], Craig Davidson[1], Nicholas Hart[1,2,4], Joerg Steier[1]. *[1]Lane Fox Respiratory Unit, Guy's & St Thomas' NHS Foundation Trust, London, United Kingdom; [2]Division of Asthma, Allergy and Lung Biology, King's College London, United Kingdom; [3]Department of Respiratory and Sleep Medicine, Guy's and St Thomas' NHS Foundation Trust, London, United Kingdom; [4]Guy's and St Thomas' NHS Foundation Trust and King's College London, NIHR Comprehensive Biomedical Research Centre, London, United Kingdom*

Introduction: Patients with neuromuscular disease (NMD) are at risk of developing sleep-disordered breathing (SDB) with hypercapnic respiratory failure. We hypothesised that the SiNQ-5 score may be useful to assess patient who are ventilated for NMD with SDB.
Methods: We screened patients attending a tertiary referral centre for investigation of SDB, administering the SiNQ-5 (range 0-10 points, lower scores indicating fewer symptoms). The questionnaire contains five questions related to breathlessness, sleep and posture (Steier et al, *Eur Respir J,* 2011). 236 (105 female) patients had complete data sets. Treatment was defined as either continuous positive airway pressure (CPAP) or non-invasive ventilation (NIV). Results were compared using the Mann-Whitney U independent t-test.
Results: 141 patients had obstructive sleep apnoea and obesity hypoventilation syndrome (score 4.1 (2.7)), 51 had NMD (3.5 (2.8)), 16 had chronic obstructive pulmonary disease (COPD, 4.3 (2.6)) and 6 had chronic heart failure (CHF, 5.7 (2.8)), 52 patients had no evidence of SDB (4.4 (2.7)). 28 patients had NMD with SDB; 26 of those were treated for SDB with a total score of 2.9 (2.5) points, 2 were untreated, scoring 4.0 (0.0) points. Patients with NMD without SDB did not differ from those with SDB who were controlled on treatment (p=0.3) or from Snorers without SDB (p=0.53).
Conclusion: NMD patients with controlled SDB are likely to score similarly to those without SDB and lower than other groups. In order to further address its clinical usefulness it is necessary to follow up and correlate clinical outcomes to the SiNQ-5 scores changes associated with treatment.

P903
Validation of the Greek version of Pittsburg sleep quality questionnaire in a sleep lab population
Eleni Perantoni[1], Paschalis Steiropoulos[2], Dimitra Siopi[1], Anastasia Amfilochiou[3], Vasileios Michailidis[1], Kalliopi Christoforatou[1], Venetia Tsara[1]. *[1]Sleep Unit, GH G Papanikolaou, Thessaloniki, Greece; [2]Sleep Lab, Democritus University of Thrace and University Hospital of Alexandroupolis, Alexandroupolis, Greece; [3]Sleep Centre, GH Sismanoglio, Athens, Greece*

The Pittsburgh Sleep Quality Index (PSQI) is a widely used questionnaire which evaluates subjective sleep quality over the previous month. The purpose of this study was the validation of the Greek version (PSQI-GR) of the questionnaire both in subjects with or without sleep apnea syndrome (SAS).
Patients and method: PSQI includes 19 self-report questions in 7 clinically derived domains of sleep difficulties, scored as a single factor with a cut off <5. We used the PSQI-GR of the questionnaire in 494 subjects with suspected SAS. Three hundred and fifty seven patients were diagnosed as SAS (AHI 41.63±27.65/h) and 137 with AHI <5/h were consider as control group (AHI 2.9±2.1/h). In all subjects daily sleepiness was assessed by ESS.
Results: For the SAS patients the PSQI-GR global score was 8.2±3.7 and for the control group 4.9±2.3. The ESS was 10.0±4.9 in SAS patients and 8.7±4.7 in the control group. A statistically significant difference was found between the two groups in the global score of PSQI-GR (p= 0.00) and the components of Subjective Sleep Quality (SSQ, p= 0.00), Sleep Latency (SL, p= 0.001), Sleep Duration (SDU, p=0.00), Habitual Sleep Efficiency (HSE, p= 0.00), Sleep Disturbances (SDI p=0.00), Sleep Medication (SM, p=0.00) and Daytime Dysfunction (DD, p= 0.00) but not for the ESS. In the group with SAS a correlation was found between ESS and global score of PSQI-GR (r= 0.200 p= 0.001) and with some of its components SSQ (r= 0.149 p= 0.012), SD (r= 0.254 p= 0.00) and DD (r= 0.274 p= 0.000).
Conclusion: PSQI-GR is high in patients with SAS and within the normal range for healthy individuals. The Greek version is a valuable tool both for clinical use and research purposes.

P904
Screening of sleep apnea-hypopnea syndrome in patients with type 2 diabetes
Djamila Neves[1], Jose Romero[1], Karl Cunha[1], Dina Torrado[2], Helena Boavida[2], Ulisses Brito[1]. *[1]Pneumology, Hospital de Faro E.P.E, Faro, Portugal; [2]Primary Care, UCSP- Faro, Faro, Portugal*

Introduction: Some studies point to the likelihood of a significant relationship between the type 2 diabetes (DM2) and the Sleep apnea-hypopnea syndrome (SAHS). These conditions are considered important public health issues for their morbi-mortality and high prevalence.
Objectives: Prospective analysis of the prevalence of SAHS in patients with diagnosis of DM2 followed in outpatient primary care (PC).

Methods: Between March- September of 2010, the patients were submitted to an questionnaire. The sleep study was carried at home, with the Apnealink® device (AL). The Apnea/Hypopnea Index (AHI) was defined as suggestive of SAHS for AHI ≥ 5 events/hour (e/h) and classified as mild (AHI 5-14), moderate (AHI 15-29) and severe (AHI ≥ 30). According to the result of the AHI and the patient's symptoms, they were referred for treatment.
Results: Were included 108 patients, after the exclusion of 32, 52,7% were male, mean age of 58age ± 7 years. The average body mass index was 29.8±5 kg/m^2 and hemoglobin glycosylated A1c 7,2±1.7. There was a history of high blood pressure in 76,8%, Dyslipidemia in 54,6%, Ischeamic heart disease in 8%. The patients complained, either frequently or occasionally, of snoring 56.6%, waking up 47%, poor sleep quality 35%, and witnessed apneas 17%, with a Scale of Epworth of 5,6±4.4. The mean AHI of the AL was 11,9±11 e/h (0-55). The AHI ≥ 5 was observed in 70.3% of the patients, 20% had AHI 15-29 and 9% AHI ≥ 30.
Conclusion: In our sample we find one high percentage of studies suggestive of SAHS, both mild, moderate and severe. The AL can be a useful tool for the screening of SAHS in patients with DM2 in collaboration with the PC.

P905
A new therapeutic intervention for position-related OSA using an adaptive bedding system
Nina Michiels[1], Dorien Van Deun[2], Willemen Marc[1], Bart Haex[2], Jos Vander Sloten[2], Vasileios Exadaktylos[3], Marie Vandekerckhove[4], Johan Verbraecken[1]. *[1]Multidisciplinary Sleep Disorders Centre, Antwerp University Hospital and University of Antwerp, Belgium; [2]Biomechanics, KU Leuven, Leuven, Belgium; [3]Biosystems, KU Leuven, Leuven, Belgium; [4]Biological Psychology, Vrije Universiteit Brussel, Brussel, Belgium*

Obstructive sleep apnoea (OSA) is associated in 80% of the cases with more and longer apnoeas/hypopneas in the supine position. Some effort has been made to find an effective treatment that improves OSA by correcting the sleep position. So far, the most used treatment is avoidance of sleeping supine, although there is a lack of compliance due to discomfort and sleep disruption. Researchers recently investigated the effect of the head/neck position on OSA. One study found an improvement of the apnoea/hypopnea index (AHI) and sleep quality after promoting neck extension with a custom fitted cervical pillow (Kushida, C.A. et al. Sleep and Breathing 2001; 5(2): 71-78).
The objective of this study was to assess the effect of cervical positioning on OSA through the use of an adaptive bedding system which promotes neck extension in the supine position.
Seven male OSA patients were studied. The group included 2 mild, 3 moderate and 2 severe patients. They spent 3 nights in a sleep center: an adaptation, a reference (REF) and a steering night (AS), during which the shoulder-neck region of the bed was automatically adapted to promote neck extension when detecting a supine position of the subject. Sleep and breathing parameters were obtained by means of questionnaires and PSG.
Overall, subjects showed no significant improvement in AHI between the reference (24.1±14.3) and steering night (25.4±15.5; p=.866). However, detailed evaluation identified an improvement in the apnoea index during supine positions in the steering night (REF: 5.3±4.5; AS: 1.3±1.8; p<.05).
These preliminary findings indicate that the bedding system might improve supine-related AHI, but further experiments are needed.

P906
Impact of continuous, non-invasive blood pressure (BP) measurement on sleep quality during polysomnography (PSG)
Thomas Wibmer[1], Benedikt Schildge[1], Christoph Fischer[2], Stephanie Brunner[1], Cornelia Kropf[1], Kathrin M. Stoiber[1], Stefan Ruediger[1], Ioanna Blanta[1], Wolfgang Rottbauer[1], Christian Schumann[1]. *[1]Department of Internal Medicine II, University of Ulm Medical Center, Ulm, Germany; [2]Institut für Assistenzsysteme und Qualifizierung e.V., SRH-Hochschule Heidelberg, Heidelberg, Germany*

Introduction: Obstructive sleep apnea (OSA) is generally considered an etiologic factor in the development of hypertension (HT). Recent findings, demonstrating that renal sympethetic denervation could also reduce OSA severity, provoke new questions on the interaction of HT and OSA. Portapres continuous non-invasive blood pressure measurement during PSG might be a powerful tool for future research to better understand these mechanisms. However, the effect of overnight Portapres BP monitoring itself on sleep is unclear.
Aims: To analyze the impact of Portapres BP measurement on sleep quality during PSG.
Methods: 40 individual patients with either treated or newly diagnosed untreated sleep apnoea syndrome were recruited. They underwent one overnight PSG randomly with or without simultaneous Portapres BP measurement.
Results: 20 PSG recordings with additional Portapres monitoring and 20 gender and treatment matched control PSGs were investigated for comparisons. In the Portapres and the control group mean age was 58 and 56 years, 55 and 60% were males, 75 and 60% had predominantly OSA, 50 and 50% had CPAP treatment, mean apnea-hypopnea-index was 14.1 and 21.0, mean arousal index 21.4 and 24.7, mean total sleep time 5.2 and 5.4 hours, mean sleep efficiency 75.2 and 73.9%, mean sleep onset latency 20 and 21 minutes, mean REM-sleep 16 and 15% and mean slow-wave sleep was 8.8 and 11.5%, respectively.
Conclusions: The results of this pre-study suggest that Portapres BP measurement during overnight PSG does not have a clinically relevant impact on sleep quality and might therefore be a good diagnostic tool for future research on HT and BP changes in sleep apnea.

P907
A portable device for assessment of daytime sleepiness
Miaofang Liu, Yuanming Luo, Nanshan Zhong. *State Key Laboratory of Respiratory Disease, Guangzhou Medical College, Guangzhou, China*

Many studies have shown that sleepiness is a major cause of traffic accidents. Patients with obstructive sleep apnoea usually have daytime sleepiness. Epworth sleepiness scale has been used to subjectively assess daytime sleepiness in patients with OSA, but it was far from perfect. Osler test was a useful alternatively objective test for daytime sleepiness and has been used in clinical practice. However, Osler test was usually performed in hospital. It is important to develop an easy-to-use portable device to assess daytime sleepiness at home. We have recently developed a portable device based on the principles of Osler test. The purpose of the present study was to determine whether the onset of sleep detected by our portable device was the same as that detected by conventional polysomnography. Eight patients with OSA and eight normal subjects were studied. Sleep latency as judged by portable device was the same as that judged by conventional polysomnography and sleep latency measured from patients with OSA (18.1±9.1 minutes) was significantly shorter than that measured from normal subjects (> 40minutes), p<0.01. In conclusion, the portable device designed for use at home was as useful as conventional polysomnography in assessment of daytime sleepiness.
This work was funded by NSFC (Grant No. 81120108001).

P908
The use of bispectral index (BIS) as a marker of sleep staging
Cristina Estirado[1], Nuria Grau[1], Encarna Guardiola[1], Miquel A. Felez[1], Carles Sanjuás[1], Lluis Gallart[2], Fernando Escolano[2], Mauricio Orozco-Levi[1,3]. *[1]Pneumologia, H. Mar- IMIM, CIBER, Barcelona, Spain; [2]Anesthesiology, H. Mar- IMIM, Barcelona, Spain; [3]Pneumology, Fundación Cardiovascular de Colombia, Floridablanca, Colombia*

Background: The bispectral index (BIS) is a parameter which reflects brain electrical activity (EEG) in a range of values between 0 au (minimum value, no EEG) and 100 au.
Aim: We further assessed whether BIS can be useful for identifying sleep and the difference between its stages.
Methods: The study was conducted in 14 patients being investigated for sleep apnea/hypopnea syndrome (OSA). A full polysomnography through a night's sleep was recorded and analyzed manually according to standard criteria for sleep staging. Throughout the process, from initial waking up to awakening, a continuous record of the BIS time-synchronized with the manual analysis of the PSG was performed. The average BIS value every minute was used as the dependent variable in the analysis.
Results: Thirteen patients were diagnosed from OSA, with an apnea/hipoapnea index (AHI) of 53.6±26.1. We analyzed a total of 5.579 minutes with synchronized measurements of BIS and PSG data. Overall, 91% of all EEG records corresponded to sleep period, representing 5.4% of stage 1, 68.9% of stage 2, 15.7% of stage 3-4 and 9.9% REM sleep. The mean BIS value was 88.9±9.5 (mean ± SD) in wakeful state, 84.9±12.4 in stage 1, 77.7±11.4 in stage 2, 56.1±13.4 in stages 3-4 and 76.8±17.7 in REM sleep. Significant differences were observed between wakefulness and sleep in any stage (p <0.001, all). By ROC curve analysis it was identified that a BIS index value of 70 had a sensitivity of 81% and a specificity of 81% for detecting deep sleep stages (3-4).
Conclusions: BIS values decrease during sleep and change according to its stages. BIS values below 70 have a high sensitivity and specificity for detecting deep sleep stages.

P909
Effectiveness of sequential automatic-manual home respiratory polygraphy scoring
Juan F. Masa, Jaime Corral, Ricardo Pereira, Joaquín Durán-Cantolla, Marta Cabello, Luis Hernández-Blasco, Carmen Monasterio, Alberto Alonso-Fernandez, Eusebi Chiner, Francisco-José Vázquez-Polo, Jose M. Montserrat. *Pulmonology, CIBER de Enfermedades Respiratorias (Ciberes), San Pedro de Alcántara Hospital, Cáceres, Spain Pulmonology, CIBER de Enfermedades Respiratorias (Ciberes), San Pedro de Alcántara Hospital, Cáceres, Spain Pulmonology, CIBER de Enfermedades Respiratorias (Ciberes), San Pedro de Alcántara Hospital, Cáceres, Spain Pulmonology, Txagorritxu Hospital, Vitoria, Spain Pulmonology, Valdecillas Hospital, Santander, Spain Pulmonology, General Universitario Hospital, Alicante, Spain Pulmonology, Belvitge Hospital, Barcelona, Spain Pulmonology, Son Espases Hospital, Palma de Mallorca, Spain Pulmonology, San Juan Hospital, Alicante, Spain University Prof, Las Palmas de Gran Canaria University, Las Palmas de Gran Canaria, Spain Pulmonology, Clinic Hospital, Barcelona, Spain*

Introduction: Automatic home respiratory polygraphy (HRP) scoring functions can potentially confirm the diagnosis of sleep apnea-hypopnea syndrome (SAHS)

(obviating technician scoring) in a substantial number of patients. The result would have important management and cost implications.
Objectives: To determine the diagnostic cost-effectiveness of a sequential HRP scoring protocol (automatic and then manual for residual cases) as compared to manual HRP scoring, both with in-hospital polysomnography.
Methods: We included suspected SAHS patients in a multicentric study and assigned to home and hospital protocols at random. We constructed Receiver Operating Characteristic (ROC) curves for manual and automatic scorings. Diagnostic agreement for several cut-off points was explored and costs for two equally effective alternatives were calculated.
Results: Of 366 randomized patients, 348 completed the protocol. Manual scoring produced better ROC curves than automatic scoring. There was no sensitive automatic or subsequent manual HRP apnea-hypopnea index (AHI) cut-off point. The specific cut-off points for automatic and subsequent manual HRP scorings (AHI>10 in both) had a specificity of 88% and 97%, respectively. The costs of manual and sequential HRP protocols were similar but less than the half that of polysomnography.
Conclusion: A sequential HRP scoring protocol is a cost-effective alternative to polysomnography, although with a marginal cost savings compared to HRP manual scoring.

P910
Nasal pressure variation measurement with a microphone: A new low cost tool for diagnosis of obstructive sleep apnoea in a resource poor setting
Chatura Wirasinghe[1], Srini Godevithanage[2], Dushantha Madegedara[1].
[1]Respiratory Medicine, Teaching Hospital, Kandy, Central Province, Sri Lanka; [2]Neurology, Teaching Hospital, Kandy, Central Province, Sri Lanka

Background: Lack of polysomnography in Sri Lanka leads to under investigation of OSA. Nocturnal saturation (SPO_2) was used instead. Pressure variations due to turbulent flow through nose measured by a microphone fixed to a nasal cannula can be demonstrated to be proportional to nasal air flow, which allows calculation of apnoea hypopnea index (AHI).
Objective: To test if nasal pressure variation measurement increases accuracy of diagnosis of OSA than SPO_2 alone.
Method: 31 patients with clinical features of OSA were enrolled. Their overnight nasal pressure variations were picked up by a microphone fixed the distal end of a nasal cannula. The microphone signal was processed with elimination of baseline noise, and airflow measurements were derived. Airflow was analyzed together with SPO_2 to calculate AHI.
Results: The Epworth sleepiness scale (ESS) of patients ranged 0 to 19 (mean 8) and Mallampati grade (MG) ranged 1 to 4 (mean 2). The mean BMI was 28.4 kg/m^2 (range 20.44 to 40.48). The oxygen desaturation index (ODI), the number of desaturations per hour, ranged 0 to 15 (mean 2). The mean AHI was 8 (range 0 to 40). AHI significantly correlated with ODI (Pearson correlation coefficient = 0.63 p=0.00). 13 patients were diagnosed with OSA using AHI. ODI alone would result in 4 true positive, 9 false negative and 2 false positive diagnosis of OSA.
Conclusions: Nasal pressure variation measured by a microphone can be combined with SPO_2 to increase accuracy of diagnosis of OSA in patients with clinical likelihood, in a resource poor setting. With further validation this technique may be used for a low cost portable home based apparatus to derive AHI.

P911
STOP-Bang questionnaire as a preoperative screening tool for obstructive sleep apnea in bariatric surgery patients
Ali Khodabandeh[1], Ryan Chua[1], Antonio De Gorordo Arzamendi[1], Julia Tassinari[2], Anthony McCluney[2], Nicole Pecquex[2], Armin Ernst[1], Katherine Hendra[1]. *[1]Pulmonary, Critical Care and Sleep Division, St. Elizabeth's Medical Center, Tufts University, Boston, MA; [2]Center for Weight Control, St. Elizabeth's Medical Center, Tufts University, Boston, MA, United States*

Introduction: STOP (snoring, tiredness, observed apnea, high blood pressure) questionnaire is a screening tool to identify surgical patients with high risk of obstructive sleep apnea (OSA). Incorporating BMI, age, neck size, and gender (Bang) has been shown to further increase the sensitivity and negative predictive value. The STOP-Bang questionnaire has not been validated as a screening tool for OSA in patients undergoing bariatric surgery.
Method: We retrospectively reviewed prospective data on bariatric surgery patients. Patients were asked to answer the STOP questionnaire during their preoperative assessment. The BMI, age, neck circumference and gender were documented. All patients underwent overnight polysomnography as one of the assessments prior to bariatric surgery.
Results: A total of 49 patients were included. The mean age was 42*m*12.2 years; 29% males; BMI 48±8.2 kg/m^2. We classified 43 patients (88%) as high risk based on the STOP-Bang questionnaire (≥3 positive responses). A total of 36 patients (73%) were diagnosed with OSA (AHI>5); 13 patients as mild, 10 patients as moderate (30>AHI>15) and 13 patients as severe OSA (AHI>30). The sensitivity of the STOP-Bang questionnaire for all OSA patients (AHI > 5) and for moderate and severe OSA patients (AHI > 15) was 92% and 100%, respectively. The specificity was 33% and 23%. The positive predictive value was 81% and 54%. The negative predictive value was 57% and 100%.
Conclusions: The preliminary results of the STOP-Bang questionnaire suggest a high sensitivity to detect bariatric surgery patients with obstructive sleep apnea. The negative predictive value was high only in patients with moderate and severe OSA.

P912
Overnight pulse propagation time derived from oximetry is associated with daytime blood pressure in patients with sleep apnea
Ludger Grote[1], Dirk Sommermeyer[1,2], Ding Zou[1], Derek Eder[1], Joachim Ficker[3], Winfried Randerath[4], Ingo Fietze[5], Bernd Sanner[6], Jan Hedner[1]. *[1]Dept. of Pulmonary Medicine, Sahlgrenska University Hospital, Gothenburg, Sweden; [2]Institute for Monitoring, Diagnosis and Assistance, SRH University Heidelberg, Heidelberg, Germany; [3]Dept. of Pulmonary Medicine, Clinic Nürnberg Nord, Nürnberg, Germany; [4]Dept. of Pulmonary Medicine, Bethanien Hospital, Solingen, Germany; [5]Dept. of Cardiology, University Hospital Charité, Berlin, Germany; [6]Dept. of Pulmonary Medicine, Bethesda Hospital, Wuppertal, Germany*

Introduction: The state of sleep is characterized by unloading of the autonomic nervous system and represents an opportunity to investigate the properties of the cardiovascular (CV) system. We investigated overnight pulse propagation time (PPT) as an indirect measure of vascular stiffness during sleep and its association with daytime blood pressure (BP).
Methods: The digital pulse wave, derived from finger oximetry, was recorded during sleep in 495 subjects (169 females, age 54±12 y, BMI 30±6 kg/m^2, AHI 19±23 n/h) referred to five sleep centers. Office BP and established CV risk factors were assessed. PPT was calculated as the time between the top and the subsequent dichotic notch of the digital pulse wave. Mean PPT across the entire sleep period was calculated.
Results: PPT was associated with age, systolic BP, diastolic BP, the number of apneic as well as hypoxic events during sleep (r=-0.54, -0.19, -0.21, -0.13, and -0.11, $p<0.01$ respectively). PPT was lower in patients with hypertension compared to normotensives (160±34 ms vs. 178±47 ms, $p<0.001$). In a multivariate analysis, PPT was independently associated with age, height, waist, smoking, hypertension and diabetes but not sleep apnea indices.
Conclusions: PPT determined by overnight oximetry reflects daytime BP and presence of hypertension. Assessment of PPT during sleep may be a useful tool for classification of overall CV function and risk.
The study was supported by Weinmann GMBH, the Swedish Heart and Lung Foundation and the University of Gothenburg.

P913
Development of a new scale to evaluate sleepiness in obstructive sleep apnea (OSA): The Barcelona sleepiness scale (BSS)
Marc Guaita[1], Montse Romero-Cardos[2], Manuel Salamero[2], Isabel Vilaseca[3], Josep M. Montserrat[4], Cristina Embid[4], Alejandro Iranzo[1], Joan de Pablo[2], Carles Gaig[1], Carme Leon[4], Joan Santamaria[1]. *[1]Neurology, Hospital Clinic, Barcelona, Spain; [2]Clinical Psychology and Psychiatry, Hospital Clinic, Barcelona, Spain; [3]Otorhinolaryngology, Hospital Clinic, Barcelona, Spain; [4]Pneumology, Hospital Clinic, Barcelona, Spain*

Background: Excessive daytime sleepiness (EDS) is a common problem with serious consequences for health and social activities of the patients. There is no simple method to reliably quantify sleepiness, and objective methods (Multiple Sleep Latency Test, MSLT; Maintenance of Wakefulness Test, MWT) and subjective ones (Epworth Sleepiness Scale, ESS) are poorly correlated.
Aim: To develop and validate a new sleepiness scale for clinical use in OSA.
Methods: Generation of items: 30 consecutive patients with OSA and their partners were interviewed using focus group techniques and cognitive interviews generating a preliminary list of sleepiness items. This list was reduced to 16 common situations considering the frequency of response and a homogeneous representation of the sleepiness severity. Validation: 30 consecutive patients complaining of snoring or apneas with and without EDS were evaluated with MSLT, MWT, ESS and the list of sleepiness items. A composite of MSLT and MWT was calculated as an objective criterion of sleepiness. Exhaustive regression analysis of all the subsets of the list was performed. Mallow's Cp minimization was used to choose the best item combination.
Results: Two items (In the morning, when I get relaxed & In the afternoon, while standing in a line) achieved the minimum Cp score and comprised the BSS. The correlation between the BSS and the composite score of MSLT and MWT was 0.51, much higher than that found with ESS (0.23).
Conclusion: Our data suggest that the BSS, a simple sleepiness scale of 2 items, shows the best correlations with objective tests.
Support by PI07/0318.

P914
The role of desaturation index evaluated by nocturnal pulse oximetry in recognition of sleep apnea syndrome in patients with morbid obesity
Stefan Dumitrache-Rujinski, George Calcaianu, Dragos Zaharia, Alina Croitoru, Miron Bogdan. *4th Pulmonology Department, National Institute of Pneumology, Bucharest, Romania*

Background: The nocturnal pulse oximetry is used as a validated screening method in the diagnostic approach of Sleep Apnea Syndrome (SAS).

Aim: To assess the role of nocturnal pulse oximetry as a screening method in subjects with morbid obesity (BMI>40 kg/m^2), knowing that the basal nocturnal saturation is lower in this patients due to hypoventilation in supine position during sleep.
Method: 87 obese (BMI>40 kg/m^2) patients with high pre-test clinical suspicion of SAS (Epworth sleepiness scale >10, snoring, witnessed apneas) were prospectively evaluated by respiratory polygraphy (pulse oximetry, nasal airflow, thoraco-abdominal movements, body position and snoring). We assessed the correlation between the values of Desaturation Index (DI) and Apneea Hypopnea Index (AHI). The cut-off for independent desaturation was 3%.
Results: 82 patients (94.2%) were diagnosed with SAS (AHI>5/hour); mean age: 53.1±11.5 years (range 28-79 years); mean BMI: 45.07±5.1 kg/m^2 (range 40-68 kg/m^2). The mean DI was 45±26.4/hour and the mean AHI: 44.2±26.1/hour. Mean lowest SaO2 was 67.8±13% and mean average SaO2 was 87.9±7.1%. There was a significant correlation between DI and AHI ($p<0.001$). Also, DI was correlated with lowest SaO2 ($p<0.001$) and average SaO2 ($p=0.02$).
Conclusion: Desaturation Index assessed by nocturnal oximetry maintains its utility in the recognition of SAS in morbid obese patients with high clinical pre-test suspicion.

P915

The diagnostic value of self-reported symptoms for the detection of sleep apnea syndrome in stroke patients

Janneke Nachtegaal, Justine Aaronson, Erny Groet, Tijs van Bezeij, Coen van Bennekom. *Research & Development, Heliomare, Wijk aan Zee, Netherlands*

Introduction: Sleep apnea syndrome (SAS) is a common sleep disorder in stroke patients and associated with decreased functional recovery, increased risk of recurrent stroke and mortality. Despite the high prevalence and poor functional outcome no guidelines for SAS screening in stroke rehabilitation are available.
Objective: This study evaluated the predictive value of a self-report symptom questionnaire, socio-demographic and clinical variables for detection of stroke patients with a high risk of SAS.
Methods: 306 stroke patients were screened with pulse-oximetry to determine their oxygen desaturation index (ODI). An ODI $\geq$ 15 was classified as a high risk of SAS. Potential predictors included socio-demographic variables, disease characteristics and self-reported symptoms (snoring, apneas, restless legs, morning headaches, waking up feeling unrefreshed, daytime sleepiness, falling asleep during daytime, fatigue, concentration loss, irritability and mood changes). With univariate logistic regression analysis, the associations between potential prognostic indicators and the primary outcome of ODI $\geq$ 15 were examined. Significant variables (p-value $\leq$ 0.20) were selected for a backward multivariate logistic regression and checked for co-linearity.
Results: A high risk of SAS was predicted by gender, body mass index, systolic blood pressure and the presence of the self-reported symptoms apneas, falling asleep during daytime and concentration loss.
Conclusion: The diagnostic value of self-reported SAS symptoms alone is very low in stroke patients. Therefore, socio-demographic and clinical variables should be included in the screening of SAS in stroke rehabilitation.