## 362. Obstructive sleep apnoea in children and adults

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**Late-breaking abstract: Cardiac function in a revascularized coronary artery disease cohort with obstructive sleep apnoea with and without daytime sleepiness in the RICCADSA trial**

Yuksel Peker[1,2], Helena Glantz[1], Erik Thunstrom[2], Bjorn Cederin[1], Johan Herlitz[3], Jan Ejdeback[1]. *[1]Sleep Medicine Unit, Skaraborg Hospital, Skovde & Lidkoping, Sweden; [2]Emergency and Cardiovascular Medicine, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden; [3]Cardiology, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden*

**Objectives:** The RICCADSA study is a randomized, controlled trial started in 2005 addressing the impact of CPAP in revascularized coronary artery disease (CAD) patients and concomitant OSA (Apnoea-Hypopnoea-Index [AHI]≥15/h) without daytime sleepiness (Epworth Sleepiness Scale <10). The primary outcome is the combined rate of new revascularization, myocardial infarction, stroke and cardiovascular mortality over a mean period of 3 years. Among secondary outcomes, cardiac function is also evaluated.
**Participants and methods:** Among 660 screened CAD patients, 511 (399 OSA, 112 non-OSA) have been assessed by echocardiography and p-NT proBNP at baseline.
**Results:** Compared to non-OSA subjects, patients with OSA had thicker interventricular septum and left ventricular posterior wall, enlarged left atrium and more diastolic dysfunction. Left ventricular ejection fraction was similar (56.9 vs 58.3%; ns). P-NTproBNP values were higher in the OSA patients (484.4 vs 332.5 ng/L; p=0.040). Within the OSA group, none of the echocardiographic measures differed significantly between sleepy and non-sleepy OSA subjects. However, p-NT proBNP values were higher (578.9 vs 336.7 ng/L; p=0.002) in the non-sleepy OSA subjects.
**Conclusions:** In this RICCADSA cohort, adverse alterations in cardiac structure as well as diastolic dysfunction were more common and p-NT-proBNP values increased in OSA patients compared to non-OSA patients. Whether the more elevated p-NT-proBNP values in the non sleepy subjects reflect a poorer prognosis and if CPAP is effective in OSA patients remain to be demonstrated when the trial is completed.

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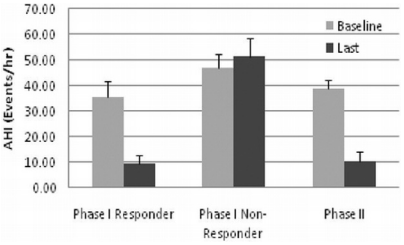
**Feasibility of implanted upper airway nerve stimulation therapy to treat obstructive sleep apnea**

Wilfried De Backer[1], Johan Verbraecken[1], Joachim Maurer[2], Lennart Knaack[3], Arie Oliven[4]. *[1]Respiratory Medicine, University Hospital Antwerp, Edegem, Antwerp, Belgium; [2]Hals-Nasen-Ohrenklinik, Universitaetsmedizin, Mannheim, Germany; [3]SOMNOLAB Dortmund, Zentrum fur Schlafmedizin, Dortmund, Germany; [4]Department of Medicine, Bnai Zion Medical Center, Haifa, Israel*

We studied a second generation Upper Airway Stimulation system (Inspire Medical

Systems, Inc) in OSA with an attempt to identify baseline predictors of therapy success.
Moderate-to-severe OSA patients who failed, or were intolerant of, continuous positive airway pressure were included. The study was conducted in 2 phases. In Phase 1, patients were enrolled with broad selection criteria. In Phase 2, patients were enrolled using selection criteria derived from the experience in Phase 1.
20 of 22 patients enrolled in Phase 1 (2 exited the study) were examined for factors predictive of a response (AHI < 20 and 50% reduction from baseline at last post-implant). Among responders (n=6) in Phase I, AHI reduced from 35.8±14.5 (mean ± SD) at baseline to 9.5±7.4 events/hr ($p<0.05$) at the last follow-up, and ODI reduced 14.4±8.3 to 5.3±4.7 ($p<0.05$) accordingly. Among non-responders, AHI remained unchanged from 46.9±19.4 to 51.4±26.6; similarly, ODI remained from 36.8±25.5 to 32.9±21.3. Responders had both a BMI ≤ 32 and AHI ≤ 50, and were free of predominant palatal airway collapse. Phase 2 patients (n= 8) selected using these responder criteria showed significant reduction in AHI from 38.9±9.8 at baseline to 10.4±11.0 at last follow-up ($p<0.05$) and ODI from 32.1±24.0 to 9.5±10.2 ($p< 0.05$).




We conclude that site of obstruction, baseline AHI, and BMI may be important therapy success predictors.

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**Twelve months follow-up in children with obstructive sleep apnea syndrome (OSAS) after adenotonsillectomy or orthodontic treatment with rapid maxillary expander**

Rosa Castaldo, Maria Chiara Paolino, Filomena Ianniello, Danila D'Onofrio, Alessandra Tabarrini, Marilisa Montesano, Manuela Cecili, Maria Pia Villa.
*NESMOS Department, Pediatric Unit, S. Andrea Hospital, Faculty of Medicine and Psychology, University la Sapienza, Rome, Italy*

Rapid Maxillary Expander (RME) may be an alternative treatment for OSAS. It has been used for patients who have OSAS and craniofacial anomalies because it changes the mandible posture forwards, enlarges upper airway and increases upper airspace, improving the respiratory function.
**Aim:** To compare the efficacy of adenotonsillectomy (AT) and orthodontic treatment in children with OSAS.
**Methods:** Children with referred SDB underwent polysomnography at baseline and after 12 months of surgical or orthodontic treatment.
**Results:** We included 32 children (mean age 4.9±1.5 yrs, 75% male). Eighteen children underwent AT (group A) and 14 children RME (group B). There were no differences for age, sex and BMI between the two groups.
Children treated with AT showed an AHI at baseline higher than children treated with RME (14.3±8.2 vs 5.5±1.4 ev/h, $p<0.001$); this difference were no significant after 12 months (1.3±1.4 vs 1.6±1.9 ev/h,NS).
After one year, 40.6% had a residual disease, without any differences between the 2 groups. Children with residual OSAS (RO) had an higher duration of disease than children with complete resolution of SDB (47.3±18.4 vs 31.9±18.7 months). In the group A 7 children (38.8%) had RO and of them 5 children (71.4%) had a malocclusion. In the group B 6 children (42%) had RO, and between them 3 children (50%) had severe tonsillar hypertrophy.
**Conclusions:** Both treatment showed efficacy in the management of paediatric OSAS but both had a residual disease, not related to the treatment or the severity of the disease but to its duration. Data underline the importance of an early treatment using integrated approach.

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**Oxidative stress in children with OSAS: Role of urinary 8-isoprostane**

Susanna Bonafoni[1], Susanna Fedeli[1], Valentina Negro[1], Maria Chiara Supino[1], Maria Chiara Paolino[1], Rosa Castaldo[1], Manuela Cecili[1], Maurizio Simmaco[2], Maria Pia Villa[1]. *[1]NESMOS Department, Pediatric Unit, S. Andrea Hospital, Faculty of Medicine and Psychology, University la Sapienza, Rome, Italy; [2]NESMON Department, Advanced Molecular Diagnostic Unit, S. Andrea Hospital, Faculty of Medicine and Psychology, University la Sapienza, Rome, Italy*

**Background:** In Obstructive Sleep Apnea Syndrome (OSAS), the key role of airway inflammation is confirmed. Studies about noninvasive methods and new markers of inflammation in diagnosis and management of pediatric OSAS are increasing. 8-IsoP is an oxidative stress marker.The study of this marker in urines of children with OSAS could be promising.
**Aim:** To evaluate urinary 8-IsoP values in children with OSAS
**Methods:** Twenty children (mean age 6.33±2.06, M/F:12/8), with referred OSAS, underwent urinary collection at the morning after the polysomnography, sleep questionnaire, medical examination. 8-IsoP was assessed in urinary sample.
**Results:** According to the AHI (Apnoea/Hypopnea index) obtained from the polysomnography, we found 13 subjects (group1) with primary snoring/minimum OSAS (mean AHI 1.89±1.80; mean SaO2 97.59±0.59) and 7 subjects (group2) with moderate/severe OSAS (mean AHI 14.65±11.09; mean SaO2 96.04±2.98). The urinary 8-IsoP values is higher in Group 2 (respectively Group1:0,72±0,57 ng/ml *vs* Group2: 2.19±1.29 ng/ml, p=0.01). Moreover we found a positive correlation between AHI and urinary 8Iso-P (r= 0,5; p=0,02). The linear regression analysis, performed using as dependent variable values of urinary 8-Isop and as independent variables severity of OSAS, age, sex, AHI, SaO2, Prick test, BMI percentile, adenotonsillar ipertrophy, showed that the severity of OSAS was the only predictor for levels of urinary 8-Isop (R Square: 0.415).
**Conclusion:** Our data show that values of urinary 8-IsoP are related to OSAS severity. Further studies are needed to assess the utility of urinary 8-Isop as marker of inflammation likely due to oxidative stress.

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**Prevalence of sleep disordered breathing in middle-aged general population: The HypnoLaus study**

Raphael Heinzer[1,3], Daniela Andries, Francois Bastardot[2], Nadia Tobback, Peter Vollenweider, Mehdi Tafti[1,4], José Haba-Rubio[1]. *[1]Center for Investigation and Research in Sleep (CIRS), Lausanne University Hospital (CHUV), Lausanne, Switzerland; [2]Internal Medicine Department, Lausanne University Hospital (CHUV), Lausanne, Switzerland; [3]Pulmonary Department, Lausanne University Hospital, Lausanne, Switzerland; [4]Center for Integrative Genomics (CIG), Lausanne University, Lausanne, Switzerland*

**Introduction:** Prevalence of sleep disordered breathing (SDB) in middle-aged general population was reported to be around 9% of women and 27% of men in studies performed in the 80's-90's. Considering the recent improvements in the sensitivity of recording techniques, our aim is to reevaluate the prevalence of SDB in the general population.
**Methods:** 505 subjects (47.1% women, 50.3±5.6 y.o, BMI 25.7±4.4 kg/m$^2$) participating in an ongoing population-based cohort study (HypnoLaus, Lausanne, Switzerland) underwent complete polysomnographic recordings at home and had an extensive clinical workup including Epworth Score (ESS). Prevalence of SDB was determined according to apnea-hypopnea index (AHI) using two different scoring criteria: AASM 1999 and 2007.
**Results:** With AASM 2007 criteria, prevalence of SDB with AHI thresholds of 5/h, 15/h and 30/h was 45.7%, 15,7% and 6.3% respectively in men, and 19.3%,4.2% and 0.8% respectively in women. Mean ESS score was 6.9±4.2 in men and 6.4±3.8 in women. 18% of the men and 12.6% of the women had an ESS >10. The prevalence of ESS>10 and OSA with the same thresholds (5/h, 15/h, 30/h) was 6.3%, 3.4%, and 0.4% respectively in men and 2.1%, 1.3%, and 0% in women. With AASM 1999 criteria, prevalence of OSA with the same thresholds was 77.2%, 37.5% and 14.6% in men and 51.3%, 15.1% and 4.6% in women. Prevalence of OSA and ESS>10 was 12.0%, 6.7% and 2.6% in men and 5.5%, 2.1% and 0.4% in women.
**Conclusion:** In HypnoLaus population-based study, prevalence of SDB is higher than previously reported, especially in middle-aged men. This appears to be due to differences in scoring criteria and to a higher sensitivity of nasal pressure sensors compared to thermocouple.

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**Morbidity prior and after a diagnosis of sleep disordered breathing. A controlled national study**

Poul Jennum, Jakob Kjellberg. *Danish Center for Sleep Medicine, Department of Clinical Neurophysiology, Center for Healthy Aging, Faculty of Health Sciences, University of Copenhagen, Glostrup Hospital, Copenhagen, Denmark Danish Institute for Health Services Research, DSI, Copenhagen, Denmark*

**Background:** Sleep disordered breathing (SDB) cause's significant burden. Most studies have focused on cardiovascular diseases (CVD) after a diagnose of sleep apnea (SA) or obesity hypoventilation syndrome (OHS) but the overall morbidity prior to a SDB diagnose is incompletely evaluated.
**Methods:** Using data from the Danish National Patient Registry (1998-2006), we identified all national patients with a diagnosis of SA (19438), or OHS (755). For every patient, we randomly selected 4 age-, sex- and socioeconomic-matched citizens from the Danish Civil Registration System Statistics. We further extracted information from the Danish Ministry of Health, Danish Medicines Agency, and National Health Security
**Results:** Pts with SA and OHS presented increased morbidity ($p<0.01$) up to more than eight years prior to a SDB diagnose of SA the most common contacts were diseases of the endocrine, nutritional and metabolic diseases ((Odds Ratio (OR) SA/OHS 4.5/4.8), nervous system: OR 4.4/5.5), respiratory system (OR: 2.9/4.0)), skin and subcutaneous tissue (OR 2.5/1-3), infections (OR 1.8/3.0), CVD (OR 1.7/1.3), genito-urinary system (OR 1.3), ear-nose and throat (OR 1.3), psychiatric diseases (OR 1.1/1.4). After a SDB diagnose, patients also presented significant morbidities and mortality. CPAP treatment reduced mortality (6.6% versus 5.5 in SA pts, 4.0% in control subjects.
**Conclusion:** Patients with SDB shows significant morbidities several years prior to

a diagnose of SA or OHS. As early detection of SA/OHS is important for improving prognosis, SDB should be considered in patient's with endocrine, nutritional, metabolic, neurological, pulmonary and CVD disorders.

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**Longterm follow-up of severe obstructive sleep apnea-hypopnea syndrome and prediction of systemic arterial hypertension**

Stefan Marian Frent[1], Daniel Lighezan[1], Voicu Tudorache[1], Carmen Ardelean[2], Diana Dimitriu[2], Stefan Mihaicuta[1]. *[1]Pneumology, Victor Babes University of Medicine and Pharmacy, Timisoara, Timis, Romania; [2]Pneumology, Victor Babes Pneumology and Infectious Diseases Clinical Hospital, Timisoara, Timis, Romania*

Obstructive sleep apnea (OSA) is an important risk factor for systemic arterial hypertension (SH).
**Aim:** Identify the best predictors for SH in patients with OSA.
**Methods:** We prospectively followed 589 consecutive patients (pts) with clinically suspected OSA. The pts were included and followed-up for a mean period of 7 years by sleep questionnaires, anthropometric measurements, polisomnography for apnea-hypopnea index (AHI) (values: normal 0-4, mild 5-14, moderate 15-29, severe over 30) and history of SH. We evaluated the Odds Ratio (OR) and 95% confidence interval (CI) in a univariate analysis and the independent variables.
**Results:** 436 males (71%) 153 females (29%), age 50±12 years (range 18-84 years) were included. The Body Mass Index (BMI) was 34±6 kg/m$^2$ (range17-56 kg/m$^2$) and the mean AHI 36/h±28. SH was found in 59% patients. The time from diagnostic to abnormal changes in blood pressure values was 7±5years. The structure of the study population according to European Society of Hypertension 2007 Guidelines: from the 59% of pts with SH: 11% with high normal values, 15% stage I, 29% stage II, 8% stage III. AHI in all 3 levels, with reference normal, is extremely significant (p<0.001) in hypertensive patients. Only severe OSA is the strongest predictor for hypertension, OR 3,2 (p<0.001, CI 1, 67–5, 59). Mild and moderate OSA did not significantly influence the appearance of SH (p<0,14, OR 0,58, CI 0,29-1,20, p<0,24, OR 1,52, CI 0,76-2,86). SH is a weak predictor for OSA in univariate analysis, p = 0,045, OR 1,76, CI 1,01-3,08.
**Conclusion:** Patients with OSA are exposed to a higher risk of developing SH. A strong predictor for SH is only severe OSA.

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**cPAP compliance and survival in elderly and sleep apnoea patients**

Rodrigo Alonso Moralejo, Salvador de la Torre Carazo, Trinidad Diaz Cambriles, Jesus Muñoz Mendez, Maria Josefa Diaz de Atauri, Angel Lopez Encuentra. *Pneumology Service, Hospital Universitario 12 de Octubre, Madrid, Spain*

**Introduction:** Sleep apnea-hypopnea syndrome (SAHS) prevalence increases with age, but very few data are available on this population.
**Aim:** To describe the clinical features, survival and tolerance to cPAP treatment of aged patients.
**Methods:** Observational, concurrently study performed during ten years including patients with SAHS evaluated in our Sleep Disorders Unit (SDU) at the age of 80 or older. Failure of treatment was defined when cPAP use was below 3.5 hours per day. Kaplan Meier and Log rank tests were performed for the survival analysis.
**Results:** 1.8% (144/7989) of patients were at least 80 years old when were studied in our SDU. There were 72 women (50%). The patients characteristics expressed by mean and standard deviation were, age: 82 (1.7), body mass index: 33 (4.3) Epworth test: 12.5 (5.3), neck circumference 41.2 (9). The 93% (135/144) of the patients were diagnosed of SAHS. 57% (83/144) of the patients started treatment with cPAP. 28/83 (34%) of them used it less than 3.5 hours. The survival analysis results are listed in the table beneath:

Use of cPAP

| Use of cPAP | Mean age (SD) | Median survival (months) | Probability of survival in 10 years | p (Log rank) |
|---|---|---|---|---|
| <3.5 hours (n=28) | 81.8 (1.9) | 43 (95% CI : 35–50) | 0% | 0.008 |
| >3.5 hours (n=55) | 81.2 (1.5) | median not reached | 69% | |

**Conclusion:** Although the percentage of aged patients is low compared with the whole population, those who fulfil correct treatment with cPAP seem to have a longer survival in 10 years.