The second international conference organised by the European Respiratory Society (ERS) and the European Sleep Research Society (ESRS)

11-13 April 2013 Berlin

FINAL PROGRAMME
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On behalf of the European Respiratory Society (ERS) and the European Sleep Research Society (ESRS), we would like to welcome you to the second international Sleep and Breathing Conference. Building on the success of the inaugural 2011 Sleep and Breathing Conference, this meeting will continue to address the knowledge deficit relating to this highly prevalent clinical problem, bringing in a wide range of experts to provide a comprehensive update and to further relevant educational and professional development.

The Sleep and Breathing Conference is the largest pan-European meeting of its kind and the only meeting offering an integrated approach to the investigation and treatment of sleep disorders.

In Berlin 2013, the focus will remain predominantly on sleep breathing disorders but our programme will extend to cover sleep-related areas of paediatrics, obesity, cardiovascular disorders, diabetes, psychology, psychiatry and neurology.

As a venue, Berlin is an ideal choice, as it is a city of creativity, economics and science. From our perspective, the Conference will benefit from this energy to support your learning and networking.

We look forward to seeing you there for an exceptional ERS/ESRS International Sleep and Breathing Conference 2013. We trust that you will come away with an increased awareness of sleep and respiratory disorders and science.

Prof. Claudio Bassetti
Conference Chair

Prof. Walter McNicholas
Conference Chair
Table of contents

WELCOME
1 Welcome from the Conference Chairs
7 Organising Committee
8 The City of Berlin
9 Travel within Berlin
10 General Information

SCIENTIFIC INFORMATION
13 Programme at a glance
15 Programme details
29 Abstracts
56 Indexes

PRACTICAL INFORMATION
58 List of exhibitors
60 Exhibition floor plan
Back Cover Conference map
Complex Sleep Disordered Breathing
Recognition and Management

What sleep breathing patterns are considered as complex?
The current terminology for Sleep Related Breathing Disorders (SRBD) is rather confusing. Naturally, there are still clear cases of obstructive and central sleep apnea. Central sleep apnea also includes periodic respiration, i.e. the crescendo/decrescendo pattern, which frequently occurs in relation to cardiovascular diseases.

For several years, the phrase “complex sleep apnea” has been increasingly used. However, this should be reserved for a specific group of SRBD - central breathing disorders that newly occur or are intensified under CPAP therapy. Additionally, breathing disorders that only arise briefly for a few days or weeks and then disappear again need to be excluded, as well as central breathing disorders that have existed previously.

To achieve clear definitions and delineations of the symptoms, we do not use the phrase “complex sleep apnea” for combined conditions. In these cases, descriptive terms should be used, such as coexisting sleep apnea or complicated sleep apnea. The same also applies for combinations of sleep apnea and hypoventilation.

Which co-morbid medical conditions are these types of sleep breathing patterns associated with and why?
Central SRBD and combinations of OSAS and central SRBD frequently occur with cardiovascular diseases, in particular cardiac insufficiency, atrial fibrillation, arterial hypertension and stroke. However, they also occur in patients with renal failure and the chronic use of opiates. The pathophysiology is not yet fully understood, but, some aspects can however be made clear using heart failure as an example. In heart failure, a build-up of fluid in the lungs stimulates irritant receptors, which stimulate respiration and lead to hyperventilation. Consequently, the level of carbon dioxide in the blood falls. This is detected by chemoreceptors, which are hypersensitive in patients with heart failure. As CO₂ falls below the apnea threshold, apnea results. Subsequent oxygen deficiency further stimulates respiration so that a vicious cycle of waxing and waning develops.

With renal failure, a fluid overload can also play a major part, both through the collection of fluid in the lungs as well as through the restriction in the upper respiratory tract.

How and when do you diagnose these types of sleep breathing patterns?
With central and complicated SRBD, the typical symptoms of daytime drowsiness, snoring and observer reported apnea are often missing. For patients in ‘at risk groups’, we therefore recommend a systematic search for SRBD, since 50% of those in ‘at risk groups’ are frequently unaware that they are suffering from SRBD. After a polygraphic screening test, a diagnosis should be made using polysomnography. This permits the best differentiation between the diverse types of SRBD, whilst also taking into account sleep stages and arousals. In our opinion, it is very important to diagnose SRBD in ‘at risk groups’, such as patients with cardiovascular diseases, stroke and renal failure, since these groups have an unfavourable prognosis.

What device modes should you use to treat each type of complex sleep breathing pattern?
We begin with CPAP therapy on most patients. Around 50% show a satisfactory elimination of the SRBD under constant pressure.1 Where satisfactory improvement to the breathing disorder is not achieved after the first night of CPAP, we change to an Auto Servoventilation device.2 Numerous studies have demonstrated the advantages of this therapy, including a more effective suppression of breathing disturbances, improvement in the quality of life and cardiovascular function parameters. In our opinion, there is insufficient data that would adequately support bi-level or oxygen therapy. For a small number of patients, a further improvement to their breathing disorder can occur after several weeks of CPAP use. In these patients it may, therefore, be sensible to change over to an Auto Servoventilation device later on.

Does treating these complex sleep breathing patterns have an effect on the co-morbid medical conditions they are associated with?
There are ever increasing indications that a complete suppression of the SRBD improves the survival of co-morbid patients.3 It is hoped that final proof will be achieved by two major international studies, Advent-HF and SERVE-HF. At present, evidence suggests that complete suppression of the SRBD improves quality of life and cardiac efficiency.

References
PRACTICAL INFORMATION
ERS
EUROPEAN RESPIRATORY SOCIETY

ANNUAL CONGRESS 2013
BARCELONA  spain, 7–11 september

EARLY BIRD REGISTRATION opening
April 2013

LATE BREAKING ABSTRACT SUBMISSION
May 2013

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ERSCONGRESS2013.ORG
Organising Committee

**Chairs**

Prof. Claudio Bassetti  
Prof. Walter McNicholas  
Prof. Johan Verbraecken  
Prof. Patrick Lévy

**Vice Chairs**

Dr. Athanasios Kaditis  
Prof. Ferran Barbé  
Prof. Marisa Bonsignore  
Prof. Jan Hedner

**Committee Members**

Prof. Stefan Andreas  
Prof. Jan Hedner

The Conference is also supported and endorsed by the following medical societies and joint sessions have been organised:

- European Association for the Study of Diabetes
- European Association for the Study of Obesity
- European Neurological Society
- European Paediatric Association
- European Psychiatric Association
- European Society of Cardiology
- European Society of Hypertension
- German Sleep Society (DGSM)

---

**Conference Committee**

The Sleep and Breathing Conference was organized by both the European Respiratory Society (ERS) and the European Sleep Research Society (ESRS)

**European Respiratory Society**

4, Ave Sainte-Luce  
CH-1003 Lausanne, Switzerland  
Tel: + 41 21 213 01 01, Fax: + 41 21 213 01 00  
E-mail: info@ersnet.org  
www.ersnet.org

**European Sleep Research Society**

Neuropsychology and Functional Neuroimaging Research Unit  
Université Libre de Bruxelles  
Avenue F.D. Roosevelt 50  
B-1050 Bruxelles, Belgium  
Tel: +31-2 650 26 39. Fax: +31-2 650 22 09  
E-mail: secretary@esrs.eu  
www.esrs.eu
Berlin is Germany's largest city and also its capital. Once the capital of Prussia and a leading cultural centre of the 1920s, few cities have been shaped by history to such an extent, or undergone as much major transformation as Berlin. “Berlin is always in the process of becoming” remarked historian Karl Scheffler, and this is one of the traits that makes it one of Europe’s most vibrant, exciting and colourful capitals, now characterized by dazzling modernity and breathtaking architecture.

Although Berlin is only about 750 years old, making it comparatively young among European cities, it has generated a great deal of history. Since the Wall fell in 1989, Berlin has been in a state of constant change, becoming a symbol of both division and unity. Berlin is an important junction where East and West meet: a fulcrum of political, cultural and historic experiences, and a major economic centre. Its universities, research institutes, theatres, museums, concert halls and architecture enjoy an international reputation. Famous Berlin sights from the iconic Brandenburg Gate with Schadow’s Quadriga, to the modern Potsdamer Platz and Sir Norman Foster’s reconstructions of the Reichstag are just a few of the city’s enthralling highlights. In the field of medicine, Berlin is home to the Charité, one of Europe’s largest teaching hospitals, with a significant Sleep Medicine centre whose research activity ranges from the genetics of sleep apnoea to the long-term effects of CPAP, and encompasses a joint research programme with Beijing University.

Berlin is also a green city, famous for its “Berliner Luft” (Berlin Air). Forests, parks and waterways cover more than one-third of the city’s area, and the numerous lakes ion the city centre and surrounding areas are ideal places for relaxation. There is a unique atmosphere in Berlin, and throughout the city you can experience the vitality of life on the boulevards, in the many art galleries and museums, at the flea markets and in the innumerable bars and restaurants - many of which are open around the clock. The three major universities attract dynamic, creative people who appreciate the lively atmosphere of the fast-moving city, while the fantastic range of culture, politics, entertainments and dining mean that Berlin really does have something for everyone.
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D-72244 Singen, Germany
Tel: +49 773179 76 0

[www.compumedics.com](http://www.compumedics.com)
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Opening Ceremony and Reception
All registered delegates are welcome to join the Organising Committee and the faculty at the Opening Ceremony & Cocktail of the 2nd international Sleep and Breathing Conference 2013 on Thursday April 11 at 19:00 in the Potsdam Foyer of the Intercontinental Hotel. (Dress code is smart casual)

Registration

<table>
<thead>
<tr>
<th></th>
<th>Early Bird / 15 January</th>
<th>Standard</th>
<th>Day Rate / onsite</th>
</tr>
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<tbody>
<tr>
<td>ERS/ESRS Member</td>
<td>€395</td>
<td>€451</td>
<td>€160</td>
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<tr>
<td>Non-Member</td>
<td>€451</td>
<td>€503</td>
<td>€184</td>
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<tr>
<td>Physiotherapists, technicians and nurses</td>
<td>€316</td>
<td>€352</td>
<td>€129</td>
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For countries with GNP below 3,000$:

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<tr>
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<th>Early Bird / 15 January</th>
<th>Standard</th>
<th>Day Rate / onsite</th>
</tr>
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<tr>
<td>ERS/ESRS Member</td>
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<td>€221</td>
<td>€80</td>
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<tr>
<td>Non-Member</td>
<td>€226</td>
<td>€252</td>
<td>€92</td>
</tr>
<tr>
<td>Physiotherapists, technicians and nurses</td>
<td>€158</td>
<td>€176</td>
<td>€64</td>
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Badges
Access to all scientific sessions is only permitted for valid badge holders. Badges will be handed out at the registration desk in Berlin. We advise you to always wear your badge within the conference venue. €35 will be charged for replacement of lost badge.

Cancellation / Name change
Refund of fees, less 25% administrative charges, can be applied for in writing up to 28 February 2013. After this date no refund will be possible. Substitutions of attendees can be made at any time. A fee of €35 will be charged for name changes.

Car parking
The Hotel InterContinental has an underground car park. Parking tickets at €4 per hour or €24 per day can be purchased onsite at the parking office.

Certificates of attendance and CME
The 2013 ERS/ESRS International Sleep and Breathing Conference is accredited by the European Board for Accreditation in Pneumology (EBAP), which works under the umbrella of the European Accreditation Council for Continuing Medical Education (EACCME). The EACCME is an institution of the European Union of Medical Specialists (UEMS; visit www.uems.net).

Designation Statement
EBAP/EACCME designates the Sleep and Breathing Conference as a continuing medical education activity for a maximum of 18 European hours of credit. Recognition of EACCME credits EBAP/EACCME credits can be exchanged for their national equivalent by contacting your national CME authority. EACCME credits are recognised throughout Europe and in North America. A record of your CME credit status will also be kept for future reference.
To receive credits
You must complete an electronic CME Application Form. This will allow you to directly print your CME accreditation certificate as well as a certificate of attendance after the Conference. Further information will be sent by e-mail to each participant or will be available online on www.sleepandbreathing.org.

Cloakroom
A cloakroom is available on the conference level during the secretariat opening hours.

Coffee breaks
Morning and afternoon coffee breaks are included in the registration fee and are served in the poster and exhibition area.

Insurance
The meeting organiser cannot accept liability for personal injuries sustained, or for loss or damage of property, either during, or as a result of the meeting. Please check the validity of your own insurance.

Language
The official language of the congress is English. No simultaneous translation will be provided. The national language of Germany is German, although English is widely spoken.

Mobile phones
Please be aware that mobile phones must be switched off during the sessions.

Opening hours

<table>
<thead>
<tr>
<th></th>
<th>Thursday 11 April 2013</th>
<th>Friday 12 April 2013</th>
<th>Saturday 13 April 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration &amp; Secretariat</td>
<td>07:15–18:45</td>
<td>07:30–18:45</td>
<td>07:30–16:30</td>
</tr>
<tr>
<td>Exhibition</td>
<td>09:00–18:00</td>
<td>09:00–18:00</td>
<td>09:00–18:00</td>
</tr>
<tr>
<td>Speakers’ Service Room</td>
<td>07:15–18:45</td>
<td>07:30–18:45</td>
<td>07:30–16:30</td>
</tr>
</tbody>
</table>

Onsite registrations will be accepted but delegates cannot be guaranteed to receive all conference documents.

Responsibility
The participant acknowledges that he/she has no right to lodge damage claims against the organisers, should the holding of the meeting be hindered or prevented by political events (such as acts of terrorism, danger of hostility, war etc.) or by unexpected economic events or generally by force majeure, or should the nonappearance of speakers or other reasons necessitate programme changes. With registration, the participant accepts this proviso.

Speaker Service Room (SSR)
There is a centrally located SSR in room Potsdam IV connected to all lecture rooms. All speakers are asked to hand in their PowerPoint presentation at least one hour before their lecture at the SSR. Speakers are requested to adhere strictly to the schedule and time limit indicated in the programme. The indicated lecture times generally include discussion time.

Visa Requirements
A valid passport (or identity card for European Community nationals) is required to enter the Germany. Visas are not necessary for citizens of EU countries. Please contact your local German embassy, consulate or travel agency for further information.

Wifi
The conference level is equipped with wireless-LAN. 24-hours cards can be bought at the hotel reception for €20.
## Programme at a glance

### Thursday 11 April 2013

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00–10:00</td>
<td>Opening Session “Diagnosis of sleep and breathing disorders”</td>
<td>Potsdam I-III</td>
</tr>
<tr>
<td>10:30–12:00</td>
<td>Hot Topic “Sleep and genetics”</td>
<td>Potsdam I-III</td>
</tr>
<tr>
<td>10:30–12:00</td>
<td>Pro/Con debate “Obstructive sleep apnoea contributes to premature death”</td>
<td>Pavilion</td>
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<tr>
<td>10:30–12:00</td>
<td>Specialised Symposium “OSA: upper airway pathophysiology and treatment interactions”</td>
<td>Bellevue</td>
</tr>
<tr>
<td>12:30–13:30</td>
<td>Case studies “Heart failure and sleep: recent advances”</td>
<td>Pavilion</td>
</tr>
<tr>
<td>12:30–14:00</td>
<td>TP Thematic Poster Sessions: Posters of accepted abstracts will be manned by authors. Faculty will coordinate the interactions between authors and delegates.</td>
<td>Bellevue</td>
</tr>
<tr>
<td>13:45–14:45</td>
<td>TP “Sleep Apnoea: from paediatrics to neurology”</td>
<td>Thematic Poster Area</td>
</tr>
<tr>
<td>15:15–17:15</td>
<td>Plenary Session “Insomnia (joint session with European Psychiatric Association)”</td>
<td>Potsdam I-III</td>
</tr>
<tr>
<td>17:30–19:00</td>
<td>Evening Symposium “Recognition and Management of Complex Sleep Disordered Breathing – An Interactive Session”, organised by Philips Respironics</td>
<td>Bellevue</td>
</tr>
<tr>
<td>17:30–19:00</td>
<td>Evening Symposium “Hot topics in sleep disorder breathing”, organised by ResMed Europe</td>
<td>Charlottenburg</td>
</tr>
<tr>
<td>19:00–20:30</td>
<td>OC Opening Ceremony &amp; Reception: All registered delegates are welcome to join the Organising Committee and the faculty at the Opening Ceremony &amp; Cocktail.</td>
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### Friday 12 April 2013

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Room</th>
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<tbody>
<tr>
<td>08:00–09:30</td>
<td>Specialised Symposium “Epidemiology of respiratory sleep problems and related comorbidities: large scale studies in OSA”</td>
<td>Potsdam I-III</td>
</tr>
<tr>
<td>08:00–09:30</td>
<td>Specialised Symposium “New guidelines on OSA and hypertension (joint session with European Society of Hypertension)”</td>
<td>Pavilion</td>
</tr>
<tr>
<td>08:00–09:30</td>
<td>Hot Topic “Problems areas in central sleep apnoea: complex sleep apnoea, opioid-induced CSA, stroke and CSA”</td>
<td>Bellevue</td>
</tr>
<tr>
<td>10:00–12:00</td>
<td>Plenary Session “Sleep disordered breathing and the heart (joint session with European Society of Cardiology)”</td>
<td>Potsdam I-III</td>
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<tr>
<td>12:30–13:30</td>
<td>How to measure the quality of a sleep journal and a sleep article: an academic and publisher’s perspective</td>
<td>Pavilion</td>
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<tr>
<td>12:30–13:30</td>
<td>Case studies “Hypersomnia, fatigue and sleepiness”</td>
<td>Bellevue</td>
</tr>
<tr>
<td>13:45–14:45</td>
<td>TP Thematic Poster Session: Posters of accepted abstracts will be manned by authors. Faculty will coordinate the interactions between authors and delegates.</td>
<td>Thematic Poster Area</td>
</tr>
<tr>
<td>15:15–17:15</td>
<td>Plenary Session “Sleep and ageing”</td>
<td>Potsdam I-III</td>
</tr>
<tr>
<td>17:30–19:00</td>
<td>Specialised Symposium “The role and consequences of obesity and adenotonsillar hypertrophy in paediatric OSA (joint session with European Association for the Study of Obesity)”</td>
<td>Potsdam I-III</td>
</tr>
<tr>
<td>17:30–19:00</td>
<td>Hot Topic “Sleep and driving”</td>
<td>Pavilion</td>
</tr>
<tr>
<td>17:30–19:00</td>
<td>Pro/Con Debate “Bariatric surgery is preferrable than CPAP for management of OSA”</td>
<td>Bellevue</td>
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### Saturday 13 April 2013

<table>
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<tr>
<th>Time</th>
<th>Event</th>
<th>Room</th>
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<tbody>
<tr>
<td>08:00–09:30</td>
<td>Specialised Symposium “Restless legs syndrome (joint session with the European Neurological Society)”</td>
<td>Potsdam I-III</td>
</tr>
<tr>
<td>08:00–09:30</td>
<td>Hot Topic “Chronic hypoventilation and its management”</td>
<td>Pavilion</td>
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<tr>
<td>08:00–09:30</td>
<td>Hot Topic “Parasomnias: abnormal movements during sleep”</td>
<td>Bellevue</td>
</tr>
<tr>
<td>10:00–12:00</td>
<td>Plenary Session “Sleep apnoea and metabolic dysfunction (joint session with European Association for the Study of Diabetes)”</td>
<td>Potsdam I-III</td>
</tr>
<tr>
<td>12:30–13:30</td>
<td>Specialised Symposium “Chronobiology: regulation of wake and sleep (joint session with the German Sleep Society DGSM)”</td>
<td>Potsdam I-III</td>
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<tr>
<td>12:30–13:30</td>
<td>Expert Lecture “Narcolepsy and H1N1 vaccination”</td>
<td>Pavilion</td>
</tr>
<tr>
<td>12:30–13:30</td>
<td>Case studies “Methodology in diagnosis and therapy of OSA”</td>
<td>Bellevue</td>
</tr>
<tr>
<td>14:30–16:00</td>
<td>Specialised Symposium “Sleep and COPD”</td>
<td>Potsdam I-III</td>
</tr>
<tr>
<td>14:30–16:00</td>
<td>Pro/Con Debate “Is the sleep laboratory obsolete?”</td>
<td>Pavilion</td>
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<tr>
<td>14:30–16:00</td>
<td>Hot Topic “New imaging techniques in the evaluation of sleep and breathing disorders”</td>
<td>Bellevue</td>
</tr>
<tr>
<td>16:15–17:30</td>
<td>Closing session “Management of sleep and breathing disorders”</td>
<td>Potsdam I-III</td>
</tr>
</tbody>
</table>
PROGRAMME DETAILS

This information is valid up to March 4, 2013.
Visit www.sleepandbreathing.org for updates.
**POTS DAM I-III ROOM**  
**SESSION 2**  
08:00–10:00

**OPENING SESSION “DIAGNOSIS OF SLEEP AND BREATHING DISORDERS”**

Aims: The aims of this session are to:
- provide overview of clinical assessment of patients with suspected SDB;
- review the respective merits of polysomnography and ambulatory monitoring in the diagnosis of SDB.

Target audience: Clinicians, technologists and other allied health professionals with an interest in SDB.

Chairs: W. McNicholas (Dublin, Ireland), C. Bassetti (Bern, Switzerland)

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>08:00</td>
<td>Welcome from ERS and ESRS</td>
</tr>
<tr>
<td>08:20</td>
<td>Questionnaires versus detailed history taking in clinical evaluation of SDB</td>
</tr>
<tr>
<td>08:45</td>
<td>Differential diagnosis of sleep complaints in SDB</td>
</tr>
<tr>
<td>09:10</td>
<td>Polysomnography in the evaluation of SDB: still the gold standard?</td>
</tr>
<tr>
<td>09:35</td>
<td>Ambulatory monitoring in the diagnosis of SDB</td>
</tr>
</tbody>
</table>

**POTS DAM I-III ROOM**  
**SESSION 3**  
10:30–12:00

**HOT TOPIC “SLEEP AND GENETICS”**

Aims: The aims of this session are to provide a basic understanding of current genetic research in the areas of sleep disordered breathing, a very common chronic condition within our community, and that of narcolepsy, a much rarer condition largely related to orexin deficiency. Additionally, strategies for future genetic research will be discussed from ongoing population-wide studies from Iceland, in the area of sleep disordered breathing and restless legs syndrome. At the end of this session, participants should understand basic strategies for undertaking large-scale genetic studies and smaller, more detailed family studies. Participants will be able to understand the limitations of genetic epidemiology and current technology utilised in the area of sleep genetics. Lastly, participants will be able to identify genes and areas of interest in studying disorders related to sleep.

Target audience: Health professionals working in the area of sleep, including medical professionals, allied health professionals, technologists, nurses and basic scientists.

Chairs: R.L. Riha (Edinburgh, United Kingdom), M. Tafti (Lausanne, Switzerland)

<table>
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<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>10:30</td>
<td>Genetics of OSA</td>
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<tr>
<td>11:00</td>
<td>Genetics of narcolepsy</td>
</tr>
<tr>
<td>11:30</td>
<td>Strategies for future genetic research in the SDB and RLS areas</td>
</tr>
</tbody>
</table>

**PAVILLON ROOM**  
**SESSION 4**  
10:30 - 12:00

**PRO/CON DEBATE “OBSTRUCTIVE SLEEP APNOEA CONTRIBUTES TO PREMATURE DEATH”**

Aims: This session will be the opportunity to discuss whether obstructive sleep apnoea contributes to premature death.

Target audience: Physicians interested in sleep medicine, cardiologists and pneumologists.

Chairs: S. Andreas (Immenhausen, Germany), J.L. Pepin (Grenoble, France)

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>10:30</td>
<td>Pro</td>
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<tr>
<td>11:00</td>
<td>Con</td>
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<tr>
<td>11:30</td>
<td>Discussion and summary</td>
</tr>
</tbody>
</table>

**BELLEVUE ROOM**  
**SESSION 5**  
10:30–12:00

**SPECIALISED SYMPOSIUM OSA: UPPER AIRWAY PATHOPHYSIOLOGY AND TREATMENT INTERACTIONS**

Aims: The aim of this session is to review the most recent progress in the pathophysiology of upper airways and examine the impact of treatments alternative to CPAP on UA pathophysiology.

Target audience: Pulmonary clinicians, ORL and sleep clinicians interested in OSA.

Chairs: J.A. Hedner (Gothenburg, Sweden), M.R. Bonsignore (Palermo, Italy)
10:30 Upper airway pathophysiology in OSA: negative pressure versus dilator muscle deficiency
A. Schwartz (Baltimore, United States of America) 12

11:00 Hypoglossal stimulation in the management of OSA
D. Rodenstein (Brussels, Belgium) 13

11:30 Mandibular advancement devices: how do they affect pathophysiology?
O. Vanderveken (Antwerp, Belgium) 14

**PAVILLON ROOM**  **SESSION 6**  **12:30–13:30**

**EXPERT LECTURE “HEART FAILURE AND SLEEP: RECENT ADVANCES”**

Aims: During this session, the audience will learn:
- about OSA as a cause of heart failure: systolic dysfunction versus diastolic dysfunction;
- and how treatment of sleep disordered breathing can have an impact on heart failure.

Target audience: Clinicians with an interest in heart failure, pneumologists and clinical researchers.

12:30 Heart failure and sleep: recent advances prevalence and diagnostics
S. Andreas (Immenhausen, Germany) 15

13:00 Heart failure and sleep: recent advances prevention
W. Randerath (Solingen, Germany) 16

**BELLEVUE ROOM**  **SESSION 7**  **12:30–14:00**

**CASE STUDIES “VIDEO SESSION: SLEEP MOVEMENT DISORDERS”**

Aims: The aim of this session is to appreciate the spectrum of movement disorders occurring in patients with sleep disorders.

Target audience: Clinicians.

Chairs: C. Bassetti (Bern, Switzerland), D. Pevernagie (Heeze, Netherlands)

12:30 Snoring, stridor, catathrenia and other sleep-related respiratory disturbances
D. Pevernagie (Heeze, Netherlands) 17

13:00 What is your diagnosis? (interactive presentation)
C. Bassetti (Bern, Switzerland) 18

13:30 Parasomnia versus epilepsy
L. Nobili (Milan, Italy) 19

**Thematic Poster Sessions: Posters of accepted abstracts will be manned by authors. Faculty will coordinate the interactions between authors and delegates.**

**THEMATIC POSTER AREA**  **SESSION 9**  **13:45–14:45**

**THEMATIC POSTER SESSION “SLEEP APNOEA: FROM PAEDIATRICS TO NEUROLOGY”**

Chairs: R.L. Riha (Edinburgh, United Kingdom), A. Kaditis (Piraeus, Greece)

P1: Turner Syndrome and Obstructive Sleep Apnea: A Case Report

P2: Asthma outcomes and mite allergen bedding control: a revisited meta-analysis

P3: Clinical presentation and polysomnographic data of catathrenia – a retrospective experience of a university sleep clinic

P4: Sleep problems in patients with Parkinson’s disease

P5: Is there an association between sleep disordered breathing in children and deficits in recognition memory?

P6: Is Obstructive Sleep Apnea Syndrome Different in Women?

P7: Learning disturbance in children with obstructive breathing disorders before and after adenotonsillectomy

P8: Metabolic profile in children with obstructive sleep breathing disorders associated or not to obesity

P9: Resistant hypertension and sleep apnea syndrome at patients with acromegaly

P10: Positional Sleep Apnea in Asian Patients

P11: Obstructive sleep-disordered breathing and long-term non-invasive ventilation in children—a 20 years experience

P12: Self-report of cognition in obstructive sleep apnea syndrome

P13: Developing An Electronic Archive For The Sleep Disorder Breathing Patient

P14: Patients With Metabolic Syndrome Presenting For Sleep Disordered Breathing

P15: Prevalence and morbidity of undiagnosed obstructive sleep apnea in a population sample of men aged >40 years.

P16: Deriving respiratory data from infant overnight pulse oximetry plethysmogram recordings

P17: Treatment of Hypersomnolent patients without objective Obstructive Sleep Apnoea (OSA)

P18: Relationship of sleep-related breathing disorder with depression and anxiety in epilepsy patients
THEMATIC POSTER AREA  SESSION 10  13:45–14:45

THEMATIC POSTER SESSION “OTHER RESPIRATORY AND NON-RESPIRATORY DISORDERS”
Chairs: F. Barbe Illa (Lleida, Spain), J. Verbraecken (Antwerp, Belgium)
P19: Bond of night desaturations and intensity of asthma symptoms and Rtot in severe asthma patients
P20: Characteristics of SLEEP STAGES IN COPD PATIENTS
P21: Particular qualities of sleep stages in COPD patients with concomitant depressive episode
P22: Effect of antidepressive treatment on sleep in patients with COPD and concomitant depressive episode
P23: Short-term effects of non-invasive ventilation on sleep quality in patients with amyotrophic lateral sclerosis
P24: Nocturnal continuous positive airway pressure in severe asthma. A pilot study
P25: Does emphysema severity disturbs sleep?
P26: Heart rate recovery after cardiopulmonary exercise test does not predict survival in patients with IPF and sleep disordered breathing
P27: OSA’S risk factors in patients with chronic obstructive disease (COPD) and chronic hypercapnic respiratory failure (CHRF)
P28: Congenital Central Hypoventilation Syndrome-long term follow-up on a tertiary hospital
P29: Obstructive Sleep Apnoea among COPD patients
P30: Autonomic cardiovascular control during sleep in patients with spinal cord injury
P31: Prevalence and clinical features of obesityhypventilation syndrome in Okinawa, Japan. Focused on physiological characteristics of sleep related breathing disorders among patients with obesityhypventilation.
P32: Sleep-breathing disorders during the night in children with mucopolysaccharidosis
P33: Polysomnography in Pompe Disease - case report.
P34: Effect of Sleep Position Trainer and Mandibular Advancement Devices on Residual Positional Sleep Apnea
P35: Prevalence of residual excessive sleepiness in patients receiving mandibular advancement device treatment
P36: May flow limitation% during sleep be a good index to decide when begin non invasive mechanical ventilation(NIMV) in patients with amyotrophic lateral sclerosis (ALS) ?
P37: Polysomnographic Phenotypes of OSA and Mandibular Advancement Splint Treatment Outcome
P38: Rationale and objectives of an oral appliance network on global effectiveness: the ORANGE Registry
P39: Craniofacial structure in OSA and relationship to CPAP treatment pressure and compliance
P40: Effects of brief motivational interviewing on continuous positive airway pressure adherence in obstructive sleep apnea: A Randomized Controlled Trial
P41: Work productivity modification in Obstructive Sleep Apnoea patients under CPAP treatment
P42: Differences between controlled and resistant hypertension in an obstructive sleep apnea population regarding CPAP values
P43: Elderly patients with Obstructive Sleep Apnoea (OSA) - tolerance and compliance with CPAP
P44: Effect of nasal airway stent on obstructive sleep apnea.
P45: EEG significance in PSG applying Continuous Positive Airway Pressure therapy in patients with OSAS.
P46: Treatment of Obstructive Sleep Apnea with Auto-Bilevel Pressure – an easy solution for difficult patients?
P47: CPAP treatment with nasal pillows: preference, long term effectiveness and adherence

THEMATIC POSTER AREA  SESSION 11  13:45–14:45

THEMATIC POSTER SESSION “TREATMENT OF SLEEP APNOEA”
Chairs: A. Simonds (London, United Kingdom), I. Fietze (Berlin, Germany)
P37: Adherence to positive airway pressure of patients with stroke and sleep-disordered breathing
P38: Effect of Sleep Position Trainer and Mandibular Advancement Devices on Residual Positional Sleep Apnea
P39: Prevalence of residual excessive sleepiness in patients receiving mandibular advancement device treatment
P40: May flow limitation% during sleep be a good index to decide when begin non invasive mechanical ventilation(NIMV) in patients with amyotrophic lateral sclerosis (ALS) ?
P41: Polysomnographic Phenotypes of OSA and Mandibular Advancement Splint Treatment Outcome
P42: Rationale and objectives of an oral appliance network on global effectiveness: the ORANGE Registry
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P48: Effect of nasal airway stent on obstructive sleep apnea.
P49: EEG significance in PSG applying Continuous Positive Airway Pressure therapy in patients with OSAS.
P50: Treatment of Obstructive Sleep Apnea with Auto-Bilevel Pressure – an easy solution for difficult patients?
P51: CPAP treatment with nasal pillows: preference, long term effectiveness and adherence
P52: Efficacy of Mandibular Advancement Splint for Treatment of OSA. Report at three months of a one-year follow-up study.
PLENARY SESSION “INSOMNIA (JOINT SESSION WITH EUROPEAN PSYCHIATRIC ASSOCIATION)”

Aims: This session aims to allow an understanding of the different forms of insomnia and its pharmacological treatments. Insomnia is a leading symptom of many disorders and particularly psychiatric disorders. In turn, insomnia might increase the risk to develop psychiatric disorders. Moreover, insomnia is also increasingly evident in sleep apnoea patients. Knowledge in this area is therefore of importance not only for psychiatric sleep specialists, but for all physicians in the sleep medicine field.

Target audience: Physicians, psychiatrists and sleep specialists.

Chairs: T. Pollmaecher (Ingolstadt, Germany), H. Sass (Aachen, Germany)

15:15 Insomnia: clinical presentation and differential diagnosis
D. Riemann (Freiburg, Germany)

15:45 Insomnia and sleep apnoea
J. Acker (Bad Zurzach, Switzerland)

16:15 Insomnia and psychiatric disorders: mutual causative interactions
T. Pollmaecher (Ingolstadt, Germany)

16:45 Insomnia: basic pharmacological treatment approaches
T. Wetter (Regensburg, Germany)

BELLEVUE ROOM SESSION 14 17:30–19:00

EVENING SYMPOSIUM “RECOGNITION AND MANAGEMENT OF COMPLEX SLEEP DISORDERED BREATHING – AN INTERACTIVE SESSION”

Organised by Philips Respironics

Chairs: P. Escourrou (Clamart, France), W. Randerath (Solingen, Germany)

17:30 Introduction
P. Escourrou (Clamart, France)

17:35 Non Compliant to CPAP
W. Randerath (Solingen, Germany)

17:55 Obesity Hypoventilation Syndrome
N. Hart (London, United Kingdom)

18:15 Complicated Breathing in Heart Failure
M. Arzt (Regensburg, Germany)

18:35 Sleep Apnoea and Stroke
C. Bassetti (Bern, Switzerland)

18:55 Conclusion
W. Randerath (Solingen, Germany)

CHARLOTTENBURG ROOM SESSION 15 17:30–19:00

EVENING SYMPOSIUM “HOT TOPICS IN SLEEP DISORDER BREATHING”

Organised by ResMed Europe

Chairs: T. Penzel (Berlin, Germany), I. Fietze (Berlin, Germany)

17:30 Introduction
T. Penzel (Berlin, Germany), I. Fietze (Berlin, Germany)

17:35 Benefits of remote telemonitoring for OSA patients
U. Anttalainen (Turku, Finland)

17:55 Treatment of non-compliant CPAP patients
B. Pigearias (Nice, France)

18:15 Arrhythmia and chronic heart failure: what’s the role of sleep disorder breathing management?
O. Oldenburg (Bad Geynhausen, Germany)

18:35 Overlap Syndrome (COPD and OSA): Are we always seeing the whole picture?
J.L. Pepin (Grenoble, France)

18:55 Conclusion
T. Penzel (Berlin, Germany), I. Fietze (Berlin, Germany)
12 April 2013

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<th>POTSDAM I-III ROOM</th>
<th>SESSION 16</th>
<th>08:00–09:30</th>
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| **SPECIALISED SYMPOSIUM “EPIDEMIOLOGY OF RESPIRATORY SLEEP PROBLEMS AND RELATED COMORBIDITIES: LARGE SCALE STUDIES IN OSA”**  
Aims: The aim of this session is to review classic epidemiology of OSA, as well as more recent data regarding OSA in women and interventional trials.  
Target audience: Clinicians.  
Chairs: F. Barbe Illa (Lleida, Spain), J.L. Pepin (Grenoble, France)  
08:00 Epidemiological data on OSA and cancer  
F. Barbe Illa (Lleida, Spain)  
08:30 Interventional trials and outcome perspective  
J.L. Pepin (Grenoble, France)  
09:00 Specific parameters (gender, age) and large cohorts  
L. Grote (Gothenburg, Sweden) |

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<th>PAVILLON ROOM</th>
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| **SPECIALISED SYMPOSIUM “NEW GUIDELINES ON OSA AND HYPERTENSION (JOINT SESSION WITH EUROPEAN SOCIETY OF HYPERTENSION)”**  
Aims: The aims of this session are to:  
- discuss recently published guidelines on the management of OSA and hypertension;  
- review mechanisms of hypertension in OSA;  
- and discuss recent findings relating to hypertension and OSA in the ESADA cohort study.  
Target audience: Clinicians, including cardiologists, with an interest in SDB, technologists and other allied health professionals.  
Chairs: W. McNicholas (Dublin, Ireland), G. Parati (Milan, Italy)  
08:00 Guidelines for the management of sleep apnea and hypertension (from ESH)  
G. Parati (Milan, Italy)  
08:30 Mechanisms of systemic hypertension in OSA  
J.A. Hedner (Gothenburg, Sweden)  
09:00 OSA and hypertension: the ESADA cohort study  
W. McNicholas (Dublin, Ireland) |

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<tr>
<th>BELLEVUE ROOM</th>
<th>SESSION 18</th>
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| **HOT TOPIC “PROBLEMS AREAS IN CENTRAL SLEEP APNOEA: COMPLEX SLEEP APNOEA, OPIOID-INDUCED CSA, STROKE AND CSA”**  
Aims: During this session, clinical and pathophysiological aspects of complex sleep apnoea, opioid-induced central sleep apnoea and stroke will be addressed.  
Target audience: Clinicians, clinical researchers and scientists.  
Chairs: S. Andreas (Immenhausen, Germany), J. Verbraecken (Antwerp, Belgium)  
08:00 Complex sleep apnoea syndrome: prevalence, risk factors and practical approach  
W. De Backer (Antwerp, Belgium)  
08:30 Central sleep apnoea in opioid use and in behavioural hyperventilation  
D. Pevernagie (Heeze, Netherlands)  
09:00 Central sleep apnoea in stroke: a diagnostic and therapeutical challenge  
C. Bassetti (Bern, Switzerland) |

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<th>POTSDAM I-III ROOM</th>
<th>SESSION 19</th>
<th>10:00–12:00</th>
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| **PLENARY SESSION “SLEEP DISORDERED BREATHING AND THE HEART (JOINT SESSION WITH EUROPEAN SOCIETY OF CARDIOLOGY)”**  
Aims: The aims of this session are to:  
- review mechanisms of cardiovascular disease in OSA;  
- discuss cardiac disorders associated with OSA including coronary artery disease and cardiac arrhythmias;  
- review associations of sleep apnoea and heart failure.  
Target audience: Clinicians, basic scientists, cardiologists, allied health professionals with an interest in SDB.  
Chairs: W. McNicholas (Dublin, Ireland), O. Oldenburg (Bad Oeynhausen, Germany)  
10:00 Basic mechanisms of cardiovascular disease in OSA  
S. Ryan (Dublin, Ireland)  
10:30 Coronary artery disease and OSAS  
P. Levy (Grenoble, France) |
11:00  Sleep apnoea and cardiac arrhythmias (from ESC)
      O. Oldenburg (Bad Oeynhausen, Germany)  45
11:30  Sleep apnoea and heart failure: cause or effect?
      G. Parati (Milan, Italy)  46

PAVILLON ROOM  SESSION 20  12:30–13:30

“HOW TO MEASURE THE QUALITY OF A SLEEP JOURNAL AND A SLEEP ARTICLE: AN ACADEMIC AND PUBLISHER’S PERSPECTIVE”

Aims: The aims of this session are to provide an overview of:
- current trends in publishing basic and clinical sleep research;
- changes in academic quality requirements in sleep research publications;
- and the challenges and opportunities related to the open access movement.

Target audience: Junior and senior clinicians and academics with an interest in publishing their research in a multidisciplinary sleep research journal published by a reputable publisher and owned by a professional society.

12:30  Publishing sleep research for the future
      D. Dijk (Surrey, United Kingdom)  47
12:50  The future of publishing: how to deal with open access?
      L. Cranfield (Copenhagen, Denmark)  48
13:10  Discussion

BELLEVUE ROOM  SESSION 21  12:30–13:30

CASE STUDIES “HYPERSOMNIA, FATIGUE AND SLEEPINESS”

Aims: The aim of this session is to appreciate the spectrum of clinical presentations and etiological causes of disturbances of wakefulness.
Target audience: Clinicians.
C. Bassetti (Bern, Switzerland)

Thematic Poster Sessions: Posters of accepted abstracts will be manned by authors. Faculty will coordinate the interactions between authors and delegates.

THEMATIC POSTER AREA  SESSION 23  13:45–14:45

THEMATIC POSTER SESSION “PHYSIOLOGY AND PATHOPHYSIOLOGY”

Chairs: M.R. Bonsignore (Palermo, Italy), J.A. Hedner (Gothenburg, Sweden)
P53:  Expiratory and inspiratory muscle functions in obstructive sleep apnea syndrome
P54:  The association of carotis artery atherosclerosis with obstructive sleep apnea syndrome and snoring
P55:  High altitude hypoxia and periodic breathing during sleep: gender related differences. The HIGHCARE project
P56:  Hypertension, heart failure and sleep related breathing disorders: results from the ProMISES (progetto multicentrico italiano sonno e scompenso) study.
P57:  Validation of Pulse-Transit-Time Derived Blood Pressure Monitoring in Bi-Level Ventilated Patients with Heart Failure
P58:  Only severe obstructive sleep apnea is a strong predictor for systemic hypertension
P59:  Sleep disorders in patients with stroke
P60:  The lengths of the pterygoideus hamulus is associated with the Obstructive Sleep index–A combined 3D CBCT and polysomnographic study
P61:  Obstructive sleep apnea in obese patients with type 2 diabetes in primary health care
P62:  Average and minimum oxygen saturation in OSAS patients as disease severity index in polysomnographic evaluation.
P63:  Relationships between fluctuations in state and respiratory events during Cheyne-Stokes respiration in heart failure patients.
P64:  GAL-021 decreases the frequency and severity of obstructive apneas in urethane anesthetized rats
P65:  GAL-021 stabilizes breathing and decreases the frequency of central sleep apneas in morphine-tolerant rats
P66:  A specific pattern of potential cardiotoxic CD4 lymphocytes in alfa delta sleep is not influenced by obstructive sleep apneas
P67:  Positive correlation between enuresis and apnea/hypopnea index
P68:  Heart Rate Variability and Severity of Obstructive Sleep Apnoea
P69:  Sleep related breathing disorders and diastolic dysfunction in hypertensive patients
P70:  Interval hypoxic training can be a promising tool in management of obstructive sleep apnoea
P71:  Evaluation of lung volumes as predictors of obstructive sleep apnea
THEMATIC POSTER AREA  SESSION 24  13:45–14:45

THEMATIC POSTER SESSION “BASIC MECHANISMS AND BIOMARKERS”

Chairs: S. Andreas (Immenhausen, Germany), J. Marin (Zaragoza, Spain)

P72: Whole blood rotational thromboelastometry (ROTEM) analysis of the coagulability in untreated obstructive sleep apnoea syndrome (OSAS).

P73: Experimental assessment of rebreathing and exposure to gaseous pollutants from mattresses and pillows in common sleep positions.

P74: Effect of CPAP on circulating vascular injury markers in obstructive sleep apnoea syndrome.

P75: Does obesity effect inflammatory factors in patients with severe OSAS?

P76: Contribution of oxidative stress and inflammation to the cardiorespiratory alterations and carotid chemosensory potentiation induced by intermittent hypoxia

P77: Does chronic intermittent hypoxia due to obstructive sleep apnoea affect haematocrit?

P78: Relationships between obstructive sleep apnoea syndrome, albumin antioxidant status and cardiovascular risk

P79: The DJ-1 protein as a novel biomarker in obstructive sleep apnoea syndrome

P80: Progestin effects on sleep in Postmenopausal Women with Sleep-Disordered Breathing

P81: Severity of Obstructive Sleep Apnea Correlates With 25-Hydroxyvitamin-D Levels in Obese Asian Indian.

P82: Oxidative stress biomarkers in patients with untreated obstructive sleep apnea syndrome

P83: Risk of obstructive sleep apnea syndrome in association with liver damage in non obese patients with nonalcoholic fatty liver disease

P84: Obstructive sleep apnea is associated with the non-alcoholic fatty liver disease in obese Asian Indians.

P85: Additive effect of obstructive sleep apnoea and smoking on endothelial dysfunction

P86: Wake-up stroke and TIA due to paradoxical embolism during long obstructive sleep apneas: a cross-sectional study

THEMATIC POSTER AREA  SESSION 25  13:45–14:45

THEMATIC POSTER SESSION “CLINICAL ASPECTS AND DIAGNOSIS”

Chairs: C. Bassetti (Bern, Switzerland), W. De Backer (Antwerp, Belgium)

P87: Measurement properties of the Functional Outcomes of Sleep Questionnaire (FOSQ-10) in Swedish patients

P88: Predicting or excluding sleep disordered breathing in outpatients with suspected OSA

P89: Sleep quality, psychological distress and dyspnea in palliative care

P90: Predictive Value of Clinical Features for Obstructive Sleep Apnea Syndrome

P91: Sleep Apnea in kidney Transplant Patients: clinical correlates and comparison with pretransplant patients

P92: Predictors of Anxiety and Depression in Patients with Obstructive Sleep Apnea

P93: Prevalence of sleep disordered breathing in Thai primary-school children

P94: Automatic sleep-wake classification using two EOG electrodes in sleep apnoea patients

P95: Polysomnographic evaluation of disturbances of sleep structure in patients with suspected OSAS.

P96: Sleepiness and risk of obstructive sleep apnoea syndrome in ambulance drivers

P97: Is a questionnaire a useful screening method for sleep apnea in stroke?

P98: Berlin Questionnaire and Epworth Sleepiness Scale as screening tools for diagnosis of obstructive sleep apnea in preoperative bariatric surgery patients

P99: Comparing outcomes on an office based advanced driving simulator (MiniSim) between Obstructive Sleep Apnoea Syndrome (OSAS) patients and controls

P100: Hypertension and obstructive sleep apnea: is the Berlin Questionnaire a valid screening tool?

P101: Reported incidence of nodding whilst driving and its impact on simulator outcomes in Obstructive Sleep Apnoea Syndrome (OSAS) patients and controls

P102: The clinical and polysomnographic differences between obese and nonobese patients with obstructive sleep apnea

P103: Obstructive Sleep Apnea in Premenopausal and Postmenopausal Women

P104: Sleep duration, change of sleep duration and development obesity in women – a 10 year prospective study

P105: Sleep apnoea is a common occurrence in women

POTSDAM I-III ROOM  SESSION 27  15:15–17:15

PLENARY SESSION “SLEEP AND AGEING”

Aims: The aim of this session is to examine the effects of ageing on sleep in normal and pathological conditions, with a special focus on clinical and epidemiological data.

Target audience: Neurologists and pulmonary clinicians.

Chairs: J.A. Hedner (Gothenburg, Sweden), C. Bassetti (Bern, Switzerland)

15:15 Ageing and upper airways

A. Schwartz (Baltimore, United States of America)
POTSDAM I-III ROOM  SESSION 28  17:30–19:00

SPECIALISED SYMPOSIUM “THE ROLE AND CONSEQUENCES OF OBESITY AND ADENOTONSILLAR HYPERTROPHY IN PAEDIATRIC OSA” (JOINT SESSION WITH EUROPEAN ASSOCIATION FOR THE STUDY OF OBESITY)

Aims: The aims of this session are to:
- discuss the role of obesity as a risk factor for OSA and associated morbidity in childhood;
- summarise factors related to residual OSA after adenotonsillectomy;
- review treatment of OSA in obese children.

Target audience: Paediatricians, paediatric pulmonologists, pulmonologists with an interest in paediatric sleep medicine, paediatric ENT surgeons.

Chairs: A. Simonds (London, United Kingdom), A. Kaditis (Piraeus, Greece)

17:30 Paediatric obesity, OSA: present and future consequences (from EASO)
M. Villa (Rome, Italy)

18:00 Does adenotonsillectomy cure OSA in childhood?
A. Kaditis (Piraeus, Greece)

18:30 Management of obese children and role of CPAP
S. Verhulst (Edegem, Belgium)

PAVILLON ROOM  SESSION 29  17:30–19:00

HOT TOPIC “SLEEP AND DRIVING”

Aims: This session will discuss the risk of road accidents in patients with obstructive sleep apnoea, ways to predict risk in these patients as well as current European regulations related to driving with a diagnosis of sleep apnoea.

Target audience: Physicians interested in sleep medicine, neurologists, pneumologists and allied health professionals with an interest in SDB.

Chairs: L. Grote (Gothenburg, Sweden), I. Fietze (Berlin, Germany)

17:30 Sleepiness and road accidents: what are the statistics?
P. Philip (Bordeaux, France)

18:00 How to predict risk of traffic accidents in sleepy patients
M.W. Elliott (Leeds, United Kingdom)

18:30 Driving, sleepiness and the law in Europe
D. Rodenstein (Brussels, Belgium)

BELLEVUE ROOM  SESSION 30  17:30–19:00

PRO/CON DEBATE “BARIATRIC SURGERY IS PREFERABLE THAN CPAP FOR MANAGEMENT OF OSA”

Aims: This session will discuss whether bariatric surgery is effective in obese patients with obstructive sleep apnoea and whether it may be preferred in front of conventional CPAP treatment.

Target audience: Physicians in sleep medicine, internists, pneumologists and allied health professionals with an interest in SDB.

Chair: M.R. Bonsignore (Palermo, Italy)

17:30 PRO: Bariatric surgery is preferable for OSA management
R.R. Grunstein (Sydney, Australia)

18:00 CON: CPAP is preferable for OSA management
J.L. Pepin (Grenoble, France)

18:30 Summary and discussion
M.R. Bonsignore (Palermo, Italy)
13 April 2013

POTSDAM I-III ROOM  SESSION 31  08:00–09:30

SPECIALISED SYMPOSIUM “RESTLESS LEGS SYNDROME” (JOINT SESSION WITH THE EUROPEAN NEUROLOGICAL SOCIETY)

Aims: The aim of this session is to give an update on manifestations, consequences and treatment of restless legs syndrome (RLS).
Target audience: Clinicians and clinical researchers.

Chairs: C. Bassetti (Bern, Switzerland), D. Garcia-Borreguero (Madrid, Spain)

08:00  RLS and cardiovascular risk/disorder
M. Manconi (Lugano, Switzerland)  63

08:30  RLS and pregnancy
C. Bassetti (Bern, Switzerland)  64

09:00  European guidelines
D. Garcia-Borreguero (Madrid, Spain)  65

PAVILLON ROOM  SESSION 32  08:00–09:30

HOT TOPIC “CHRONIC HYPOVENTILATION AND ITS MANAGEMENT”

Aims: The aim of this session is to provide an updated review on treatment of some hypoventilation syndromes.
Target audience: Clinicians.

Chair: D. Rodenstein (Brussels, Belgium)

08:00  Sleep studies in patients on NIV to optimise ventilator settings
M.W. Elliott (Leeds, United Kingdom)  66

08:30  Obesity hypoventilation syndrome: indications to treatment, problems and results
J.L. Pepin (Grenoble, France)  67

09:00  How to manage sleep disordered breathing in neuromuscular disease
A. Simonds (London, United Kingdom)  68

BELLEVUE ROOM  SESSION 33  08:00–09:30

HOT TOPIC “PARASOMNIAS: ABNORMAL MOVEMENTS DURING SLEEP”

Aims: The aim of this session is to provide an overview on the phenotypes of noturnal motor behavior during sleep and its various causes and treatments.
Target audience: Clinicians from all specialties working in the field of sleep medicine.

Chairs: T. Pollmaecher (Ingolstadt, Germany), R. Khatami (Barmelweid, Switzerland)

08:00  Neurological disorders and behaviour during sleep
B. Hoegl (Innsbruck, Austria)  69

08:30  Motor behaviour in sleep apnoea
R. Khatami (Barmelweid, Switzerland)  70

09:00  Abnormal nocturnal motor behaviour in psychiatric patients
T. Wetter (Regensburg, Germany)  71

POTSDAM I-III ROOM  SESSION 34  10:00–12:00

PLENARY SESSION “SLEEP APNOEA AND METABOLIC DYSFUNCTION” (JOINT SESSION WITH EUROPEAN ASSOCIATION FOR THE STUDY OF DIABETES)

Aims: The aims of this session are to:
- review evidence regarding independent association of OSA and glucose intolerance/diabetes;
- discuss role of OSA/intermittent hypoxia in the metabolic consequences of obesity;
- discuss benefits of lifestyle measures in the management of OSA with particular reference to metabolic benefits;
- discuss relationships between sleep and metabolism with particular reference to hypersonomolence and sleep quality.
Target audience: Clinicians, including endocrinologists and diabetologists with an interest in SDB, allied health professionals.

Chairs: A.L. Borel (Grenoble, France), L. Tarnow (Gentofte, Denmark)

10:00  OSA and diabetes: an independent relationship?
A.L. Borel (Grenoble, France)  72

10:30  Role of OSA in the metabolic consequences of obesity
M.R. Bonsignore (Palermo, Italy)  73

11:00  Lifestyle intervention: metabolic benefits of exercise and weight reduction in OSA
R.R. Grunstein (Sydney, Australia)  74

11:30  Sleep and metabolism: sleepiness and quality of sleep
J.L. Pepin (Grenoble, France)  75
SPECIALISED SYMPOSIUM “CHRONOBIOLOGY: REGULATION OF WAKE AND SLEEP”

Aims: The aim of this session is to demonstrate and discuss:
- the bidirectional influences of hormones and their circadian variation of secretion on sleep and wake (e.g. growth hormone, leptin, ghrelin, insulin, cortisol);
- the influence of environmental and artificial light and darkness on the human sleep wake rhythm;
- and the molecular basis of human circadian behaviour.

Target audience: Researcher and clinicians.

Chairs: S. Andreas (Immenhausen, Germany), A. Rodenbeck (Berlin, Germany)

12:30 Interactions between hormones and the sleep wake cycle
A. Rodenbeck (Berlin, Germany) 76

12:50 Molecular and genetic basics of circadian rhythms: larks and owls
A. Kramer (Berlin, Germany) 77

13:10 The impact of light on sleep-wake regulation
D. Kunz (Berlin, Germany) 78

EXPERT LECTURE “NARCOLEPSY AND H1N1 VACCINATION”

Aims: The aim of this session is to review information on the association between H1N1 vaccination and narcolepsy with a special focus on epidemiological data and potential mechanisms of action.

Target audience: Clinicians, clinical researchers with an interest in sleep medicine, technologists and other allied health professionals.

M. Partinen (Helsinki, Finland) 79

CASE STUDIES “METHODOLOGY IN DIAGNOSIS AND THERAPY OF OSA”

Aims: The aim of this session is to provide basic knowledge about the major indications and contra-indications for polygraphy/polysomnography and optimisation of CPAP therapy. This includes a short description of the spectrum of sleep disordered breathing and of the parameters used to perform sleep studies. Moreover, the physiological basis, the main principles of treatment, as well as the major acute and chronic side effects of CPAP treatment will be discussed. Finally, solutions to optimise CPAP use will be presented.

Target audience: Anybody who has an interest in sleep studies and delivery of CPAP, e.g. respiratory function technologists/scientists, respiratory (OSA) nurses, respiratory physician assistants, pulmonologists, OSA consultants and others.

Chair: J. Montserrat (Barcelona, Spain)

12:30 When should you use polysomnography/polygraphs?
J. Verbraecken (Antwerp, Belgium) 80

13:00 How to perform optimal CPAP titration
R.L. Riha (Edinburgh, United Kingdom) 81

SPECIALISED SYMPOSIUM “SLEEP AND COPD”

Aims: The aims of this session are to:
- discuss effects of COPD on sleep;
- review the manifestations and clinical relevance of the overlap syndrome of COPD and OSA;
- discuss possible pharmacological therapies to ameliorate adverse effects of sleep on COPD.

Target audience: Clinicians and allied health professionals with an interest in COPD and SDB.

Chairs: J.A. Hedner (Gothenburg, Sweden), I. Fietze (Berlin, Germany)

14:30 Pathophysiology of sleep and breathing in COPD
J. Verbraecken (Antwerp, Belgium) 82

15:00 COPD and OSA: the overlap syndrome
J. Marin (Zaragoza, Spain) 83

15:30 Pharmacotherapy of sleep-related disturbances in COPD
W. McNicholas (Dublin, Ireland) 84
PAVILLON SESSION 40 14:30–16:00

PRO/CON DEBATE “IS THE SLEEP LABORATORY OBSOLETE?”

Aims: This session will be the opportunity to discuss the advantages and disadvantages of managing obstructive sleep apnoea in an ambulatory setting.

Target audience: Clinicians and allied health professionals with an interest in SDB.

Chairs: P. Levy (Grenoble, France), S. Ryan (Dublin, Ireland)

14:30 Pro: OSAS is best managed outside the sleep laboratory
J. Montserrat (Barcelona, Spain) 85

15:00 Con: OSAS is best managed inside the sleep laboratory
T. Penzel (Berlin, Germany) 86

15:30 Summary and discussion
P. Levy (Grenoble, France) 87

BELLEVUE ROOM SESSION 41 14:30–16:00

HOT TOPIC “NEW IMAGING TECHNIQUES IN THE EVALUATION OF SLEEP AND BREATHING DISORDERS”

Aims: During this session, the audience will get insight into:
- the principles and practice of sleep endoscopy;
- the indication(s) for sleep endoscopy;
- the correlations between sleep stages and regional cerebral activity.

Target audience: Clinicians and scientists.

Chairs: M. Partinen (Helsinki, Finland), W. Randerath (Solingen, Germany)

14:30 Role of sedated endoscopy in the evaluation of the upper airway
O. Vanderveken (Antwerp, Belgium) 88

15:15 Imaging and the brain
P. Peigneux (Brussels, Belgium) 89

POTSDAM I-III ROOM SESSION 42 16:15–17:30

CLOSING SESSION “MANAGEMENT OF SLEEP AND BREATHING DISORDERS”

Aims: The aims of this last session are to:
- discuss most efficient techniques to achieve and maintain optimum CPAP therapy;
- review evolving approaches to monitoring therapy of OSAS in the home setting, including telemedicine;
- discuss recent research that may point to novel therapeutic approaches to the management of OSAS patients.

Target audience: Clinicians and allied health professionals with an interest in SDB.

Chairs: W. McNicholas (Dublin, Ireland), P. Levy (Grenoble, France)

16:15 Latest developments in CPAP therapy
J. Montserrat (Barcelona, Spain) 90

16:40 Home monitoring of therapeutic efficacy
P. Levy (Grenoble, France) 91

17:05 Future possibilities in the management of OSA
J.A. Hedner (Gothenburg, Sweden) 92

17:30 Farewell
W. McNicholas (Dublin, Ireland), P. Levy (Grenoble, France) 93
Frequency of prevalence of undiagnosed previously hypothyroidism in the group of patients with the obstructive sleep apnea (OSA) suspicion.

**Aim:** The estimation of the usefulness of TSH screening in the group of patients with OSA suspicion.

**Conclusions**

1. It necessary to examine 150 patients with OSA suspicion in order to find out persons with previously undiagnosed hypothyroidism.
2. It necessary to examine 60 patients with OSA suspicion and measure TSH-suspicion in order to find out persons with previously undiagnosed hypothyroidism.
3. The TSH-suspicion of all OSA-suspicious patients is a subject to observation.
4. Assimilation for additional factors (the above mentioned suspicion OSA-suspicion) which remove shows the group of OSA-suspicious patients appear to be very important.
P1 - Turner Syndrome and Obstructive Sleep Apnea: A Case Report
Ozen Kacmaz Basoglu1, Mehmet Sezal Taşbakan1
1 Department of Chest Diseases, Ege University School of Medicine, Izmir, Turkey

A 41-year-old female was presented to the sleep laboratory of a university hospital with symptoms of snoring, excessive daytime sleepiness and witness apnea. She had been diagnosed as Turner syndrome (45X) for 30 years and treated with hormonal replacement therapy. She had a history of diabetes mellitus, hypertension and hypothyroidism. On physical examination, the patient was 148-cm tall, 63 kg and her body mass index was 28.8 kg/m². She had a webbed neck with a circumference of 45 cm, and micrognathia. Examination of ear, nose, and throat showed that nasopharynx and larynx were normal, whereas there was tongue base hypertrophy. Chest x-ray, pulmonary function tests and arterial blood gas analysis were normal. Epworth sleepiness score of the patient was 10. Full-night in-laboratory polysomnography revealed an apnea-hypopnoea index (AHI) of 52.9 events/hour, mean oxygen saturation (SpO2) of 97% and lowest SpO2 of 80%. She was diagnosed as severe obstructive sleep apnea syndrome (OSAS) and treated with nasal continuous positive airway pressure therapy.

Anatomical upper airway and neck abnormalities, and hormonal factors predispose to develop OSAS in patients with Turner syndrome. Therefore, sleep-disordered breathing should be investigated in these patients.

P2 - Asthma outcomes and mite allergen bedding control: a revisited meta-analysis
Frank van Boven, Roy Gerth van Wijk
1 Department of Internal Medicine, Erasmus MC, Rotterdam, Netherlands

Introduction
Alergic asthma is the most common childhood disease in western countries and affecting the quality of sleep. The effectiveness of mite allergen control is debatable. We revisited a dominating meta-analysis (Gøtzsche, P.C. and H.K. Johansen. Cochrane Database of Systematic Reviews 2008, Issue 2. No. CD1187) and studied whether patients with allergic asthma benefit from different concepts of bedding control.

The intervention was limited to bedding control, with primarily the use of covers. The outcome was limited to the binary change in FEV1 and in the asthma symptom score.

Methods
We started with a subgroup of 26 trials reporting on bedding control from the existing meta-analysis. Trials were selected by environmental criteria. Interventions were classified for the number of barriers used. A dose response was fitted for the reduced allergen load. The influence of type of intervention on FEV1 and symptom score was examined with a mixed effect model with the package Metafor in R.

Results
Twelve trials (totally 650 observations) included one to three combined barriers. All data showed considerable heterogeneity (reduced load I2 = 89%; FEV1 I2 = 95%; symptom score I2 = 94%). The intervention influenced the reduced load significantly (p < 0.0001). The change in FEV1 was influenced significantly by use of integral bedding control (p < 0.0001; 4 trials). For the change in the symptom score we found no average effect (p = 0.45; 8 trials).

Discussion
A post hoc meta-regression focusing on the association with mental health problems, fatigue and restless legs syndrome (RLS).

Objective: To assess risk factors associated with excessive daytime sleepiness and nocturnal sleep disorders.

Methods: The study was conducted in Clinical Hospital of Recovery, Iasi, over a period of 6 months. All participants responded to the Parkinson's Disease Sleep Scale (PDSS). Staging of the disease was in accordance with Hoehn and Yahr Staging and Unified Parkinson's Disease Rating Scale (UPDRS). Also was assessed cognitive functioning, mental health, fatigue and restless legs syndrome (RLS).

Results: In this cross-sectional study 44 consecutive in patients with Parkinson's disease (41% females) were included. The mean age was 67.8 years (range 55–74); the mean Hoehn and Yahr stage was 2.4 (SD 0.8), and the mean UPDRS part III was 22.6 (SD 11.5). Sleep disturbances were common among patients with Parkinson's disease. While only 23% of the sample had an overall score below 82 on the PDSS, 70% of the patients had a score below 5 on one item. There was no significant association between Parkinson's disease severity and any of the sleep items in the PDSS.

Conclusions: The current findings call for increased awareness of sleep problems in patients with Parkinson's disease, especially focusing on the association with mental health problems, fatigue and RLS. Physicians should be aware of these issues so that sleep problems can be appropriately recognized and treated.

P5 - Is there an association between sleep disordered breathing in children and deficits in recognition memory?
Melodee Mograss1,2,3, Evelyn Constantin1,2,3
1 Pediatric Sleep Lab, Montreal Children’s Hospital, McGill University, Montreal, Canada
2 Department of Pediatrics, McGill University, Montreal, Canada
3 Research Institute, McGill University Health Centre (RI-MUHC), Montreal, Canada

Children with sleep disordered breathing (SDB) and/or snoring have been reported to be at risk for learning and memory problems as well as poor school performance due to sleep deprivation. The objectives of our study are to assess the extent of memory deficits in children with SDB. METHODS: Participants were youths (N=5) aged 12-16 yrs (M=13.7±SD=1.5) referred to the sleep lab for evaluation of obstructive sleep apnea (OSA). OSA was screened using the McGill Oximetry Score (number of clusters/desaturations on oximetry). Youths with inconclusive oximetry screening for OSA were recruited. OSA was identified with a polysomnography (PSG). The children of the study was to summarize clinical and PSG data of all cases of catathea diagnosed in our sleep clinic. METHODS: A retrospective analysis of clinical and PSG data of catathea diagnosed during two-year period was performed. RESULTS: Catathea was diagnosed to 6 persons, 4 males and 2 females ranging in age from 19 to 31 years. Median duration of symptoms was 6 years. Average body mass index was 22.84 kg/m². Only one man had concomitant mild obstructive sleep apnea and one man was obese and snoring. All patients reported having social problems especially with their family members or bed partners because of the signs emerging during sleep. Epworth sleepiness scale (ESS) ranged from 3 to 17 indicating that only two patients had excessive daytime sleepiness. On PSG catathea specific breathing was detected in REM sleep in all of the cases and in NREM - only in one case. More catathea specific breathing events were detected in more sleepy patients. A continuous positive airway pressure (CPAP) trial was performed to one female with ESS 17 and it was effective. Conclusions: Most of the patients were young and lean, having social problems because of catathea. A CPAP trial should be suggested to symptomatic patients.
completed a facial recognition memory task (E-Prime v2.0 software) that included a study session prior to bedtime where the child was instructed to memorize the face stimuli for a subsequent test the next morning. The child’s task was to indicate as quick and accurately as possible the previously presented face stimuli. PSG metrics included Total Sleep Time, mixed obstructive apnea hypopnea index (MOAHI), and oxygen desaturation (SpO2) index. Memory was assessed by behavioural performance, i.e. Accuracy (number correct); Reaction Time, RT (ms). RESULTS: The MOAHI ranged from 0/h to 5.9/h (1.6±2.5), and the SpO2 index, 0-1/h (0.5±0.5). Our group data show greater accuracy to the stimuli studied compared to these “new” stimuli seen for the first time (paired t=2.72, p=0.05). RT for the new faces correlated with the higher SpO2 index (Pearson r=0.88, p=0.04). In the youths with evidence of mild MOAHI (>1.0/h) compared to those with normal MOAHI (≤1.0/h).

P6 - Is Obstructive Sleep Apnea Syndrome Different in Women? Maria Victoria Lopera Varela1, Edilberto Pacheco1, Jimena Nuñez1, Rodrigo Celis1, Silvia Sarria1, Ana Pérez2, Laura Díaz1, Erica Pacheco3
1Pulmonary Division, Hospital Maciel, Montevideo, Uruguay
Obstructive Sleep Apnea Syndrome (OSAS) in Montevideo, Uruguay, estimated by combination of habitual snoring, witnessed apneas and excessive daytime sleepiness is 3.7 and 0.5% in males vs females, independently associated with males and obesity (PLATINIO). Women are predominantly referred for OSAS diagnosis to our sleep unit.

Objectives To explore clinical, anthropometric, polygraphic profile and factors associated with OSAS in women.

Methods Patients prospectively completed a questionnaire, anthropometry and polygraphy, recalling reason for referral, education level, occupation, sleep symptoms disorders, self-reported comorbidities, anxiety or depression, medication, and Epworth Scale (ESS).

Results Out of 83 patients, 58 were women (69.9%) similar to men in age, education level, consumption of tobacco and cafffeinated beverages, self reported anxiety depression, use of psychiatric medications, diabetes, cardiac and pulmonary disease and presenting complaints snoring, somnolence and ESS. Women had significantly overweight (BMI =39.21±10.21 vs32.56±7.89, p<0.001); morbid obesity 55.2% vs 16.0 % (p<0.001), less hypertension (51.7±72.0%, p<0.05), and witnessed apneas (39.6±72.0% p< 0.05), more insomnia (63.8±36.0%, p<0.05) and daytime fatigue (58.6±32%, p<0.05) equivalent diagnosis of OSAS (66.7%) but less severity (AHI=15.45±15±45.6 vs54.2%, p<0.05; mean 20.37±22.4vs32.08±33.35, p<0.05). Factors associated with OSAS (multivariate analysis) were: morbid obesity, daytime fatigue and EES.

Conclusions Women at our sleep centre, had clinical presenting profile different to men, same frequency but lower severity of OSAS, associated to morbid obesity, daytime fatigue and EES.

P7 - Learning disturbance in children with obstructive breathing disorders before and after adenotonsillectomy Sergio Henrique Kiemle Trindade1, Érico Vinícius Campos Moreira da Silva1, Priscila Melchior Oliveira Rocha1, Núbia Souza Silva1, Silke Anne Weber1
1Otorhinolaryngology - Head and Neck Surgery Department, Botucatu Medical School, UNESP - São Paulo State University, Botucatu - SP, Brazil

Introduction: Obstructive sleep apnea syndrome (OSAS) is considered a common disorder in acromegaly. Aim: To evaluate the particularities of OSAS and comorbidities among patients with acromegaly.

Methods: Between June 2005 and March 2009 we evaluated 1288 consecutive patients with suspected OSAS at V.Babes Hospital, Timisoara, Romania. 13 (1%) have acromegaly caused by pituitary adenoma. We collected general data, medical history, physical evaluation, sleep questionnaires, anthropometric measurements, polysomnography for apnea-hypopnea index (AHI normal 0-4, mild 5-14, moderate 15-29, severe over 30), oxygen desaturation, co morbidities and measured mean values, standard deviation, 95% confidence interval (CI).

Results: AHI normal 1 of 13, mild 2 of 13, moderate 4 of 13, severe 6 of 13, 10 females, 3 males, age 48 ± 11.6 years (31-62) 95% CI 40.99 ± 55.01, 33.7% smokers, obesity 10 of 13 with BMI 34.4 ± 5.98 kg/m2 (25-45) 95% CI 30.77 - 38, neck circumference 40.46 ± 3.48 cm 95% CI, 38.36 - 42.56, abdominal circumference 104.23 ± 11.8 cm 95% CI 97.11 - 111.3. Epworth Sleepiness Scale 8.16 ± 5.35 (2-20), 95% CI 4.92 - 11.39. Oxygen desaturation 94.30 ± 1.55, 95% CI 93.37 - 95.24, lowest desaturation 82.69 ± 11.7%.

P8 - Metabolic profile in children with obstructive sleep breathing disorders associated or not to obesity Sergio Henrique Kiemle Trindade1, Érico Vinícius Campos Moreira da Silva1, Priscila Melchior Oliveira Rocha1, Núbia Souza Silva1, Silke Anne Weber1
1Otorhinolaryngology - Head and Neck Surgery Department, Botucatu Medical School, UNESP - São Paulo State University, Botucatu - SP, Brazil

Introduction: Obstructive sleep apnea (OSA) prevalence in obese children is reported in up to 36%. Both OSA and obesity are considered risk factors for metabolic disorders.

Aims: To evaluate metabolic disorders in children with obstructive sleep breathing disorders, associated to obesity or not.

Methods: 65 prepubertal children, both genders, aged 3 to 12 years, were analyzed. Overweight and known metabolic disease were exclusion criteria. Children were divided into four groups: G1=non-obese OSA(n=20); G2=obese OSA(n=20); G3=obese non-OSA(n=15); and G4=non-obese non-OSA (n=10,controls). OSA children underwent polysomnography for severity assessment. All answered Osa-18 questionnaire. Glicemia, insulinaemia, cholesterol and fractions, triglicerides, TSH and T4, glucose resistance and HOMA were determined. Data were compared for the 4 groups (ANOVA, p<0.05).

Results: The 65 children enrolled had similar age and gender. G2 and G3, G1 and G4 were similar for BMI. Sleep disturbances, physical suffering and parents preoccupation were worse in OSA children, independent of obesity. Glicemia, triglicerides, cholesterol, TSH and T4 were similar for all 4 groups, whereas insulinaemia, HOMA and glicemia resistance was higher in obese children (G2 and G3). We found no difference of metabolic markers for obese OSA and obese non-OSA (G2xG3), neither for non-obese OSA and non-obese non-OSA (G1xG4).

Conclusion: Obesity seems to be the most important risk factor for metabolic disorders in children, even in the presence of OSA.
Hypertension 7 of 13, most in stage 2 and 3, duration 13.6 ± 8.02 years (7-27) 95% CI 3.64-23.55, 5 of 13 with resistant hypertension.

Conclusion. Systemic hypertension is frequent in patient with OSAS and acromegaly. Most patients with acromegaly are obese female with few symptoms and less somnolence, decreased oxygen desaturation, high prevalence of systemic hypertension, mostly resistant.

P10 - Positional Sleep Apnea in Asian Patients
Thun How Ong1, Nancy Lew1
1 Sleep disorders Unit, Singapore General Hospital, Singapore, Singapore

In Asian patients, a smaller craniofacial structure has been shown to be an important contributory factor in Obstructive Sleep Apnea (OSA). We hypothesized that positional sleep apnea (POSA) is prevalent in Asian patients as a lateral sleep position may help to attenuate the respiratory events.

Methods
Retrospective analysis of polysomnographic characteristics of patients undergoing diagnostic overnight polysomnography between January and December 2011.

Results
729 diagnostic overnight polysomnographies were conducted over the study period, of which 216 studies were excluded because the patient did not have at least 15 min of sleep in a different sleep position. Of the 513 patients who could be evaluated for positional sleep apnea, 270 (52%) had a lateral AHI that was less than half of the supine AHI. The incidence of positional sleep apnea was 123/185 (66.5%) patients with mild, 84/127 (66.1%) moderate and 61/198 (30.8%) severe OSA respectively. In patients with moderate POSA, lateral AHI was less than 15 in 77/84 (92%). In patients with severe POSA, 24/61 (39%) patients had lateral AHI < 15.

Patients with positional OSA had a significantly lower BMI (28 vs 31, p = 0.001) but no significant difference in age or neck circumference compared to those with non-positional OSA. The proportion of patients with POSA among Chinese (54%), Indian (50%), Malay (40%) and other (42.9%) Asian patients in this study was not significantly different.

Conclusion
POSA is prevalent in Asian patients with OSA. In patients who have mild and moderate POSA, training patients to sleep in the lateral position may be an important adjunct to treatment.

P11 - Obstructive sleep-disordered breathing and long-term non-invasive ventilation in children—a 20 years experience
Nuria Madureira1, Joana Migueis1, M. Helena Estêvão1
1 Hospital Pediátrico, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal

Background: Obstructive sleep-disordered breathing (SDB) may be associated with adverse cardiovascular, metabolic and neurocognitive outcomes. Non-invasive ventilation (NIV) may be indicated in craniofacial syndromes, obesity or if adenotonsillectomy is contraindicated/failed. Compliance is a key factor for success and sometimes is difficult in young children, adolescents or if development delay is associated.

Objective: To review children with obstructive SDB treated with long-term (> or = 3 m) NIV followed in a tertiary hospital between 1993 and 2012.

Methods: Retrospective study with clinical reports analysis. Obstructive SDB was diagnosed on a clinical basis and/or by polysomnography (PSG)/overnight pulse oximetry.

Results: NIV was initiated in 91 patients with obstructive SDB (10d-15y, median 5y), 17.6% were< or = 3 m or less. The risk factors for obstructive SDB were: syndromic pathology 51.6%, laryngomalacia 11%, obesity 9.9%, cerebral palsy 8.8%, minor dysmorphisms 7.7%, adenotonsillar hypertrophy 5.5%. PSG was performed before NIV in 65%; OSAS 81.3%, obstructive hypoventilation 10.2% and upper airway resistance syndrome 8.5%. All children initiated positive airway pressure ventilation during hospital admission, 63.7% of which were planned. Eleven children died, 42.9% improved or were admitted to ENT/maxillofacial surgery and stopped ventilation (NIV duration 3m-11y, median 15m), 2.2% abandoned NIV, 3.3 were lost to follow-up and 39.6% are on ventilation with good compliance (NIV duration 4m-19y, median 5y).

Conclusions: NIV on obstructive SDB is most frequently reserved to children with syndromes and can be used for long-term with good compliance.

P12 - Self-report of cognition in obstructive sleep apnea syndrome
Tim Vaessen1, Henk Hassing2
1 Department of Medical Psychology, VieuCuri Medisch Centrum, Venlo, Netherlands
2 Department of Pulmonary Medicine, VieuCuri Medisch Centrum, Venlo, Netherlands

Introduction
So far research studying daytime cognitive impairments in obstructive sleep apnea syndrome (OSAS) has primarily made use of cognitive tests. Performances on cognitive tests however show a weak relation with everyday cognitive failures. Less research has made use of self-report measures of cognition, which relate to quality of life and work productivity.

Aims and objectives
The aim of this study is to assess self-report of cognition in OSAS patients and explore its relation with the performance on cognitive tests, reported sleepiness, OSAS-severity and emotional problems.

Methods
We compared 20 newly diagnosed OSAS patients without any medical comorbidity to 19 healthy controls on self-report measures of cognition. All OSAS patients underwent a polysomnography. Additionally all participants underwent a test battery of cognitive tests and filled in questionnaires regarding emotional problems and sleepiness.

Results
Compared to healthy controls, OSAS patients more frequently reported cognitive failures in everyday life, specifically related to symptoms of distractibility and difficulty remembering names and words. In OSAS patients self-report of cognition did not correlate to OSAS-severity or the performance on cognitive tests. Self-report of cognition did correlate to reported sleepiness and symptoms of depression.

Conclusions
OSAS patients report more cognitive failures in everyday life than healthy controls. Cognitive tests may not adequately assess daytime cognitive impairments experienced by OSAS patients. Perception of cognitive failures in OSAS patients is related to reporting sleepiness and experiencing symptoms of depression.

P13 - Developing An Electronic Archive For The Sleep Disorder Breathing Patient
Nikolaos Chavouzis1, Katalin Fekete Passa1, Paraskevi Argyropoulou1
1 Respiratory Failure Unit, Aristotle University of Thessaloniki, Thessaloniki, Greece

Aim
To communicate the experience of developing and using a computerised data-base in the routine work of a Sleep Disordered Breathing (SDB) laboratory.

Method
Patient data relevant to SDB problems were retrieved by bibliography: general patient history (e.g. history for Arterial Hypertension, Stroke, Arrhythmia, Diabetes, etc), anthropometric values and sleep habits (e.g. snoring, witnessed apneas, dreaming, etc). Every effort was made to code the possible answers into closed type choices (e.g yes/no). The questions from Berlin Questionnaire, STOP-BANG and Epworth Sleepiness Scale were used and the result was automatically computed. Polysonomographic data (PSG) and follow-up visits (e.g. changes in weight, sleepiness, compliance to CPAP therapy, etc) were also archived. Using data already entered in the data-base (e.g during the first interview, the PSG study, the blood laboratory results, etc), a medical certification with key points of medical history and sleep history was automatically created for use with the patient’s health insurance.

Results
The data-base is in every-day use in the Sleep Laboratory of the Respiratory Failure Unit of the Aristotle University of Thessaloniki since 4/2007 and currently stores data of approximately 1800 patients. A similar version is under development for a tertiary hospital of Thessaloniki and Alexandroupolis. No paper archives are used in

(51-96), 95% CI 75.6-89.78.
our lab, except of a one-page document signed by the patient and a copy of the certification delivered to the insurance company.

Conclusion
We report a fully operative computerised data-base for use in a Sleep Laboratory routine work and we encourage every direct contact with the authors.

P14 - Patients With Metabolic Syndrome Presenting For Sleep Disordered Breathing
Nikolaos Chavoucis 1, Katalin Fekete Passa 1, Afroditi Boutou 1, Assimina Papala 1, Ioannis Stanapoulou 1, Georgia Pitsou 1, Athanasia Patakia 1, Vasilios Bagalas 1, Theodoros Kontakiotis 1, Paraskevi Argyropoulou 1
1 Respiratory Failure Unit, Aristotle University of Thessaloniki, Thessaloniki, Greece
2 Pneumonology Clinic, Aristotle University of Thessaloniki, Thessaloniki, Greece

Aim
To assess the impact of Metabolic Syndrome (MS) on patients presenting for Sleep Disordered Breathing (SDB) and evaluated with polysomnography (PSG).

Methods
Data of 1627 cases with a PSG study were retrospectively analysed and 1034 (756 males) entered the study. The MS cases were defined according to the International Diabetes Federation and the Obstructive Sleep Apnea (OSA) cases were defined as Apnea/ Hypopnea Index (AHI)-5 and excessive day-time sleepiness assessed with Epworth questionnaire. Chi-square test, independent samples t-test and logistic regression of SPSS v17.0 were used for analysis.

Results
The group of patients with MS is more likely to have OSA in both males (p<0.0005), and females (p<0.0005). In the group of OSA cases, the mean AHI in MS patients vs non MS resulted significantly higher in both males (M=44.9 SD=24.2 vs M=36.3 SD=22 p<0.0005) and females (M=22.6 SD=25.5 SD=15.1 p<0.0005). Logistic regression was performed to assess the impact of MS on the likelihood for SA and males with MS resulted 3.4 times more likely to have SA (B=1.23 p<0.0005) while females with MS were 7.8 times more likely to have SA (B=2.06 p<0.0005).

Discussion
In every-day sleep lab practice, seeking history of MS is important. This is validated in our study. BMI is a variable known to highly contribute to SA and is also a common factor for MS. When controlling for BMI, the predictive value of MS for having SA loses statistical significance in males but not in females.

Conclusion
Patients with Metabolic Syndrome presenting for SDB have increased likelihood of Sleep Apnea, and are likely to have more severe OAS.

P15 - Prevalence and morbidity of undiagnosed obstructive sleep apnea in a population sample of men aged >40 years.
Robert Adams1, Sarah Appleton1, Andrew Vakulin2, Anne Taylor2, Janet Grant3, Sean Martin4, Peter Catcheside 4, Nick Antic2, Doug McEvoy2, Gary Wittert2
1 The Health Observatory, Discipline of Medicine, The University of Adelaide, Woodville, Adelaide, Australia
2 Discipline of Medicine, The University of Adelaide, Adelaide, Australia
3 Population Research & Outcomes Study Unit, The University of Adelaide, Adelaide, Australia
4 Adelaide Institute for Sleep Health, Repatriation General Hospital, Daw Park, Adelaide, Australia

Introduction: With increases in obesity over 20 years it is likely OSA morbidities in a well characterized representative population-based cohort of men aged over 40yrs (MAILES) (n=1869). In 2011-12, full in-home unattended polysomnography (Embletta X100) were done in 851 randomly selected men from the cohort without a prior diagnosis of OSA and were scored by a single experienced scorer to current AASM (alternate) criteria.

Results: Among all MAILES participants, n= 184 (11.3%) self-reported a previous diagnosis of OSA on a sleep study. Among sleep study participants (mean age 59.6 (sd 10.8) yrs) n=451 (53%) had an AHI ≥10, with AHI 20-29 in 14% (n=119), AHI ≥30 12.3% (n=105), and Central sleep apnea in 5.8% (n=17). In those with AHI ≥10, n=199 (44.1%) reported frequent diurnal sleepiness, n=198 (51%) had symptoms of sleep disturbance (Pittsburgh Sleep Quality Index -5). In a multivariate logistic regression model, previously undiagnosed severe OSA (AHI ≥30) was associated with diabetes (OR 1.9, 95% CI 0.94-3.9), pre-diabetes (OR 2.1, 95% CI 1.1-4.0); nocturia (OR 1.7, 95% CI 0.98-3.0); depression (OR 2.7, 95% CI 1.3-5.6), and central adiposity (OR 4.6, 95% CI 2.6-9.2) but not sleepiness or hypertension (OR 1.4, 95% CI 0.8-2.6). Quality of life was impaired in severe OSA vs none, SF-36 Physical Component scores adjusted for age and obesity, 46.9 vs 50.5; Mental Health Component scores 48.1 vs 51.5.

Discussion: OSA is common in men aged over 40 years, mostly undiagnosed, and OSA, pre-diabetes and depression are common co-morbidities.

P16 - Deriving respiratory data from infant overnight pulse oximetry plethysmogram recordings
David Wertheim1, Chloe Parsley2, Scott Burgess3, Carolyn Dakin2, Paul Seddon2
1 Faculty of Science, Engineering and Computing, Kingston University, Kingston, Surrey, United Kingdom
2 Department of Respiratory and Sleep Medicine, Mater Children’s Hospital, Brisbane, Australia
3 Respiratory Unit, Royal Alexandra Children’s Hospital, Brighton, United Kingdom

In an earlier study we observed that respiratory rate can be derived from 2 minute sections of oximetry plethysmogram (pleth) traces in healthy newborn infants (Wertheim, D. et al., Arch Dis Child Fetal Neonatal Ed. 2009; 94: F301-F303). The aim of this study was to investigate changes in pleth data associated with apnoeic episodes detected using respiratory inductance plethysmography bands (RIP bands) during overnight recordings for routine polysomnography. A Somnologica N7000 (Natus Medical Inc., USA) recorded respiratory movements from RIP bands as well as oxygen saturation, heart rate and pleth in 7 infants (median age 5, range 1 to 7 months) with suspected sleep disordered breathing. Pleth data were obtained using a Nonin Xpod pulse oximeter (Nonin Medical Inc., USA). Pleth recordings were low pass filtered (LPF) in order to extract respiratory data using software we developed with MATLAB (The MathWorks Inc., USA). Median respiratory rate in 2 minute epochs was also computed from the thoracic and abdominal RIP band recordings to enable comparison with data derived from the pleth traces in sections with little or no artefact. We observed that low pass filtered pleth traces showed a reduction in amplitude associated with apnoeas of duration greater than 10 seconds. The start of some apnoeic periods was also associated with a sudden change in level of the ‘raw’ unfiltered pleth signal; these observations require further study to investigate if such changes could be associated with sighs. The results of this study suggest that oximetry pleth recordings may enable additional respiratory information to be derived using standard oximetry sensors.

P17 - Treatment of Hypersomolent patients without objective Obstructive Sleep Apnoea (OSA)
Prince James1, Richa Gupta1, Bashareet Ibrahim1, Chengetai Mabuto1, Johnson T Samuel1
1 Respiratory Medicine, Basildon and Thurrock University Hospital, Basildon, United Kingdom

Introduction: The management of patients with excessive day time somnolence without objective evidence of OSA is not clear. We present the results of these patients treated empirically with CPAP.

Methods: Patients referred to our sleep clinic with a history of snoring and hypersomolence were evaluated with domiciliary pulse oximetry and /or partial polysomnography. We offered CPAP trial to all patients presenting with an Epworth sleepiness score [ESS] ≥10, Apnea Hypopnea Index (AHI) of < 5 and 4% oxygen desaturation Index (ODI) of < 5. All patients had more than one domiciliary sleep test. None had full polysomnography (PSG), or oesophageal manometry (EM) to diagnose IARS. There were no other medical reasons for hypersomolence. Tolerability and compliance with CPAP and change in ESS were reviewed.

Results: Over 3 years, 193 patients presented with ESS ≥ 10 and AHI/ODI < 5. Of these, 84 patients (44%) accepted CPAP. Of those given CPAP, 68 (81%) patients have complied over periods ranging from 3 to 48 months. Mean age of these patients was 54 years and...
mean BMI was 35kg/m2. Mean pre CPAP ESS in the treated group was 15.2. With CPAP therapy, mean ESS decreased to 7.4. ESS decreased by a score of 10 or more in 31 patients (46%). In 52 (76%) patients, ESS decreased to <10 with CPAP.

**Discussion:** Almost half of our patients accepted CPAP and in this group more than three fourth patients were compliant. There was a significant reduction in symptoms in those treated. Though UARS was not confirmed by PSG or EM (a limitation of our study), when the use of overnight monitoring of SaO2, Asthma Control Test and bodyplethysmography.

**Materials and methods:** 60 severe BA patients (FEV1 (56.4 ± 2.0) % pred.), male 27, female 33, on the age 24-83 years were studied with the use of overnight monitoring of SaO2, Asthma Control Test and bodyplethysmography.

**Results:** During overnight monitoring of SaO2 was revealed min desaturations.

**Conclusion:** patients with lower overnight SaO2 had worse asthma control and patients with increased Rtot disposed to more deep night desaturations.

**P20 - Characteristics of SLEEP STAGES IN COPD PATIENTS**

Liudmyla Iashyna1, Maryna Polianska1, Inna Zvol1, Svitlana Moskalenko1

1 Department of diagnostic, therapy and clinical pharmacology of lung diseases, State organization “National institute of Phthisiology and Pulmonology named after F.G. Yanovsky NAMS, Kiev, Ukraine

**Aim:** to study the characteristic of sleep in COPD patients with concomitant depressive episode.

**Materials and methods:** 69 patients with COPD (according GOLD 2011, post BD FEV1/FVC<0.7) (“Master Screen PFT”, “Cardinal Health” (Germany)) were investigated with PHQ-9 and clinical investigation of psychiatrist to reveal depressive episode (DE). DE (PHQ-9 >19) was revealed in 19 (28%) of COPD patients - 7 female, 12 male, mean age (61.7 ± 2.6) years: GOLD 2011 group A – 5%, B – 37%, C – 35%, D – 58 %. Assessment of sleepiness (ESS scale) and overnight polysomnography (PSG) (“SomnoStar Pro”, “Cardinal Health” (Germany)) were performed in 12 patients with COPD+DE.

**Results:** ESS score was increased (6.5 ± 0.7) in all patients, but presence of OSAHS was not verified by PSG (AHI<5/h). PSG revealed that deep sleep (3rd and 4th sleep stages of sleep) were shortened in studied patients - (9.3 ± 2.9)% of total sleep time (TST) vs normal 20 % of TST< NINDS). REM stage also was abnormal vs healthy population - higher - (32.4 ± 3.8)% vs normal duration of REM in healthy population (NINDS) 20% of TST. Latency to REM stage was lower - (52.9 ± 6.9) minutes vs normal 90 minutes.

**Conclusion:** depressive episode was diagnosed in 28% of patients with COPD patients and besides in patients with more expressed symptoms (B and D groups, GOLD 2011). Pathological structure of sleep: decrease in 3rd and 4th sleep stages and pathological REM sleep with low latency to REM stage was revealed in all patients with COPD+DE.

**P22 - Effect of antidepressive treatment on sleep in patients with COPD and concomitant depressive episode**

Yriy Feshchenko1, Liudmyla Iashyna1, Rodion Zagrebelniy1, Inna Zvol1, Liudmyla Savelieva1, Svitlana Moskalenko1

1 Department of diagnostics, therapy and clinical pharmacology of lung diseases, State Institution National Institute of Phthisiatry and Pulmonology n.a. F.G.Yanovsky of NAMS of U, Kiev, Ukraine

**Aim** of the study was to investigate the correlation between overnight SaO2 and asthma symptoms and Rtot in severe asthma patients.

**Materials and methods:** 50 patients with COPD (according GOLD 2011, post BD FEV1/FVC<0.7) were investigated with PHQ-9 and clinical investigation of psychiatrist to reveal depressive episode (DE). DE (PHQ-9 >15) was revealed in 19 (38%) of COPD patients - 14 female, 16 male, mean age (61 ± 2.6) years: GOLD 2011 group A – 5%, B – 37%, C – 35%, D – 58 %. Assessment of sleepiness (ESS scale) and overnight polysomnography (PSG) (“SomnoStar Pro”, “Cardinal Health” (Germany)) were performed in 12 patients with COPD+DE.

**Results:** ESS score was increased (6.5 ± 0.7) in all patients, but presence of OSAHS was not verified by PSG (AHI<5/h). PSG revealed that deep sleep (3rd and 4th sleep stages of sleep) were shortened in studied patients - (9.3 ± 2.9)% of total sleep time (TST) vs normal 20 % of TST< NINDS). REM stage also was abnormal vs healthy population - higher - (32.4 ± 3.8)% vs normal duration of REM in healthy population (NINDS) 20% of TST. Latency to REM stage was lower - (52.9 ± 6.9) minutes vs normal 90 minutes.

**Conclusion:** depressive episode was diagnosed in 28% of patients with COPD patients and besides in patients with more expressed symptoms (B and D groups, GOLD 2011). Pathological structure of sleep: decrease in 3rd and 4th sleep stages and pathological REM sleep with low latency to REM stage was revealed in all patients with COPD+DE.
Sleepiness Scale (ESS) at baseline, at 2 and 4 weeks and PSG, at baseline and after 2 weeks.

**Results:** Sleepiness (ESS) score initially was increased (6.5±0.7). Yet after first 2 weeks of treatment was noted tendency to the improvement of this index, and after 4 weeks it was significantly decreased to (5.6±0.8).

PSG data: all patients had normal index of apnea-hypopnea (1.9±0.3) per hour. In all studied patients REM stage was abnormal at baseline - increased (32.4±3.8)% of total sleep time (TST). Deep sleep stages (3rd and 4th) were also abnormal - significantly decreased at baseline (4.3±1.6)% TST vs normal duration. After 2 weeks of treatment tendency to improvement of REM stage was noted – it decreased to (28.8±2.7)% TST, improved deep sleep stages increased to (9.2±1.8)% TST (p<0.05). Latency to REM stage, that was decreased at baseline (57.2±8.2) minutes, after 2 weeks increased to (73.0±7.1) minutes (p<0.05).

**Conclusion:** use of agomelatin in complex COPD therapy in patients with COPD and depressive episode caused improvement of daily activity (decrease of sleepiness), improvement of sleep structure: tendency to the normalization of REM stage, significant improvement of deep sleep stages and latency to REM stage.

**P23 - Short-term effects of non-invasive ventilation on sleep quality in patients with amyotrophic lateral sclerosis**

Bart Vrijsen1, Dries Testelmans1, Catharina Belge1, Philip Van Damme1, Bertrin Buyse1

1 Deparment of Pulmonology, University Hospitals Leuven, Leuven, Belgium
2 Department of Neurology, University Hospitals Leuven, Leuven, Belgium

Treatment with non-invasive ventilation (NIV) is indicated for patients with amyotrophic lateral sclerosis (ALS) when chronic alveolar hypoventilation develops. NIV improves survival and quality of life (QoL) in ALS patients. Although NIV is mainly applied during the night, with potential extension to daytime use and/or invasive ventilation via tracheostomy, little research has been performed on the impact of NIV on sleep quality (QoS) in these patients. We examined the short-term effects of NIV on QoS in ALS patients.

Fifteen ALS patients (59±11 years, 13 males), who have started NIV since January 2012, were prospectively studied. Before the start and after 1 month a polysomnography (PSG) was performed. Patients’ subjective QoS was examined by the Pittsburgh Sleep Quality Index (PSQI). Functionality was measured by the revised Amyotrophic Lateral Sclerosis Functional Rating Scale (ALSFRS-r) and QoL by the McGill Quality of Life Questionnaire.

One male patient died during the 1 month follow up. Fourteen patients (baseline FVC 53±13 %predicted) were analyzed. During this period ALSFRS-r worsened significantly (p<0.05). No significant deterioration was found in QoL. Both total PSQI and PSQI subscale of sleep duration significantly improved after 1 month of NIV (p<0.05). Objective changes in the QoS were found; sleep efficiency, slow wave sleep and the arousal/awake index improved significantly (p<0.05). Although there is a significant loss of functionality, QoS was increased not only as reported by the patient, but also as measured by PSG. This is the first prospective study showing improvement of QoS in ALS patients by objective measurement with PSG.

**P24 - Nocturnal continuous positive airway pressure in severe asthma. A pilot study**

Christian Russo1, Diana Radicella1, Maurizia Lanza1, Maria D’Amato1, Matteo Sofia1

1 Department of Respiratory Disease, Università degli Studi Federico II, Naples, Italy

It has been reported that brief periods of nocturnal continuous positive airway pressure (CPAP) reduces airway reactivity in rabbits. This effect persists 12-24 h after its discontinuation.

**Aim:** In this pilot study nocturnal CPAP was applied for four nights to ten patients (7 with severe allergic asthma under regular treatment with LABA+inhaled corticosteroids (≥ 1000mg fluticasone/day) and 5 of them with anti IgE treatment omalizumab while the rest with Prednisone (mean dose 17 mg [Range 10-30mg]). Spirometry was performed baseline, after 4 days of nocturnal CPAP and 30 days after. Daily PEF was performed from two weeks before baseline, to two weeks after the treatment. Their mean baseline asthma control test (ACT) was 11 (8-15) with mean of 4 exacerbations in the last 6 months. CPAP was titrated in autotitration with values between 4 and 20 cmH20 (mean value =6).

**Results:** ACT at 30 days and peak flow variability at 1, 2, 3, 4 weeks were evaluated. 2 patients were unable to tolerate nocturnal CPAP. Peak flow variation in 8 patients is indicated in the figure. After 30 days ACT was improved (mean 21 [Range 15-25]).

**Conclusions:** Brief period of nocturnal CPAP have an effect on PEF variability and on asthma control in severe asthma. Larger and longer studies are required to evaluate this kind of intervention in severe asthma.

**P25 - Does emphysema severity disturbs sleep?**

Helder Novais Bastos1,2,3, Inês Neves1, Margarida Redondo1, Adriana Magalhães1, Maria Sucena1, Gabriela Fernandes1,4

1 Pneumology department, Hospital São João, Porto, Portugal
2 Life and Health Sciences Research Institute (ICVS), School of Health Sciences, University of Minho, Braga, Portugal
3 ICVS/GF’S - PT Government Associate Laboratory, University of Minho, Braga, Portugal
4 Faculty of Medicine, University of Porto, Porto, Portugal

Sleep-related breathing disorders have been thoroughly studied in COPD patients. There is also the notion that severe COPD disturbs sleep, although evidence is lacking. Since emphysema-predominant COPD patients have worse functional features, we hypothesized that lung emphysema severity is correlated with impaired sleep.

In 40 patients with lung emphysema (90% male, aged 63.7±11.1 years, 62.9±35.7 pack-year smoking history, BMI 23.1±4.6Kg/m², FEV1 65.0 [33.9-92.0]% predicted), we underwent clinical and functional assessment, that includedCOPD Assessment Test(CAT) andModified Medical Research Council Dyspnea Scale (mMRC) questionnaires, an index of disturbed sleep (Pittsburgh Sleep Quality Index, PSQI) and daytime sleepiness (Epworth Sleepiness Scale, ESE) evaluation.

Median CAT score was 12.5 (7.3-22.0) and mMRC 1 (0.0-2.8). Twenty-one (52.5%) patients showed poor quality of sleep (PSQI>5, median 5 [2-8]). However, only 8 (20%) reported increased daytime sleepiness (ESE>10, median 5 [2-8.8]). PSQI and ESE scores were significantly correlated to symptoms severity, evaluated by CAT (r=0.547, p<0.0005 and r=0.387, p=0.014, respectively). Only PSQI was correlated with mMRC (r=0.653, p<0.0005). Poor quality of sleep and daytime sleepiness were not associated to age, pack-year smoking history, BMI, number of exacerbations, functional features or exercise capacity.

In this cohort of emphysema patients, only a minority complained of being sleepy, although a large proportion report poor quality of sleep. Our data suggest that symptoms burden, more than functional severity, may impair sleep quality.

**P26 - Heart rate recovery after cardiopulmonary exercise test does not predict survival in patients with IPF and sleep disordered breathing**

Lykourogos Koliakas1,2, Effrosyni Manali2,3, Panagiotis Lyberopoulos2, Katerina Vlami2, Christina Triantafillidou1, Konstantinos Kagouridis1, Solinies Gytopoulos1, Konstantinos Vougas1, Mina Giga1, Anna Karakatsani1, Manos Alchanatis1, Spyros Papiris1

1 7th Pulmonary Department, Sotiria Hospital for Chest Diseases, Athens, Greece
2 2nd Pulmonary Department, Attikon University Hospital, Medical School, National and Kapodistrian University of Athens, Athens, Greece
3 1st Department of Respiratory Diseases, Sotiria Hospital for Chest Diseases, Medical School, National and Kapodistrian University of Athens, Athens, Greece
4 Genomics and Proteomics Research Units, Center of Basic Research II, National and Kapodistrian University of Athens, Greece
Biomedical Research Foundation, Academy of Athens, Athens, Greece

Background and aim Cardiopulmonary exercise testing (CPET) is increasingly used in IPF. IPF patients found to have an impaired heart rate recovery (HRR) at the first-minute after 6MWT, show a worse prognosis. Sleep disordered breathing in IPF is frequent. OSA is associated with autonomic nervous system dysfunction and blunted HRR is related to the severity of OSA. The aim of the present study was to examine the prognostic role of HRR after CPET in IPF patients with OSA.

Patients and Methods A group of treatment-naive newly diagnosed IPF patients was prospectively studied. The association of HRR with pulmonary hypertension (PH) and survival was examined.

Results Twenty eight patients, a mean age (± SD) of 68.4 (± 7.9) years and BMI (± SD) of 28.66 (± 4.3), ex-smokers (60%) with IPF and AHI>5 were examined. Median AHI was 16.3. MinSaO2 during sleep and maxSaO2 awake-sleep was 81.86±7.3 and 10.75±5.7 respectively. Patients had a mean (± SD) of FVC%, TLC% and DLCO% at 77±17.9, 63.5±12.8 and 43.5±15.61 respectively. At CPET the mean (± SD) VO2peak/kg, SaO2peak, VO2/VCO2slope and HRR were 17.04 ml/min/kg±4.11, 88.4±6.01, 75.78±12.15 and 15.76±8.01 respectively. RVSP was 35.29±12.41 mmHg. Median survival was 520 days. No association was found between HRR and AHI, PH and survival. HRR was associated only with VO2peak/kg. RVSP was significantly associated with minSaO2, maxSaO2 during sleep and with SaO2peak at CPET.

Conclusion Heart rate recovery after CPET does not predict either the severity of OSA or survival in IPF patients with OSA.

P27 - OSA’s risk factors in patients with chronic obstructive disease (COPD) and chronic hypercapnic respiratory failure (CHRF) Andriani Ziki1, Chaido Pastaka1, Vasiliki Isolaki1, georgios vavougios1, Kostantinos Gourgoulianis1 1-1-Department of Pulmonary Medicine, Medical College Kottayam, Kottayam, India

INTRODUCTION COPD is a very common disease and a leading cause of morbidity worldwide. COPD patients with CHRF suffer exacerbations more often worsening their prognosis. Although prevalence of obstructive sleep apnea (OSA) is no higher in COPD patients, their coexistence worsens their clinical situation. However there are only subjective indications that lead patients undergo a polysomnography test.

PURPOSE Our object is to study the risk factors of the increased incidence of OSA in COPD patients with CHRF which can support the necessity of a sleep study in these patients.

MATERIAL AND METHODS 52 COPD with CHRF, outpatients were included of stage III and stage IV with PCO2>45mmHg respectively. They underwent a spirometry and were evaluated by BMI and MRC and ESS (Epworth sleepiness scale) questionnaires. Subsequently underwent a full sleep study.

RESULTS There was found statistically significant positive correlation between AHI index and FEV1, FEV1/FVC, MRC and BMI. Subsequently the patients were classified in groups according to the AHI(AHI<5, 5≤AHI<15, AHI≥15). The third group (AHI≥15) presents statistically significant higher values of FEV1, FEV1/FVC ,MRC and BMI.

CONCLUSION FEV1, FEV1/FVC and BMI, appears to constitute quantitative risk factors for the occurrence of OSA in COPD patients with CHRF.COPD patient with CHRF and BMI >30 present 5 times more the possibility of the coexistence of OSA. So, this subgroup population should undergo a polysomnography test to evaluate the possibility of the coexistence of OSA.

P28 - Congenital Central Hypoventilation Syndrome-long term follow-up on a tertiary hospital Nuria Madureira1, Inês Barreto1, Filipa Costa1, M. Helena Estêvão1 1-1-Department of Pulmonary Medicine, Medical College Kottayam, Kottayam, India

Introduction: Congenital Central Hypoventilation Syndrome (CCHS) is a rare genetic disorder associated with PHOX2B mutation. An autonomic nervous system dysfunction is responsible for hypoventilation (more pronounced during sleep) with decreased sensitivity to hypercapnia/ hypoxia and a spectrum of other manifestations.

Objective: To review the CCHS children followed regarding: clinical presentation, non-respiratory manifestations, genetic study, polysomnography (PSG), management and follow-up.

Methods: Retrospective clinical reports analysis.

Results: Since 1993, eleven children were followed. In 10 patients first manifestations were on first day and 1 CCHS was diagnosed at 13m (LO-CCHS). Four died and the others are now aged 3-13 y.PHOX2Bgenetic testing revealed 8 PARM mutations (1 homozygoty) and 2 NPARM mutations (1 with the most severe situation and other with LO-CCHS). PSG was performed in 9/11: all had hypercapnia and hypoxia during sleep. Ten children were/are on positive pressure ventilation, 5 by tracheostomy and 6 by mask. The 7 living children are dependent on ventilation during sleep. 10/11 performed Holter records. 5 had abnormalities (the child with PAR mutation in homozygoty received cardiac pacemaker). Other non-respiratory manifestations were: Hirschsprung disease 3; GERDiseases 5;ophthalmologic disorders 5; intelligence index lower than general population and ADHD 4.

Conclusions: Presently, genetic study enables earlier diagnosis of atypical patients. Some studies show a genotypy-phenotype correlation, our study is not large enough to support such a conclusion. Adequate ventilation support and multidisciplinary follow-up are the mainstay for improving quality of life.

P29 - Obstructive Sleep Apnoea among COPD patients Kesavan Govind Nikhil1, Davis Paul1, Shajahan PS1, Venugopal KP1 1-Department of Pulmonary Medicine, Medical College Kottayam, Kottayam, India

AIM •To find out the prevalence of Obstructive Sleep Apnoea in COPD patients. •To assess the prevalence of co morbidities in COPD patients with Obstructive Sleep Apnoea.

MATERIALS AND METHODS The study was cross sectional and was conducted in the Department of Pulmonary Medicine, Government Medical College Kottayam. All COPD patients in mild to severe stages with a day time SpO2 >92 attending outpatient clinics between 1-1-2010 and 31-12-2010 were included in the study. The patients satisfying the inclusion and exclusion criteria were subjected to formal polysomnography to identify patients with/without OSA. The patients were divided into various groups based on the presence or absence of complications (Diabetes mellitus, Coronary Artery Disease (CAD), Hypertension, Hyperlipidemia and Pulmonary Artery hypertension (PAH)). Statistical analysis was done using Pearson Chi-Square test and Fishers Exact test, taking p value <0.05 as significant.

RESULTS The study was conducted in 60 COPD patients.11 out of 60 COPD patients (18.33%) were having OSA. It was also observed that the prevalence of Systemic Hypertension (Fisher exact p 0.033) and CAD (Fisher exact p 0.038) and PAH (Fisher exact p 0.0489) was significantly higher among COPD patients with OSA compared to those without OSA.

CLINICAL IMPLICATIONS The prevalence of OSA is high among COPD patients. COPD patients with OSA are at high risk for developing systemic complications than others. Hence those COPD patients with symptoms and risk factors for OSA as well as COPD patients with complications out of proportion to the degree of obstruction should be screened for OSA and treated at the earliest.

P30 - Autonomic cardiovascular control during sleep in patients with spinal cord injury Eleonora Tobaldini1, Paola Proserpio2, Katrinia Sambusida2, Andrea Lanza2, Tiziana Redaelli2, Pamela Frigerio2, Lara Fraticci2, Lino Nobili2, Nicola Montano2 1-Department of Biomedical and Clinical Sciences, Internal Medicine II,
Conclusion: Among the OHS patients the severity of SDB was between percent time of Spo2, Paco2, Age, AHI, and the number of OSA, and a negative relationship with OH changes by ANOVA. A significant positive relationship with BMI, was similar to western countries. Among the four AHI subgroups with SRBD 5 (0.54% of non-SRBD), respectively. The prevalence of OH in children with various types of mucopolysaccharidosis (MPS) was sparse. Link, SDB among patients with obesity and hypoventilation (OH) are among sleep disordered breathing (SDB) have been lots. The reverse pattern is maintained through sleep stages within the groups and the marked reduction of cardiac sympathetic modulation. This autonomic characteristic is maintained through sleep stages within the groups and the dynamic of autonomic control during N2, N3 and REM is similar in the two groups.

P31 - Prevalence and clinical features of obesity hypoventilation syndrome in Okinawa, Japan. Focused on physiological characteristics of sleep related breathing disorders among patients with obesity hypoventilation.

Hirosi Nakamura1, Kazuy Tóhyama1, Chikashi Takara1, Kyoko Yoshida1, Tatsu Okada1, Yoshio Tamaki1, Tatsuo Kohki1

Sleep respiratory center, nakamura clinic, Isuraos, Japan

Background: Analyses of obesity hypoventilation syndrome (OHS) among sleep disordered breathing (SDB) have been lots. The reverse link, SDB among patients with obesity and hypoventilation (OH) are sparse.

Objectives: Examine prevalence and clinical features of SDB among OH patients with obesity.

Methods: OHS is defined as obesity of body mass index (BMI)≥30 kg/m², hypoventilation (Paco2>45 mmHg at awake) with SDB without any other causes of hypventilation. Among 5800 patients who underwent a nocturnal polysomnography (PSG), arterial blood gases’ analysis (ABG), and spirometer during 11 years at Nakamura clinic, 237 patients were diagnosed with OH. In these groups, anthropometric characteristics, the relations among PSG findings, pulmonary function and ABG’s were reviewed and compared among the four subgroups based on Apnea-hypopnea index (AHI).

Results: In 5800 subjects, obstructive sleep apnea (OSA) was 4849, central sleep apnea (CSA) 32, non-SRBD 919, respectively. In 237 patients with OH, OSA was 232 (4.75% of OSA), CSA zero, and non-SRBD 5 (0.54% of non-SRBD), respectively. The prevalence of OH in OSA patients was lower than other reports but by categories of BMI was similar to western countries. Among the four AHI subgroups with OH changes by ANOVA. A significant positive relationship with BMI, Paco2, Age, AHI, and the number of OSA, and a negative relationship between percent time of SpO2.

Conclusion: Among the OHS patients the severity of SDB was variable and even those with non SRBD were found.

P32 - Sleep-breathing disorders during the night in children with mucopolysaccharidosis

Victor Altunin1, Julia Namazova-Baranova1, Anna Gervorkyan1, Olga Kozhevnikova1, Nato Vashakmadze1, Eka Abashidze1

1 Diagnostic Center, Scientific Centre of Child Health Care, Moscow, Russian Fed.

Background: The investigation of sleep-breathing disorders (SBD) during the night in children with various types of mucopolysaccharidosis (MPS)
of patients had OSAS of mild stage and 39% - of moderate stage (p<0.05). 76% of patients had from 169 to 2414 cases of cardiac rhythm disturbances within 24 hours: 52% made supraventricular extrasystoles and 36% - ventricular extrasystoles of I-V classes (B.Lown), 12% - clinically significant pauses. 53% of patients had late ventricular potentials and 59% - atrial late potentials. There were revealed correlations between duration of apnea cases and CVR (r=0.6815;p<0.05), number of heart rhythm disorders(HRD) (r=0.7183;p<0.05); between AHI and DFP(r=0.26;p<0.05); between number of HRD and totalQRS(r=0.49;p<0.05), RMS40(r=-0.46,p<0.05), Las40(r=0.36;p<0.05); between CVR and totalQRS(r=0.56;p<0.05) and DFP(r=0.5975;p<0.05). Risk for fatal complications was evidently increased (r=0.7969;p<0.05); high risk level in 14.6% and very high risk in 73% of cases. Conclusions: Patients with both COPD and OSAS have evidently increased risk for life-dangerous arrhythmias and risk of sudden cardiac death.

P35 - What’s the risk of sleep problems for occupational accidents? A systematic review and meta-analysis.
Katrin Uehli 1,2, Amar J Mehta 1,2,3, Christian Schindler 1,2, Edith Holsboer-Trachsler 2,5, Joerg D Leuppi 2,4, Kerstin Hug 1,2, Katrin Uehli 1,2, Joao Almeida 1, João Carlos Winck 1,2
1 Swiss Tropical and Public Health Institute, Basel, Switzerland
2 University of Basel, Basel, Switzerland
3 Harvard School of Public Health, Boston, MA, USA
4 Clinic of Internal Medicine, University Hospital of Basel, Basel, Switzerland
5 Psychiatric University Clinics, Basel, Switzerland

Objectives: The magnitude of the risk of sleep problems for occupational accidents is still unclear. Thus, we conducted a systematic review and meta-analysis to quantify the effect of sleep problems on occupational accidents.

Methods: A systematic literature review using Medline, Embase, Web of Science, and Psycinfo was performed. The risk factor of interest was a sleep problem of any duration, frequency and severity. The considered outcome was an occupational accident of any severity (minor, major or fatal). Pooled relative risks (RR) and 95% confidence intervals (CI) were calculated through random effects models after assessing between-study heterogeneity. Furthermore, the population attributable risk percent was estimated.

Results: 27 observational studies providing 54 risk estimates were included. The findings of the meta-analysis showed that workers with sleep problems had a 1.62 times higher risk for being injured at work compared to workers without sleep problems (RR: 1.62, 95% CI 1.43 – 1.84). Among the different sleep problems, breathing-related sleep problems resulted in the highest risk for work injuries (RR: 1.80, 95% CI 1.49 – 2.18). The attributable risk percent suggested that around 13% of the work injuries were due to sleep problems.

Conclusion: This systematic review confirmed and quantified the association between sleep problems and occupational accidents for the first time. As sleep problems are of growing concern in the population, sleep medicine needs to further assess the implications and preventive measures, and occupational physicians should be aware of this risk and its effects on employees.

P36 - Polysomnographic breathing parameters depend on seizure type in epilepsy
Sevan Iritsyan 1, Lilit Ghahramanyan 1, Samson Khachatryan 1,2
1 Sleep Unit, Somnus Neurology Clinic, Yerevan, Armenia
2 Clinical Psychology and Psychotherapy Program, Yerevan State University, Yerevan, Armenia
3 Department of Neurology, Yerevan State Medical University, Yerevan, Armenia

Background
Sleep-disordered breathing (SDB) is a frequent co-morbidity of epilepsy. SDB (primary snoring and obstructive sleep apnea, etc.) can seriously influence the course of epilepsy. Severity of SDB could define the epileptic seizure severity and frequency.

Objectives
Aim of our study was to reveal a possible relationship between SDB and seizure severity.

Methods
Patients with defined all-cause epilepsy were enrolled in the study. Detailed clinical interview regarding sleep and epilepsy variables was conducted including information regarding seizure severity and type. Seizures in our study were divided into two groups according to severity: only minor seizures (G1, simple partial seizures, absences, myocloni) and major seizures (G2, generalized tonic-clonic seizures, complex partial seizures). A full EEG-PSG study was performed in all patients. PSG evaluation was performed according to current scoring rules (AASM 2007).

Results
Thirty patients with epilepsy aged 18-67 mean age - 33.4, ±43.3 (13) enrolled in the study. According to the study design they were divided into those having only minor seizures – G1 group (n=4), and those having major seizures – G2 group (n=26). The respiratory PSG data was distributed among groups as follows. G1 vs. G2 group

- Mean apnea index was 30.9±17.7 events/h. Central IAH > 5/h was present in 30% of patients, but without central sleep apnea syndrome criteria. Good adherence was observed initially in 24% of patients. Only 14 patients (56%) repeated sleep study in ambulatory, 50% of which without forward indication to PAP. From the 18 patients who maintained PAP treatment, only 28% showed a good first-year adherence. Treatment was constantly refused by 36% of patients. High AHI was the only factor associated to adherence (p=0.03), and no association was found with age, sex, education level, SBD symptoms or inability.

Conclusion
Despite the evidence of the impact of SDB treatment in stroke patients, we found a weak adherence to PAP. AHI was the only factor associated to adherence. The significantly percentage of patients that lost indication to PAP, after repeating sleep study, suggest the importance of reassessment.
Aims

The aim of this prospective randomized controlled trial was to assess the additional effect of sleep position trainer (SPT) in patients with residual positional obstructive sleep apnea (POSA) under mandibular advancement device (MAD) therapy, combined with SPT and MAD.

Methods

In 13 patients (age: 54±9 y; Male:Female: 6/7; AHI: 22±13/h) with residual POSA under MAD therapy, the additional effect of a chest- and supine-position monitoring was assessed. The SPT continuously monitors sleep position, vibrating when in supine position. If patient shifts to non-supine position, vibration stops. After baseline polysomnography (PSG) and PSG with MAD, patients were invited for 2 PSGs in randomized order: with SPT and with SPT and MAD.

Results

Combination of SPT and MAD in patients with residual POSA under MAD therapy was effective with a significant reduction in AHI as compared to baseline and the other treatment modalities (*:p<0.05) (Table 1).

Table 1: Results of the different PSGs

<table>
<thead>
<tr>
<th>PSG</th>
<th>Baseline</th>
<th>PSG MAD</th>
<th>PSG SPT</th>
<th>PSG SPT+MAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHI (h)</td>
<td>22±13</td>
<td>11±6*</td>
<td>12±9*</td>
<td>5±3*</td>
</tr>
</tbody>
</table>

*: p<0.05 compared to baseline; †:p<0.05 compared to MAD; $: p<0.05 compared to SPT

Conclusions

The prevalence of POSA before and under MAD therapy is high. These results suggest that in patients with residual POSA under MAD therapy, combination of SPT and MAD leads to an additional reduction in AHI as compared to baseline and the individual treatment modalities.

P39 - Prevalence of residual excessive sleepiness in patients receiving mandibular advancement device treatment

Annelies E.R. Verbruggen1,2, Marijke Deltjens1,2,3, Kristen Wouters3, Ilse De Volder3,4, Paul H. Van de Heyning1,4, Marc J. Braem3,4, Olivier M. Vanderveken1,4,6

1 ENT Department and Head and Neck Surgery, Antwerp University Hospital, Edegem, Antwerp, Belgium

2 Department of Special Care Dentistry, Antwerp University Hospital, Edegem, Antwerp, Belgium

3 Scientific Coordination and Biostatistics, Antwerp University Hospital, Edegem, Antwerp, Belgium

4 Multidisciplinary Sleep Disorders Centre, Antwerp University Hospital, Edegem, Antwerp, Belgium

5 Department of Neurology, Antwerp University Hospital, Edegem, Antwerp, Belgium

6 Faculty of Medicine and Health Sciences, University of Antwerp, Edegem, Antwerp, Belgium

Background

A mandibular advancement device (MAD) is an effective treatment in patients with sleep-disordered breathing (SDB). Some patients, however, show little or no improvement in daytime sleepiness with MAD despite a significant reduction in apnea-hypopnea index (AHI). The prevalence of this residual excessive sleepiness (RES), defined as ≥11/24 on the Epworth Sleepiness Scale (ESS) despite effective MAD treatment (AHI<5/h), is unknown.

Study aim

To determine the prevalence of RES in patients treated with a titratable, custom-made MAD.

Patients and methods

A prevalence study was performed collecting data from 185 patients (men/women ratio 129/56; age 48±9 y; BMI 27±4 kg/m²; baseline ESS 10±5 and baseline AHI 19±12/h). Full-night polysomnography was done before starting and after 3 months of MAD treatment.

Results

Out of 185 patients, 87 patients (47%) were sleepy (ESS≥11) at baseline. Forty-seven % (n=41) of these patients remained sleepy after 3 months of MAD treatment while 23 of these patients (56%) reached AHI<5/h. In addition, 4 other patients that were not sleepy at baseline reported excessive daytime sleepiness under effective MAD treatment, resulting in a total prevalence of RES in a sample of SDB patients under MAD treatment of 15% (n=27).

P40 - May flow limitation/during sleep be a good index to decide when begin non invasive mechanical ventilation (NIMV) in patients with amyotrophic lateral sclerosis (ALS)?

Roberto Bossi1, Giulia Spoletini2

1 Dept.of Pneumology and lung transplant Center of respiratory diseases during sleep, Fond. IRCCS Ca'Granda Ospedale Maggiore Policlinico, University of Milano, Italy

2 Centre for Sleep Health and Research, Department of Respiratory Medicine, Royal North Shore Hospital, Sydney, Australia

Aim

Of our study was to evaluate if there is any new predictive respiratory index, other than pulmonary functional test and ABG (arterial blood gas) decline, to determine the beginning of nocturnal NIMV in patients with ALS. Material and methods We evaluated 10 male patients (63±12 y) not affected by bulbar ALS, through ABG (arterial blood gas), PFT (pulmonary function test) and polysomnography. At first all of our patient did not show any signs of chronic respiratory failure and a mild reduction of FEV1 (72±7%) and FVC (71±6%) at PFT. The polysomnography(PSG), underlined flow-limitation %, an early index of respiratory fatigue, and desaturation during sleep.(see table 1).After acquiring informed consent, we began NIMV with mean IPAP 12±2 cmH2O and mean EPAP 6±1 cmH2O. Results After 1 year of nocturnal NIMV, we noticed a significant increase of ABG values and decrease of flow limitation by PSG(see Table 1). Conclusion Therefore, we concluded that flow limitation % may be a good early index to decide when to begin NIMV in ALS patients. An early beginning of NIMV can improve quality of life and compliance of this kind of patients.

Table 1

<table>
<thead>
<tr>
<th>PSG</th>
<th>Baseline</th>
<th>After 1 year of NIMV</th>
<th>pvalue</th>
</tr>
</thead>
<tbody>
<tr>
<td>p02</td>
<td>73±9 mmHg</td>
<td>80±10 mmHg</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>p02</td>
<td>43±6 mmHg</td>
<td>39±5 mmHg</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Sp02 desaturation during sleep</td>
<td>29±3%*</td>
<td>6±2%*</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Flow limitation</td>
<td>49±7%**</td>
<td>49±7%**</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

*percentage of total sleep time with Sp02<90%.

**percentage of total sleep time with flow-limitation

P41 - Polysomnographic Phenotypes of OSA and Mandibular Advancement Splint Treatment Outcome

Kate Sutherland1,2, Hitoshi Takaya1, Craig Phillips1,2, Ali Darendeliler4, Jin Qian3, Peter Cistulli1,2

1 NHMRC Centre for Sleep Health (CIRUS), Woolcock Institute of Medical Research, University of Sydney, Sydney, Australia

2 Centre for Sleep Health and Research, Department of Respiratory Medicine, Royal North Shore Hospital, Sydney, Australia

3 Department of Respiratory Medicine, Toranomon Hospital, Tokyo, Japan

4 Department of Orthodontics, Faculty of Dentistry, Sydney Dental Hospital, University of Sydney, Sydney, Australia

5 Department of Respiratory and Sleep Medicine, St George Hospital, University of New South Wales, Sydney, Australia

Mandibular advancement splints (MAS) can be an effective treatment for OSA, however patient characteristics which predict a good treatment response are not well understood. Our aim was
to assess MAS treatment response in different OA phenotypes of severity, body position and sleep stage. Methods: Retrospective analysis of polysomnography (PSG) from MAS research patients (N=386). Diagnostic PSG was used to classify OA by severity (mild, moderate, severe), body position (supine-dependent, non-positional) and sleep stage (REM, NREM, non-stage dependent). Proportion of MAS responders, defined as both Complete (MAS AHl=5/hr) and Partial (~50% AHl reduction), were compared between OA phenotypes. Results: More Complete responders had mild OSA (mild 57.6%, moderate 68.3%, severe 22.9%, p=0.001) but there was no difference in partial responders (mild 60.6%, moderate 68.3%, severe 67.9%). Supine and non-positional OA patients did not differ in proportion of complete (38%/vs. 40.9%) or partial (68%/vs. 81%) responders. There was a trend for more Complete responders to have REM OSA (REM 45.3%, NREM 39.7%, non-state 31.3%, p=0.052). Conclusion: Complete response to MAS occurred more often in mild OSA however there was no overall difference in AHl reduction between severity groups. Body position or sleep stage phenotypes did not differ in proportion of responders. This contrasts previous suggestions that supine OA is associated with better response. We plan to further analyse this dataset of PSG without and with MAS to better understand MAS response across all sleep-stages and body positions and identify PAD predictors of treatment response.

P42 - Rationale and objectives of an oral appliance network on global effectiveness: the ORANGE Registry
Olivier M. Vanderweken 1,2, Fernanda R Almeida 3, Peter A Cistulli 4, Bernard Fleury 5, Frédéric Gagnadoux 4, Arnaud Hoekema 2, Nelly Huynh 6, Dennis Hwang 7, Clete Kushida 8, Gilles Lavigne 8, Alan Lowe 1, Marie Marklund 10, Jean-François Masse 11, Tim G Quinell 12, Hiroko Tsuda 13, Satoru Tsukui 13
1 ENT, Head and Neck Surgery, Antwerp University Hospital, Antwerp, Belgium
2 Faculty of Medicine and Health Sciences, University of Antwerp, Antwerp, Belgium
3 Faculty of Dentistry, The University of British Columbia, Vancouver, Canada
4 Centre for Sleep Health and Research, Department of Respiratory Medicine, Royal North Shore Hospital St Leonards, NSW Australia, Australia
5 Department of Respiratory Medicine, Hôpital Saint Antoine (Assistance Publique Hôpitaux de Paris-Université Paris Vl), Paris, France
6 Department of Pneumology, Centre Hospitalier Universitaire, Angers, France
7 Department of Oral and Maxillofacial Surgery, University Medical Center Groningen, University of Groningen, Groningen, Netherlands
8 École de Médecine Dentaire, Université de Montréal, Montréal, Canada
9 Sleep Medicine, Kaiser Permanente/SCPMG, Fontana, USA
10 Stanford Sleep Medicine Center, Stanford University, Redwood City, USA
11 Department of Orthodontics, Faculty of Medicine, Umeå University, Umeå, Sweden
12 Unité de Recherche en Pneumologie, Institut Universitaire de Cardiologie et de Pneumologie de Québec, Université Laval, Quebec, Canada
13 Tim. Quinell@papworth.nhs.ts, Papworth Hospital, Cambridge, United Kingdom
14 Comprehensive dentistry, Kyushu University Hospital, Fukuoka, Japan
15 Neuropsychiatric Research Institute, Tokyo, Japan

Oral appliance (OA) therapy is the main non-CPAP therapy for patients with obstructive sleep apnoea (OSA). More research is needed to assess the effectiveness of OA therapy in OSA patients. Academic researchers from 9 countries have founded a network focused on OA outcomes. The primary aim of this ORANGE (Oral Appliance Network on Global Effectiveness) network is to evaluate the long-term effectiveness of OA therapy in OSA patients. Exploratory aims are: predictors of treatment outcomes; objective compliance and tolerance; side-effects; quality of life and mood indices; health care costs of OA therapy in different countries; indications for combination and alternative of OA and CPAP; differences between OA types and titration methods; incidence of OA contra-indications and long-term health outcomes of OA therapy related to cardiovascular disease.

During a first strategic meeting, objectives and feasibility of the registry were discussed. Data collection priorities were subdivided into anthropometrics, medical history, sleep test data, questionnaires, dental variables, side-effects, compliance and titration. All participating sites will standardize the data to be collected and to be entered in a web-based registry. Consecutive patients who consent to participate will be included. The final data to be included in the registry were discussed and determined in June 2012. In April 2013, patient data entry needs, charts and ethical board requirements will be finalized in order to start data collection in June 2013. ORANGE is an international multicenter patient registry with unique research opportunities in the exploration of the global effectiveness of OA therapy for patients with OSA.

P43 - Craniofacial structure in OSA and relationship to CPAP treatment pressure and compliance
Kate Sutherland 1,2, Whitney Mostafiz 1, Vasanth Srinivasan 3, Oyku Dalci 1, Ali Darendellier 1, Ronald Grunstein 1,2, Peter Cistulli 1,2
1 Centre for Sleep Health and Research, Department of Respiratory Medicine, Royal North Shore Hospital, Sydney, Australia
2 NHMRC Centre for Sleep Health (CSH), Woolcock Institute of Medical Research, University of Sydney, Sydney, Australia
3 Department of Orthodontics, Faculty of Dentistry, University of Sydney, Sydney Dental Hospital, Sydney, Australia
4 School of Dental Medicine, Harvard, Boston, USA
5 Department of Respiratory and Sleep Medicine, Royal Prince Alfred Hospital, Sydney, Australia
Craniofacial morphology is a risk factor for OSA that may additionally influence treatment effectiveness. Our aim was to investigate whether craniofacial structure has any relationship to CPAP pressure requirement or has any impact on compliance. Methods: OSA patients were participants in a randomised cross-over trial of one month of optimal CPAP and oral appliance treatment. OSA patients (AHl-10/hr) were CPAP-naive. Optimal fixed pressure was determined at home using autoseat CPAP mode as the 95th percentile pressure during sleep >4 hours. Compliance was defined as >4hrs/night average use over 1 month of treatment. Standardised lateral cephalometric radiographs were taken as part of oral appliance treatment assessment. Results: Cephalometric analysis is complete in 49 patients (81% male, 45.0±12.2 years, BMI 29.0±4.3 kg/m2). Baseline AHl was 34.2±14.8/hr (range 10.2-68.8) with fixed pressure requirement of 10.5±1.9 cmH2O (range 4-14). CPAP pressure correlated with age (r=0.32, p=0.03) and baseline AHl (r=0.29, p=0.04). No craniofacial skeletal variables significantly correlated with CPAP pressure requirement. There was a modest relationship with soft palate length and optimal pressure (r=0.30, p=0.04). There was a trend towards a greater tongue length in CPAP compliers vs.non-compliers (81.2±6.0 vs.77.9±6.6, p=0.07) and a larger tongue to intra-mandibular enclosure area ratio. Conclusions: Preliminary analysis did not show any relationship between craniofacial skeletal measurements and CPAP pressure or compliance. There was a modest relationship with upper airway soft tissues.

P44 - Effects of brief motivational interviewing on continuous positive airway pressure adherence in obstructive sleep apnea: A Randomized Controlled Trial
Agnes Lai 1, Daniel Fong 1, Jamie Lam 1, Terri Weaver 2, Dace Svikiš 1, Mary Ip 1
1 Faculty of Medicine, The University of Hong Kong, Hong Kong, Hong Kong
2 College of Nursing, University of Illinois at Chicago, Chicago, USA

Introduction: Poor continuous positive airway pressure (CPAP) adherence in patients with obstructive sleep apnea(OSA) adversely affects the effectiveness of the treatment. Effective education is important to enhance CPAP use. Aims: This study examined the interventional effects of brief motivational interviewing with social cognitive theory based education(BMIE) vs standard education(SE) in improving CPAP adherence in OSA subjects. Methods: Newly diagnosed OSA subjects were recruited from May 2010 to Oct 2012. The SE group received advice on the use and care of the CPAP machine while the BMIE group received SE with an additional 45
minutes session with a video of knowledge enhancement, and a 10 minutes telephone follow-up after 3 days of CPAP use. The percentage of days (>4hrs/day) of CPAP use was the primary outcome. Daytime sleepiness was the secondary outcome. Objective CPAP usage was downloaded after 3-month CPAP use. Epworth Sleepiness Scores (ESS) were collected before, after 1 month and 3 months treatment. Results: 100 OS subjects were recruited, with mean age of 52 years and AHI of 36 events/hr. The mean percentages of days (>4hrs/day) using CPAP in BMIE group vs SE group were 74% vs 39% at 1 week, 69% vs 34% at 1 month, 61% vs 32% at 3 months. The intervention effect did not have significant change in adherence in CPAP use (p=0.065) and ESS(p=0.912) during 3 months treatment. The BMIE significantly enhanced CPAP use by 33% [95%CI, 21% to 44%] and reduced ESS by 2.2 [95%CI, 0.9 to 3.5]. Conclusions: Compared with SE, BMIE improved CPAP adherence and daytime sleepiness in subjects with OSA.

P45 - Work productivity modification in Obstructive Sleep Apnoea patients under CPAP treatment
Evangelia Nena 1,2, Elieni Perantoni 1, Dimitra Siopi 1, Venetia Tsara 1, Paschalis Steiropoulos 1, Evangelia Nena 1,2, Eleni Perantoni 1, Dimitra Siopi 1, Venetia Tsara 1, Paschalis Steiropoulos 1, 1-Faculty of Medicine, University of Medicine and Pharmacy "Carol Davila", Bucharest, Romania 2-Sleep Laboratory, Democritus University of Thrace, Alexandroupolis, Greece

OBJECTIVE: Previous studies have demonstrated that work productivity is limited in Obstructive Sleep Apnoea (OSA) patients in comparison to controls, mainly due to the presence of excessive daytime sleepiness. Aim of this study was to examine the modification of work productivity in OSA patients who received CPAP treatment and to compare it with that of OSA patients who did not apply the prescribed therapy.

METHODS: Work productivity was assessed by the Endicott Work Productivity Scale (EWPS) in 45 male OSA patients (AHI 48.9±19.9/hr) of working age (48±8.7 years), without comorbidities. Daytime sleepiness was measured with the Epworth Sleepiness Scale (ESS). Both questionnaires were answered again 3 months after the initial prescription of CPAP treatment. Comparisons were performed between patients who complied with CPAP treatment and those who did not.

RESULTS: Out of the 45 recruited patients, 10 did not comply with CPAP treatment. To them, no significant modification was observed in values of EWPS (20.5±10.1 vs. 22.5±9.7; p=0.085) and ESS (11.4±3.5 vs. 12.8±4.6; p=0.196). On the contrary, in OSA patients under CPAP, a significant amelioration was observed in EWPS (26.6±10.7 vs. 18.3±8.5; p<0.001) and in ESS (10.2±5.7 vs. 1.5±4.2; p<0.001).

CONCLUSIONS: This study demonstrates that three months of CPAP treatment in OSA patients resulted, apart from amelioration of excessive daytime sleepiness, in the improvement of work productivity, as was expressed by the decrease in EWPS values.

P46 - Differences between controlled and resistant hypertension in an obstructive sleep apnea population regarding CPAP values
Dana Claudia Delcau 1,2, Andra Elena Malaut 2, Stefan Dan Mihaica 1,2, Florin Dumitru Mihaltan 1,2 1-Faculty of Medicine, University of Medicine and Pharmacy “Carol Davila”, Bucharest, Romania 2-National Institute of Pneumology "Marius Nasta", Bucharest, Romania 3-Faculty of Medicine, University of Medicine and Pharmacy “Victor Babes”, Timisoara, Romania

INTRODUCTION: Many patients with obstructive sleep apnea syndrome(OSAS) have resistant hypertension(RHT), the refractoriness among them is frequently caused by OSAS.Both OSAS and RHT represent major public health concerns.

AIMS: To study the differences between OSAS patients with controlled HT and RHT in terms of sleep study variables and need of CPAP pressure.

METHOD: We applied the exclusion criteria to 214 patients with sleep apnea syndrome; we studied 34 patients with controlled HT and RHT in terms of sleep study variables and need of CPAP pressure (SPSS 17.0). The groups were similar in terms of smoking habit and classes of antihypertensives used.

RESULTS: Controlled HT were 27 patients(79.4%) - 19 men(70.4%), 8 women(29.6%), mean age 58.4±12.1 years; RHT were 7 patients(20.6%) - 4 men(57.1%), 3 women(42.9%), mean age 49.6±8.8 years. No differences regarding body mass index(BMI) between the two groups. RHT patients had mild OSAS in a higher percent (Chi test: 57.1% vs. 22.2%, p<0.05) even if there was no difference regarding apnoea-hypopnea index (AHI) between the two groups (T test: 36.5±25.6/h vs. 39.4±29.0/h, p=NS).

CONCLUSIONS: Patients with RHT and OSAS require higher CPAP values, which did not correlate with BP values. Further studies are necessary to elucidate this phenomenon.

P47 - Elderly patients with Obstructive Sleep Apnoea (OSA)- tolerance and compliance with CPAP
Charles Mukherjee 1, Terry Lim How 1, Basharet Ibrahim 1, Chentegai Mabuto 1, Johnson Samuel 1, 1-Pulmonary Physiology Lab; Sleep Department, Basildon and Thurrock University Hospital, Basildon, United Kingdom

INTRODUCTION: The treatment of elderly patients with OSA is variable. We present results of tolerance and compliance to CPAP in elderly patients (>70 years) with OSA over 2 years.

METHODS: Elderly patients referred to the sleep clinic with a history of snoring and hypersomnolence were evaluated with domiciliary pulse oximetry and/or partial polysomnography. A trial of CPAP was offered to patients diagnosed with OSA defined as Apnoea Hypopnoea Index(AHI)-5 or 4% Oxygen Desaturation Index (ODI)-5 who were hypersomnolent with an Epworth Sleepiness Score (ESS) of <10. Tolerability and compliance were reviewed.

RESULTS: Of 593 patients referred, 83(14%) were over 70 years. Mean age was 75 years and mean BMI 33.9kg/m2. 69 patients (83%) had AHI and/or ODI <5 and of these 39 (57%) accepted CPAP. 25 (64%) were able to tolerate CPAP for >6 months. 14(56%) had averaged more than 4 hours/night of CPAP (mean 5 hours). This was maintained for the two-year follow-up period. In the treated group, the mean pre-CPPSS was 10.1(range 24-1). With CPAP, mean ESS decreased to 4.1(range 17-0). In 19(76%) patients ESS decreased to <10.

DISCUSSION: Only a small number of elderly patients are referred for sleep studies. The majority were referred as they had other co-morbidities. Over three quarters referred had objective evidence of OSA but just over half of them accepted CPAP. Two thirds of those on CPAP tolerated it for >6 months with about half being compliant. Increased awareness of OSA in the elderly, particularly those with co-morbidities, is essential. This group may need added support to improve acceptance and compliance compared to younger patients.

P48 - Effect of nasal airway stent on obstructive sleep apnea.
Makoto Satoh 1, Kenji Hioki 2, Hiroshi Yamada 2, Ichiro Komada 3, Kennosuke Kadono 1, Yuki koshino 1, Shinnichi Sakane 1 1-Sleep Medicine, University of Tsukuba, Tsukuba, Japan 2-Seven Dreamers Laboratories, inc., Redwood shores, USA 3-Otorhinolaryngology, Shiga Hospital of Social Insurance, Ohtsu, Japan

Introduction: We report promising preliminary findings regarding the clinical effectiveness of a novel nasal airway stent (NAS) that was developed for the treatment of OSA. The device is constructed using resilient semi-rigid silicone rubber and was designed to be safely and comfortably inserted into the upper airway. The NAS contains a expandable distal end, located within the nasopharynx and retropalatal oropharynx, which is encapsulated by a nontoxic water-soluble material. Following device placement, the distal end of the device is released and expands to maintain an air flow passageway of 5-10 mm in diameter.

Effectiveness of the NAS on sleep disordered breathing was assessed by PSG studies before and during placement of the device in six male patients with OSA.

The NAS did not normalize the disordered breathing, but significantly improved the apnoea hypopnea index (from 30.9±20.4 to 15.2±14.3 events/hr), 3% oxygen desaturation index (from 26.8±22.1 to 12.5±12.7events/hr) and arousal index (from 29.4±16.6 to 16.7±9.8events/hr). None of the patients experienced traumatic
side effects such as nasal bleeding, pain, or discomfort following placement of the device.

The NAS appears to be a useful alternative or additive treatment for patients with OSA. The device may be used as an immediate therapeutic tool while a patient undertakes a weight loss program or as an alternative for patients who cannot tolerate a nasal continuous positive airway pressure treatment. The NAS affects obstruction of nasopharynx and partly oropharynx but not of hypopharynx, therefore the combination of the NAS and an oral appliance may provide additional benefits.

P49 - EEG significance in PSG applying Continuous Positive Airway Pressure therapy in patients with OSAS.

Eleni Perantoni1, Vasileios Michailidis1, Nikolaos Maglaveras2, Ioanna Chouvarda3, Venetta Tsara1
1 2nd Pulmonary Clinic, G.H. G.Papanikolaou, Thessaloniki, Greece
2 Lab of Medical Informatics, The Medical School, Aristotle University, Thessaloniki, Greece

The aim of the study is to explore the variations of EEG and evaluate the impact of its recording upon the process of discovering the optimal CPAP pressure, aiming at eliminating OSA episodes. 34 individuals diagnosed with OSAS after PSG were included. The indicated therapy was the application of positive pressure during the 2nd PSG for titration of CPAP. The patients were divided in 2 teams depending on Sleep Efficiency during CPAP titration. The SE variation in relation to the initial PSG was further used to separate the patients into 3 subgroups showing stable, improved or degraded SE. The examination of the EEG occurs before and after finding the optimal pressure. For the analysis of EEG Fractal dimension and Sample Entropy were used.

No statistically important findings emerged comparing the eras before and after finding the optimal pressure in regards to the FD and its parameters in EEG. An important statistical difference between the 2 patient groups was found in the stages, total time of sleep and the time of beginning of each stage. All groups showed a tendency of entropy decline after the optimal pressure mark with no statistical importance. The patients with degraded SE produced a significant statistical difference between the various sleep stages that the optimal pressure was found with the mean value of entropy (p=0.02) and its variation(p=.001), as well as the mean values before(p=.005) and after(p=.05) the optimal pressure mark and the coefficient variation of the FD(p=.04).

The changes in the EEG from the analysis of the various parameters using FD and entropy are considered indirect evidence of the improvement of EEG signal and therefore the microstructure of sleep.

P50 - Treatment of Obstructive Sleep Apnea with Auto-Bilevel Pressure – an easy solution for difficult patients?

Lígia Rodrigues Fernandes 1, Lúcia Batata 2, Vitória Martins 2, Fátima Teixeira 2, José Moutinho Santos 2
1 Pneumologia, Hospital Geral, Centro Hospitalar Universitário de Coimbra, Coimbra, Portugal
2 Centro de Medicina do Sono, Hospital Geral, Centro Hospitalar Universitário de Coimbra, Coimbra, Portugal

New devices and ventilatory modes, such as Auto-Bilevel pressure (ABP), have been emerging for the treatment of obstructive sleep apnea (OSA). Objectives: To evaluate the efficacy, tolerability and response to ABP compared with previous treatment options. Methods: Prospective study (01-2012 to 09-2012) of patients with OSA treated with ABP, evaluated by laboratory polysomnography (PSG) using ResMed ™ Auto25®. We analyze data for 30 of the 39 eligible patients: epidemiological, clinical, PSG and therapeutic data (before and after ABP). Results: Included 30 patients, 93.3% men, mean age 57 ± 12.2 years (at diagnosis). The diagnosis was made by screening in most cases with a mean AHI of 47.6±4.86 and minimum saturation of 70.8±11.3%. All patients received initial treatment with another ventilation mode: Auto-CPAP 27, CPAP 2 and BiPAP 1 patient. Prior to ABP 14 patients (46.7%) needed - 1 ventilation mode - 12 with 2 modes and 2 with 3 modes - and 56.7% of patients were non adherent to treatment. The alteration to ABP was motivated by: high residual AHI (21 cases; mean value of 10.3 ± 8.9), excessive day sleepiness (7 case; mean value of Epworth scale -ESS- 9.2±5.2) or ventilator intolerance (2 patients). After ABP (minimum 1.5 months of therapy) 76.7% of patients were adherent and showed residual AHI of 7.25±13.1 and ESS of 7.8±4.8. Patients reported overall improvement and were better adapted to this mode in 76.7%. Conclusions: ABP showed to be, in our group, a good option for difficult cases, with improvement in symptoms and in objective measures such as AHI.

P51 - CPAP treatment with nasal pillows: preference, long term effectiveness and adherence

Andrea Lanza1, Sara Marianì1, Maurizio Sommariva2, Katrinna Sambusida1, Paola Proserpio1, Lino Nobili1
1 Centre of Sleep Medicine, Niguarda Hospital, Milan, Italy
2 Physical Therapy and Rehabilitation Centre, Niguarda Hospital, Milan, Italy
3 Broncopedneumologia, Fondazione IRCCS Ca’ Granda Ospedale Maggiore Policlinico, Milan, Italy

Backgrounds: Mask discomfort can negatively influences adherence to CPAP therapy in patients with obstructive sleep apnea (OSA). Nasal pillows can be alternative to standard nasal masks although there are no data about their long term efficacy. Our aim is to asses long term effectiveness and adherence to CPAP therapy in OSA patients (pts) choosing nasal pillows as initial therapeutic option. Patients and Methods: 93 consecutive CPAP naïve pts affected by moderate-to-severe OSA: 73M; age 58±12; Body Mass Index (BMI) 32±6; Epworth Sleepiness Scale (ESS) score 9±5; Apnea-Hypopnea Index (AHI) 46±22/h. Pts were allowed to choose the type of nasal interface they preferred to start the therapy with, among standard nasal-mask (SN) and nasal-pillows (NP). In case of side effects due to nasal CPAP, pts switched to face mask (FM). Outcomes were assessed after 5 days, 2 and 8 months. Results: 44 (47%) pts chose SN, 22 (24%) SN, while 27 (29%) needed FM. The groups didn’t differ in age, gender, BMI, and baseline AHI. Mean CPAP pressure was 11.1 with NP, 11.8 with SN and 12cmH2O with FM. Side effects were reported in 53 pts (57%) and 21 pts changed type of mask. 2 pts lost weight and stopped therapy. 86 pts reached the 8-months follow up. Mean daily CPAP use was 5±3.1 with NP, 5±4.2 with SN and 4.8±1h/night with FM. In all groups AHI was below 5/h and ESS was significantly reduced. The preference for NP was confirmed: 27 pts after 8 months were using NP, 13 SN and 21 FM. 5 pts alternated NP with SN or FM. Conclusions: nasal pillows was the most frequently chosen interface. They were well-tolerated and showed equal long term effectiveness and objective adherence as standard nasal mask.

PS2 - Efficacy of Mandibular Advancement Splint for Treatment of OSA. Report at three months of a one-year follow-up study.

Tatjana Djordjevic1, Renata Pecotic1, Josko Bozic1, Tina Ticinovic Kurir1, Goran Racic1, Zoran Dogas1
1 Neurosience, University of Split, School of Medicine, Split, Croatia

Background: Mandibular advancement splint (MAS,Silensor-s) can effectively treat mild to moderate obstructive sleep apnea (OSA) with suggested improvements of endothelial function and metabolic parameters on long-term use.

AIMS: To investigate the efficacy of an adjustable MAS and the first 3 months impact of an ongoing one-year study on arterial stiffness, metabolic parameters and psychomotor function in patients with diagnosed mild to moderate OSA.

Methods: 25 patients (9 men and 16 women; age: 49.5±10.3; mean BMI, 27.7±3.6 kg/m²) were initially treated with suggested improvements of MAS treatment with nasal pillows: preference, long term effectiveness and adherence

CONCLUSIONS: Adjustable MAS treatment may contribute to the
reduction of AHI in patients with mild to moderate OSA, but the influence on cardiovascular, metabolic and psychomotor function still needs to be shown.

**P53 - Expiratory and inspiratory muscle functions in obstructive sleep apnea syndrome**
Elif Torun Parmaksiz1, Banu Salepci1, Gulsen Sarac1, Nesrin Kiral1, Ali Fidan1, Sevda Comert1, Benan Caglayan1

1 Chest diseases, Dr. Lutfi Kirdar Kartal Education and Research Hospital, Istanbul, Turkey

OSAS patients are presumed to have some level of inspiratory weakness due to several possible mechanisms. However whether OSAS patients have lower respiratory effort when measured just following sleep remains unclear. A quick, simple and noninvasive way of assessing respiratory muscle pump strength is measurement of MIP and MEP. In order to find out how much impairment, if any, OSAS causes on daytime maximal inspiratory-expiratory pressures, we studied morning respiratory muscle functions of OSAS patients. Patients admitted to our sleep laboratory in one-year period were prospectively analysed. Patients with diseases that could effect respiratory muscle function such as neuromuscular diseases were not included. All cases had pulmonary function tests performed the morning following sleeping study. The study population consisted of 51 female, 84 (62.2%) male patients. Mean age of 135 cases was 47.76±11.88 (18-79). AHI was found to be correlated with FVC, MEP, FEV1/FVC, MIP and MEP values did not seem to be correlated with AHI. FVC, FV1, FEV1, MEP, MIP, MIP% and MEP were similar in patients with and without OSAS. FEV1/FVC was significantly lower in apnee an nonapnee cases (p=0.04). OSAS patients also demonstrated significantly lower MEP% values. When spirometric parameters were compared between nonapneics, mild, moderate and severe OSAS patients, FVC, FEV1, MEP showed significant difference between groups.

In this study we demonstrated that maximal expiratory muscle strength during wakefulness is lower in OSAS patients, whereas inspiratory muscle strength is similar in subjects with and without OSAS. This may possibly suggest that inspiratory muscles are more resistant than expiratory muscles.

**P54 - The association of carotis artery atherosclerosis with obstructive sleep apnea syndrome and snoring**
Banu Musaffa Salepci1, Ali Fidan1, Suhendan Cosan Ketenci1, Elif Torun Parmaksiz1, Sevda Comert1, Nesrin Kiral1, Benan Caglayan1, Ulku Aka Akturk1

1 Chest Diseases, Dr. Lutfi Kirdar Kartal Teaching and Research Hospital, Istanbul, Turkey

2 Radiology, Dr. Lutfi Kirdar Kartal Teaching and Research Hospital, Istanbul, Turkey

3 Chest Diseases, Arnautovkoy Government Hospital, Istanbul, Turkey

We aimed to assess prospectively effect of disease severity of OSAS and snoring to carotid artery IMT and stenosis. Of 102 cases who were examined by polysomnography May 2011 - March 2012 were included in the study. CCAs (Common Carotid Arteries) and ICAs (Internal Carotid Arteries) were evaluated for IMT and stenosis by carotid doppler ultrasonography. For statistical analysis: Chi-Square, Fisher’s Exact, Student’s T tests and Logistic Regression Analysis in SPSS package program were used. The mean age was 45.9 ± 11.1 (20 – 73), with 40 (39.2 %) women and 62 (60.8 %) men. Of 88 OSAS cases who had AHI (Apnea-Hypopnea Index) > 5, 33 (37.5 %) had mild, 20 (22.7 %) had moderate and 35 (39.8 %) had severe disease. Fourteen cases who had AHI < 5 were designated as the control group. IMT was detected in 18 (17.6%) of all cases and stenosis in 32 (31.4%). In patients with severe OSAS carotid artery walls were thicker (p<0.05) and stenosis was higher (p=0.006) compared to control group. Also in the same group, IMT ratios were higher (p=0.004) compared to mild/moderate OSAS patients. In patients with IMT age, AHI, ODI and snoring index were higher; oxygen saturation was lower compared to patients without IMT (p>0.05). In patients with stenosis; age, BMI (Body-Mass Index), AHI, obesity, hypertension were found to be higher (p<0.05). Age and AHI were found to be independent risk factors. In conclusion; IMT in carotid arteries is associated with age, OSAS severity, hypoxemia and snoring severity. Stenosis in carotid arteries was found to be associated with age and OSAS severity but was not associated with hypoxemia or snoring severity.

**P55 - High altitude hypoxia and periodic breathing during sleep: gender related differences. The HIGHCARE project**
Carolina Lombardi1, Paolo Merigg1, Piergiuseppe Agostoni2, Andrea Faini3,4, Gianluca Caldara1, Grzegorz Bilo5, Miriam Reversa6, Francesca Gregorini1, Marco Di Rienzo4, Gianfranco Parati1,4

1 Sleep Disorders Center, Dept of Cardiology, Istituto Auxologico Italiano IRCCS, Milan, Italy
2 Polo Tecnologico Biomedical Technology Department, Fondazione Don Carlo Gnocchi Onlus, Milan, Italy
3 Dept of Cardiology, Centro Cardiologico Monzino, Milan, Italy
4 Dept Cardiology, Istituto Auxologico Italiano IRCCS, Milan, Italy

**Introduction** Respiratory periodicity during night at high altitude is frequently reported and is due to alternation between respiratory center stimulation by hypoxia and its subsequent inhibition by hyperventilation-induced hypocapnia. **Aim** of our study was to explore whether a different ventilatory pattern during sleep might characterize women and men during acute exposure at high altitude hypoxia. **Methods** In 37 healthy subjects, 23 male and 14 female participating in the HIGH altitude Cardiovascular Research project (HIGHCARE), we performed nocturnal portable polysomnography with a new wearable system (MAGIC vest) and with a standard portable system (Embletta device) in the following conditions: 1) at sea level, 2) during the first or second night at Namche Bazaar (3500 m) and 3) during first or second night at Mt Everest Base Camp (5400 m). Mean and minimum Spo2 during night, number of central and obstructive apneas, oxygen desaturation index (ODI), apnea-hypopnea index (AHI) were measured.

**Results** During night at Namche Bazaar (3500 m) AHI was 57.7±33.4 in male and 4.68±2.7 in female (p<0.05) the difference being due to the number of central sleep apneas and hypopneas. At Base Camp AHI was 92±41 in male and 53.6±45 in female.

**Conclusions** Under exposure to high altitude hypoxia periodic breathing at night affects more frequently male than female subjects. This data highlight the presence of a gender-related difference in respiratory center stimulation by hypoxia, which leads to trigger periodic breathing in males earlier and more frequently than in females.

**P56 - Hypertension, heart failure and sleep related breathing disorders: results from the ProMISEs (progetto multicentrico Italiano sonno e scompenso) study**
Carolina Lombardi1, Andrea Faini1, Andrea Giuliano1, Maria Teresa La Rovere1, Raffaele Ferri1, Biancamaria Guarnieri1, Walter Serra1, Liborio Parrino1, Piergiuseppe Agostoni1, Federica Provini1, Monica Puligheedu1, Fulvio Bellocchi1, Michele Correale1, Oriana Scala1, Pasquale Perrone Filardi1, Giovanni Mercuro1, Rosa Raimondo1, Raffaele Calabro1, Rocco La Gioia1, Gianfranco Parati1,4

1 PROMISE research group, Italy

**Introduction** Heart failure is an increasingly prevalent syndrome. Only few epidemiological studies on the prevalence of sleep related breathing disorders (SRBD, obstructive - OSA- and central sleep apnea- CSA) in patients with HF are available, but regarding the role of obstructive sleep apnea in the pathophysiology of HF, in the Sleep Heart Health Study the presence of OSA conferred a 2.38 relative risk in the likelihood of having HF, independent of other known risk factors. No data in this regard are available in Europe.

**Aim** The ProMISEs study aims at generating a multidisciplinary database containing sleep and clinical data from HF patients referred to the Italian heart failure centers.

**Methods** At present we have consecutively enrolled 280 HF patients in whom polysomnography was performed.

**Results** 225 (80%) patients had AH>5. 152 patients (54%) had mainly OSA, while 73 patients (26%) were conversely affected mostly by CSA. Both OSA and CSA patients were more frequently males (respectively 80% and 92%). The prevalence of hypertension was 53% in non SRBD, 55% in CSA and 60% in OAS. Hypertension could be identified as a major pathogenetic mechanism responsible for HF development in 3.9% of the OSA group while it was not found in CSA patients.

**Conclusions** Our data provide a clear demonstration of the high prevalence of SRBD in HF patients. Male gender was a risk factor both
for central and obstructive sleep apneas. Interestingly, prevalence of hypertension was higher in OSA group, in which elevated blood pressure might have played a key role also in determining HF appearance.

**P57 - Validation of Pulse-Transit-Time Derived Blood Pressure Monitoring in Bi-Level Ventilated Patients with Heart Failure**

Jens Spiesshoefer1, Jessica Heinrich1, Thomas Bitter1, Dieter Horakotte1, Olaf Oldenburg1

1 Department of Cardiology, Heart and Diabetes Center North Rhine-Westphalia, Ruhr University Bochum, Bad Oeynhausen, Germany

Since blood pressure (BP) monitoring through pulse transit time (PTT) appears to be a promising alternative for oscillometric BP monitoring devices we tested such device for validity.

25 Heart failure patients (23 male; 71± 9.4 years; NYHA ≥ 2; EF ≤ 45% and Cheyne Stokes Respiration were ventilated non-invasively for 1 h using bi-level-positive-airway-pressure (BiPAP). BP was measured by 2 devices (oscillometric and via SOMNOscreen™) for 30 min before, after and during BiPAP intervention of 60 minutes.

Mean BP for the entire 2 hours was 118.1 ± 14.4mmHg vs 115.9 ± 14.1mmHg for systolic values (oscillometric versus PTT) and 77.2 ± 17.3mmHg vs 76.4 ± 11.1mmHg for diastolic values, respectively. While clinically comparable, statistically these differences were different (p<0.05). There was a trend towards an increasing bias over time and with BiPAP intervention. In addition, a total of 18.6 % of PTT based measurements were not analyzable. Regarding to the direction of BP changes we found that PTT-based measurements showed an opposite change as compared to oscillometrically obtained values 17.0% for systolic values and 32.8% for diastolic values, respectively.

Our main finding is that overall BP monitoring in heart failure patients through PTT for a period of 2 hours (including a 1 h BiPAP) results in more failure prone and less valid for longer periods, which might require periodical recalibration of the system.

**P58 - Only severe obstructive sleep apnea is a strong predictor for systemic hypertension**

Stefan A. Mihaicuţa1, Voicu Tudorache1, Stefan Frent, Daniel Lichezan1

1 Pulmonology, University of Medicine and Pharmacy Victor Babes, Timisoara, Romania

**Aim:** Identify the strongest predictors for SH in patients with OSA syndrome.

**Material:** Results: 489 consecutive patients (pts) with clinically suspected OSA were included prospectively and follow-up for a mean period of 7 years, with sleep questionnaires, anthropometric measurements, polysomnography for apnea-hypopnea index (AHI) (normal 0–4, mild 5–14, moderate 15–29, severe >30), history of ST. We evaluated the Odds Ratio (OR) together with 95% confidence interval (CI) in a univariate analysis and the independent variables in order to identify the most important predictors for ST. 346 males (71%) 143 females (29%), age 50 ± 12 years (range 18–84 years).

Body Mass Index (BMI): 34 ± 6 kg/m² (17–56 kg/m²), AHI 36 ± 28/h.

SH was found in 59% patients. The mean time from the diagnostic of SH was 7 ± 5 years. The structure of the population regarding SH was classified following the European Society of Hypertension 2007 Guidelines as follows: if the 59% of pts with SH 11% with normal values, 15% stage I, 29 % stage II, 8% stage III. AHI in all 3 levels (mild, moderate and severe), with reference normal, is extremely significant (p < 0.001) in HT patients. Still, only severe OSA is the strongest predictor for SH, OR 3.2 (p < 0.001, CI 1.7, 6.4, 5.9). Mild and moderate OSA did not significantly influence the appearance of SH (p < 0.1, OR 0.58, CI 0.29 – 1.2, 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 1.7, 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.

**Background:** According to the World Health Organization, 15 million people suffer from stroke worldwide, annually, of which 8 million have lethal outcome. Among the well known stroke risk factors are the sleep disorders (sleep apnea, insomnia, daytime sleepiness).

**Aim:** To determine the presence of the sleep disorders in patients with stroke, to correlate them with the stroke type, side of the lesion and associated risk factors. Material and methods: We made a prospective analysis of 58 patients (40 with ischemic and 18 with haemorrhagic stroke), median age 74, 5 years. All patients had computer tomography of the brain and were analyzed for stroke risk factors. Sleep disorders were verified according the history of the disease and Epworth scale. Patients with consciousness impairment were excluded. **Results:** 42 patients (72%) had sleep disorders (sleep apnea (27 patients), insomnia (13 patients), day time sleepiness (2). There was no significant difference between the type and side of stroke (p<0.05). Sleep disorders were significantly correlated with hypertension and obesity (p<0.05).

**Conclusion:** Sleep disorders are significant stroke risk factors. Sleep apnea is the most common sleep disorder, associated with hypertension and obesity.

**P60 - The lengths of the pterygoideus hamulus is associated with the Obstructive Sleep index - A combined 3D CBCT and polysomnographic study**

Ulás Oz1,2, Finn Rasmussen1

1 School of Dentistry, Near East University, Nicosia, Turkey
2 College of Dentistry, Division of Orthodontics, University of Kentucky, Lexington, USA

**Background:** Obstructive sleep apnea (OSA) is associated with a variety of diseases and functional disturbances. However, the pathophysiology of OSA is still unclear. Therefore, this study was designed to determine the lengths of the pterygoideus hamulus (PH) in patients with OSA and their association with the obstructive sleep index (OSI). The PH is a hook-like process at the Pterygoid plate of the sphenoid bone. Its of great importance for the function of several muscles such as the tensor veli palatini, palatopharyngeus, levator veli palatini, and upper part of the upper pharyngeal constrictor, pars pterygoideus. The activation of upper airway dilator muscles is associated with prevention of pharyngeal collapse and maintains adequate upper airway patency. A total of 64 and right sides of PHs were measured in 32 3D CBCT images of OSA patients (22 male and 10 female with a mean age of 62.65 years, range 32-82 years. The mean AHI= 20.3±22.4, Mean BMI=34±7.3). In a linear regressions the impact of the pterygoid hamulus (included as either left, right or total length), adjusting for age, gender and body mass index was assessed with the outcome variable AHI. The PH was associated with the AHI; (Left-sidePH= -2.6, p=0.01; R=0.58; Right-sidePH= -3.0, p<0.005, R=0.63; and Total LengthPH=-3.1, p<0.004, R=0.62, respectively). Age was significant in the equations. We showed an association between the severity of the sleep apnea measured as the AHI and the length of the pterygoid hamulus. We hypothesized that the spatial features of PH can affect the level of the muscle activity and thereby the severity of sleep apnea.

**P61 - Obstructive sleep apnea in obese patients with type 2 diabetes in primary health care**

Margarida Guedes1, João Pereira1, Ana Valério2, Tiago Oliveira1, Carla Marques1, Maria José Alves1, Maria Teresa Dias, Deolinda Diniz1

1 Linde Healthcare, Linde Sagas LDA, Lisbon, Portugal
2 USF S. João do Pragal, Almada, Portugal

**Background:** Obesity is a major risk factor for Obstructive Sleep Apnea (OSA). However, it has been demonstrated an association between OSA and type 2 diabetes (DM2), independent of weight.

**Aims:** To evaluate the prevalence of OSA in obese patients with DM2 and to determine if body mass index (BMI) and neck circumference (NC) are correlated with the severity of OSA.

**Methods:** Observational, descriptive study, based on a sample of obese (BMI ≥ 30 kg/m2) and DM2 population of a primary care unit. Demographic and anthropometric data, risk factors and symptoms of OSA were collected. It was also applied Ewprth Sleepiness Scale and a home cardiorespiratory polygraphy. **Results:** 50 patients were evaluated. The majority were female (70%), the mean age was 65±8 years,
the mean BMI was 35±4.6 kg/m2 and the average NC was 42±4.7 cm. The major associated comorbidities were hypertension (84%) and dyslipidemia (62%). 88% of participants had OSA with an apnea-hypopnea index (AHI) ≥ 5 events/hour. Severe OSA was observed in 16% of the patients, moderate in 22% and mild in 50%. Mean AHI of 19±19.9 events/hour and mean oxygen desaturation index (ODI) of 18±18.3 events/hour. BMI and ODI were significantly correlated to the severity of OSA. However, the relationship between the NC and the severity of OSA wasn’t significant. Conclusions: In this study, the OSA prevalence in obese patients with DM2 is high, with 38% of cases classified as moderate or severe. This emphasizes the need for a proper sleep screening test in the primary care unit as a routine test for DM2 patients, especially the obese.

P62 - Average and minimum oxygen saturation in OSAS patients as disease severity index in polysomnographic evaluation.

Monika Kuzminska1, Ewa Marcinowska-Suchowierska1
1-Department of Biomedical Engineering, S. Maugeri Foundation, IRCCS, Monza, Italy

Hypoxia is an important factor in the development of obstructive sleep apnea syndrome (OSAS) complications therefore the saturation values, which are exponents of hypoxia are important for assessing the risk of complications. Aim of this work is to compare the oxygen saturation in OSAS vs healthy patients and show how they present in different OSAS stages. We included 960 patients. On the basis of polysomnography (PSG) they were divided into 2 groups: OSAS (AHI≥5) and healthy (AHI<5). According to AHI (Apnea/Hypopnea Index) OSAS groups was divided into 3 stages: mild (AHI≤5), moderate (15>AHI≤30), severe (AHI>30). In all patients average (avStO2) and minimum (minStO2) oxygen saturation were evaluated. The outcomes were analyzed by Statistica. In OSAS (n=590): avStO2=91.55%, minStO2=77.14%, in healthy: avStO2=93.71%, minStO2=82.56%. In OSAS stages: mild:avStO2=93.06%, minStO2=82.35%; moderate:avStO2=92.31%, minStO2=79.01%; severe:avStO2=89.48%, minStO2=70.55%. Statistically significant differences were found in avStO2 (p=0.0025) and minStO2 (p=0.00006) between the mild and moderate OSAS stage and in avStO2 (p=0.0000) and minStO2 (p=0.00000) between the moderate and severe stage. We found differences in the avStO2 and minStO2 among healthy and OSAS patients, and between the different stages of OSAS advancement. In more advanced OSAS we observed the lower avStO2 and minStO2 which is additional to AHI hint to apply the treatment and prevent associated with hypoxia complications.

P63 - Relationships between fluctuations in state and respiratory events during Cheyne-Stokes respiration in heart failure patients.

Gian Domenico Pinna1, Elena Robbi2, Roberto Maestri3
1-Department of Family Medicine, Internal Medicine and Metabolic Bone Disease, Medical Center for Postgraduate Education., Warsaw, Poland

We included 960 patients. On the basis of polysomnography (PSG) they were divided into 2 groups: OSAS (AHI≥5) and healthy (AHI<5). According to AHI (Apnea/Hypopnea Index) OSAS groups was divided into 3 stages: mild (AHI≤5), moderate (15>AHI≤30), severe (AHI>30). In all patients average (avStO2) and minimum (minStO2) oxygen saturation were evaluated. The outcomes were analyzed by Statistica. In OSAS (n=590): avStO2=91.55%, minStO2=77.14%, in healthy: avStO2=93.71%, minStO2=82.56%. In OSAS stages: mild:avStO2=93.06%, minStO2=82.35%; moderate:avStO2=92.31%, minStO2=79.01%; severe:avStO2=89.48%, minStO2=70.55%. Statistically significant differences were found in avStO2 (p=0.0025) and minStO2 (p=0.00006) between the mild and moderate OSAS stage and in avStO2 (p=0.0000) and minStO2 (p=0.00000) between the moderate and severe stage. We found differences in the avStO2 and minStO2 among healthy and OSAS patients, and between the different stages of OSAS advancement. In more advanced OSAS we observed the lower avStO2 and minStO2 which is additional to AHI hint to apply the treatment and prevent associated with hypoxia complications.

P64 - GAL-021 decreases the frequency and severity of obstructive apneas in urethane anesthetized rats.

Matthew Hewitt1, Francis Golder1, Euan MacIntryre1
1-Discovery, Galileo Pharmaceuticals, Horsham, USA

Rationale: GAL-021 is a novel ventilatory stimulant and is being developed to reverse drug-induced respiratory depression. Recently we showed that GAL-021 also enhances CO2chemosensitivity in rats at doses that do not stimulate breathing. Thus, we hypothesized that GAL-021 would also protect against obstructions in a rat model of obstructive apneas (OA).

Methods: Rats were anesthetized and placed in a head-out plethysmograph. The trachea was cannulated to measure sub-glottal pressure. The femoral vessels were cannulated. Pulse oximetry was recorded continuously. Baseline measurements were collected for 2 hours before GAL-021 administration. Rats were then administered either vehicle or GAL-021 (1.5 or 3 mg/kg/hr) for 2 hours.

Results: During baseline conditions, 38 OAs/hr were observed with an average duration of 9 seconds. Severe respiratory acidosis and intermittent hypoxia were present. GAL-021 (1.5 mg/kg/hr) decreased OA duration and the severity of oxy-Hb desaturations but did not reduce the frequency of OA. GAL-021 (3 mg/kg/hr) had similar effects but also reduced the frequency of OAs. GAL-021 decreased the severity of respiratory acidosis. Neither dose of GAL-021 stimulated eupneic breathing.

Conclusions: These results demonstrate that in anesthetized rats, GAL-021 at sub-stimulatory doses significantly reduces the frequency and length of OAs. GAL-021 infusion also improves SaO2 and decreases the number of significant desaturation events possibly due to increasing chemosensitivity to PaCO2and/or PaO2.

P65 - GAL-021 stabilizes breathing and decreases the frequency of central sleep apneas in morphine-tolerant rats.

Francis Golder1, Ryan Gruber1, Courtney Ide1, Andrew Kennedy1, Sean Peng1, Euan McIntyre1
1-Discovery, Galileo Pharmaceuticals, Horsham, USA

Introduction: GAL-021 is a novel drug that stimulates ventilation and is being developed to reverse respiratory depression. We have also shown that GAL-021 enhances CO2chemosensitivity in rats at doses that do not stimulate breathing. Thus, we hypothesized that GAL-021 would protect against central sleep apneas (CSA) in a model of opioid-induced sleep disordered breathing.

Aims: We hypothesized that GAL-021 would diminish CSAs without altering the sleep time in morphine tolerant rats.

Methods: EEG/EMG telemetry was used to score sleep in rats. Ventilation and the frequency of CSA were measured using whole body plethysmography. The co-efficient of variation was used to assess ventilatory stability. The study was divided into three treatments: baseline, chronic morphine, and chronic morphine + GAL-021. Vehicle controls were evaluated in a satellite group. Morphine tolerance was established by adding morphine to the drinking water. GAL-021 was given IV over 2 hours (low dose – LD: 1.12 mg/kg; high dose – HD: 3.60 mg/kg).

Results: Chronic morphine increased the incidence of CSA’s during NREM sleep (but not REM sleep) from 4/hr to 13/hr without altering the time spent in each sleep state. Morphine had no effect on ventilation. The LD GAL-021 decreased CSA frequency to 7/hr during NREM sleep. HD GAL-021 abolished all CSA in both NREM and REM sleep. GAL-021 did not alter time in each sleep state or minute ventilation. CV was normalized.

Conclusions: Intravenous GAL-021 decreased the number of CSAs during sleep and did not affect sleep times. This suggests that oral GAL-021 may be effective in treating CSA in opioid tolerant patients.
This work was supported by the Fundação para a Ciência e a Investigação. OSA did not increase the potentially cardiotoxic CD4 perforin mediated cytotoxicity. However a causal relationship was not also exists in patients with fatigue that sometimes show a reduced consumption, diuretics, Diabetes Mellitus, the number of arousals, the role of several factors such as age, deliveries in women, coffee and urodynamics of the bladder.

**Methods:** We investigated 80 participants by polysomnography. Groups were divided by the apnea/hypopnea index (AHI) of < or =15/h. ADS was defined by a superimposed alpha-rhythm during slow wave sleep. Mononuclear cells were stained for CD3, CD4 and the proteins P and GrB. Results are shown as means +/- SEM. A p < 0.05 was considered statistically significant.

**Results:**

- Age or BMI were not significantly different between the groups. Results for P or GrB positive cells are shown in Table 1

<table>
<thead>
<tr>
<th>ADS</th>
<th>AHI &lt; 15/h (n=44)</th>
<th>AHI =15/h (n=36)</th>
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<tr>
<td>ADS no ADS (n=29)</td>
<td>ADS+ (n=15)</td>
<td>no ADS (n=30)</td>
</tr>
<tr>
<td>% of P+ cells</td>
<td>5.39 +/-1.16</td>
<td>3.0 +/-1.36</td>
</tr>
<tr>
<td>% of GrB+ cells</td>
<td>5.16 +/-1.00</td>
<td>2.60 +/-0.68</td>
</tr>
</tbody>
</table>

Table 1: Mean percentage of perforin or granzyme B positive cells. All ADS groups showed a lower percentage of P and GrB the later in AHI < 15 reaching significance a p<0.05

**Discussion**

We demonstrated that ADS is associated with a specific cytotoxic lymphocyte pattern. Rheumatic diseases were excluded, but ADS also exists in patients with fatigue that sometimes show a reduced perforin mediated cytotoxicity. However a causal relationship was not investigated. OSA did not increase the potentially cardiotoxic CD4 cells. This work was supported by the Fundação para a Ciência e a Tecnologia: PICO/IC/29991/2007

**P67 - Positive correlation between enuresis and apnea/hypopnea index**

Vasiliaki Apollonatou1, Dimosthenis Lykouras1, Kiriakos Karkoulias1, John Lakoumentas1, Kleanthis Theodoropoulou1, Kostas Spiropoulos1, Biljana Pencic2, Vera Celic1, Kleut M1, Anaica Andric1, Anka Majstorovic1, Sladajna Backovic1

1 Department of Pulmonary Medicine, University Hospital of Patras, Rio, Patras, Greece
2 Department of Computer Engineering and Informatics, University of Patras, Rio, Patras, Greece

**Introduction:** Secondary involuntary nocturnal voiding (enuresis) is a common symptom in children with obstructive sleep apnea syndrome (OSAS); however it is encountered less frequently in adults suffering from OSAS. Aims and Objectives: The aim of our study was to estimate the relationship between enuresis and OSAS. Methods: All patients that recruited in this study underwent overnight polysomnography and existing co-morbidities were recorded according to a relative questionnaire. The total number of the patients was 124 individuals, 89 male and 35 female. Results: Our results showed that enuresis is strongly connected with an increase in apnea/hypopnea index (AHI). 65% of the cohort population were current smokers, 75% were consuming at least one coffee daily and only 2% were consuming alcohol on a daily basis. We also used multivariate analysis to examine the role of several factors such as age, deliveries in women, coffee consumption, diuretics, Diabetes Mellitus, the number of arousals, the lowest SaO2 during sleep, smoking habits, sleep efficiency and AHI in enuresis in OSAS patients. Conclusion: Our Apnea hypopnea Index is strongly correlated to enuresis (p=0.03), whereas there were no other significant correlations found. We are currently investigating the pathogenesis of enuresis using follow-up of the CPAP treatment and urodynamics of the bladder.

**P68 - Heart Rate Variability and Severity of Obstructive Sleep Apenoa**

Ahmad Izuanuddin Ismail1, Siti Noor Aishah Zahari1, Mohd Arif Md Zim1, Tengku Saifudin Tengku Ismail1

1 Respiratory Unit, Universiti Teknologi MARA, Shah Alam, Malaysia

**Introduction:** The adverse cardiovascular outcome from OSA has been attributed to the changes in sympathetic tone secondary to intermittent hypoxia occurred during observed apnoeic/hypopnoeic episodes. Heart rate variability (HRV) represents autonomic cardiac dysfunction related to respiratory events during these episodes. HRV can be determined from continuous ECG recordings and despite its limitation, is useful for assessing risk of cardiovascular death or arrhythmic events.

Objective: To identify the correlation between HRV and AHI severity among patients with OSA attending our sleep clinic.

**Methods:** We studied 60 consecutive overnight polysomnographies of patients attending our clinic from July 2011 to March 2012. We calculated HRV by measuring beat-to-beat variability between minimum and maximum overnight heart rate using R-R interval.

**Results:** The study population has higher number of males and severe OSA [43 male, 39 severe OSA, mean (95%CI) age 47.2(43.4 – 51.0), BMI 34.9(32.7 – 37.1), AHI 44.3(37.0 – 51.6)]. Our study showed positive correlation between HRV and severity of AHI, r = 0.122, p value = 0.004, controlling for age and BMI [mean differences (95%CI) between mild-moderate vs. severe group, age 48.8(39.3 – 54.3) vs. 47.4(43.1 – 51.7), BMI 33.9(29.2 – 38.6) vs. 35.3(33.0 – 37.6)].

**Discussion:** In patients with OSA, HRV correlates with severity of AHI reflecting worsening autonomic cardiac dysfunction in the most severe patient. This possibly relates to severity of intermittent hypoxia and more frequent arousal during sleep. Studies are required to assess the effect of treatment in reversing these observed changes. Reference: Park DH, et al. J Korean Med Sci 2008;23:226-31.

**P69 - Sleep related breathing disorders and diastolic dysfunction in hypertensive patients**

Biljana Pencic1, Vera Celic1, Kleut M1, Anica Andric1, Anka Majstorovic1, Sladajna Backovic1

1 Cardiology, University Hospital "D.Misovic-Dedinje", Belgrade, Serbia

**Aim:** was to evaluate the relationship between sleep related breathing disorders (SRBD) and diastolic left ventricular (LV) dysfunction.

**Methods:** Sixty patients (pts) with hypertension without any other heart disease were included and divided according to apnea/hypopnea index (AHI) into group I (AHI 5/h) and group II with AHI< 5/h. Assessment of heart function was done according to echocardiography. Left atrium (LA) diameter and volume, LV enddiastolic diameter and volume, LV endystolic diameter and volume, LV ejection fraction, deceleration time (DTE) and relaxation time (IVRT) intervals were measured. Mitral annular velocity (Ea) was derived from tissue Doppler imaging. The ratio E/A and the ratio E/Ea were also obtained.

**Results:** There were 22 pts in group I and 38 pts in group II. All patients had preserved global systolic LV function. Group I had significantly larger LV endsystolic diameter and volume, LA diameter and volume, LV endsystolic diameter and volume, LV ejection fraction, DTE and relaxation time (IVRT) intervals were measured. Mitrail annular velocity (Ea) was derived from tissue Doppler imaging. The ratio E/A and the ratio E/Ea were also obtained.

**Conclusions:** There were 22 pts in group I and 38 pts in group II. All patients had preserved global systolic LV function. Group I had significantly larger LV end-diameter (53.0±3.5 vs 50.7±3.8mm, p=.022) and LA diameter (39.1±4.6 vs36.5±3.2±3.8cm/s vs 33.8±3.0cm/s, p=.029) compared to II. Patients in both groups were similar in E/A,Ea velocities, E/A, E/e ratio and IVRT. Prolongation of DTE (263.6±39.5 vs 241.3±36.2ms, p=.032) was significantly higher in group I. AHI significantly correlated with DTE (r=0.351, p=0.006) and the 3% oxygen desaturation index exhibited a significant correlation with DTE (r=0.32, p=.005) and IVRT (r=0.377, p=.003) Multivariate linear regression model revealed that AHI was independently associated with the DTE (p=0.398, p=.005).

**Conclusions:** SRBD may contribute directly to the impairment of diastolic function in patients with essential hypertension.
P70 - Interval hypoxic training can be a promising tool in management of obstructive sleep apnoea
Kristynya Semen1, Olha Yeliseyeva2, Danylo Kaminskyi3, Lyubomyr Solovey1, Ostap Yavorsky1
1 Department of pediatrics of Internal Medicine #2, Danylo Halitsky Lviv National Medical University, Lviv, Ukraine
2 Department of Histology, Cytology and Embryology, Danylo Halitsky Lviv National Medical University, Lviv, Ukraine
3 Department of Pharmaceutical, Organic and Bioorganic Chemistry, Danylo Halitsky Lviv National Medical University, Lviv, Ukraine

Background: Oxidative stress, cellular hypoxia and autonomic defect are recognized pathogenetic mechanisms involved in obstructive sleep apnoea (OSA), which could be reversed by interval hypoxic training (IHT). This study was aimed to evaluate the effects of individually adjusted single IHT session on the parameters of heart rate variability (HRV) and pro-/antioxidant balance.

Methods and methods. IHT was performed in closed breathing circuit under constant pulse oxymetry control in 24 athletes. It included several cycles: the duration of hypoxic exposure per cycle was defined as the time to decrease SaO2to 94%. HRV was recorded and activities of catalase, superoxide dismutase (SOD), thiorbitric acid reactive species (TBARS), oxidative modification products, middle mass molecules, the levels of total hemoglobin (Hb) and its ligand forms were determined spectrophotometrically.

Results. IHT session resulted in improved HRV due to increase in parasympathetic activity with optimization of sympathetic influences and decrease in activity of central regulatory mechanisms in athletes. These changes most likely resulted from activation of aerobic metabolism, because the most prominent improvement of HRV parameters was observed in athletes with decrease in TBARS without major changes of catalase and SOD activities after IHT. The prooxidant activity in this group was further confirmed by redistribution of Hb ligand forms.

Conclusions. The individually adjusted singular IHT improved HRV parameters, eliminated oxidative stress and promoted efficient modulation of impulses from chemoreceptors, which may substantiate use of this therapy in OSA.

P71 - Evaluation of lung volumes as predictors of obstructive sleep apnoea
Ricardo Reis1, Ana Antunes2
1 Pneumology, Hospital Center of Trás-os-Montes e Alto Douro, Vila Real, Portugal
2 Pneumology, Hospital Center of Vila Nova de Gaia/Espinho, Vila Nova de Gaia, Portugal

Introduction: Studies have suggested that lung volumes are related with the cross-sectional area of the upper airways, however if, and to what extent, lung volumes correlate with obstructive apneas and oxygen desaturations independently of other factors is unclear.

Aims: To evaluate the influence of lung volume variables in the apneoa-hypopnea index (AHI), oxygen desaturation index (ODI) and minimal oxygen desaturation (mO2).

Methods: In a 6 month period, all patients, evaluated in a sleep consult, with complaints of snoring and excessive sleepiness were examined by ambulatory or laboratory recording of nocturnal apneas and desaturations. All subjects performed static and dynamic spirometry.

Results: A total of 75 subjects (47 males, age 54.4±12.3years, BMI 30.9±4.7kg/m2) were evaluated, of which 50 had objective obstructive sleep apnoea (OSA) (8 severe and 14 moderate). Age, weight, BMI and cervical perimeter were significantly higher in the OSA group. Only in the moderate and severe OSA patients was there a correlation of OSA parameters with lung volumes: AHI was correlated with expiratory reserve volume (ERV) (R:0.577; p:0.005), airway resistance (Raw) (R:0.516; p:0.014) and BMI (R:0.571; p:0.006); mO2 was correlated with functional residual capacity (FRC) (R:0.531; p:0.019) and BMI (R: -0.499; p:0.03). However, in the multiple regression analysis only ERV was independently related to AHI (p:0.04).

Conclusions: In patients with severe and moderate OSA, AHI is correlated with ERV, Raw and BMI; and minO2 with FRC and BMI. However, only ERV appears to have a significant independent association with AHI, suggesting that ERV may be a strong influence in the occurrence of obstructive apneas.

P72 - Whole blood rotational thromboelastometry (ROTEM) analysis of the coagulability in untreated obstructive sleep apnoea syndrome (OSAS).
Maria Wilczynska1, Philip Adrian Evans2, Matthew Lawrence3, Keir Edward Lewis1, Sophie Stanford2
1 Respiratory Medicine Department, Prince Philip Hospital, Llanelli, United Kingdom
2 NISCHR HRRU, Morriston Hospital, Swansea, United Kingdom

Introduction: Obstructive sleep apnoea is an independent risk factor for cardiovascular disease and pro-thrombotic state is partially implicated. This is the first report on use of rotational thromboelastometry (ROTEM) to assess coagulability in OSAS. Routine parameters include the coagulation time (CT), clot formation time (CFT), maximum clot firmness (MCF) and α angle (α). Shortened CT, increased α angle or increased MCF indicate hypercoagulability.

Aim: To compare afternoon coagulation parameters with morning waking values in untreated OSAS subjects.

Methods: 34 patients with untreated OSAS: 30 males, mean±SD BMI= 37.6±7.4 kg/m2; age 56.3±10.3 years, 4% Dip-rate (DR) = 45.2±31.9 events/hour. 20 controls with symptoms of OSAS but negative sleep studies: 17 males, BMI =31.3±6.6 kg/m2, age 52.6±13.8 years, 4% DR=4.8 ±2.9 events/hour. Whole blood was collected at 4pm and after sleep the following morning. Samples were tested using ROTEM.

Results: All measurements were within normal range and did not differ significantly between groups. Only in the control group there was statistically significant diurnal variation in MCF and CFT with mean delta change for the extrinsic pathway of 1.7+1.7 and -6.7+8.0, respectively and for the intrinsic pathway of 2.1+3.0 and -9.2+13.2 correspondingly.

Conclusion: In healthy state haemostatic markers change accordingly to the circadian rhythm. Although there is no evidence for increased coagulability in untreated OSAS patients as measured by ROTEM it seems that diurnal haemostatic variability is lost in this group.

P73 - Experimental assessment of rebreathing and exposure to gaseous pollutants from mattresses and pillows in common sleep positions.
Jelle Laverge1, Atila Novoselec2, Richard Corsi2, Arnold Janssens1
1 Architecture and Urban Planning, Ghent University, Gent, Belgium
2 CEER, University of Texas at Austin, Austin, USA

Background: Common sleeping positions (partially) shield nose and therefore induce rebreathing. Additionally, the close proximity of the nose and materials such as mattresses and bedding will increase exposure to gaseous pollutants emitted from these materials. Since Pco2 is important than the sleep position. An additional important finding is mechanisms that are triggered by these phenomena, the effects of this were tested on real subjects using capnography.

Methods: Experiments in which a breathing thermal manikin was exposed to different pollutants sources in a number of common sleep positions and bedding arrays were done in an environmental chamber. SF6 was used as a tracer for gaseous pollutants as well as to measure the fraction of exhaled air that was rebreathed. To study the adaptation mechanisms that are triggered by these phenomena, the effects of this were tested on real subjects using capnography.

Results: The results show that human metabolism and corresponding heat release by the human body are dominant factors in the dilution of pollutants emitted in close proximity of the nose. This effect is more important than the sleep position. An additional important finding is that sleeping with the head under the covers increases intake by a factor 24 and results in a rebreathing rate of over 60%. Adaptation
mechanisms include changing breathing frequency and tidal volume.

**Conclusions:** We can conclude that rebreathing in most common sleep positions is mild, but that for specific situations, like sleeping with the head under the covers, it perturbates normal breathing/gas exchange.

**P74 - Effect of CPAP on circulating vascular injury markers in obstructive sleep apnoea syndrome.**

Maria Wilczyńska¹, Keir Edward Lewis², Sam Rice¹

¹ Diabetes and Endocrinology Department, Prince Philip Hospital, Llanelli, United Kingdom
² Respiratory Medicine Department, Prince Philip Hospital, Llanelli, United Kingdom

**Introduction:** Obstructive sleep apnoea syndrome (OSAS) increases risk of cardiovascular disease and vascular injury is at least partially implicated.

**Aim:** To see if severity of OSAS correlates with levels of vascular injury markers and if continuous positive airway pressure (CPAP) reduces these markers levels.

**Methods:** 20 patients with newly diagnosed OSAS and subsequently commenced on CPAP: 18 males, (mean+SD) BMI 37.1±6.2 kg/m², age 56.6±10.3 years, 4% Dip-rate (DR) 44.3±31.4 events/hour. Serum amyloid A (SAA), high sensitivity C-reactive protein (hsCRP), vascular cell adhesion molecule-1 (VCAM-1) and interleukin adhesion molecule-1 (ICAM-1) were measured before and after a mean of 36.8±12.7 days of CPAP. All assays were performed as sandwich immunoasays using electrochemiluminescent labels.

**Results:** Vascular injury markers levels have not changed significantly with CPAP treatment despite a good compliance (4.7±1.5 hours/night use) (table). There were positive correlations between nocturnal hypoxia and hsCRP (r=0.74), SAA (r=0.71), ICAM-1 (r=0.48) and VCAM-1 (r=0.47); and between 4% DR and hsCRP (r=0.89), SAA (r=0.77) and VCAM-1 (r=0.55).

**Conclusion:** Vascular injury markers levels do not change significantly with CPAP treatment but correlate positively with severity of OSAS.

<table>
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<tr>
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<th>CPAP (5weeks)</th>
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<tr>
<td>hsCRP</td>
<td>6.5 (9.5)</td>
<td>4.8 (3.3)</td>
<td>0.65</td>
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<tr>
<td>SAA</td>
<td>5.1 (4.7)</td>
<td>5.2 (4.1)</td>
<td>0.91</td>
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<tr>
<td>ICAM-1</td>
<td>284.1 (64.7)</td>
<td>288.8 (87.0)</td>
<td>0.13</td>
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<tr>
<td>VCAM-1</td>
<td>366.3 (90.1)</td>
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<td>8-IP(blood)</td>
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<td>TNF-alpha(blood)</td>
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**P75 - Does obesity effect inflammatory factors in patients with severe OSAS?**

Deniz Kazanlık1, Harun Karamanli1, Duygu Ozel1, Ramazan Yigitoglu2, Zeki Yildirim1

1 Department of Respiratory Medicine, Fatih University, Ankara, Turkey
2 Department of Biochemistry, Fatih University, Ankara, Turkey

Obstructive sleep apnea syndrome (OSAS) is an important disease with increased mortality and morbidity as a result of increased intermittent hypoxemia and systemic inflammation. Obesity is a well-known risk factor for OSAS but also a proinflammatory state. The background of this study is to search the influence of obesity on inflammatory markers in severe OSAS patients.

A total of 35 patients with severe OSAS according to polysomnographic findings were included in the study. All patients who had comorbid diseases that may affect levels of inflammation and oxidative stress and current smokers were excluded. Patients were divided in to two according to their body mass index. TNF-alpha, IL-6, CRP, sedimentation as a marker of inflammation and 8-isoprostane, nitrotyrosine as a marker of oxidative stress were measured in both serum and exhaled breath condensate.

There are 25 obese (group-1) and 10 non-obese (group-2) patients with similar mean ages. 10 of the obese patients were women and 15 were men; 4 of the non-obese patients were women and 6 were men. Mean apnea-hypopnea index in group-1 was 45.7±23.8, and in group-2 was 32.5 ± 21.4. There was no significant relation between all investigated parameters and obesity except serum IL-6. IL-6 level were found higher in obese patients than in non-obese patients.

**Conclusions:** Vascular injury markers levels do not change significantly with CPAP treatment but correlate positively with severity of OSAS.

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**P76 - Contribution of oxidative stress and inflammation to the cardiorespiratory alterations and carotid chemosensory potentiation induced by intermittent hypoxia**

Rodrigo Iturriaga¹, Rodrigo Del rio¹, Esteban Moya¹

¹ Laboratory of Neurobiology, P Universidad Catolica de Chile, Santiago, Chile

**Background:** Chronic intermittent hypoxia (CIH), a main feature of obstructive sleep apnoea induces hypertension. A crucial step in the CIH-induced hypertension is the potentiation of the carotid body (CB) chemosensory hypoxic responses. Upregulation of pro-inflammatory cytokines in the CB secondary to oxidative stress may underlie the CB chemosensory potentiation.

**Aims and Objectives.** We studied if oxidative stress-induced upregulation of the pro-inflammatory cytokines TNF-α and IL-1β are involved in the CB and cardiorespiratory alterations following CIH.

**Methods:** We studied the effects of ibuprofen (40 mg/Kg day) and ascorbic acid (100 mg/kg) on TNF-α, IL-1β and 3-nitrotyrosine (3-NT) immunoreactivity in the CB, ventilatory and CB chemosensory hypoxic responses, and arterial blood pressure in male Sprague-Dawley rats exposed to CIH (5% 02, 12 times/h for 8 h/day) for 21 days.

**Results:** CIH increased TNF-α, IL-1β and 3-NT, potentiated the CB chemosensory and ventilatory hypoxic responses, and increased basal arterial blood pressure. Ibuprofen treatment prevented the increased of TNF-α and IL-1β in CB, and the cardiorespiratory alterations, but failed to prevent the CB chemosensory potentiation. By contrast, ascorbic acid treatment prevented the increased of TNF-α, IL-1β and 3-NT in the CB, the chemosensory and ventilatory potentiation, and the hypertension.

**Conclusions:** Our results suggest that the potentiated CB chemosensory responses to hypoxia depend on the oxidative stress, but not on the increased TNF-α and IL-1β levels in the CB. Supported by FONDECYT 1100405

**P77 - Does chronic intermittent hypoxia due to obstructive sleep apnoea affect haematocrit?**

Vladimir Macavei¹, Kristofer Spurling¹, Himender Makker¹

¹ Sleep and Ventilation Unit, Department of Respiratory Medicine, North Middlesex University Hospital, London, United Kingdom

**Introduction:** Hypoxia is an important stimulus for erythropoiesis, and it has been suggested that chronic intermittent hypoxia due to obstructive sleep apnoea (OSA) can contribute to polycythaemia. Objective: To determine the association between the severity of chronic intermittent hypoxia due to OSA and haematocrit (Ht).

**Methods:** We performed a retrospective analysis of prospectively collected data on 449 consecutive sleep clinic patients between January 2009 and January 2011. Subjects with suspected sleep disordered breathing (SDB) were evaluated according to a clinical protocol. Patients with haematological disorders were excluded.

**Results:** The mean age of the 449 patients was 51.7±12.5 years, mean BMI 34.5±7.9 kg/m², and 66.3 % (298/449) were males. OSA (defined as oxygen desaturations index ODI>10 events per hour at an oxygen drop >4% on overnight oximetry) was present in 61.4% (276/449) patients. Time spent on oxygen below 90% (TST90) was present in 61.4% (276/449) patients. Time spent on oxygen below 90% (TST90) was present in 61.4% (276/449) patients.

**Conclusion:** Chronic intermittent hypoxia due to obstructive sleep apnoea affects haematocrit.

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they accounted for only 15% of the variability in hematocrit level (multiple $R^2 = 0.1526$, $p = 0.0001$). Conclusion: Minor elevations in $Ht$ can be attributed to chronic intermittent hypoxia only in severe OSA, with only a few patients meeting the criteria for polycythaemia.

P78 - Relationships between obstructive sleep apnea syndrome, albumin antioxidant status and cardiovascular risk

Ligia Puiu1, Andreaa Didilescu2, Doina Todea3, Anca Petrovan4, Mirea Marta5, Stefan Dan Mihalcuta6

1_pneumologie, Preventive Cardiology Hospital, Baia-Mare, Romania
2_discipline of embryology, Faculty of Dental Medicine, Bucharest, Romania
3_pneumologie, Pneumology Hospital, Cluj-Napoca, Romania
4_infectious diseases, University Hospital for Infectious Diseases, Cluj-
Napoca, Romania
5_pneumologie, Medical Hospital, Oradea, Romania
6_pneumologie, Preventive Cardiology Hospital, Timisoara, Romania

Background: In Obstructive Sleep Apnea (OSA) syndrome the episodes of hypoxia/ reoxygenation induces important changes on serum albumin that may modulate the platelet functions with impact on fatty acids binding affinity, initiating the early atherosclerotic lesions. Objectives: The aims of our study were to assess the relationship between OSA and serum albumin levels and to test the hypothesis that this relationship is related by the impaired antioxidant properties of albumin caused by oxidative stress, in OSA patients, comparing to a control group. Methods: Two Romanian groups, consisting of 40 patients diagnosed with OSA and 26 healthy controls, were recruited. All subjects underwent cardiorespiratory polygraphy. Plasma albumin, total cholesterol (TC), triglycerides (TG), low density lipoprotein cholesterol (LDL-c), high density lipoprotein cholesterol (HDL-c), glycemia, thrombocytes and endothelin-1 (ET1) levels were assessed. Statistical analysis was performed using Pearson correlations tests, two tailed-test and one-way ANOVA test. Results: In the OSA group, correlations were found as follows between: albumin-glycemia ($r = -0.40; p = 0.01$); albumin-TC ($r = 0.41; p = 0.007$); glycemia-snoring ($r = 0.32; p = 0.03$); ET1-apnea hypopnea index (AHI) ($r = -0.40; p = 0.01$), while in the control group between albumin-thrombocytes ($r = -0.39; p = 0.04$); TG-AHI ($r = -0.47; p = 0.01$). The mean value of serum albumin was statistically significant higher in the control group ($p = 0.01$). Conclusions: In OSA patients, the lower antioxidant capacities of albumin might be an early marker for endothelial dysfunction and cardiovascular risk. Key words: sleep apnea, albumin, oxidative stress, blood lipids, atherosclerosis

P79 - The DJ-1 protein as a novel biomarker in obstructive sleep apnea syndrome

George Vavougios1, Chaido Pastaka1, Irene Tsili1, George Natsios1, George Seitandis1, Evangelia Florou1, Konstantinos Gorgoulis1

1_Respiratory Department, University of Thessaly Medical School, Larissa, Greece

Background Oxidative stress is believed to play a considerable role in the pathophysiology of Obstructive Sleep Apnea Syndrome (OSAS). DJ-1 is a protein that acts both as a reactive oxygen species scavenger and a regulator of the antioxidative response.

Aim The aim of our study is to determine serum levels of DJ-1 in patients with OSAS, and detect any correlations with their clinical, demographical and biochemical characteristics.

Method Subjects from the Sleep Disorder Laboratory of the University Hospital of Thessaly with no cardiovascular comorbidities, excluding hypertension were screened by full-night polysomnography (PSG). Those with an apnea-hypopnea Index (AHI) greater than 5 were enrolled. A total of 120 patients, 100 male and 20 female with a mean age of 48±10 years were included. PSG was followed by morning blood sampling. Part of the sample was used for a routine biochemical analysis. The rest was used to determine serum DJ-1 levels via commercially available ELISA kits. Statistical analysis was performed using SPSS 19.0.

Results The median DJ-1 levels were determined to 56.7 ng/mL (IQR: 34.9–99.3 ng/mL). Statistically significant positive correlations were found between DJ-1’s levels and AHI (Spearman’s Rho=0.189, P=0.04). Desaturation Index (Spearman’s Rho=0.239, P=0.012) and statistically significant negative correlation with serum LDL (Spearman’s Rho=-0.205, P=0.042).

Conclusions DJ-1 may be a useful biomarker in OSAS due to its correlations with AHI and DI, and its relationship with serum LDL warrants further investigation regarding a possible implication in cardiovascular events of OSAS patients.

P80 - Progesterone effects on sleep in Postmenopausal Women with Sleep-Disordered Breathing

Ulla Anttalainen1, Tarja Saarensranta1, Tero Vahlberg1, Olli Polo1,2

1_Department of Physiology, University of Turku, Turku, Finland
2_Department of Pulmonary Diseases, University Hospital of Turku, Turku, Finland

Background Progesterone is a respiratory stimulant and it may produce sedative-like effects on sleep through GABAAreceptor complex system (Greenspan et al.CHEST 1999; 115:1581-1587; Söderpalme et al.PNEC 2004; 29:339-354). The aim of this study was to compare the efficacy of medroxyprogesterone acetate (MPA) and nasal CPAP on sleep-disordered breathing (SDB) in postmenopausal women. The study was a placebo-controlled double-blind parallel group trial carried out at the Sleep Research Unit of the University of Turku. We recruited 34 postmenopausal women (17 in placebo and 17 in MPA group) on regular CPAP therapy for 0.5 to 8 years. After baseline sleep study CPAP was discontinued after one week and replaced with the study medication (placebo or 30 mg of oral MPA administered at 9 and 11 PM) for two weeks, followed by a 3-week washout, still off CPAP. The next sleep studies were done at 3 weeks (after 2-week MPA) and at 6 weeks (after 3-week washout). After stopping CPAP therapy, the apnoea-hypopnoea index increased similarly on placebo or MPA after two-week therapy and after five-week follow-up. After two-week therapy, wake time increased and REM sleep decreased in both groups. In the MPA group, N1 sleep and SWS decreased. At three-week washout, movement time increased and SWS decreased in both groups. In the MPA group, N1 sleep increased compared to baseline. Our results failed to show evidence that high dose MPA alleviates sleep-disordered breathing or improves sleep IN POSTMENOPAUSAL WOMEN.

P81 - Severity of Obstructive Sleep Apnea Correlates With 25-Hydroxyvitamin-D Levels in Obese Asian Indian.

yogendra singh1, Randeep Guleria1, Naval Kishore Vikram1, Arvind Uniyal1

1_Pulmonary Medicine and Sleep Disorders, All India Institute of Medical Sciences, New Delhi, India

Purpose: Obstructive sleep apnea (OSA) and 25-hydroxyvitamin-D(25-OH-D) deficiency are disorders associated with obesity, inflammation and myopathies. Clinically identified myopathy may be associated with upper airways collapse which leads to OSA. We looked for correlation, if any, between serum 25-OH-D levels and severity of OSA.

Method: We screened 79 obese (BMI >25 Kg/m2) subjects with mean age were 46.6, who had suspected sleep disorders by Epworth sleepiness Scale (ESS). All subjects underwent a full-montage digital polysomnography. Demographic data and blood sample were collected. Serum level of 25-OH-D was evaluated. Subjects with Apnea Hypopnea Index (AHI) >5/h were diagnosed with OSA. Subject with 25-OH-D levelsdeficient.

Results: In 79 obese subjects, we found 33 with severe, 7 with moderate, 13 with mild OSA, 26 subjects did not have OSA. 25-OH-D deficiency was seen in 64.1% with OSA. In 22 subjects with severe OSA, 5 subjects with moderate OSA, 7 subjects with mild OSA and in 11 subjects without OSA, 25-OH-D was deficient. In 40 subjects with moderate to severe OSA, the mean serum 25-OH-D level was 12.94 ng/mL. In 39 subjects with mild OSA, the mean serum 25-OH-D levels were 17.9 ng/mL. Chi square linear trends between AHI ›15/h and statistically significant negative correlation with serum LDL (Spearman’s Rho=-0.205, P=0.042).
25-OH-D deficiency occurs. Subjects with moderate to severe OSA should be evaluated for the vitamin D deficiency & treatment as this may help in reducing inflammation, and decrease cardiovascular risk. A larger study is needed to confirm these findings.

### P82 - Oxidative stress biomarkers in patients with untreated obstructive sleep apnea syndrome
Michelangelo Marcuso1, Annalisa Lo Gerfo1, Daniele Orsucci1, Michelangelo Maestri2, Elena Iacopini2, Lucia Chico3, Elisa Di Coscio2, Luca Carnicelli3, Monica Fabbrini3, Gabriele Siciliano1, Enrica Bonanni1

1 Department of Clinical and Experimental Medicine, Division of Neurology, Pisa, Italy

**Background:** Besides daytime sleepiness and cognitive deficits, obstructive sleep apnea syndrome (OSAS) is an independent risk factor for cardio and cerebrovascular disease, possibly mediated by several mechanisms such as sympathetic activation and oxidative stress.

**Methods:** Aim of our study was to evaluate AOPP, FRAP and GSH levels in a cohort of OSAS patients, comparing the results with a group of healthy controls. Moreover we evaluated if these oxidative stress markers were related to the severity of OSAS by apnea-hypopnea index (AHI) and mean O2saturation (SatO2). We also present preliminary data on how those biomarkers may be influenced by 3-months CPAP therapy in an unselected subgroup of patients from the OSAS cohort.

**Results:** AOPP levels were greater in patients than in controls (P<0.0005), suggesting an increased protein oxidative damage, while FRAP and GSH were lower (P<0.0001). These data suggest impaired antioxidant defenses in OSAS. A significant correlation between AHI and FRAP levels (r= −0.410, P<0.01) suggests for patients with higher AHI (and, therefore, a more severe OSAS) a lower total antioxidant capability. Preliminary data on a subgroup of patients treated with CPAP shows a significantly increased FRAP values (P<0.005).

**Conclusions:** Our findings indicate that such oxidative stress markers may be useful to detect and monitor redox imbalance in OSAS. FRAP might be a new useful biomarker to monitor viva the oxidative response to CPAP therapy.

### P83 - Risk of obstructive sleep apnea syndrome in association with liver damage in non obese patients with nonalcoholic fatty liver disease
Eduardo Pulixi1, Eleonora Tobaldini2, Anna L. Fracanzani3, Silvia Fargion3, Nicola Montano3, Luca Valenti1

1 Fondazione IRCCS Ca Granda Ospedale Maggiore Policlinico U.O. Medicina Interna IB, University of Milan, Milan, Italy

2 Department of Biomedical and Clinical Sciences, Internal Medicine II, L.Sacco Hospital, University of Milan, Milan, Italy

A high prevalence of obstructive sleep apnea syndrome (OSAS) has been reported in obese patients with nonalcoholic fatty liver disease (NAFLD). A liver disease associated with obesity and metabolic syndrome. Intermitent hypoxiacoal be coaxofactor liver damage progression. Fewstudies evaluated the relationship between histological liver damage in NAFLD and OSAS in non-obese patients. To determine the risk of OSAS in patients with NAFLD without severe Ob and evaluate the association with liver damage. 85 patients with histologically proven NAFLD and body mass index (BMI) <35kg/m2 were enrolled. Risk of OSAS was assessed by BerinQuestionnaire (BQ) and Sleepiness Epworth Scale (ESS). Liver damage was evaluated according to Kleiner score. BQ was positive in 28 (35%), ESS in 11 (13%), and both in 9 (11%) of patients. In patients at high risk of OSAS (positivity of both BQ and ESS) we observed: a) higher prevalence of nonalcoholic steatohepatitis (NASH, the progressive form of NAFLD: 89% vs. 40%, p < 0.009), b) higher severity of NAFLD activity score, reflecting histological liver damage (p = 0.002), and c) higher hepatic fibrosis (p = 0.015). Prevalence of BQ and ESS positivity was observed to be higher in patients with than without NASH (21% vs. 2%, p = 0.009). BQ and ESS positivity was a risk factor of NASH independently of BMI and glucose levels (OR 7.46, p = 0.03).

A high proportion of NAFLD patients without severe obesity is at risk of OSAS. High risk of OSAS, detected by BQ and ESS positivity, is independently associated with NASH. These preliminary results suggest that OSA may be involved in the pathogenesis of liver disease progression in NAFLD patients without severe obesity.

### P84 - Obstructive sleep apnea is associated with the non-alcoholic fatty liver disease in obese Asian Indians
Surya Prakash Bhatt1, Randeep Guleria1

1 Department of Pulmonary Medicine and Sleep Disorders, All India Institute of Medical Sciences, New Delhi, India

**INTRODUCTION:** Obstructive sleep apnea (OSA) is prevalent in 7.5% in urban Asian Indians. OSA and non-alcoholic fatty liver disease (NAFLD) are both strongly associated with obesity.

**OBJECTIVE:** This study looks for any association between OSA and the NAFLD in obese Asian Indians.

**METHODS:** 55 obese patients [body mass index (BMI) ≥25 kg/ m²] underwent a sleep study followed by a liver ultrasound at the time of recruitment. The diagnosis of OSA was based on an apnea hypopnea index of ≥10. Clinical, anthropometric and biochemical parameters were also recorded. Patients who reported alcohol an intake equivalent to a dose ≥ 20 g/day for males and ≥ 10 g/day for females were excluded.

**RESULTS:** OSA and NAFLD (group 1) was present in 22 (21.8%), OSA and without NAFLD (group 2) in 16 (29.0%), NAFLD without OSA (group 3) in 20 (36.4) and 7 (12.7%) patients had no OSA and NAFLD (group 4). Multivariate analysis showed the values of systolic blood pressure (p = 0.001), diastolic blood pressure (p = 0.004), BMI (p = 0.005), waist circumference (p = 0.001), hip circumference (p = 0.005), fasting blood glucose (p = 0.04), serum triglycerides (p = 0.002), total cholesterol (p = 0.002), alanine transaminase (p = 0.05), gamma-glutamyl transferase (p = 0.001), % body fat (p = 0.02) and body fat (kg) (p = 0.01) were significantly higher in patients with OSA and NAFLD group as compared to OSA without NAFLD, NAFLD without OSA and those without OSA and NAFLD. Multivariable-logistic regression showed that OSA was positively associated with the NAFLD. OR: 95% CI: 2.42 (2.58-5.72), p < 0.0005.

**CONCLUSION:** OSA has a significant association with the NAFLD which is more than just due to obesity in Asian Indians in northern India.

### P85 - Additive effect of obstructive sleep apnea and smoking on endothelial dysfunction
Mei Sze Macy Lui1, Agnes Yuk Kwan Lai1, Jamie Lam1, David Chi Leung Lam1, Wai Kuen Ho1, Mary Sau Man Ip1

1 Medicine, Queen Mary Hospital, The University of Hong Kong, Hong Kong, Hong Kong

2 Otorhinolaryngology, Queen Mary Hospital, The University of Hong Kong, Hong Kong, Hong Kong

**Background:** Endothelial dysfunction is associated with obstructive sleep apnea (OSA) or smoking exposure. However, the interactions between smoking and OSA have not been explored.

**Method:** Adult men without medical illnesses or medications were recruited. Endothelial dysfunction was assessed using peripheral arterial tonometry. PAT ratio was expressed as the natural logarithm of the ratio of post-definition to baseline pulse amplitude in the hyperemic finger divided by the same ratio in the control finger. Polysomnography defined the presence or absence of OSA with apnea hypopnea index equal to or more than 15, or OSA.

They are classified as ever-smoker, ES, or never-smoker, NS.

**Results:** 114 subjects, mean age 44 years were included. 47 of them -41.2%- were ever-smokers. 75 -65.7%- had AHI≥5. By partial correlation with adjustment for age and BMI, PAT ratio was correlated negatively with ODI (r = −0.208, p = 0.028), duration of oxygen saturation <90% (r = −0.221, p = 0.020), and positively with minimal oxygen saturation (r = 0.237, p = 0.012). ES OSA subjects had significantly lower mean PAT ratio than NS OSA group, NS NOA group, and NS NOA group (p = 0.011).

**Conclusion:** Both intermittent hypoxia and smoking contribute independently to endothelial dysfunction. The concurrent presence of OSA and smoking exposure markedly increase the risk of endothelial dysfunction.

### P86 - Wake-up stroke and TIA due to paradoxical embolism during long obstructive sleep apnea: a cross-sectional study
Paola Proserpio1, Alfonso Ciccone1, Daria Valeria Roccatagliata1

1 Fondazione IRCCS Ca Granda Ospedale Maggiore Policlinico U.O. Medicina Interna IB, University of Milan, Milan, Italy

**Background:** Obstructive sleep apnea (OSA) is an independent risk factor for cardio and cerebrovascular disease, possibly mediated by several mechanisms such as sympathetic activation and oxidative stress.

**Methods:** Aim of our study was to evaluate AOPP, FRAP and GSH levels in a cohort of OSAS patients, comparing the results with a group of healthy controls. Moreover we evaluated if these oxidative stress markers were related to the severity of OSAS by apnea-hypopnea index (AHI) and mean O2saturation (SatO2). We also present preliminary data on how those biomarkers may be influenced by 3-months CPAP therapy in an unselected subgroup of patients from the OSAS cohort.

**Results:** AOPP levels were greater in patients than in controls (P<0.0005), suggesting an increased protein oxidative damage, while FRAP and GSH were lower (P<0.0001). These data suggest impaired antioxidant defenses in OSAS. A significant correlation between AHI and FRAP levels (r= −0.410, P<0.01) suggests for patients with higher AHI (and, therefore, a more severe OSAS) a lower total antioxidant capability. Preliminary data on a subgroup of patients treated with CPAP shows a significantly increased FRAP values (P<0.005).

**Conclusions:** Our findings indicate that such oxidative stress markers may be useful to detect and monitor redox imbalance in OSAS. FRAP might be a new useful biomarker to monitor viva the oxidative response to CPAP therapy.
Michele Nichelatti1, Gian Luigi Gigi2, Gianfranco Parati2, Carolina Lombardi3, Fabio Piza1, Fabio Cirignotta1, Ignazio Michele Santilli2, Vincenzo Silani2, Roberto Sterzi1, Lino Nobili7, D.A.R.L.A study Investigators
1 Department of Neuroscience, Niguarda Hospital, Milan, Italy
2 Neurological Clinic, University, Udine, Italy
3 Italian Auxologic Institute, Milan, Italy

BACKGROUND Long obstructive sleep apneas (LOSAs) can cause brain ischaemia through paradoxical embolism since they can lead to right to left shunting (RLSh) but this has never been assessed as a risk factor for stroke. We investigated whether the combination of LOSA and RLSh is associated with ischaemic stroke or transient ischaemic attack (TIA) on waking (wake-up stroke).

METHODS We prospectively considered patients aged over 18 years, admitted to 13 stroke units for acute ischaemic stroke or TIA. Patients had to be able to give consent, to specify whether the event occurred on waking, and to cooperate sufficiently to undergo contrast transcranial Doppler examination and cardiorespiratory sleep study within 10 days of the onset of symptoms. Single LOSA events, lasting 20 s or more, were considered a possible harbinger of RLSh.

RESULTS Between April 2008 and March 2010, 335 patients (109 women; 61 TIA, mean age 64 years) were enrolled; 202 (60%) had at least one LOSA and 116 (35%) a RLSh; 69 (21%) had both. There were significantly more wake-up strokes/TIAs in subjects with RLSh plus LOSA than those without this association (27/69 vs 70/266; OR 1.91, controlled for age, sex, hypertension, diabetes, atrial fibrillation, antithrombotic therapy; 95% CI 1.08 to 3.38; p=0.03). No other risk factor was associated with an increase in the incidence of events on waking.

CONCLUSIONS The study suggests that the combination of LOSA and RLSh could be a new major, potentially treatable risk factor for cerebrovascular ischaemic events.

P88 - Predicting or excluding sleep disordered breathing in outpatients with suspected OSA
Douglas Cowan1, Duncan MacFarlane1, Laura Dunbar2, Heather Ambler1, Stephen Banham3, Christopher Carlin1, Eric Livingston4
1 North Glasgow Sleep Service, Gartnavel General Hospital, Glasgow, United Kingdom
2 School of Medicine, University of Glasgow, Glasgow, United Kingdom
3 North Glasgow Sleep Service, Glasgow Royal Infirmary, Glasgow, United Kingdom

Introduction: Referral rates to sleep clinics are increasing and predictors of sleep disordered breathing (SDB) are required to allow prioritisation of investigations.

Aims and Methods: Consecutive patients referred with possible OSA were prospectively evaluated at the time of attendance for pre-clinic home 5 channel sleep study. Variables obtained were compared against 2 selected cutpoints of apnoea hypopnoea index (AHI) <-5 and >15 – to determine their utility at predicting or excluding significant SDB. ROC curve analysis and Fisher’s exact test were used as appropriate.

Results: 99 subjects had adequate sleep study data; AHI <5 in 22 and >15 in 43. Epworth and Berlin questionnaire scores were not significantly associated with either cutpoint. AHI of <5 (“rule out” measurement) was significantly associated with female sex and absence of witnessed apnoeas (p<0.03). AHI of >15 (“rule in” measurement) was associated with male sex, witnessed apnoeas and loud snoring (p<0.02). ROC curves revealed AUCs >0.7 (p<0.05) for neck circumference (NC) and STOP-BANG questionnaire (SBQ) score for both AHI cutpoints. NC of ≥14 inches and SBQ ≥3 excluded sleep disordered breathing (AHI <5) with sensitivity of 93% and 90% respectively. NC of ≥19 inches or SBQ ≥7 predicted significant sleep disordered breathing (AHI >15) with specificity of 95% and 90% respectively.

Conclusion: We found notable associations between pre-clinic sleep study results and patient sex, sleep symptoms, neck circumference and SBQ score. The utility of a composite predictive score based on these will be explored.

P89 - Sleep quality, psychological distress and dyspnea in palliative care
Marie Carmen Valenza1, Irene Cabrera1, Gerald Valenza1, Irene Torres1, Maria Romero Morales1
1 Department of physiotherapy, University of Granada, Granada, Spain

Introduction and background
Sleep disorders may be primary or a secondary symptom of the advancing diseases process. Multiple interventions have been successfully used for the management of sleep disturbances and palliative medicine. Yet, despite these measures, many patients do not seek medical attention for sleep disturbances.

Aims and objectives
The aim of this study was to assess the relationship between sleep quality, pain, psychological distress, dyspnea and Edmonton symptoms assessment scale in advanced cancer patients.

Methods
Participants were 35 advanced cancer patients referred to a palliative care unit for control of pain and other symptoms. A variety of assessment tools were used, Pittsburgh Sleep Quality Index (PSQI), Borg Scale, Hospitализed Anxiety and Depression scale (HAD), Epworth sleepiness and Edmonton symptoms assessment scales.

Results
Using the Pittsburgh Sleep Quality Index (PSQI) 97.1% of patients were ‘poor sleepers’. Statistically significant associations were found between PSQI and psychological distress (HAD) (r=0.522; P < 0.001) and dyspnea (Borg scale) (r=0.527; P < 0.001). No association were found with sleepiness (Epworth scale) (r=0.252; p=0.144).

Conclusions
Dyspnea, Anxiety and Depression seemed to be the strongest predictors of sleep quality in a sample of advanced cancer patients referred for palliative care.

P90 - Predictive Value of Clinical Features for Obstructive Sleep Apnea Syndrome
Ozen K. Basoglu1, Mustafa Sahin2, Mehmet Sezai Tasbakan1, Cem Bilgen2, Rasit Midilli3
1 Department of Chest Diseases, Ege University School of Medicine,
ABSTRACTS

Izmir, Turkey
2 Department of Otorhinolaryngology, Ege University School of Medicine, Izmir, Turkey

The waiting lists of sleep clinics are quite long and it is difficult to perform polysomnography to all patients with obstructive sleep apnea syndrome (OSAS) symptoms. The present study aimed to evaluate the predictive values of symptoms, anthropometric, laboratory and physical examination findings in order to determine a formula to define patients at high risk for OSAS.

We retrospectively evaluated 390 patients (mean age 50.1±11.1 yrs, 101 men) admitted with OSAS symptoms to the sleep laboratory of a university hospital. Demographic and anthropometric data, pulmonary function tests, Epworth Sleepiness Scale, arterial blood gas analysis were evaluated. Ear, nose, and throat examination including endoscopy of the upper airway, and polysomnography were performed. Multivariate linear and logistic regression analysis were used to identify independent predictors of apnea-hypopnea index (AHI) and derive a prediction formula.

When the correlations between AHI and other variables were examined, it was found that body mass index (BMI) (p=0.034), waist circumference (WC) (p=0.024), neck circumference (NC) (p<0.0001), oxygen saturation (SaO2) (p=0.0001) and tonsil size (TS) (p=0.024) were significant predictors for AHI. The final prediction formula was AHI=prad=(0.797xBMI)+(2.286xWC)+(1.272xSaO2)+(5.114xTS)+(0.314xWC). The probability that this equation predicts AHI correctly was 68.2%.

In conclusion, it is demonstrated in the present study that a new prediction formula based on body mass index, circumferences of the waist and neck, oxygen saturation, and tonsil size is useful in calculating AHI of the patients admitted to sleep clinics and in prioritizing patients for polysomnography.

P91 - Sleep Apnea in Kidney Transplant Patients: Clinical Correlates and Comparison with Pretransplant Patients
Rasha Daabis1, Iman El Gohary2
1 Chest Diseases, Faculty of Medicine, Alexandria University, Egypt
2 Internal Medicine (Nephrology Unit), Faculty of Medicine, Alexandria University, Egypt

Sleep disordered breathing (SDB) is a prevalent, but forgotten, cardiovascular (CV) risk factor in end-stage renal disease patients. Studies of SDB in renal transplant patients are few with mixed results. Objectives: to assess the prevalence and clinical correlates of sleep apnea (SA) in patients who received a kidney transplant, and to compare the prevalence of SA between waiting list and transplant patients. Subjects and methods: our study included 40 clinically stable renal transplant patients and 15 patients awaiting transplantation. Patients with morbid obesity, diabetes, pulmonary disease or symptomatic heart failure were excluded from the study. All patients underwent overnight cardiopulmonary sleep studies, anthropometric, demographic and clinical data were also collected. Results: we found that the prevalence of SA was high in both the transplant (Tx) and the waiting list (WL) groups (38% vs 47%). The severity of SA was the same in both groups (AHI=9.6 vs 16.2). Moreover, we found a significant association between impaired renal function and the AHI in Tx patients. Also, SA was associated with difficult-to-treat hypertension in Tx patients as we found a significant association between the AHI and the systolic blood pressure as well as the number of prescribed antihypertensive drugs. Conclusion: SA is as highly prevalent in Tx as in WL patients. Moreover, this high prevalence in the transplant patients could be a consequence of declining renal function. In addition, we propose that sleep apnea is a new risk factor for hypertension and cardiovascular events in kidney-transplanted patients.

P92 - Predictors of Anxiety and Depression in Patients with Obstructive Sleep Apnea
Rasha Daabis1, Heba Gharraf4
1 Chest Diseases, Faculty of Medicine, Alexandria University, Egypt

Anxiety and depression have been frequently associated with obstructive sleep apneas (OSA). We aimed to assess anxious and depressive symptoms in patients with OSA, and evaluate their association with potentially related variables. Methods: This study included 72 newly diagnosed patients with OSA and 30 controls. Patients underwent an overnight polysomnography and were assessed using the Epworth Sleepiness Scale (ESS) for excessive daytime sleepiness (EDS), Hospital Anxiety and Depression Scale (HADS) for anxious and depressive symptoms, and Maugeri Obstructive Sleep Apnea Syndrome (MOSAS) questionnaire for quality of life. Results: 72 OSA patients (60 men &12 women), whose mean age was 49 yr and mean Apnea and Hypopnea Index (AHI) was 64, were compared with 30 controls according to their HADS. The HADS for anxiety and depression was significantly higher in OSA patients than in the controls. The prevalence of symptoms of anxiety in patients with OSA was 33% while that of depression was 51%. Linear regression analysis revealed that daytime sleepiness and reduced quality of life were strong predictors of depressive symptoms in OSA patients, while reduced quality of life was the only predictor of anxious symptoms. No significant relations were found between severity of psychiatric symptoms and AHI or nocturnal hypoxemia in OSA patients. Conclusion: Psychiatric symptoms are highly prevalent in patients with moderate to severe untreated obstructive sleep apnea. Moreover, the reduced quality of life is a strong predictor of psychiatric symptoms in OSA patients. Therefore, patients with OSA should be routinely screened for psychiatric symptoms to improve their quality of life and optimize diagnosis and therapy.

P93 - Prevalence of Sleep Disordered Breathing in Thai Primary-School Children
Paskorn Sritipsukho1, Araya Satdhabudha1, Siraporn Chana1, Orapan Poachanukoon1
1 Department of Pediatrics, Thammasat University, Pathum Thani, Thailand

Background: Sleep disordered breathing (SDB) is increasingly recognized as a cause of morbidity in school children. Aims and objectives: The author aimed to investigate the prevalence of SBD in Thai primary-school children. Methods: A cross-sectional study was conducted in 3,240 pupils, aged 6-10 years, in 6 primary schools in Bangkok and Pathum-Thani province (central Thailand). Symptomatic children were identified by parental reports of the screening questionnaire. Habitual snoring children were randomly invited to undergo polysomnography (PSG) for diagnosis of obstructive sleep apnea syndrome (OSAS). Results: A total of 2,392 questionnaires (response rate of 89%) were completed for analysis. The prevalence of habitual snoring, witnessed apnea, and excessive daytime sleepiness were 4.3% (95% confidence interval: 3.6%-5.1%), 1.2% (95% confidence interval: 0.8%-1.8%), and 8.7% (95% confidence interval: 7.5%-9.9%) respectively. Prevalence of habitual snoring was significantly higher in boys (5.6%, p=0.003), in obese children (10.7%, p=0.001), and in allergic rhinitis children (7.7%, p=0.001). The prevalence of OSAS revealed by PSG was 0.7% (95% confidence interval: 0.2%-1.8%) in this population. Conclusion: SDB is prevalent in Thai primary-school children, especially among boys and children with obesity and allergic rhinitis.

P94 - Automatic Sleep-Wake Classification Using Two EEG Electrodes in Sleep Apnoea Patients
Jussi Virkkala1, Jussi Toppila2, Paula Massilta3, Adel Bachour1
1 Sleep Laboratory, Finnish Institute of Occupational Health, Helsinki, Finland
2 Dept. of Clin. Neurophysiology, Medical Imaging Center, Helsinki University Hospital, Helsinki, Finland
3 Sleep Unit, Pulmonary Department, Helsinki University Hospital, Helsinki, Finland

Introduction: Recently we have developed a simple method that uses two EEG electrodes for the automatic scoring of sleep-wake in normal subjects. In this study we investigated the usefulness of this method on patients referred for a suspicion of sleep apnoea. Methods: A total of 285 patients underwent a polysomnography. We applied the AASM 2007 scoring rules. Eighteen patients were excluded as the quality of their EEG traces was low (automatic sleep-wake classification using two EEG electrodes). Results: We found that the prevalence of SA was high in both the transplant (Tx) and the waiting list (WL) groups (38% vs 47%). The severity of SA was the same in both groups (AHI=9.6 vs 16.2). Moreover, we found a significant association between impaired renal function and the AHI in Tx patients. Also, SA was associated with difficult-to-treat hypertension in Tx patients as we found a significant association between the AHI and the systolic blood pressure as well as the number of prescribed antihypertensive drugs. Conclusion: SA is as highly prevalent in Tx as in WL patients. Moreover, this high prevalence in the transplant patients could be a consequence of declining renal function. In addition, we propose that sleep apnea is a new risk factor for hypertension and cardiovascular events in kidney-transplanted patients.

P95 - Aims and Objectives
Jussi Virkkala1, Jussi Toppila2, Paula Massilta3, Adel Bachour1
1 Sleep Laboratory, Finnish Institute of Occupational Health, Helsinki, Finland
2 Dept. of Clin. Neurophysiology, Medical Imaging Center, Helsinki University Hospital, Helsinki, Finland
3 Sleep Unit, Pulmonary Department, Helsinki University Hospital, Helsinki, Finland

Introduction: Recently we have developed a simple method that uses two EEG electrodes for the automatic scoring of sleep-wake in normal subjects. In this study we investigated the usefulness of this method on patients referred for a suspicion of sleep apnoea. Methods: A total of 285 patients underwent a polysomnography. We applied the AASM 2007 scoring rules. Eighteen patients were excluded as the quality of their EEG traces was low (automatic sleep-wake classification using two EEG electrodes). Results: We found that the prevalence of SA was high in both the transplant (Tx) and the waiting list (WL) groups (38% vs 47%). The severity of SA was the same in both groups (AHI=9.6 vs 16.2). Moreover, we found a significant association between impaired renal function and the AHI in Tx patients. Also, SA was associated with difficult-to-treat hypertension in Tx patients as we found a significant association between the AHI and the systolic blood pressure as well as the number of prescribed antihypertensive drugs. Conclusion: SA is as highly prevalent in Tx as in WL patients. Moreover, this high prevalence in the transplant patients could be a consequence of declining renal function. In addition, we propose that sleep apnea is a new risk factor for hypertension and cardiovascular events in kidney-transplanted patients.
sleepiness and risk of OSAS by BQ was lower than in similar studies, didn’t have ESS >10 or accidents. STOP-BANG identified high risk (x2= 10.235, p=0.001) and STOP-BANG (x2= 6.255, p=0.012), but BANG. Drivers reporting drowsiness had higher risk of OSAS by BQ and 47.9% by STOP-BANG. High risk of OSAS had 14.1% by BQ and 47.9% by STOP-BANG.

P96 - Sleepiness and risk of obstructive sleep apnoea syndrome in ambulance drivers

Martin Povečič, Aleksandar Milovanovec, Dragan Babic
1-Serbian Institute for Occupational Health, Faculty of Medicine, University of Belgrade, Belgrade, Serbia
2-Institute of Biomedical Statistics and Informatics, Faculty of Medicine, University of Belgrade, Belgrade, Serbia

Introduction: Prevalence of excessive sleepiness and obstructive sleep apnea syndrome (OSAS) in ambulance drivers has rarely been reported. Aim: Identify the relation of sleepiness and risk of OSAS with self-reported drowsy driving and traffic accidents in ambulance drivers. Methods: A questionnaire was distributed to 120 ambulance drivers in Belgrade, Serbia. 58% answered on demographics, work, sleep, sleepiness or falling asleep while driving and traffic accidents in the last year. Epworth sleepiness scale was used for excessive sleepiness (ESS-10). Berlin (BQ) and STOP-BANG questionnaire for the risk of OSAS. Results: All drivers were male, mean age 40 years, 80.3% overweight (body mass index >25). Mean driving experience was 18 years, 40 hours per week, in 4-day shifts. 28% slept less than 6 hours on workday. Snoring had 36 drivers. Sleepiness while driving had 35% and 4% fell asleep while driving;9.9% had traffic accidents. Mean ESS score was 4.45, and ESS >10 had 5.6% of drivers. High risk of OSAS had 14.1% by BQ and 47.9% by STOP-BANG. Drivers reporting drowsiness had higher risk of OSAS by BQ (x2= 10.235, p=0.001) and STOP-BANG (x2= 6.255, p=0.012), but didn’t have ESS-10 or accidents. STOP-BANG identified high risk of OSAS in 68% of sleepy drivers, 71% drivers with accidents, and 100% that fell asleep driving.

Conclusion: Prevalence of excessive sleepiness and risk of OSAS by BQ was lower than in similar studies, not in line with drowsy driving, and with difference in risk of OSAS using Berlin vs. STOP-BANG questionnaire. Further investigation is needed to establish usefulness of questionnaires as screening tools in ambulance drivers.

P97 - Is a questionnaire a useful screening method for sleep apnea in stroke?

Justine Aaronson, Janneke Nachtgeaaij, Tijs van Beezij, Greet Erny, Coen van Bennekem
1-Research & Development, Heliomare, Wijk aan Zee, Netherlands
2-Psychology, Universiteit of Amsterdam, Amsterdam, Netherlands

Introduction: Sleep apnea syndrome (SAS) is a highly prevalent sleep disorder in stroke patients and is associated with decreased functional recovery, increased risk of recurrent stroke and mortality. Screening for SAS in stroke rehabilitation settings is limited, despite the high prevalence. Standard self-report symptom questionnaires for SAS, such as the Berlin Questionnaire, are found to be of limited diagnostic value. Objective: This study evaluated the predictive value of a SAS questionnaire combining self-reported symptoms, socio-demographic and clinical variables in stroke patients. Methods: 450 stroke patients were assessed with the SAS questionnaire and underwent pulse-oximetry to determine their oxygen desaturation index (ODI). Patients with an ODI ≥ 15 were classified as having a high probability of SAS. The SAS questionnaire included socio-demographic (e.g. age, gender and smoking), clinical variables (e.g. BMI, stroke type and blood pressure) and self-reported symptoms (snoring, apneas, morning headaches, daytime sleepiness, fatigue, concentration loss, irritability and mood changes). With univariate logistic regression analysis, the associations between potential questionnaire items and ODI ≥15 were examined. Significant variables (p-value ≤ 0.20) were selected for a backward multivariate logistic regression. Results: A high probability of SAS was insufficiently predicted by self-report symptoms. Socio-demographic and clinical variables improved the diagnostic value of the questionnaire. Conclusion: Socio-demographic and clinical variables should be incorporated in SAS self-report symptom questionnaires to improve SAS screening in stroke rehabilitation.
P99 - Comparing outcomes on an office based advanced driving simulator (MiniSim) between Obstructive Sleep Apnoea Syndrome (OSAS) patients and controls

Akshay Dwarakanath1, Dipansu Ghosh1, Samantha Jamson2, Mark Elliott1
1 Department of Respiratory Medicine, St. James' University Hospital, Leeds, United Kingdom
2 Department of Transport Studies, University of Leeds, Leeds, United Kingdom

Introduction- Untreated OSAS is associated with increased likelihood of being involved in a road traffic accident. We have previously shown that a subset of OSAS patients who fail on the MiniSim can be identified with a high degree of accuracy. (Ghosh et al, Thorax 2012) We now explore this further; do controls perform differently on the MiniSim compared to patients?

Method- 133 (52+10 yrs, ESS 12+6, ODI 31+24) untreated OSAS patients and 89 controls (49+15 yrs, ESS 3+2) were included. All performed a 90km motorway driving simulation. Outcomes pass or fail, based on preset criteria, were compared between patients and controls.

Results- Patients are more likely to fail on the Minisim than controls (OR: 2.247, 95% CI: 1.065 - 4.738), 13/32 failed patients struggled to complete the simulator task and there were other differences in the way patients & controls failed. (Table 1)

Conclusion- Controls perform better on the MiniSim than OSAS patients. The differences in the way these groups fail suggest that different factors are responsible; this warrants further investigation.

Table 1: Comparing simulator outcomes of patients & controls

<table>
<thead>
<tr>
<th>Simulator Outcomes</th>
<th>Patients (n=133)</th>
<th>Controls (n=89)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failed on the MiniSim</td>
<td>32 (24%)</td>
<td>11 (12%)</td>
</tr>
<tr>
<td>Chi Square p value and OR</td>
<td>0.03 and 2.247</td>
<td></td>
</tr>
<tr>
<td>Criteria for fail on the driving simulator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unable to complete</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>&lt;95% time in middle lane</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Unprovoked crash</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Veer event crash</td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

P100 - Hypertension and obstructive sleep apnea: is the Berlin Questionnaire a valid screening tool?

Elisabetta Lis1, Carolina Lombardi1, Andrea Faini2, Laura Maria Lonati1, Sabrina Salerno2, Paola Mattaliano2, Francesca Gregorini3, Valentina Giul1, Andrea Giul1, Gianfranco Parati1
1 University of Milan-Bicocca, Milan, Italy, University of Milan-Bicocca, Milan, Italy
2 Sleep Disorders Center, Dept. Cardiology, Ospedale San Luca, Istituto Auxologico Italiano IRCCS, Milano, Italy
3 Dept. Cardiology, Ospedale San Luca, Istituto Auxologico Italiano IRCCS, Milan, Italy

Introduction. Obstructive Sleep Apnea (OSA) has been associated with increased cardiovascular risk. Berlin questionnaire (BQ) has been validated in quantifying the risk of OSA in the general population. Nevertheless the BQ is already used also in hypertensive patients, its validity in such population has never been formally tested. Aim of our study was to assess sensitivity and specificity of the BQ to identify OSA's risk in a group of unselected hypertensive patients as compared to PSG. Methods. 207 consecutive hypertensive outpatients having filled the BQ were included. Out of them 110 patients with technically valid PSG and properly filled BQ were considered for analysis.

Results. According to BQ score, a high risk of OSA was suggested in 46% of the hypertensives. PSG diagnosed OSA in 54% of the subjects considering an apnea-hypopnea index (AHI)≥5, in 42% using an AHI≥10. BQ showed a lower sensitivity and specificity (53% and 63% respectively) compared to the general population (86% and 77%). In patients with AHI≥10, sensitivity became 57% and specificity 60%.

Finally if we consider as positive the third category of BQ only when BMI is >30 kg/m2, applying an AHI≥5, sensitivity decreased to 26%, but specificity increased to 82%. Conclusions. Our data confirm the high prevalence of OSA in patients with arterial hypertension, but we suggest that the BQ is not an adequate screening tool for OSA in this population. Either a specific BQ version or scoring criteria applicable to hypertensive subjects pressure are thus needed for a more reliable screening of OSA in this population.

P101 - Reported incidence of nodding whilst driving and its impact on simulator outcomes in Obstructive Sleep Apnoea Syndrome (OSAS) patients and controls

Akshay Dwarakanath1, Dipansu Ghosh1, Samantha Jamson2, Mark Elliott1
1 Department of Respiratory Medicine, St. James University Hospital, Leeds, United Kingdom
2 Institute of transport studies, University of Leeds, Leeds, United Kingdom

Introduction- Patients with OSAS are at increased risk of having road traffic accidents. Nodding at the wheel due to tiredness can potentially be fatal. We hypothesised that untreated patients would report more nodding events than controls and would perform worse on an advanced driving simulator (MiniSim).

Method- 118 (51+9 yrs, ESS 12+5, ODI 30+22) untreated OSAS patients and 69 controls (49+15 yrs, ESS 3+2) were included in the study. They completed a questionnaire about their driving behaviour. All undertook a 90km simulated driving test. The simulator outcomes (pass or fail) were based on preset criteria and were compared between two groups; admitting & not admitting to nodding while driving.

Results- Significantly more patients admitted to nodding whilst driving (Table-1) and had more failures on the MiniSim (Table-2) compared to controls.

Conclusion- History of nodding whilst driving might prove to be good predictor of simulator outcome in OSAS. However this was not true for controls indicating different factors contribute to failure on MiniSim in case of patients & controls.

Table 1: Comparing reported incidence of nodding while driving in patients and controls

<table>
<thead>
<tr>
<th>Admitting to nodding</th>
<th>Patients (n=118)</th>
<th>Controls (n=69)</th>
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<tr>
<td>Chi Square p</td>
<td>0.0003</td>
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</table>

Table 2: Comparing simulator outcomes of patients & controls with history of nodding while driving

<table>
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<tr>
<th>Failed the simulator test</th>
<th>Patients (n=42)</th>
<th>Controls (n=8)</th>
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</thead>
<tbody>
<tr>
<td>Chi Square p</td>
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</tr>
</tbody>
</table>

P102 - The clinical and polysomnographic differences between obese and nonobese patients with obstructive sleep apnea

Banu Gulbay1, Turan Acican1, Fatma Ciftci1, Merda Erdemir Isik1, Zeynep Pinar Onen1
1 Ankara University School of Medicine, Department of Pulmonary Diseases, Ankara, Turkey

Aim: Obesity has been considered to be one of the classical risk factor for obstructive sleep apnea (OSA). We aimed to compare the clinical and polysomnographic differences among obese and nonobese OSA patients.

Material and method: The polysomnographic data of 157 consecutive patients that underwent a sleep study were analyzed.
Results: Of 99 patients with OSA, 36 (36.4%) were nonobese and 63 (63.6%) were obese. There were no differences in the symptoms related to OSA between two groups (p>0.05). In addition, habitual long sleep duration (2.41; 1.23-4.72) was a risk factor for central obesity. The prevalence of obesity was higher for women increasing or decreasing their sleep duration compared with normal sleepers. After controlling for confounders, increased sleep duration remained a risk factor of general (1.67; 1.28-2.19) and central obesity (1.37; 1.01-1.84). When age-dividing the women both habitual short and long sleep duration were risk factors in the younger age group (age at baseline below40 years) whereas in women above age 40 years decreased sleep duration was a risk factor for general obesity after adjustments.

Conclusion: Apart from habitual short or long sleep duration also increased sleep duration was a risk factor for obesity in women, especially in younger women.

P103 - Obstructive Sleep Apnea in Premenopausal and Postmenopausal Women
Ana Tavares e Castro1, Maria João Matos1, Sara Freitas1
1 - Pulmonology, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal

Rationale: Menopause is thought to play a key role in obstructive sleep apnea (OSA). However, there is conflicting data on this matter and differences between pre and postmenopausal OSA have not been fully explained.

Objectives: To evaluate the effect of menopause on OSA's characteristics and severity.

Methods: All women diagnosed with OSA by nocturnal polysomnography at the Sleep Laboratory of Coimbra University Hospital Centre and treated with CPAP in the last 3 years were retrospectively accessed. Menopausal status and other gynaecological information were obtained by telephonic questionnaire. Other clinical data, including Body Mass Index (BMI), sleep-related complaints, co-morbidities and medication were also assessed.

Results: Complete data was obtained from 120 women with OSA (29 pre and 91 postmenopausal) from a total of 172 clinical files reviewed. There were no baseline demographic differences between the two groups regarding age (median±IQR, 58±12.0 years vs 57±11.0 years), BMI (32.9±8.9 kg/m2 vs 33.3±9.6 kg/m2) and sleep-related complaints. Charlson Comorbidity Index was higher in the postmenopausal group namely for Arterial Hypertension and Diabetes (OR 3.88 and 4.84). IAH and RDI had no statistical significance difference in both groups (p=0.214 and p=0.949).

Minimum oxygen saturation was more severe in the postmenopausal women (p=0.048) although desaturation index was similar.

Conclusions: In this study, the degree of OSA was unenlivened both in premenopausal and postmenopausal groups suggesting that menopause is a scarce explanation for the global difference in prevalence and severity of the disease in women.

P104 - Sleep duration, change of sleep duration and development of obesity in women – a 10 year prospective study
Jenny Theorell-Hagloew1, Christian Berne2, Christer Janson1, Eva Lindberg1
1 - Dept Med Sci, Resp Med Allergol, Uppsala University, Uppsala, Sweden
2 - Dept Med Sci, Internal Med, Uppsala University, Uppsala, Sweden

Background: Obstructive sleep apnea syndrome is highly related with obesity. One potential cause of obesity may be short sleep duration or change of sleep duration.

Aim: The aim was to assess how sleep duration and change of sleep duration over time was related to obesity over a 10-year period, in a population-based sample of women.

Methods: A total of 5,002 non-pregnant women (response rate 80 %; 330 years, answered a 10-year follow-up questionnaire. The questionnaire included questions on sleep duration, weight, height, waist circumference, snoring and life style factors. Logistic regression analysis was performed to analyze independent associations between sleep duration and measures of obesity.

Results: Both habitual short (<6h) (OR=1.50; 95%CI 1.03-2.19) and long sleep duration (>9h) (2.08; 1.11-3.94) were risk factors for general obesity after controlling for confounders. In addition, habitual long sleep duration (2.41; 1.23-4.72) was a risk factor for central obesity. The prevalence of obesity was higher for women increasing or decreasing their sleep duration compared with normal sleepers. After controlling for confounders, increased sleep duration remained a risk factor of general (1.67; 1.28-2.19) and central obesity (1.37; 1.01-1.84). When age-dividing the women both habitual short and long sleep duration were risk factors in the younger age group (age at baseline below40 years) whereas in women above age 40 years decreased sleep duration was a risk factor for general obesity after adjustments.

Conclusion: Apart from habitual short or long sleep duration also increased sleep duration was a risk factor for obesity in women, especially in younger women.
### Chair Index
(Name, Session number)

<table>
<thead>
<tr>
<th>Name</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANDREAS S.</td>
<td>4, 18, 24, 36</td>
</tr>
<tr>
<td>BARBE ILLA F.</td>
<td>10, 16</td>
</tr>
<tr>
<td>BASSETTI C.</td>
<td>2, 7, 21, 25, 27, 31</td>
</tr>
<tr>
<td>BONSIGNORE M.R.</td>
<td>5, 23, 30</td>
</tr>
<tr>
<td>BOREL A.L.</td>
<td>34</td>
</tr>
<tr>
<td>DE BACKER W.</td>
<td>25</td>
</tr>
<tr>
<td>ESCOURROU P.</td>
<td>14</td>
</tr>
<tr>
<td>FETZE I.</td>
<td>11, 29, 39</td>
</tr>
<tr>
<td>GARCIA-BORREGUERO D.</td>
<td>31</td>
</tr>
<tr>
<td>GROTE L.</td>
<td>29</td>
</tr>
<tr>
<td>HEDNER J.A.</td>
<td>5, 23, 27, 39</td>
</tr>
<tr>
<td>KADITIS A.</td>
<td>9, 28</td>
</tr>
<tr>
<td>KHATAMI R.</td>
<td>33</td>
</tr>
<tr>
<td>LEVY P.</td>
<td>40, 42</td>
</tr>
<tr>
<td>MARIN J.</td>
<td>24</td>
</tr>
<tr>
<td>MCNICHOLAS W.</td>
<td>2, 17, 19, 42</td>
</tr>
<tr>
<td>MONTSERRAT J.</td>
<td>38</td>
</tr>
<tr>
<td>OLDELBURG O.</td>
<td>19</td>
</tr>
<tr>
<td>PARATI G.</td>
<td>17</td>
</tr>
<tr>
<td>PARTINEN M.</td>
<td>41</td>
</tr>
<tr>
<td>PEIPIN J.L.</td>
<td>4, 16</td>
</tr>
<tr>
<td>PEVERNAGIE D.</td>
<td>7</td>
</tr>
<tr>
<td>POLLMAECHER T.</td>
<td>13, 33</td>
</tr>
<tr>
<td>RANDERATH W.</td>
<td>14, 41</td>
</tr>
<tr>
<td>RYAN S.</td>
<td>40</td>
</tr>
<tr>
<td>SASA A.</td>
<td>13</td>
</tr>
<tr>
<td>SIMONDS A.</td>
<td>11, 28</td>
</tr>
<tr>
<td>TAFTI M.</td>
<td>3</td>
</tr>
<tr>
<td>TARNOW L.</td>
<td>34</td>
</tr>
<tr>
<td>VERBRAECKEN J.</td>
<td>10, 18</td>
</tr>
</tbody>
</table>

### Speaker Index
(Name, Presentation number)

<table>
<thead>
<tr>
<th>Name</th>
<th>Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACHER J.</td>
<td>21</td>
</tr>
<tr>
<td>ANDREAS S.</td>
<td>11, 15</td>
</tr>
<tr>
<td>ANTtalainen U.</td>
<td>30</td>
</tr>
<tr>
<td>ARZT M.</td>
<td>27</td>
</tr>
<tr>
<td>BARBE ILLA F.</td>
<td>5, 34</td>
</tr>
<tr>
<td>BASSETTI C.</td>
<td>1, 18, 28, 42, 51, 64</td>
</tr>
<tr>
<td>BONSIGNORE M.R.</td>
<td>62, 73</td>
</tr>
<tr>
<td>BOREL A.L.</td>
<td>72</td>
</tr>
<tr>
<td>CRANFIELD L.</td>
<td>48</td>
</tr>
<tr>
<td>DE BACKER W.</td>
<td>40</td>
</tr>
<tr>
<td>ELLIOTT M.W.</td>
<td>58, 66</td>
</tr>
<tr>
<td>ESCOURROU P.</td>
<td>24</td>
</tr>
<tr>
<td>GARCIA-BORREGUERO D.</td>
<td>65</td>
</tr>
<tr>
<td>GISLASON T.</td>
<td>8</td>
</tr>
<tr>
<td>GROTE L.</td>
<td>3, 36</td>
</tr>
<tr>
<td>GRUNSTEIN R.R.</td>
<td>60, 74</td>
</tr>
<tr>
<td>HART N.</td>
<td>26</td>
</tr>
<tr>
<td>HEDNER J.A.</td>
<td>38, 92</td>
</tr>
<tr>
<td>HOEGL B.</td>
<td>69</td>
</tr>
<tr>
<td>KADITIS A.</td>
<td>53, 55</td>
</tr>
<tr>
<td>KHATAMI R.</td>
<td>70</td>
</tr>
<tr>
<td>KOHLER M.</td>
<td>10</td>
</tr>
<tr>
<td>KRAMER A.</td>
<td>77</td>
</tr>
<tr>
<td>KUNZ D.</td>
<td>78</td>
</tr>
<tr>
<td>LEVY P.</td>
<td>44, 87, 91, 93</td>
</tr>
<tr>
<td>MANCONI M.</td>
<td>63</td>
</tr>
<tr>
<td>MARIN J.</td>
<td>9, 83</td>
</tr>
<tr>
<td>MCNICHOLAS W.</td>
<td>1, 39, 84, 93</td>
</tr>
<tr>
<td>MONTSERRAT J.</td>
<td>85, 90</td>
</tr>
<tr>
<td>MORRELL M.</td>
<td>52</td>
</tr>
<tr>
<td>NOBILI L.</td>
<td>19</td>
</tr>
<tr>
<td>OLDENBURG O.</td>
<td>32, 45</td>
</tr>
<tr>
<td>PARATI G.</td>
<td>37, 46</td>
</tr>
<tr>
<td>PARTINEN M.</td>
<td>79</td>
</tr>
<tr>
<td>PIGEARIAS B.</td>
<td>31</td>
</tr>
<tr>
<td>POLLMAECHER T.</td>
<td>22</td>
</tr>
</tbody>
</table>
## Presenting Authors Index
(Name, Poster Number)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aaronson, J.</td>
<td>P97</td>
<td></td>
</tr>
<tr>
<td>Adams, R.</td>
<td>P15</td>
<td></td>
</tr>
<tr>
<td>Agnes, L.</td>
<td>P44</td>
<td></td>
</tr>
<tr>
<td>Altunin, V.</td>
<td>P32</td>
<td></td>
</tr>
<tr>
<td>Anttalainen, U.</td>
<td>P80</td>
<td></td>
</tr>
<tr>
<td>Apollonatou, V.</td>
<td>P67</td>
<td></td>
</tr>
<tr>
<td>Ardelean, C.</td>
<td>P9</td>
<td></td>
</tr>
<tr>
<td>Arsovská, A.</td>
<td>P59</td>
<td></td>
</tr>
<tr>
<td><strong>B</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basoglu, O.K.</td>
<td>P1, P90</td>
<td></td>
</tr>
<tr>
<td>Bhatt, S. P.</td>
<td>P84</td>
<td></td>
</tr>
<tr>
<td>Bossi, R.</td>
<td>P40</td>
<td></td>
</tr>
<tr>
<td>Boven van, F.</td>
<td>P2</td>
<td></td>
</tr>
<tr>
<td>Broman, J. E.</td>
<td>P87</td>
<td></td>
</tr>
<tr>
<td><strong>C</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chavouzis, N.</td>
<td>P13, P14</td>
<td></td>
</tr>
<tr>
<td>Cowan, D.</td>
<td>P88</td>
<td></td>
</tr>
<tr>
<td><strong>D</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daabis, R.</td>
<td>P91, P92</td>
<td>P1</td>
</tr>
<tr>
<td>Deleanu, O. C.</td>
<td>P46</td>
<td></td>
</tr>
<tr>
<td>Dieltjensm M.</td>
<td>P38</td>
<td></td>
</tr>
<tr>
<td>Dumitru, M. M.</td>
<td>P4</td>
<td></td>
</tr>
<tr>
<td>Darakanath, A.</td>
<td>P99, P101</td>
<td></td>
</tr>
<tr>
<td><strong>F</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fernandes, L. R.</td>
<td>P33, P50</td>
<td>P1</td>
</tr>
<tr>
<td>Franklin, K.</td>
<td>P105</td>
<td></td>
</tr>
<tr>
<td><strong>G</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Galic, T.</td>
<td>P52</td>
<td></td>
</tr>
<tr>
<td>Ghahramanyan, L.</td>
<td>P18</td>
<td></td>
</tr>
<tr>
<td>Golder, F.</td>
<td>P64, P65</td>
<td></td>
</tr>
<tr>
<td>Guedes, M. M.</td>
<td>P61</td>
<td></td>
</tr>
<tr>
<td>Gulbay, B.</td>
<td>P102</td>
<td></td>
</tr>
<tr>
<td><strong>H</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Henrique Kiemle Trindade, S.</td>
<td>P7, P8, P98</td>
<td></td>
</tr>
<tr>
<td><strong>I</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iacopini, E.</td>
<td>P82</td>
<td></td>
</tr>
<tr>
<td>Iashyna, L.</td>
<td>P19, P20, P21, P22</td>
<td></td>
</tr>
<tr>
<td>Iritsyan, S.</td>
<td>P36</td>
<td></td>
</tr>
<tr>
<td>Ismail, A. I.</td>
<td>P68</td>
<td></td>
</tr>
<tr>
<td>Iturriaga, R.</td>
<td>P76</td>
<td></td>
</tr>
<tr>
<td><strong>K</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Khmel, E.</td>
<td>P34</td>
<td></td>
</tr>
<tr>
<td>Kizilirmak, D.</td>
<td>P75</td>
<td></td>
</tr>
<tr>
<td>Kollekas, L.</td>
<td>P26</td>
<td></td>
</tr>
<tr>
<td>Kuzminska, M.</td>
<td>P62, P95</td>
<td></td>
</tr>
<tr>
<td><strong>L</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lanza, A.</td>
<td>P51</td>
<td></td>
</tr>
<tr>
<td>Laverge, J.</td>
<td>P73</td>
<td></td>
</tr>
<tr>
<td>Lisi, E.</td>
<td>P100</td>
<td></td>
</tr>
<tr>
<td>Lombardi, C.</td>
<td>P55, P56</td>
<td></td>
</tr>
<tr>
<td>Lopez Varela, M. V.</td>
<td>P6</td>
<td></td>
</tr>
<tr>
<td>Lui, M. S. M.</td>
<td>P85</td>
<td></td>
</tr>
<tr>
<td><strong>M</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Macavei, V.</td>
<td>P77</td>
<td></td>
</tr>
<tr>
<td>Madureira, N.</td>
<td>P11, P28</td>
<td></td>
</tr>
<tr>
<td>Mihaicuta, S. A.</td>
<td>P58</td>
<td></td>
</tr>
<tr>
<td>Mograss, M.</td>
<td>P5</td>
<td></td>
</tr>
<tr>
<td>Mukherjee, C.</td>
<td>P47</td>
<td></td>
</tr>
<tr>
<td><strong>N</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nakamura, H.</td>
<td>P31</td>
<td></td>
</tr>
<tr>
<td>Nikhila, K. G.</td>
<td>P29</td>
<td></td>
</tr>
<tr>
<td>Nobili, L.</td>
<td>P86</td>
<td></td>
</tr>
<tr>
<td><strong>O</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ong, T. H.</td>
<td>P10</td>
<td></td>
</tr>
<tr>
<td><strong>P</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pencic, B.</td>
<td>P69</td>
<td></td>
</tr>
<tr>
<td>Perantoni, E.</td>
<td>P49</td>
<td></td>
</tr>
<tr>
<td>Pilkauskaitė, G.</td>
<td>P3</td>
<td></td>
</tr>
<tr>
<td>Pinna, G. D.</td>
<td>P63</td>
<td></td>
</tr>
<tr>
<td>Popevic, M.</td>
<td>P96</td>
<td></td>
</tr>
<tr>
<td>Prince, J.</td>
<td>P17</td>
<td></td>
</tr>
<tr>
<td>Puiu, L.</td>
<td>P78</td>
<td></td>
</tr>
<tr>
<td><strong>R</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rasmussen, F.</td>
<td>P60</td>
<td></td>
</tr>
<tr>
<td>Reis, R.</td>
<td>P71</td>
<td></td>
</tr>
<tr>
<td>Russo, C.</td>
<td>P24</td>
<td></td>
</tr>
<tr>
<td><strong>S</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salepci, B. M.</td>
<td>P53, P54</td>
<td></td>
</tr>
<tr>
<td>Sato, M.</td>
<td>P48</td>
<td></td>
</tr>
<tr>
<td>Semen, K.</td>
<td>P70</td>
<td></td>
</tr>
<tr>
<td>Singh, Y.</td>
<td>P81</td>
<td></td>
</tr>
<tr>
<td>Spießhoefer, J.</td>
<td>P57</td>
<td></td>
</tr>
<tr>
<td>Sriñipatukho, P.</td>
<td>P93</td>
<td></td>
</tr>
<tr>
<td>Staats, R.</td>
<td>P66</td>
<td></td>
</tr>
<tr>
<td>Steiropoulos, P.</td>
<td>P45</td>
<td></td>
</tr>
<tr>
<td>Sucena, M.</td>
<td>P25, P37</td>
<td></td>
</tr>
<tr>
<td>Sutherland, K.</td>
<td>P41, P43</td>
<td></td>
</tr>
<tr>
<td><strong>T</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tavares e Castro, A.</td>
<td>P103</td>
<td></td>
</tr>
<tr>
<td>Theorell-Haglöw, J.</td>
<td>P104</td>
<td></td>
</tr>
<tr>
<td>Tobaldini, E.</td>
<td>P30</td>
<td></td>
</tr>
<tr>
<td>Tobaldini, E.</td>
<td>P83</td>
<td></td>
</tr>
<tr>
<td><strong>U</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uehli, K.</td>
<td>P35</td>
<td></td>
</tr>
<tr>
<td><strong>V</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaessen, T.</td>
<td>P12</td>
<td></td>
</tr>
<tr>
<td>Valenza, M. C.</td>
<td>P89</td>
<td></td>
</tr>
<tr>
<td>Vanderveken, O. M.</td>
<td>P42</td>
<td></td>
</tr>
<tr>
<td>Vavougios, G.</td>
<td>P79</td>
<td></td>
</tr>
<tr>
<td>Verbruggen, A.</td>
<td>P39</td>
<td></td>
</tr>
<tr>
<td>Virkkala, J.</td>
<td>P94</td>
<td></td>
</tr>
<tr>
<td>Vrijsen, B.</td>
<td>P23</td>
<td></td>
</tr>
<tr>
<td><strong>W</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wertheim, D.</td>
<td>P16</td>
<td></td>
</tr>
<tr>
<td>Wilczynska, M.</td>
<td>P72</td>
<td></td>
</tr>
<tr>
<td>Wilczynska, M.</td>
<td>P74</td>
<td></td>
</tr>
<tr>
<td><strong>Z</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zikiri, A.</td>
<td>P27</td>
<td></td>
</tr>
</tbody>
</table>
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www.circadiance.com

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### List of exhibitors

<table>
<thead>
<tr>
<th>Exhibitor</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ResMed</strong></td>
<td>14</td>
</tr>
<tr>
<td>ResMed is a global leader in the development, manufacturing and marketing of medical products for the diagnosis, treatment and management of respiratory disorders, with a focus on sleep-disordered breathing. We invite you to meet the ResMed team at Booth 14 to see the range of exciting new options” ResMed Germany Inc. Fraunhoferstraße 16 82152 Martinsried GERMANY Tel. +49-89-9901-00 Fax +49-89-9901-1055 <a href="mailto:reception@resmed.de">reception@resmed.de</a> <a href="http://www.resmed.com">www.resmed.com</a></td>
<td></td>
</tr>
<tr>
<td><strong>Seven Dreamers Laboratories</strong></td>
<td>1</td>
</tr>
<tr>
<td>Seven Dreamers Laboratories is a R&amp;D focused medical device manufacturer, which performs research and development of medical devices for worldwide markets. Following our motto, “Pursuing a better life with wisdom through innovative technology”, we have developed new type of remedy for sleep apnea syndrome. Please come check us out! Seven Dreamers Laboratories 303 Twin Dolphin Drive, Suite 600 Redwood Shores, CA 94065 USA Tel. +1 650-632-4422 <a href="http://www.sevendreamers.com">www.sevendreamers.com</a> <a href="mailto:info@sevendreamers.com">info@sevendreamers.com</a></td>
<td></td>
</tr>
<tr>
<td><strong>SOMNOmedics GmbH</strong></td>
<td>13</td>
</tr>
<tr>
<td>SOMNOmedics is a company that designs, manufactures and distributes products dedicated to sleep diagnostics. Our products are utilized for a variety of sleep related tests and comply with AASM standards. SOMNOmedics devices are small, lightweight and completely compatible with in lab diagnostics as well as home sleep testing. SOMNOmedics GmbH Am Sonnenstuhl 63 97236 Randersacker Germany Tel. +49-931 35 90 94-0 <a href="mailto:info@somnomedics.eu">info@somnomedics.eu</a> <a href="http://www.somnomedics.eu">www.somnomedics.eu</a></td>
<td></td>
</tr>
<tr>
<td><strong>VIVISOL Deutschland GmbH</strong></td>
<td>20</td>
</tr>
<tr>
<td>VIVISOL is one of the leading suppliers of home care services. Over the years VIVISOL has continued to upgrade its services, striving to supply patients and doctors with highly specialized and effective devices for oxygen therapy, sleep apnea therapy, mechanical ventilation, aerosol therapy and monitoring. VIVISOL Deutschland GmbH Werner-von-Siemens-Str. 1 D-85375 Neufahrn b. Freising Tel. +49 (0)8165 60945-0 Website: <a href="http://www.vivisol.com">www.vivisol.com</a></td>
<td></td>
</tr>
<tr>
<td><strong>Weinmann Geräte für Medizin GmbH + Co. KG</strong></td>
<td>16</td>
</tr>
<tr>
<td>Weinmann – Partner for Life Weinmann develops and markets products and system solutions for professional users working with short-term and long-term ventilation. In the product lines Homecare and Emergency the Hamburg-based family-run business offers diagnostic, therapeutic and life-saving devices and systems of the highest quality. Weinmann Geräte für Medizin GmbH + Co. KG Kronsalsweg 40 22525 Hamburg Tel. +49-40-54702-0 <a href="mailto:info@weinmann.de">info@weinmann.de</a> <a href="http://www.weinmann.de">www.weinmann.de</a></td>
<td></td>
</tr>
<tr>
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<td>12</td>
</tr>
<tr>
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<td></td>
</tr>
</tbody>
</table>
### List of exhibitors

<table>
<thead>
<tr>
<th>Company</th>
<th>Booth number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadwell Laboratories, Inc.</td>
<td>2</td>
</tr>
<tr>
<td>CIDELEC</td>
<td>3</td>
</tr>
<tr>
<td>Circadiance</td>
<td>18</td>
</tr>
<tr>
<td>Compumedics Ltd</td>
<td>11</td>
</tr>
<tr>
<td>European Respiratory Society (ERS)</td>
<td>7</td>
</tr>
<tr>
<td>European Sleep Research Society (ESRS)</td>
<td>8</td>
</tr>
<tr>
<td>Itamar Medical Ltd</td>
<td>17</td>
</tr>
<tr>
<td>NasoPhlex</td>
<td>21</td>
</tr>
<tr>
<td>NightBalance B.V.</td>
<td>4</td>
</tr>
<tr>
<td>Philips Respironics</td>
<td>15</td>
</tr>
<tr>
<td>Resmed</td>
<td>14</td>
</tr>
<tr>
<td>Seven Dreamers Laboratories</td>
<td>1</td>
</tr>
<tr>
<td>SOMNOmedics GmbH</td>
<td>13</td>
</tr>
<tr>
<td>Vivisol Deutschland GmbH</td>
<td>20</td>
</tr>
<tr>
<td>Weinmann Geräte für Medizin GmbH+Co.KG</td>
<td>16</td>
</tr>
<tr>
<td>Wisepress Ltd</td>
<td>12</td>
</tr>
</tbody>
</table>
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