SLEEP and BREATHING

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

31 March - 2 April 2011 Prague

www.sleepandbreathing.org
Managing the patient’s changing condition with our innovative Sleep Therapy Systems

Accurate recording of therapy and compliance data is the key to patient care. As well as providing an effective and comfortable therapy, our CPAP System One allows for the detection of complex SDB which can be automatically treated by our BiPAP Auto SV Advanced.

Both systems maintain optimal patient comfort without compromising treatment efficacy or long-term compliance.

Visit us today to learn more at http://global.respironics.eu

Because our innovations are inspired by you.
On behalf of the European Respiratory Society and the European Sleep Research Society, welcome to the inaugural International Sleep and Breathing Conference. With respiratory sleep disorders taking an increasing importance for clinical practice and research, this three-day event is an unrivalled opportunity for professionals wishing to expand their knowledge and skills. It will also promote interaction between respiratory and non-respiratory physicians/scientists interested in sleep.

The Conference programme provides a comprehensive coverage of the field with a predominantly educational focus and includes a broad spectrum of participation for delegates ranging from platform lectures, case studies and ‘Meet the Professor’ sessions, together with ‘hands-on’ practical workshops.

As a venue, Prague is an ideal choice, representing “one of the most prominent world centres of creative life in the field of urbanism and architecture across generations, human mentality and beliefs.” From our perspective, it is an excellent place to meet, learn and network.

We look forward to seeing you there for an exceptional ERS/ESRS International Sleep and Breathing Conference 2011. We trust that you will come away with a heightened awareness of sleep and respiratory disorders and science.

Prof. Claudio Bassetti

Prof. Walter McNicholas
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**PRACTICAL INFORMATION**

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**Congress Organisation**

**Exhibition, Hands-on practical workshops, Advertising, Symposia and Sponsored items**
ERS Corporate Relations
4, Ave Sainte-Luce
CH-1003 Lausanne, Switzerland
Tel: +41 21 213 01 61
Fax: +41 21 213 01 00
E-mail: corporate.relations@ersnet.org
www.sleepandbreathing.org

**Registration, accommodation and travel**
Congrex Switzerland Ltd.
Peter Merian-Strasse 80, P.O.Box
CH-4002 Basel, Switzerland
Tel: +41 61 686 77 77
Fax: +41 61 686 77 88
E-mail: julia.bicher@congrex.com
www.congrex.com
What inspired our Sleep Support innovation?
Understanding what drives improved patient compliance.

Improved delivery of therapy and patient compliance as a result of years of experience. Our CPAP System One and new EasyLife mask may deliver quick patient acceptance, as a result of the pressure relief ‘Flex’ technology, humidification control preventing rainout and the ultra quiet EasyLife nasal mask with its unique AutoSeal feature. Our EncorePro software provides improved patient data for the clinician to review and assess, giving you the ability to follow-up and refine therapy if needed. Please visit us online today at http://respironicssleeptherapysystems.respironics.eu and http://easylife.respironics.eu to learn more about our CPAP System One and new EasyLife mask.

Because our innovations are inspired by you.
FORGET strolls along the canals at sundown, dining ‘Indonesian’ on a warm terrace, the flower market’s explosion of colours and hues, centuries old gingerbread houses leaning in on you, and that special emotion from seeing an original Van Gogh in his home museum...

INSTEAD submit an abstract + enhance your reputation + share your knowledge + wise up to lifelong education + see what you can learn + find out how you measure up ~ keep up with the latest in basic and clinical science + find out more about today’s trends in clinical practice and patient care + make it your goal to remain a cutting-edge professional... at the ERS Annual Congress in Amsterdam.

SUBMIT YOUR ABSTRACT, DEADLINE DATE 24 FEBRUARY 2011

WWW.ERSCONGRESS2011.ORG
Congress 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
A World Heritage Site since 1992, Prague contains one of the world’s most pristine and varied collections of architecture, from Art Nouveau to Baroque, Renaissance, Cubist, Gothic, Neo-Classical and ultra-modern. The following is an extract from the World Heritage Site inscription’s “Statement of Significance”:

“Prague is one of the most beautiful cities in Europe in terms of its setting on both banks of the Vltava River, its townscape of burger houses and palaces punctuated by towers, and its individual buildings.

The Historic Centre represents a supreme manifestation of Medieval urbanism (the New Town of Emperor Charles IV built as the New Jerusalem). The Prague architectural works of the Gothic Period (14th and 15th centuries), of the High Baroque of the first half of the 18th century and of the rising modernism after the year 1900, influenced the development of Central Europe, perhaps even all European architecture. Prague represents one of the most prominent world centres of creative life in the field of urbanism and architecture across generations, human mentality and beliefs.

Prague belongs to the group of historic cities which have preserved the structure of their development until the present times. Within the core of Prague, successive stages of growth and changes have respected the original grand-scale urban structure of the Early Middle Ages. This structure was essentially and greatly enlarged with urban activities in the High Gothic period with more additions during the High Baroque period and in the 19th century. It has been saved from any large-scale urban renewal or massive demolitions and thus preserves its overall configuration, pattern and spatial composition.

In the course of the 1100 years of its existence, Prague’s development can be documented in the architectural expression of many historical periods and their styles. The city is rich in outstanding monuments from all periods of its history. Of particular importance are Prague Castle, the Cathedral of St Vitus, Hradčany Square in front of the Castle, the Valdštejn Palace on the left bank of the river, the Gothic Charles Bridge, the Romanesque Rotunda of the Holy Rood, the Gothic arcaded houses round the Old Town Square, the High Gothic Minorite Church of St James in the Stark Město, the late 19th century buildings and town plan of the Nave Město.

As early as the Middle Ages, Prague became one of the leading cultural centres of Christian Europe. The Prague University, founded in 1348, is one of the earliest in Europe. The milieu of the University in the last quarter of the 14th century and the first years of the 15th century contributed among other things to the formation of ideas of the Hussite Movement which represented in fact the first steps of the European Reformation.”
Taxi
The Clarion Congress Hotel Prague offers a personal transfer at the rate of 850 CZK. For reservation please contact the concierge (concierge@cchp.cz, Tel: + 420 211 131 124) or reservation department (reservation@cchp.cz, Tel: + 420 211 131 119).

Public transportation in Prague
The Prague Metro is the fastest means of transportation around the city. It comprises three lines, each of which is represented by its own colour on the maps and signs: Line A (green), Line B (yellow) and Line C (red). The metro service operates between 4-5 am till midnight from Sunday till Thursday (on Friday and Saturday the last trains journey start at 1am), with about two- to three-minute intervals between trains during rush hours. Passengers must buy and validate a ticket before entering the metro platform.

The tickets are the same for all means of transport in Prague. The basic single ticket (the transfer variant) costs 26 CZK and allows a 75-minute ride. Short-term tourist passes are available for periods of 24 hours (100 CZK), 3 days (330 CZK) and 5 days (500 CZK).

The Clarion Congress Hotel Prague has direct access to the underground station Vysočanska (Line B – yellow). Clarion Congress Hotel Prague is situated in a modern part of Prague - Vysočany, just 15 minutes from the historical centre of Prague with public transportation.

Clarion Congress Hotel Prague
Freyova 33
CZ 190 00 Prague 9 - Vysočany
Tel: +420 211 131 111, Fax: +420 211 131 401
E-mail: info@cchp.cz
GPS position data 50°6’38.627”N, 14°30’7.154”E
Badges
Access to all scientific sessions are only possible with your personal badge which you receive at the registration desk in Prague. Please always wear your badge. €30.– 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 25 February 2011. After this date no refund will be possible. Substitutions of attendees can be made at any time. For any change of names, a fee of €30.– will be charged. On-site changes of name badges due to incorrect submission of names and/or address data will be charged €10.–.

Car parking
Car parking is available at the hotel at a cost of CZK 400.– per day.

Certificates of attendance and CME
The 2011 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 International 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.

Cloakroom
A cloakroom is available free of charge 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 foyer 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 the Czech Republic is Czech, although English is widely spoken.

Lunches
Lunch boxes could be pre-ordered when registering. Participants who have ordered lunch boxes will receive a voucher for the lunch boxes together with their registration material. No lunch tickets can be bought onsite. Please note that the conference centre is connected to a shopping mall which provides a food court.

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

Opening hours
All documents will be given out to registered participants during the following opening hours:

<table>
<thead>
<tr>
<th></th>
<th>Registration &amp; Secretariat</th>
<th>Exhibition</th>
<th>Speaker’s Service Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thursday, 31 March 2011</td>
<td>07:30–18:45</td>
<td>08:30–17:00</td>
<td>07:30–18:45</td>
</tr>
<tr>
<td>Friday, 1 April 2011</td>
<td>08:00–18.45</td>
<td>08:30–17:00</td>
<td>08:00–18:45</td>
</tr>
<tr>
<td>Saturday, 2 April 2011</td>
<td>08:00–16:45</td>
<td>08:30–15:30</td>
<td>08:00–16:45</td>
</tr>
</tbody>
</table>

Onsite registrations will be accepted but delegates cannot be guaranteed to receive all congress 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 non-appearance of speakers or other reasons necessitate programme changes. With registration, the participant accepts this proviso.

Speaker Service Centre (SSC)
There is a centrally located SSC in room Aquarius connected to all lecture rooms. All speakers are asked to hand in their PowerPoint presentation at least one hour before their lecture at the SSC.

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

WLAN
The conference level is equipped with wireless-LAN. 24 hours cards can be bought at the hotel reception for €15.–
Recent years have seen an unprecedented growth in sleep research and in sleep medicine. The *Journal of Sleep Research*, owned by the *European Sleep Research Society*, is an international journal that encourages important research papers presenting new findings in the field of sleep and wakefulness (including biological rhythms and dreaming). The Journal reflects the progress in this rapidly expanding field, promoting the exchange of ideas between scientists at a global level.

**Not yet a subscriber to the *Journal of Sleep Research***?

There are two ways in which you can receive the journal:

- **Join the European Sleep Research Society** – visit [www.esrs.eu](http://www.esrs.eu)
- **Subscribe** – Individual members of national societies and institutions can subscribe at discounted rates as specified on our Subscriptions page at [www.journalofsleepresearch.com](http://www.journalofsleepresearch.com)

[www.journalofsleepresearch.com](http://www.journalofsleepresearch.com)
### Programme at a glance

#### 31 March 2011

<table>
<thead>
<tr>
<th>No.</th>
<th>Event</th>
<th>Time</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Opening session from ERS/ESRS leadership “Overview of sleep and breathing”</td>
<td>08:30 – 10:30</td>
<td>Meridian</td>
</tr>
<tr>
<td>2</td>
<td>Specialised Symposium “Hot topics in sleep research”</td>
<td>10:45 – 12:15</td>
<td>Meridian</td>
</tr>
<tr>
<td>3</td>
<td>Case Studies in sleep medicine: “Paediatrics”</td>
<td>10:45 – 12:15</td>
<td>Taurus</td>
</tr>
<tr>
<td>4</td>
<td>Case Studies: “Periodic Limb Movement Disorder (PLMD) and restless legs”</td>
<td>10:45 – 12:15</td>
<td>Virgo</td>
</tr>
<tr>
<td></td>
<td>Hands-on practical workshop</td>
<td>12:30 – 13:40</td>
<td>Tycho, Kepler</td>
</tr>
<tr>
<td>5</td>
<td>Meet the Professor “Use and interpretation of vigilance tests”</td>
<td>12:30 – 13:30</td>
<td>Taurus</td>
</tr>
<tr>
<td>6</td>
<td>Meet the Professors - Pro/Con Debate: “Sleep Disordered Breathing is an important risk factor in stroke?”</td>
<td>12:30 – 13:30</td>
<td>Virgo</td>
</tr>
<tr>
<td></td>
<td>Poster Presentations</td>
<td>13:45 – 14:45</td>
<td>Foyer</td>
</tr>
<tr>
<td>7</td>
<td>Plenary Session “Diagnostic approaches to sleep-disordered breathing”</td>
<td>15:00 – 17:00</td>
<td>Meridian</td>
</tr>
<tr>
<td></td>
<td>Evening Symposium “Interactive Clinical Cases of Complicated Sleep Disordered Breathing” (Philips Respironics)</td>
<td></td>
<td>Virgo</td>
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<tr>
<td></td>
<td>Evening Symposium “Sleep and Breathing - New Frontiers: Addressing challenges in SDB therapy” (Resmed)</td>
<td></td>
<td>Taurus</td>
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</table>

#### 1 April 2011

<table>
<thead>
<tr>
<th>No.</th>
<th>Event</th>
<th>Time</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Specialised Symposium “Hot topics in non-respiratory sleep medicine”</td>
<td>08:30 – 10:00</td>
<td>Meridian</td>
</tr>
<tr>
<td>9</td>
<td>Case Studies in sleep medicine “Sleep-related respiratory disorders”</td>
<td>08:30 – 10:00</td>
<td>Taurus</td>
</tr>
<tr>
<td>10</td>
<td>Case Studies: “Sleep-disordered breathing in chronic respiratory diseases”</td>
<td>08:30 – 10:00</td>
<td>Virgo</td>
</tr>
<tr>
<td>11</td>
<td>Plenary Session “Management approaches to obstructive sleep apnoea syndrome”</td>
<td>10:15 – 12:15</td>
<td>Meridian</td>
</tr>
<tr>
<td></td>
<td>Hands-on practical workshop</td>
<td>12:30 – 13:40</td>
<td>Tycho, Kepler</td>
</tr>
<tr>
<td>12</td>
<td>Meet the Professor “Management of patients with OSA and hypertension: updated guidelines”</td>
<td>12:30 – 13:30</td>
<td>Taurus</td>
</tr>
<tr>
<td>13</td>
<td>Meet the Professor “Genetic studies in sleep disorders: lessons from restless legs syndrome and obstructive sleep apnoea/hypopnoea syndrome”</td>
<td>12:30 – 13:30</td>
<td>Virgo</td>
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<tr>
<td></td>
<td>Poster Presentations</td>
<td>13:45 – 14:45</td>
<td>Foyer</td>
</tr>
<tr>
<td>14</td>
<td>Plenary Session “Comorbidities in sleep apnoea”</td>
<td>15:00 – 17:00</td>
<td>Meridian</td>
</tr>
<tr>
<td>15</td>
<td>Specialised Symposium “Sleep in chronic respiratory disorders”</td>
<td>17:15 – 18:45</td>
<td>Meridian</td>
</tr>
<tr>
<td>16</td>
<td>Case Studies: “Asymptomatic sleep apnoea”</td>
<td>17:15 – 18:45</td>
<td>Taurus</td>
</tr>
<tr>
<td>17</td>
<td>Case Studies: “Sleep Disordered Breathing (SDB) in heart failure”</td>
<td>17:15 – 18:45</td>
<td>Virgo</td>
</tr>
</tbody>
</table>

#### 2 April 2011

<table>
<thead>
<tr>
<th>No.</th>
<th>Event</th>
<th>Time</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>Specialised Symposium “Management of non sleep apnoea patients”</td>
<td>08:30 – 10:00</td>
<td>Meridian</td>
</tr>
<tr>
<td>19</td>
<td>Case Studies: “Obesity hypoventilation”</td>
<td>08:30 – 10:00</td>
<td>Taurus</td>
</tr>
<tr>
<td>20</td>
<td>Case Studies: “Hypersomnias”</td>
<td>08:30 – 10:00</td>
<td>Virgo</td>
</tr>
<tr>
<td>21</td>
<td>Plenary Session “Hypersomnia/ Excessive daytime sleepiness”</td>
<td>10:15 – 12:15</td>
<td>Meridian</td>
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<tr>
<td></td>
<td>Hands-on practical workshop</td>
<td>12:30 – 13:40</td>
<td>Tycho, Kepler</td>
</tr>
<tr>
<td>22</td>
<td>Meet the Professors - Pro/con Debate “Should AHI be the principal criterion in assessment and management of OSAS?”</td>
<td>12:30 – 13:30</td>
<td>Taurus</td>
</tr>
<tr>
<td>23</td>
<td>Meet the Professor “Sleepiness, fatigue and driving”</td>
<td>12:30 – 13:30</td>
<td>Virgo</td>
</tr>
<tr>
<td>24</td>
<td>Specialised Symposium “Sleep disordered breathing and psychiatric disturbance”</td>
<td>15:00 – 16:30</td>
<td>Meridian</td>
</tr>
<tr>
<td>25</td>
<td>Case Studies: “Management of OSAS where CPAP fails”</td>
<td>15:00 – 16:30</td>
<td>Taurus</td>
</tr>
<tr>
<td>26</td>
<td>Case Studies: “Insomnia and parasomnia in OSAS”</td>
<td>15:00 – 16:30</td>
<td>Virgo</td>
</tr>
<tr>
<td>27</td>
<td>Plenary Session “Sleep and breathing: the future”</td>
<td>16:45 – 17:30</td>
<td>Meridian</td>
</tr>
</tbody>
</table>
This information is valid up to February 25, 2011.
Visit www.sleepandbreathing.org for updates.
## PLENARY SESSION: OPENING SESSION FROM ERS/ESRS LEADERSHIP “OVERVIEW OF SLEEP AND BREATHING”

Aims: The aims of this session are:  
- a comprehensive overview of basic knowledge regarding sleep and neuroanatomy of upper airway control will be first provided  
- how control of breathing applies to the field of sleep disordered breathing (SDB) will be reviewed  
- finally, an historical perspective and a prospective regarding SDB will be provided regarding epidemiology, pathophysiology and morbity of SDB.  

Target audience: Respiratory and sleep specialists, clinical and research fellows.

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

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presenter</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>08:30</td>
<td>Overview of sleep</td>
<td>J. Horne (Leicestershire, United Kingdom)</td>
<td>1</td>
</tr>
<tr>
<td>09:00</td>
<td>The influence of the state dependent chemical brain on breathing</td>
<td>R. Horner (Toronto, Canada)</td>
<td>2</td>
</tr>
<tr>
<td>09:30</td>
<td>Control of breathing during sleep</td>
<td>M. Morrell (London, United Kingdom)</td>
<td>3</td>
</tr>
<tr>
<td>10:00</td>
<td>Sleep and breathing disorders: past, present and future</td>
<td>P. Levy (Grenoble, France)</td>
<td>4</td>
</tr>
</tbody>
</table>

## ROOM MERIDIAN   SESSION 2  10:45–12:15

### SPECIALISED SYMPOSIUM: HOT TOPICS IN SLEEP RESEARCH

Aims: This session will review the latest cutting edge research in aspects of sleep apnoea that are particularly relevant and topical.  

Target audience: Clinicians, clinical researchers, scientists

**Chairs:** P. Levy (Grenoble, France), J. A. Hedner (Gothenburg, Sweden)

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<tr>
<th>Time</th>
<th>Session</th>
<th>Presenter</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:45</td>
<td>Mechanisms of cardiovascular disease in OSAS</td>
<td>W. McNicholas (Dublin, Ireland)</td>
<td>5</td>
</tr>
<tr>
<td>11:15</td>
<td>Basic mechanisms of narcolepsy</td>
<td>M. Tafti (Lausanne, Switzerland)</td>
<td>6</td>
</tr>
<tr>
<td>11:45</td>
<td>Basic interactions of obesity with OSA/ intermittent hypoxia</td>
<td>M. Bonsignore (Palermo, Italy)</td>
<td>7</td>
</tr>
</tbody>
</table>

## ROOM Taurus   SESSION 3  10:45–12:15

### CASE STUDIES IN SLEEP MEDICINE: “PEDIATRICS”

O. Bruni (Rome, Italy) 8

## ROOM Virgo    SESSION 4  10:45–12:15

### CASE STUDIES: “PERIODIC LIMB MOVEMENT DISORDER (PLMD) AND RESTLESS LEGS”

D. Garcia-Borreguero (Madrid, Spain) 9

## ROOMS KEPLER & TYCHO  12:30–13:40

### HANDS-ON PRACTICAL WORKSHOPS

## ROOM Taurus   SESSION 5  12:30–13:30

### MEET THE PROFESSOR: USE AND INTERPRETATION OF VIGILANCE TESTS

K. Sonka (Prague, Czech Republic) 10

## ROOM Virgo   SESSION 6  12:30 - 13:30

### MEET THE PROFESSORS: PRO/CON DEBATE: “SLEEP DISORDERED BREATHING IS AN IMPORTANT RISK FACTOR IN STROKE?”

Pro: “SDB is an important risk factor in stroke?”

C. Bassetti (Lugano, Switzerland) 11
Con: “SDB is an important risk factor in stroke?”
N. Douglas (Edinburgh, United Kingdom)

Rebuttal
C. Bassetti (Lugano, Switzerland), N. Douglas (Edinburgh, United Kingdom)

POSTER PRESENTATION SESSION
Diagnosis, Co-morbidities, Treatment

PLENARY SESSION: DIAGNOSTIC APPROACHES TO SLEEP DISORDERED BREATHING
Aims: The participants will:
- get an insight in the clinical presentation of sleep disordered breathing
- learn when to perform polysomnography
- learn about the possibilities and limitations of portable monitoring and screening questionnaires
- learn about the assessment of neuropsychiatric aspects of sleep disordered breathing

Target audience: All physicians involved in the assessment of sleep disorders

Chairs: B. Buyse (Leuven, Belgium), M. Eijsvogel (Enschede, Netherlands)

15:00 Clinical assessment - what is the difference between OSAS and OSA?
J. Verbraecken (Antwerp, Belgium)

15:30 Which test for which kind of nocturnal breathing?
T. Penzel (Berlin, Germany)

16:00 Limited sleep screening and questionnaires for OSAS and OSA
R. L. Riha (Edinburgh, United Kingdom)

16:30 Assessing sleepiness and responses to treatment
E. Lindberg (Uppsala, Sweden)

EVENING SYMPOSUM: INTERACTIVE CLINICAL CASES OF COMPLICATED SLEEP DISORDERED BREATHING
Organised by Philips Respironics
Chair: W. Randerath (Solingen, Germany)

17:15 Introduction
W. Randerath (Solingen, Germany)

17:20 Opioid Induced Sleep Apnea and CompSAS
L. Grote (Gothenburg, Sweden)

17:45 Heart Failure, Central Sleep Apnea and Cheyne Stokes Respiration
W. Randerath (Solingen, Germany)

18:10 A practical approach to managing complicated breathing patterns
F. Abdenbi (Goussainville, France)

18:40 Close
W. Randerath (Solingen, Germany)

EVENING SYMPOSUM: SLEEP AND BREATHING - NEW FRONTIERS: ADDRESSING CHALLENGES IN SDB THERAPY
Organised by Resmed
Chairs: A. Simonds (London, United Kingdom), P. Levy (Grenoble, France)

17:15 Challenge of non-sleepy OSA patients
F. E. Barbe (Lleida, Spain)

17:35 Questions and Discussion
F. E. Barbe (Lleida, Spain)

17:45 Challenge of non-compliant patients
A. Simonds (London, United Kingdom)

18:05 Questions and Discussion
A. Simonds (London, United Kingdom)

18:15 Challenge of patients with heart failure
P. Levy (Grenoble, France)

18:35 Questions and Discussion
P. Levy (Grenoble, France)
<table>
<thead>
<tr>
<th>ROOM MERIDIAN</th>
<th>SESSION 8</th>
<th>08:30–10:00</th>
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</thead>
<tbody>
<tr>
<td>SPECIALISED SYMPOSIUM: HOT TOPICS IN NON-RESPIRATORY SLEEP MEDICINE</td>
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<tr>
<td>Chairs: R. L. Riha (Edinburgh, United Kingdom), K. Sonka (Prague, Czech Republic)</td>
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<tr>
<td>08:30</td>
<td>Sleep and neurology</td>
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<tr>
<td>C. Bassetti (Lugano, Switzerland)</td>
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<tr>
<td>09:00</td>
<td>Sleep and psychiatry</td>
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<tr>
<td>D. Riemann (Freiburg, Germany)</td>
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<tr>
<td>09:30</td>
<td>Sleep and chronobiology</td>
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<tr>
<td>D. Skene (Surrey, United Kingdom)</td>
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<tr>
<th>ROOM TAURUS</th>
<th>SESSION 9</th>
<th>08:30–10:00</th>
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<tr>
<td>CASE STUDIES IN SLEEP MEDICINE “SLEEP-RELATED RESPIRATORY DISORDERS”</td>
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<tr>
<td>J. A. Hedner (Gothenburg, Sweden)</td>
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<tr>
<th>ROOM VIRGO</th>
<th>SESSION 10</th>
<th>08:30–10:00</th>
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<tr>
<td>CASE STUDIES: “SLEEP DISORDERED BREATHING IN CHRONIC RESPIRATORY DISEASES”</td>
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<tr>
<td>R. Tkacova (Kosice, Slovakia)</td>
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<tr>
<th>ROOM MERIDIAN</th>
<th>SESSION 11</th>
<th>10:15–12:15</th>
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<tr>
<td>PLENIARY SESSION: MANAGEMENT APPROACHES TO OBSTRUCTIVE SLEEP APNOEA SYNDROME</td>
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<tr>
<td>Aims: The aim of this Plenary session is to understand why CPAP therapy is the main treatment option in OSA, with oral appliances, surgery and weight reduction as treatment options in specific patient subgroups.</td>
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<td>Target audience: Mainly clinicians with an interest in sleep disordered breathing: pneumologists, ENT, dentists</td>
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<tr>
<td>Chairs: S. Andreas (Immenhausen, Germany), N. Douglas (Edinburgh, United Kingdom)</td>
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<tr>
<td>10:15</td>
<td>CPAP is the cornerstone in the management of OSA</td>
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<td>D. Pevernagie (Heeze, Netherlands)</td>
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<tr>
<td>10:45</td>
<td>Oral appliances in the management of mild and moderate obstructive sleep apnoea</td>
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<tr>
<td>M. Marklund (Umea, Sweden)</td>
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<tr>
<td>11:15</td>
<td>Upper airway surgery in the treatment of obstructive sleep apnoea</td>
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<td>J. T. Maurer (Mannheim, Germany)</td>
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<td>11:45</td>
<td>Weight reduction as a causal approach to obstructive sleep apnoea</td>
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<td>K. Johansson (Stockholm, Sweden)</td>
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<tr>
<th>ROOMS KEPLER &amp; TYCHO</th>
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<td>HANDS-ON PRACTICAL WORKSHOPS</td>
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<th>ROOM TAURUS</th>
<th>SESSION 12</th>
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<tr>
<td>MEET THE PROFESSOR: MANAGEMENT OF PATIENTS WITH OSA AND HYPERTENSION: UPDATED GUIDELINES</td>
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<td>G. Parati (Milan, Italy)</td>
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<th>ROOM VIRGO</th>
<th>SESSION 13</th>
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<tr>
<td>MEET THE PROFESSOR: GENETIC STUDIES IN SLEEP DISORDERS: LESSONS FROM RESTLESS LEGS SYNDROME AND OBSTRUCTIVE SLEEP APNOEA/HYPOPNOEA SYNDROME</td>
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<tr>
<td>T. Gislason (Reykjavik, Iceland)</td>
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**PLENARY SESSION: COMORBIDITIES IN SLEEP APNOEA**

Aims: At the end of this session, the audience will take away an understanding of the principal comorbidities relating to sleep apnoea, particularly cardiovascular and metabolic. The session will focus on the independent relationships between OSAS and these co-morbidities, review the mechanisms and manifestations of co-morbidities in the setting of OSAS, in addition to specific aspects of management in this setting.

Target audience: Clinicians, nurses, allied health professionals

**Chairs:** W. McNicholas (Dublin, Ireland), T. Pollmaecher (Ingolstadt, Germany)

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<th>Time</th>
<th>Topic</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>15:00</td>
<td>Cardiovascular disease in obstructive sleep apnoea</td>
<td>J-L. Pepin (Grenoble, France)</td>
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<tr>
<td>15:30</td>
<td>Diabetes Mellitus and sleep apnoea</td>
<td>M. Ip (Hong Kong, China)</td>
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<td>16:00</td>
<td>The Metabolic Syndrome and obstructive sleep apnoea</td>
<td>M. Bonsignore (Palermo, Italy)</td>
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<td>16:30</td>
<td>Insomnia and depression in OSAS</td>
<td>T. Pollmaecher (Ingolstadt, Germany)</td>
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**SPECIALISED SYMPOSIUM: SLEEP IN CHRONIC RESPIRATORY DISORDERS**

Aims: This specialised symposium will provide with:
- the basic mechanisms of interaction between sleep and breathing
- the overall impact of sleep on several chronic respiratory conditions, either revealing or aggravating the disease or the related respiratory failure
- an overview of all possible treatment options

Target audience: Pneumologists with special interest in sleep disordered breathing, but also for cardiologists, neurologists and general physicians.

**Chairs:** J. Verbraecken (Antwerp, Belgium), J. A. Hedner (Gothenburg, Sweden)

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<th>Time</th>
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<th>Speaker(s)</th>
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<tr>
<td>17:15</td>
<td>Sleep in COPD, asthma and restrictive lung disease</td>
<td>N. Douglas (Edinburgh, United Kingdom)</td>
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<td>17:45</td>
<td>Obesity-Hypoventilation</td>
<td>J-L. Pepin (Grenoble, France)</td>
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<td>18:15</td>
<td>Treatment options for chronic respiratory failure</td>
<td>A. Simonds (London, United Kingdom)</td>
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**CASE STUDIES: “ASYMPTOMATIC SLEEP APNOEA”**

R. L. Riha (Edinburgh, United Kingdom)

**CASE STUDIES: “SLEEP DISORDERED BREATHING (SDB) IN HEART FAILURE”**

S. Andreas (Immenhausen, Germany)
2 April 2011

ROOM MERIDIAN SESSION 18

SPECIALISED SYMPOSIUM: MANAGEMENT OF NON SLEEP APNOEA PATIENTS
Aims: During this session participants will get an overview of the most common non apnoeic sleep disorders, and how to manage them. This session is intended to open the eyes of the clinician who is mainly focused on sleep disordered breathing problems.
Target audience: All physicians involved in the multidisciplinary approach of patients with sleep complaints
Chairs: P. Levy (Grenoble, France), J. Verbraeken (Antwerp, Belgium)
08:30 Management of primary insomnia
C. A. Espie (Glasgow, United Kingdom) 38
09:00 Management of restless legs and periodic limb movement disorder
D. Garcia-Borreguero (Madrid, Spain) 39
09:30 Management of parasomnias
M. Manconi (Milan, Italy) 40

ROOM TAURUS SESSION 19

CASE STUDIES: “OBESITY HYPVENTILATION”
A. Simonds (London, United Kingdom) 41

ROOM VIRGO SESSION 20

CASE STUDIES: “HYPERSOMNIAS”
R. Silvestri (Messina, Italy) 42

ROOM MERIDIAN SESSION 21

PLENARY SESSION: HYPERSOMNOLENCE/ EXCESSIVE DAYTIME SLEEPINESS
Aims: The participants will:
- get an insight in the clinical presentation of hypersomnia/ excessive daytime sleepiness
- learn when to perform polysomnography
- learn about the possibilities and limitations of portable monitoring and screening questionnaires
- learn about the management and treatment of excessive daytime sleepiness/ hypersomnia
Target audience: All physicians involved in the assessment of excessive daytime sleepiness/ hypersomnia
Chairs: R. Cluydts (Brussels, Belgium), T. Penzel (Berlin, Germany)
10:15 Spectrum of clinical presentations - hypersomnia/ excessive daytime sleepiness
D. Riemann (Freiburg, Germany) 43
10:45 Diagnostic approaches and differential diagnosis
C. Bassetti (Lugano, Switzerland) 44
11:15 Management of hypersomnia/ excessive daytime sleepiness
L. Grote (Gothenburg, Sweden) 45
11:45 Driving and obstructive sleep apnoea/ hypopnea syndrome
D. Rodenstein (Brussels, Belgium) 46

ROOMS KEPLER & TYCHO

HANDS-ON PRACTICAL WORKSHOPS

ROOM TAURUS SESSION 22

MEET THE PROFESSORS: PRO/CON DEBATE “SHOULD APOE/AHPOE INDEX (AHI) BE THE PRINCIPAL CRITERION IN ASSESSMENT AND MANAGEMENT OF OSAS?”
47 PRO: “Should AHI be the principal criterion in assessment and management of OSAS?”
D. Peveragie (Heeze, Netherlands)
48 CON: “Should AHI be the principal criterion in assessment and management of OSAS?”
W. McNicholas (Dublin, Ireland)
49 Rebuttal
D. Peveragie (Heeze, Netherlands), W. McNicholas (Dublin, Ireland)
MEET THE PROFESSOR: SLEEPINESS, FATIGUE AND DRIVING
50 J. Horne (Leicestershire, United Kingdom)

SPECIALISED SYMPOSIUM: SLEEP DISORDERED BREATHING AND PSYCHIATRIC DISTURBANCE

Aims: 
- News on the neuropsychiatric consequences of SDB
- Knowledge on the prevalence and treatment of SDB in psychiatric patients
- Knowledge on the interactions between insomnia and SDB

Target audience: Physicians (clinicians) working in the field of sleep disordered breathing and faced with psychiatric comorbidities

Chairs: M. Wiegand (Munich, Germany), D. Riemann (Freiburg, Germany)

15:00 Neurocognitive function in OSAS
S. Fulda (Munich, Germany)

15:30 Depression in OSAS, prevalence and treatment response
K. Richter (Nuremberg, Germany)

16:00 Prevalence and particularities of OSAS in psychiatric patients
T. Pollmaecher (Ingolstadt, Germany)

CASE STUDIES: “MANAGEMENT OF OSAS WHERE CPAP FAILS”

P. Escourrou (Clamart, France)

CASE STUDIES: “INSOMNIA AND PARASOMNIA IN OSAS”

D. Pevernagie (Heeze, Netherlands)

PLENARY SESSION: SLEEP AND BREATHING: THE FUTURE

Aims: This session will wrap up the conference and provide a vision for the future. The session will also provide an overview of the ERS HERMES sleep project, which is intended to provide a core educational curriculum for clinicians who seek advanced knowledge in sleep and breathing disorders. The Conference co-Chairs will make a farewell address and outline plans for future meetings.

Target audience: This session will bring the meeting to a close and should be of interest to all delegates, particularly those in clinical practice.

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

16:45 Future trends in the management of patients with sleep and breathing disorders
P. Levy (Grenoble, France)

17:05 The role of the respiratory specialist in managing patients with sleep disorders/ ERS HERMES
W. De Backer (Antwerp, Belgium)

17:25 Farewell
C. Bassetti (Lugano, Switzerland), W. McNicholas (Dublin, Ireland)
Obstructive Sleep Apnea

Editor
Alain Lurie, Paris

Preliminary Contents

Obstructive sleep apnea: definition, diagnostic strategy in adults with cardiovascular and metabolic diseases; treatment options
I. Definitions
II. Prevalence and incidence of OSA
III. Risk factors for OSA
IV. OSA signs and symptoms
V. Characteristic clinical features of OSA in patients with cardiovascular disorders
VI. Strategies and tests to identify OSA
VII. Treatment options: the AASM guidelines
VIII. Conclusion

Inflammation, oxidative stress, and procoagulant and thrombotic activity in obstructive sleep apnea
I. Inflammatory response to chronic intermittent hypoxia
II. Inflammatory response to sleep loss and fragmentation
III. Hypercoagulability and thrombosis
IV. Systemic inflammation
V. Conclusion

Metabolic disorders associated with obstructive sleep apnea
I. Obesity and obstructive sleep apnea
II. Alterations in glucose metabolism and obstructive sleep apnea
III. Dyslipidemia and obstructive sleep apnea
IV. Metabolic syndrome and obstructive sleep apnea
V. Liver injury and obstructive sleep apnea
VI. Conclusion and future perspectives

Endothelial dysfunction in obstructive sleep apnea
I. OSA may alter vascular structure
II. OSA may adversely affect endothelial regulation of peripheral vasomotor tone
III. Potential mechanisms leading to endothelial dysfunction in OSA
IV. Conclusion

Hemodynamic and autonomic changes in obstructive sleep apnea
I. Control of cardiovascular function during normal sleep stages
II. Hemodynamic and autonomic changes during the apnea ventilation resumption cycle
III. Chronic autonomic cardiovascular dysfunction
IV. Conclusion

Obstructive sleep apnea and cardiovascular disease
I. Limitations of literature studies
II. Mortality from cardiovascular causes
III. Systemic hypertension
IV. Heart failure
V. Stroke
VI. Coronary artery disease
VII. Pulmonary hypertension and right ventricular dysfunction
VIII. Arrhythmias
IX. Conclusions and future directions

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VI. Coronary artery disease
VII. Pulmonary hypertension and right ventricular dysfunction
VIII. Arrhythmias
IX. Conclusions and future directions

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Poster Presentations

Posters will be manned by their authors.

Thursday 31 March 13:45 – 14:45

**Topic: DIAGNOSIS**
Coordinators: M. Bonsignore (Palermo, Italy), M. Morrell (London, United Kingdom)
Posters: P1, P3, P27, P33, P34, P35, P39, P41, P48, P51, P64, P71, P84, P85, P87, P89, P91, P92, P93

**Topic: CO-MORBIDITIES**
Coordinators: M. Ip (Hong Kong, China), D. Rodenstein (Brussels, Belgium)
Posters: P4, P9, P10, P12, P15, P19, P23, P32, P40, P44, P74, P75, P80, P81, P82, P86, P88, P90

**Topic: TREATMENT**
Coordinators: A. Simonds (London, United Kingdom), L. Grote (Gothenburg, Sweden)
Posters: P6, P13, P14, P16, P18, P22, P28, P36, P55, P62, P63, P66, P72, P73, P79

Friday 1 April 13:45 – 14:45

**Topic: PHYSIOLOGY/PATHOPHYSIOLOGY**
Coordinators: R. Horner (Toronto, Canada), W. De Backer (Antwerp, Belgium)
Posters: P2, P5, P7, P8, P11, P20, P25, P26, P30, P31, P43, P46, P49, P53, P67, P76

**Topic: CLINICAL ASPECTS**
Coordinators: E. Lindberg (Uppsala, Sweden), P. Escourrou (Clamart, France)
Posters: P17, P21, P24, P37, P38, P42, P45, P47, P50, P52, P56, P57, P58, P59, P60, P65, P68, P77, P78, P83
P1 - Sleep pattern, quality and sleepiness among patients with chronic pulmonary disease in Nigeria.
O.O. Adewole1, G. Erhabor1, O. Oguntola1, A. Fehinintola1, J. B. Jumbo1, E. Irabor1
1 Obafemi Awolowo University Teaching Hospitals Complex, Medicine, Ille Ife, Nigeria

Keywords: Diagnostic, Quality of Life

Introduction. Patients with PTB do frequently have various sleep related problems which have not been documented in Nigeria. Aims. To study sleep pattern among patients with PTB.
Method. PTB cases seen at the Chest clinic of OAUTHC, Ille Ife were recruited in a case control study. Subjects were taken through a modified Pittsburgh Sleep Questionnaires. Controls were healthy individuals.

Results. There were 64 cases and 36 controls. The mean age of the cases and control were 41.5± 5yrs and 34.0 ± 5.6 yrs respectively. Mean nocturnal sleep duration was not significantly different between the cases and the controls; 7.20 ± 1.3hrs and 6.9 ± 1.7hrs respectively. The predominant sleep problem among the cases was frequent night time wakeawakenss present in 31(48%)patients, while problems initiating sleep was a predominant problem with the cases, 4/36(11%). Cases have problems initiating sleep, increased night time awakenness and snoring than controls p <0.05. Sleepiness was reported in 31% of the cases. Overall 48% of the cases and 50% of the control described their sleep as good respectively. 2(3%) and 5% of the cases and control reported poor sleep respectively, p=0.6. Among the cases, sleep quality is significantly affected by the extent of disease on CXR: good/fair sleep quality have limited involvement on the cases, 4/36(11%). Cases have problems initiating sleep, increased night time awakenness and snoring than controls p <0.05. Sleepiness was reported in 31% of the cases. Overall 48% of the cases and 50% of the control described their sleep as good respectively. 2(3%) and 5% of the cases and control reported poor sleep respectively, p=0.6. Among the cases, sleep quality is significantly affected by the extent of disease on CXR: good/fair sleep quality have limited involvement on CXR 19/33and while 2/2 of those with poor sleep have extensive CXR involvement. Mean duration of symptoms is lower among those with good sleep/poor sleep. 2.5 mths v 6.4 mths, p=0.03. Smear negative CXR 19/33and while 2/2 of those with poor sleep have extensive CXR disease on CXR: good/fair sleep quality have limited involvement on the cases, sleep quality is significantly affected by the extent of disease on CXR: good/fair sleep quality have limited involvement on CXR 19/33and while 2/2 of those with poor sleep have extensive CXR involvement.

Conclusion. PTB patients have poor sleep pattern, quality compared with control. Extent of PTB and duration of symptoms have impact on their sleep.

P2 - Obstructive Sleep Apnoea and Left ventricular Functions and Volumes
N. Altintas1, E. Aslan2, A. Mahotra3, A. Helvaci4
1 19 mayis university, pulmonary and sleep medicine, samsun, Turkey,
2 Okmeydani Research and Education Hospital, Cardiology, istanbul, Turkey,
3 Harvard Medical School, pulmonary and sleep medicine, boston, massachusetts, United States

Keyword: Obstructive Sleep Apnoea

Obstructive sleep apnea(OSA) causes increased cardiovascular morbidity and mortality,including systemic arterial hypertension and heart failure. In our study, we aimed to assess left ventricular mass and myocardial performance index (MPI) in OSA patients.
A total of 40 subjects without any cardiac or pulmonary disease, referred for evaluation of OSA, had overnight polysomnography and echocardiography. According to the apnea-hypopnea index(AHI), subjects were classified into three groups:mild OSA (AHI:5–14/h; n=7), moderate OSA(AHI:15–29/h; n=13)and severe OSA(AHI:>30/h; n=20). Thickness of the interventricular septum (IVS) and posterior wall (LVPW) were measured by M-mode, along with left ventricular mass (LVM) and Left ventricular mass index (LVMI). Left ventricular MPI was calculated as (isovolumic contraction time+isoluvolic relaxation time)/aortic ejection time by Doppler echocardiography.

Blood pressures were higher in severe OSA compared with moderate and mild OSA. In severe OSA, thickness of IVS(11,6±1,7mm),LVPW (10,7±1,7mm),LVM (260,9±50,5g) and LVMI(121,9±21,9g.m-2) were higher than in moderate OSA (9, 38±1, 3mm; 9,9±1, 6mm; 196, 4±35,2g; 94,6±13,2 g.m-2,respectively) and mild OSA(9, 8±2,4 mm; 8,9±1, 9 mm; 187, 6±66, 2g; 95, 8±28, 6 g.m-2, respectively). In severe OSA, MPI (0,8±0,2) was significantly higher than in mild OSA (0,5±0,6), but not significantly higher than moderate OSA(0,78±0,18).
In conclusion, obstructive sleep apnea patients have demonstrable cardiac abnormalities which worsen with severity of apnea. The MPI may have utility in subsequent sleep apnea studies, possibly as a surrogate outcome measure in OSA studies, e.g. as a biomarker or to assess response to therapy or possibly as a robust marker of disease severity.

P3 - Scoring of respiratory events: a comparison between seven manual scorings and auto scoring
P. Anderer1,2, A. Moreau1, M. Ross1, S. Thuoss1, S. Smallwood2, R. Vasko2, R. Fligge3, G. Dorffner4
1 Philips Respironics, Diagnostic & Clinical Software Apps. Group, Vienna, Austria, 2 Medical University of Vienna, Department of Psychiatry and Psychotherapy, Vienna, Austria, 3 Philips Respironics, Diagnostic & Clinical Software Apps. Group, Monroeville, PA, United States, 4 Medical University of Vienna, Center for Medical Statistics, Informatics, and Intelligent Systems, Vienna, Austria

Keywords: Diagnostic, Obstructive Sleep Apnoea

Objectives: To evaluate the validity and reliability of respiratory event scoring according to the AASM rules using an auto scoring system (Somnolyzer 24x7) as compared with manual scorings. Material and Methods: Apneas (A), hypopneas (H, recommended rule) and respiratory effort-related arousals (ERA) were scored automatically (AUT) and manually by 7 experts (MAN) using predefined sleep stage and arousal scorings in 15 standard polysomnographic studies in patients with mild to severe obstructive sleep apnea syndrome (8 females, 7 males, aged 29 to 56 years).

Results: The mean apnea index (AI) was 14.3±25.6 for AUT and 13.9±24.7 for MAN-mean with a range from 8.9±18.1 (MAN-7) to 21.3±33.7 (MAN-3). The mean hypopnea index (HI) was 12.1±10.8 for AUT and 10.0±12.9 for MAN-mean with a range from 3.7±3.0 (MAN-3) to 15.5±18.1 (MAN-4). The mean AI was 26.4±35.2 for AUT and 23.9±33.0 for MAN-mean with a range from 20.7±28.4 (MAN-1) to 29.0±36.2 (MAN-4). The mean RERA index was 6.4±4.4 for AUT and 4.3±2.6 for MAN-mean with a range from 0.5±0.6 (MAN-2) to 8.8±88 (MAN-6). While the correlations with MAN-mean were high for the AI (AUT: 0.96; MAN: 0.86 to 1.00), HI (AUT: 0.92; MAN: 0.89 to 0.97) and AHI (AUT: 0.98; MAN: 0.96 to 1.00), they were rather low for the RERA index (AUT: 0.48; MAN: 0.10 to 0.84).

Discussion: Manual scoring and Somnolyzer auto scoring showed an excellent agreement for the detection of apneas and hypopneas. For the scoring of RERAs inter-rater reliability was significantly lower for both manual and auto scoring. For all indices, however, auto scoring resulted in values close to the mean of the 7 manual scorings (MAN-mean), confirming the validity of the Somnolyzer scorings.

P4 - High Prevalence of Sleep Apnea Syndrome and Comorbidities at Patients with Acromegaly
C. Ardelean1, D. Amzar1, I. Zosin1, D. Dimitriu1, S. Frent2, V. Tudorache3, S. Mihaluta2
1 V. Babes Hospital, Pulmonology, Timisoara, Romania, 2 V. Babes University of Medicine and Pharmacy, Pulmonology, Timisoara, Romania, 3 V. Babes University of Medicine and Pharmacy, Endocrinology, Timisoara, Romania

Keywords: Obstructive Sleep Apnoea, Diagnostic

Introduction. Obstructive sleep apnea syndrome (OSAS) is considered a common disorder in acromegaly. Aim. To evaluate the particularities of OSAS 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, polisomnography for apnea-hypopnea index (AHI normal 0–4, mild 5–14, moderate 15–29, severe over 30), oxygen desaturation, comorbidities 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,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 94.308 ±1.55, 95% CI 93.37 - 95.24, lowest desaturation 82.69 ± 11.7 % (51-96),95% CI 4.92 - 11.39. Oxygen desaturation 94.308 ±1.55, 95% CI 93.37 - 95.24, lowest desaturation 82.69 ± 11.7 % (51-96),95% CI 4.92 - 11.39.
Sleep apnea syndrome: effect of visual education on circadian profile of melatonin secretion in patients with OSAS

Izmir, Turkey, 2Ege University School of Medicine, Department of Ear, Nose and Throat, Izmir, Turkey. 1 Ege University School of Medicine, Department of Chest Diseases, Izmir, Turkey. 1 Ege University School of Medicine, Department of Physiology, Iasi, Romania. 2 University of Medicine and Pharmacy “Gr. T. Popa”, Pneumology, Iasi, Romania. 3 University of Medicine and Pharmacy “Gr. T. Popa”, Allergology, Warsaw, Poland

Keywords: Obstructive Sleep Apnoea, Diagnostic

Introduction: Some endocrine disorders are associated with sleep disordered breathing. Melatonin is a cyclically secreted hormone controlling a rhythm of sleep and waking.

Aim: Aim of the study was to investigate profile of melatonin secretion in patients with OSAS and to assess effect of CPAP treatment on circadian secretion of melatonin.

Methods: Study group consisted of 23 patients with OSAS, mean age 49 ± 9 years, mean BMI 32.7±5.9 kg/m2, mean AHI 45±22.8. OSAS was diagnosed with full polysomnography. Control group consisted of 18 subjects with excluded OSAS, mean age 43 ± 13 years, mean BMI 28.7±4 kg/m2, mean AHI 2.5±2.1. In the study group melatonin secretion was assessed by radioimmunoassay method (RIA) at 6 time points twice: before and after 3 months treatment with nCPAP.

In the control group circadian profile of melatonin secretion was determined once.

Results: Melatonin concentration (pg/ml) at 2.00, 6.00, 10.00 am, and 2.00, 6.00, 10.00 pm were: in the study group 91,8±70,7, 43,6±27,6, 16,6±11,9, 43,6±27,6 respectively. In the study group mean concentration of melatonin at 2.00 am and 6.00 am was significantly lower than in the control group, p<0.04 and p<0.02 respectively.

After 3 months of effective CPAP treatment there was no significant change in the concentration of melatonin at 6 time points and time of peak of melatonin secretion.

Conclusion: Effective CPAP treatment does not influence circadian secretion of melatonin in moderate to severe OSAS.

P7 - Dysfunction in pituitary-gonadal axis associated to obstructive sleep apnea syndrome (OSAS) and response on continuous positive airway pressure (CPAP) therapy

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Keywords: Obstructive Sleep Apnoea, Therapy and Treatment

Background: OSAS was associated with low serum testosterone (T) levels. Aim: To determine T deficiency and depressive mood in OSAS men and to investigate the impact of CPAP therapy on T and luteinizing hormone (LH) and on depressive status of the patients after 2 months therapy.

Methods: We selected 70 males (n1) with OSAS. Only 36 (n2) agreed CPAP therapy. Study included 20 normal men (n3). We determined T and LH from blood samples collected between 7 and 8 AM at diagnosis (for n1 and n3) and after 2 months CPAP therapy (for n2).

Results: The mean T in n1 was 3.22±1.31 ng/dl. Mean LH was in normal ranges. In addition, 61.4% had T under lower limit. After CPAP, T mean increased to 3.90±1.22 ng/dl. Group n1 recorded a strong correlation between T and AHI (apnea-hypopnea index) (r=-0.41, p<0.001), microarousals (r=-0.36, p<0.002), desaturation index (DI) (r=-0.45, p<0.002), BDI (r=-0.47, p<0.001). Comparing OSAS (n1) and normal (n3), using paired samples t-test, it shows difference significant for T (CI=95%, p=0.015) and BDI. Comparing results after 2 months CPAP (n2) with initial values from n1, resulted in significant differences for T (p<0.001) and BDI (p=0.001).

Conclusion: OSAS men is associated with T deficiency. T correlations prove that sleep fragmentation, hypoxia and obesity are responsible for the suppression of T and depressive mood in OSAS. We noticed that CPAP therapy improves T with positive impact on psychological status in OSAS patients.

P8 - Growth and Sleep impairment are related to Reduced Hypothalamic Growth Hormone Releasing Hormone in Chronic Obstructive Sleep Apnea Syndrome

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Keywords: Intermittent Hypoxia, other Experimental Models, Obstructive Sleep Apnoea

Introduction - Growth retardation is a significant morbidity in children with sleep-disordered breathing (SDB). The reduction of serum insulin-like growth factor-1 (IGF-1) in children with SDB is related to reduction of slow wave sleep (SWS). Chronic airway loading (CAL) in juvenile rats, a model of SDB, is associated with impaired longitudinal growth. In the present study we explored whether CAL affects hypothalamic growth hormone releasing hormone (GHRH) that regulates both sleep and GH homeostasis.

Methods - The trachea of 22-day-old rats were obstructed by tracheal banding (n=20 sham controls, n=21 CAL), and animals were returned to their cages for 12:12 h light dark cycle. Sixteen days after CAL surgery animals were sacrificed. Sleep architecture, serum GH, IGF-1, and hypothalamic GHRH mRNA were analyzed.

Results - In CAL group inspiratory swings in esophageal pressure and tracheal resistance were increased and respiratory rate was decreased. Body weight, testis and tibia length gains were all 30% to 40% lower in the CAL group. Serum GH and IGF-1 levels decreased by 38% and 32%, respectively, in CAL animals. Hypothalamic GHRH mRNA levels decreased in CAL rats by 22%. CAL led to sleep

Sleepiness Scale was negatively correlated by duration of use in the 6th month (r=−0.524, p<0.0001).

In conclusion, it was found that adherence rate to PAP therapy can be improved by visual education. The patients with a significant improvement in excessive daytime sleepiness and other OSAS symptoms and with fewer side effects were more compliant to PAP therapy.

P6 - Adherence to positive airway pressure therapy in obstructive sleep apnea syndrome: effect of visual education

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Keywords: Obstructive Sleep Apnoea, Therapy and Treatment

Positive airway pressure (PAP) therapy is the most effective treatment in obstructive sleep apnea syndrome (OSAS) although it is known that adherence to therapy is limited. The aims of this study were to evaluate the rate of PAP adherence and to assess the effect of visual education and other factors on adherence in patients given PAP therapy.

Out of 133 consecutive patients with moderate-to-severe OSAS, 66 were informed about OSAS and PAP therapy by the doctor and received visual education by videotape, whereas only information was given to 67 of them. The patients were followed-up in the 1st, 3rd and 6th months to evaluate the adherence rate and parameters that can affect therapy.

After six-month follow-up, adherence rate to PAP therapy was 71.2% in the visual education and 56.2% in the control group (p=0.08). When 85 patients using the device effectively were compared to 48 that can affect therapy.

Conclusions: OSAS and other co-morbidities are frequent in acromegaly. Most patients are obese female with few symptoms and less somnolence, decreased oxygen desaturation, high prevalence of systemic hypertension, mostly resistant.

P5 - Influence of nasal continuous positive airway pressure on circadian profile of melatonin secretion in patients with OSAS

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Keywords: Obstructive Sleep Apnoea, Therapy and Treatment

Continuous positive airway pressure (CPAP) therapy is considered the gold standard treatment for obstructive sleep apnea syndrome (OSAS) and response on continuous positive airway pressure (CPAP) therapy

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Keywords: Obstructive Sleep Apnoea, Therapy and Treatment

Introduction: Some endocrine disorders are associated with sleep disordered breathing. Melatonin is a cyclically secreted hormone controlling a rhythm of sleep and waking.

Aim: Aim of the study was to investigate profile of melatonin secretion in patients with OSAS and to assess effect of CPAP treatment on circadian secretion of melatonin.

Methods: Study group consisted of 23 patients with OSAS, mean age 49 ± 9 years, mean BMI 32.7±5.9 kg/m2, mean AHI 45±22.8. OSAS was diagnosed with full polysomnography. Control group consisted of 18 subjects with excluded OSAS, mean age 43 ± 13 years, mean BMI 28.7±4 kg/m2, mean AHI 2.5±2.1. In the study group melatonin secretion was assessed by radioimmunoassay method (RIA) at 6 time points twice: before and after 3 months treatment with nCPAP.

In the control group circadian profile of melatonin secretion was determined once.

Results: Melatonin concentration (pg/ml) at 2.00, 6.00, 10.00 am, and 2.00, 6.00, 10.00 pm were: in the study group 91,8±70,7, 43,6±27,6, 16,6±11,9, 43,6±27,6 respectively. In the study group mean concentration of melatonin at 2.00 am and 6.00 am was significantly lower than in the control group, p<0.04 and p<0.02 respectively.

After 3 months of effective CPAP treatment there was no significant change in the concentration of melatonin at 6 time points and time of peak of melatonin secretion.

Conclusion: Effective CPAP treatment does not influence circadian secretion of melatonin in moderate to severe OSAS.
fragmentation, i.e., there was 25% elevation in wakefulness and 15% reduction of SWS duration during 12 hrs light onset. EEG power density during the first 3 hrs of light on was 40% lower in the CAL group in the range of 0.5–4 Hz.

Conclusion - CAL impairs sleep architecture and the GH/IGF-1 axis, and is associated with somatic growth retardation. Underlying mechanisms may involve reduction of hypothalamic GHRH that regulates both GH level and sleep architecture/consolation.

P9 - TSH and thyroid hormones concentration in patients with OSAS
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Keywords: Obstructive Sleep Apnoea, Physiology and Pathophysiology

Background: Hypofunction of thyroid gland is one of risk factors for obstructive sleep apnoea (OSA). However, investigations on relationship between hypothyroidism and sleep-disordered breathing are discordant.

Aim: Aim of this study was to assess function of the thyroid gland in a large nonselected group of patients with OSA and to analyse relationships between TSH and thyroid hormones levels and severity of OSA.

Patients and methods: 813 patients with diagnosed OSA. Mean antropometry and polysomnography data were: age 54±10 years, BMI 33.1±6, Epworth Score 12.8±6, AHI 44±24, mean SpO2 89.6±6%. All patients had thyroid-stimulating hormone (TSH), free triiodothyronine (fT3) and free thyroxine (fT4) serum concentrations measured at a time of OSA diagnosis.

Results: TSH was normal in 91.9%, elevated in 3.7%, low in 3.9%. fT3 was normal in 87.8%, low in 6.2 %, elevated in 6.0%. fT4 was normal in 87.1%, low in 9.7% and elevated in 2.8%. Relationships between thyroid function and severity of OSA are shown on Table 1. Significantly correlations for p<0.05

<table>
<thead>
<tr>
<th></th>
<th>TSH conc.</th>
<th>FT3 conc.</th>
<th>FT4 conc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epworth Score</td>
<td>-0.0367</td>
<td>-0.1241</td>
<td>-0.1694</td>
</tr>
<tr>
<td>NS</td>
<td>p=0.046</td>
<td>p=0.006</td>
<td></td>
</tr>
<tr>
<td>AHI</td>
<td>0.0355</td>
<td>0.1188</td>
<td>0.0505</td>
</tr>
<tr>
<td>NS</td>
<td>p=0.001</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Time SpO2&lt;90%</td>
<td>-0.0004</td>
<td>-0.0251</td>
<td>0.0781</td>
</tr>
<tr>
<td>NS</td>
<td>NS</td>
<td>p=0.032</td>
<td></td>
</tr>
<tr>
<td>Mean SpO2(%)</td>
<td>0.0310</td>
<td>0.0324</td>
<td>0.0773</td>
</tr>
<tr>
<td>NS</td>
<td>NS</td>
<td>p=0.035</td>
<td></td>
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</table>

AHI- apnea-hypopnea index, Time SpO2<90%- percentage of sleep time spent in desaturation<90%, Mean SpO2- mean SpO2 during sleep, ns- not significant (p>0.05)

Conclusions: Our study did not confirm that thyroid gland hypofunction is related to severity of OSA. Although some correlations were statistically significant they were below clinical value except of low fT3 and elevated Epworth score.

P10 - Can a simple retinography predict carotid artery stenosis in severe OSAS patients?
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Keywords: Obstructive Sleep Apnoea, Diagnostic

Carotid stenosis is frequent and often unacknowledged in severe OSAS patients. Ultrasonographic evaluation of the carotid arteries is the fastest way to disclose a different level of stenosis in absence of clinical symptoms but not all OSAS patient undergo to this examination. Nocturnal hypoxemia related to OSAS can induce retinal vessel constriction with a reduction of artero-venous ratio (AVR) evaluated by retinography. Aim of this study was to evaluate in severe OSAS patients a correlation between a severe constriction of AVR index (<75) and carotid stenosis , with ultrasonography of the carotid arteries. 30 obese patients (BMI 35±18 kg/m2), aged from35 to 60 years, non smokers, non diabetics, non cardiopathics, non hypertensive, diagnosed for severe OSAS (AHI=43.5±22/h) after a polysomnography, underwent retinography of the two eyes with Topcon TCR NW200 non mydriatic retinal camera (after 8 h abstention from coffee and beta stimulating drugs assumption.) 27/30 patients with a severe constricted AVR index (< 75)undertook ultrasonographic evaluation of the carotid arteries. In 70% (20/27) ofthis patients ultrasonographic evaluation revealed the presence of stenosis of at least one of the two carotids.In conclusion the pathological constriction of retinal vessels could be an indirect evidence of carotid artery stenosis, and could help to decide which patients submit to an ultrasonographic evaluation ofcarotid arteries, and when to begin the treatment with disaggregation drugs.

P11 - Metabolic phenotype and adipose tissue inflammation in patients with chronic obstructive pulmonary disease
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Keywords: Physiology and Pathophysiology

Potential links between metabolic derangements and adipose tissue (AT) inflammation in patients with chronic obstructive pulmonary disease (COPD) are unexplored.

We investigated AT expressions of interleukin (IL)-6, tumor necrosis factor (TNF)-α, CD68 (macrophage cell surface receptor), leptin, proapoptotic caspase-3 and Bax, and their relationships to the metabolic phenotype in 9 cachectic, 12 normal-weight, 12 overweight, and 11 obese patients with COPD (age 62.3±7.2 years). Insulin sensitivity was assessed using euglycaemic hyperinsulinemic clamp, resting energy expenditure (REE) using indirect calorimetry with a ventilated hood system.

With increasing body mass index, increases in AT expressions of IL-6, TNF-α, and CD68 were observed (ANOVA for trend, p<0.001; p=0.008; p<0.011, respectively) in association with reduced insulin sensitivity (p<0.001) and reduced REE/kg (p<0.011). Inverse relationships were observed between REE/kg and fat mass, AT expressions of leptin and serum leptin levels (R=-0.538; p<0.001; R=-0.458; p=0.002, R=-0.522; p<0.001, respectively). No differences were observed between cachectic and normal-weight patients in AT expressions of inflammatory or proapoptotic markers. Adipose tissue TNF-α and CD68 expressions predicted insulin sensitivity independently of known confounders (p=0.006; p=0.012; R2=0.807).

Our results suggest that AT inflammation in obese COPD patients relates to insulin resistance, and increased expression of leptin is related to the metabolic rate. Cachectic patients remain insulin sensitive, with no AT upregulation of inflammatory or proapoptotic markers.

Support: APV-0122-06, VEGA 1/0348/09 and 1/0227/11, Slovakia.

P12 - Sleep-disordered breathing in acute stroke is highly prevalent and is associated with stroke severity
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Keywords: Diagnostic

Introduction - Stroke represents the first (independent) main cause of mortality and morbidity in Portugal. Sleep Apnea Syndrome (SAS) has been diagnosed in stroke patients.

Aim - Determine the incidence of SAS in the first 48 hours of acute stroke and compare subjects with and without SAS.

Methods - Consecutive patients with acute stroke (n=34) admitted to a stroke unit were prospectively evaluated for sleep cardiorespiratory indices using portable monitoring (Embla, Embia Systems, Broomfield, CO) within 48 hours following physician confirmation of the diagnosis. All studies were scored manually for respiratory events according to ASM (2007) criteria using RemLogic (Embla Systems, Inc, Broomfield, CO). SAS was defined when the
apnea hypopnea index (AHI) was ≥5 events per hour. Body Mass Index (BMI), Neck Circumference (NC), Stroke Severity measured with NIH Stroke Scale (NIHSS), glycemia (mg/dl), Cheyne Stokes Breathing% (CSB%) were analyzed.

Results - Incidence of SAS was 61.8% (21 of 34 subjects) with 81% of the SAS patients having predominantly obstructive sleep apnea (OSAS) and the other 19% central sleep apnea (CSAS). Independent t-test showed that the BMI (p=0.027), NC (p=0.002) and NIHSS (p=0.011) were significantly reduced in subjects without SAS. The average of CSB% in all SAS patients was 25.9% while in the OSAS patients was 19.1% and in CSAS patients was 56.4%. There was a trend towards higher glycemic values in patients with SAS (p=0.055).

Conclusion - In our population of acute stroke patients, 61.8% show SAS, mostly obstructive type. More than half of CSAS have CSB. Stroke subjects with SAS had higher BMI, NC and higher NIHSS compared to those without SAS.

P13 - Sleep disordered breathing in TIA/ischemic Stroke: effects on short- and long-term outcome and CPAP treatment efficacy - SAS CARE study

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Methods All patients underwent polysomnography. Snoring frequency and intensity were scored. We included snorers without OSAS and patients with mild, moderate and severe OSAS. All participants were trained in playing the didgeridoo using the technique of circular breathing and practiced for 4 months. After training the instructors judged whether the participant was able to perform the circular breathing technique correctly.

Results 50 patients (85% male) were included. 34 patients finished the complete trial. 21 patients had an AHI > 5. Of all participants, 15 (30%) were able to perform circular breathing at the end of the course. Among patients with OSAS, we found no significant decrease in AHI (from 8.52 to 6.83;p=0.14). The snoring intensity decreased from 8.46 to 5.75;(p=0.01).

Conclusion Playing the didgeridoo did not reduce AHI but did reduce snoring in patients with OSAS. In snorers without OSAS it significantly reduced the reported snoring intensity. Playing the didgeridoo is time-consuming and difficult to learn, leading to many drop-outs during training. However, oropharyngeal muscle training might be a promising treatment for snoring.

P15 - The Difference Between Patients With Refractory Hypertension And Patients With Controlled Values Of Blood Pressure In A Population With Arterial Hypertension (HT) And Obstructive Sleep Apnea Syndrome (OSAS)

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1 University of Medicine and Pharmacy „Carol Davila”, Bucharest, Romania, 2 National Institute of Pneumology Dr. M. Nasta, Bucharest, Romania, 3 University of Medicine and Pharmacy „Victor Babes”, Timisoara, Romania, 4 Technical University of Civil Engineering, Bucharest, Romania

Methods All patients underwent polysomnography. Snoring frequency and intensity were scored. We included snorers without OSAS and patients with mild, moderate and severe OSAS. All participants were trained in playing the didgeridoo using the technique of circular breathing and practiced for 4 months. After training the instructors judged whether the participant was able to perform the circular breathing technique correctly.

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P14 - Didgeridoo as treatment for OSAS and snoring

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Keywords: Obstructive Sleep Apnoea, Therapy and Treatment

Methods All patients underwent polysomnography. Snoring frequency and intensity were scored. We included snorers without OSAS and patients with mild, moderate and severe OSAS. All participants were trained in playing the didgeridoo using the technique of circular breathing and practiced for 4 months. After training the instructors judged whether the participant was able to perform the circular breathing technique correctly.

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P16 - The Role Of Medical Treatment On Arterial Hypertension (HT) In A Population With Association Of Obstructive Sleep Apnea Syndrome (OSAS)

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1 University of Medicine and Pharmacy „Carol Davila”, Bucharest, Romania, 2 National Institute of Pneumology Dr. M. Nasta, Bucharest, Romania, 3 Technical University of Civil Engineering, Bucharest, Romania

Methods All patients underwent polysomnography. Snoring frequency and intensity were scored. We included snorers without OSAS and patients with mild, moderate and severe OSAS. All participants were trained in playing the didgeridoo using the technique of circular breathing and practiced for 4 months. After training the instructors judged whether the participant was able to perform the circular breathing technique correctly.

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Keywords: Obstructive Sleep Apnoea, Quality of Life

RATIONALE: OSAS and HT commonly coexist and in this group of population antihypertensive medications are relatively ineffective in controlling blood pressure (BP).

METHODS: We performed a retrospective study on 429 patients with OSA, 240 (52.9%) of them with association of HT; from these, 162 patients (67.5%) were treated for HT and 78 (32.5%) were not treated. We studied the differences between patients with treated with BP-lowering drugs and those with untreated HT regarding: demographics, anthropometric data, symptoms, comorbidities, sleep study’s reports and we compare the 2 groups with Chi test, T student test (SPSS).

RESULTS: Patients with OSAS and treated HT compared with untreated patients are more women (M:F ratio of 3:1 vs 5:1), more older (age 55.52±9.8 years), more obese (BMI of 35.22±6.32kg/m2), more never smoker and less active smoker, with more cardiovascular and metabolic comorbidities associated (61.1% dyslipidemia, 25.3% diabetes mellitus, 16 % endocrine diseases, 24.1% abnormal cardiac rhythm, 19.1% heart block, 34.6% ischemic heart disease, 13.2% left heart failure), they were diagnosed for a longer period (8.44±7.42 years), have lower diastolic blood pressure (DBP) but with values above normal (83,11±13,83mmHg), had lower apex index (34,9±21,76/h) and requires a lower pressure on CPAP therapy (10,36±2,04 cmH2O).

CONCLUSIONS: Patients with treated HT had a lower DBP but not normal. Although there are no significant differences between the values of apex hypopnea index, patients treated with BP-lowering drugs have less severe OSAS, the effect of antihypertensive medication on OSA severity requires more study.

P17 - Nocturnal Desaturation For More Than 10% Of Night In Patients With Stable Chronic Obstructive Pulmonary Disease (COPD) Without Indication Of Long-term Oxygen Therapy (LTOT)

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Keywords: Intermittent Hypoxia, other Experimental Models, Therapy and Treatment

Rationale: Studies related to oxyhemoglobin desaturation during sleep are limited.

Method: We analyzed with nocturnal oximetry 20 patients with stable COPD and no indication for LTOT. We studied the differences between population with SaO2<90% for >10% of registration time versus those who did not register this feature (control group) using SPSS (Chi test, student T-test).

Results: 17 men (85%), 3 women (15%), mean age 64.45±9.97 years, body mass index (BMI) 26.18±4.96 kg/m2. All patients had a history of smoking, cough, sputum, 90% effort dyspnea, 10% wheezing, 55% were maximal treated. At 6 minutes walking test (13 patients), 6 patients with increasing SaO2 (46.2%), 7 with desaturation (46.2%), 7 with desaturation index (DI) 30.64 ± 24.30/h (6-128). In multiple linear regression analysis the relationship between AHI and the DI is direct proportional and the correlation is powerful, r=0.53, p=0.008 for the entire population studied (20 patients).

Conclusions: Obese patients are more severely desaturating during sleep due to additional hypoventilation. Further research is needed to elucidate the cost-benefit problem for performing night-oximetry to patients with COPD without LTOT indication and without symptoms of obstructive sleep apnea.

P18 - Treatment of obstructive sleep apnea with a novel, titratable mandibular repositioning appliance: results and evaluation for predictors of treatment success.

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Keywords: Obstructive Sleep Apnoea, Therapy and Treatment

Introduction: Mandibular repositioning appliance (MRA) therapy is a treatment option for patients with obstructive sleep apnea (OSA).

Methods: A titratable, dubocbl MRA, with attachment for adjustment of mandibular protrusion in the frontal teeth area was evaluated (RespiDent Butterfly MRA, Orthodontic Clinics, Antwerp, Belgium). The study sample included 80 patients with OSA (apnea hypopnea index (AHI) >5/h) (age, 47±8 y; Male/Female, 57/23; Body Mass Index [BMI], 27.6±4.2 kg/m²). BMI did not significantly change during treatment. Treatment success was defined as an important reduction of snoring (visual analogue scale (VAS)=5) plus an AHI <5/h with MRA and/or a > 50% reduction in AHI plus a satisfactory decrease of snoring (decrease of VAS with ≥3 points). AHI, BMI, gender and supine-dependence were analysed as predictors for OSA treatment success.

Results: A significant improvement was observed concerning AHI, with decrease from 22±14/h at baseline to 9.6±4.9/h sleep with MRA (p<0.001). The MRA evaluated in this study resulted in a significant reduction in VAS (7±2 at baseline vs 3±2 with MRA; p<0.001). In 52 out of 80 patients (65%) a treatment success was noted. 4 patients failed to continue treatment. In this sample, treatment success could not be predicted based on supine dependent OSA, gender or AHI. The lower BMI at baseline was associated with better treatment success (p<0.05).

Conclusions: The results of this study indicate that treatment with an adjustable MRA is effective in reducing the severity of OSA: 65% of patients were treated successfully. A lower BMI at baseline was significantly associated with better treatment success.

P19 - Nocturnal desaturation analysis at patients with obstructive sleep apnea syndrome and co morbidities

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Keywords: Obstructive Sleep Apnoea, Intermittent Hypoxia, other Experimental Models

AIM: Analysis of oxygen desaturation variables and correlations with apnea – hypopnea index and co morbidities.

METHODS: 817 consecutive patients with suspected obstructive sleep apnea were evaluated with sleep questionnaires, anthropometric measurements, and polysomnography for AHI (apnea-hypopnea index normal 0-4, mild 5-14, and moderate 15-29, severe over 30). We measured the Odds Ratio (O.R) together with 95% confidence interval (95%C.I) in a univariate analysis and the independent variables were used in multiple regression analysis in order to identify the most important predictors.

RESULTS: 748 (91.55%) patients had OSA, 541 males (72.47%), 208 females (27.53%), age 52 ±11.89 years (16-84), AHI 34.10/h ± 27.41, 65,61% with systemic hypertension (SHT), 16,18% with COPD. Mean desaturation (MD) 91,98 ±4,01%, lowest desaturation (LD) 70,49 ±65,61% with systemic hypertension (SHT), 16,18% with COPD. Mean desaturation (MD) 91,98 ±4,01%, lowest desaturation (LD) 70,49 ±65,61% with systemic hypertension (SHT), 16,18% with COPD.

In multiple linear regression analysis the relationship between AHI and the DI is direct proportional and the correlation is powerful, r=0.53, p=0.008 for the entire population studied (20 patients).

Conclusions: The results of this study indicate that treatment with an adjustable MRA is effective in reducing the severity of OSA: 65% of patients were treated successfully. A lower BMI at baseline was significantly associated with better treatment success.
CONCLUSIONS: The desaturation index, mean desaturation and lowest desaturation are significantly different at patients with OSA and co morbidades (systemic hypertension, COPD). The lowest desaturation is an independent predictor for systemic hypertension.

P20 - Long-term facilitation of the phrenic nerve activity in rats following intermittent hypoxia
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Keywords: Intermittent Hypoxia, other Experimental Models, Physiology and Pathophysiology
Background: Long-term facilitation of the phrenic nerve activity (pLTF) is one of the most frequently studied models of respiratory neuroplasticity and a model of obstructive sleep apnea sinec intermittent hypoxia is a prominent feature of sleep-disordered breathing.
Aim: To investigate the effects of urethane and propofol anesthetization on induction of pLTF, as well as to test the possible role of opioid and serotonin 5-HT1A receptors in induction and preservation of pLTF.
Methods: Adult, male, anesthetized, vagotomized, paralyzed, and mechanically ventilated Sprague–Dawley rats were exposed to an acute intermittent hypoxia (AIH) protocol. Peak phrenic nerve activity, burst frequency, and respiratory rhythm parameters were analyzed during hypoxia, as well as at 15, 30, and 60 min after the end of the last hypoxic episode. Intravenous remifentanil and WAY-100635 were used before the onset of the first hypoxic stimulus, and after pLTF was induced to test the possible role of opioid and serotonin 5-HT1A receptors, respectively.
Results: In urethane anesthetized rats there was a significant increase of the phrenic nerve activity following AIH at 60 min indicating pLTF. Propofol, as well as remifentanil and WAY-100635 prevented induction of the pLTF. Additionally, administration of WAY-100635 after pLTF developed impaired preservation of pLTF.
Conclusion: pLTF was induced in urethane anesthetized rats following the specific acute intermittent hypoxia protocol, but not during the propofol anesthesia. Also, there was an important role for opioid and serotonin 5-HT1A receptors in pLTF. The results suggest very sensitive mechanism of respiratory neuroplasticity following the acute intermittent hypoxia stimulus.

P21 - Hypercapnic coma and respiratory failure in a patient with obesity-hypventilation syndrome: Effects of noninvasive positive pressure ventilation
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Keywords: Chronic Respiratory Failure, Obesity Hypoventilation
Introduction: The presence of severe encephalopathy with a Glasgow coma scale (GCS) score <10 points is a contraindication for intermittent hypoxia stimuli.
Aims: The objectives were to investigate the possibility (acceptance of method) of treatment of OHS in children with WPS CPAP (nasal CPAP) which allows to improved PSG parameters, saturation, decrease day time sleeplessness and improve cognitive activity. An attempt to treat OSA should be performed all in children WPS.
Methods: Adult, male, anesthetized, vagotomized, paralyzed, and mechanically ventilated Sprague–Dawley rats were exposed to an acute intermittent hypoxia (AIH) protocol. Peak phrenic nerve activity, burst frequency, and respiratory rhythm parameters were analyzed during hypoxia, as well as at 15, 30, and 60 min after the end of the last hypoxic episode. Intravenous remifentanil and WAY-100635 were used before the onset of the first hypoxic stimulus, and after pLTF was induced to test the possible role of opioid and serotonin 5-HT1A receptors, respectively.
Results: In urethane anesthetized rats there was a significant increase of the phrenic nerve activity following AIH at 60 min indicating pLTF. Propofol, as well as remifentanil and WAY-100635 prevented induction of the pLTF. Additionally, administration of WAY-100635 after pLTF developed impaired preservation of pLTF.
Conclusion: pLTF was induced in urethane anesthetized rats following the specific acute intermittent hypoxia protocol, but not during the propofol anesthesia. Also, there was an important role for opioid and serotonin 5-HT1A receptors in pLTF. The results suggest very sensitive mechanism of respiratory neuroplasticity following the acute intermittent hypoxia stimulus.

P22 - Treatment of obstructive sleep apnea syndrome with continuous positive airway pressure in children with Willi-Prader Syndrome – two case-reports.
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Keywords: Obstructive Sleep Apnoea, Therapy and Treatment
Introduction: Children with WPS are in risk of OSA. It has been reported that treatment with continuous positive airway pressure may potentially reduce consequences of OSA: day time sleeplessness, decreased night time saturation, sympathetic hyperactivity, cognitive performance.
Aims:1) Evaluation of possibility (acceptance of method) of treatment of OSA in children with WPS with CPAP2) Evaluation of influence of the treatment on cognitive and behavior ability of WPS.
Methods: Two children – 6-year-old girl; 13-year-old boy - diagnosed with WPS basing on results of polysomnography examination were qualified for treatment with CPAP. In both cases the autoCPAP device with full face masks was used. The therapy was controlled by polysomnography.
Results: AHI in initial PSG was 57.6, average saturation 93.8%, average desaturation 71% for the girl. For the boy in initial PSG AHI was 86.0 average saturation - 93.2%, average desaturation 4.6%. Both children presented good compliance and acceptance of the CPAP. After two months therapy percent days with device usage was 100 for both children and average usage time was 8 hours 46 minutes for a girl and 9h 12 minutes for a boy. Treatment despite mental retardation. AHI during CPAP therapy was 0.3 for the girl and 0.9 for the boy. Average saturation increase to 96.8% (girl) and 98.3% (boy).
Similarly day time sleeplessness was reduced completely.
Conclusions: Children with WPS presents acceptance of treatment with CPAP which allows to improved PSG parameters, saturation, decrease day time sleeplessness and improve cognitive activity. An attempt to treat OSA should be performed all in children WPS.

P23 - Frequency of prevalence of undiagnosed previously hypothyroidism in the group of patients with the obstructive sleep apnea suspicion.
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Keywords: Obstructive Sleep Apnoea
Background: Symptoms of hypothyroidism can be similar to symptoms of OSA. Moreover hypothyroidism, particularly a myxoedema can cause or escalate the obstructive sleep apnea. A proper treatment can reverse these situations.
Aim: The estimation of the usefulness of TSH screening in the group of patients with OSA suspicion.
Methods: All patients with OSA suspicion were qualified to this examination. People with diagnosed thyroid diseases were excluded. All patients were subject to following examination: the polysomnography and TSH level analyze. There were 232 patients examined: 52 women and 180 men.
Results: The presence of OSA was confirmed in 213 cases. This illness was excluded in 19 cases. Average AHI in the study group was 34.8 Hypothyroidism was diagnosed in two cases and hyperthyroidism in seven (10.6% of prevalence). The study group was divided into two subgroups: person with and without excessive daily somnolence. All patients with hypothyroidism were in the subgroup with excessive daily somnolence. According to our examination it is necessary to examine 116 patients.
with OSA suspicion in order to find one person with previously undiagnosed hypothyroidism. Similarly it is necessary to examine 85 patients with OSA suspicion and excessive daily somnolence in order to find one person with previously undiagnosed hypothyroidism. Conclusions: The TSH screening of all OSA suspected patients is a subject to discussion. Searching for additional factors which narrow down the group of TSH-tested patients appears to be very important.

P24 - Psychologic profile in patients with obstructive sleep apnea syndrome

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Keywords: Obstructive Sleep Apnoea, Quality of Life

We attempted to investigate the psychologic profile, namely anxiety (using the Spielberger’s Trait Anxiety), depression (using the Beck Depression Inventory) and alexithymia (using the Toronto Alexithymia Scale) in patients with newly diagnosed obstructive sleep apnea syndrome (OSAS). We report here our preliminary results from 20 consecutive patients (age 47±7 years, Apnea-Hypopnea Index (AHI) 59±18 events/hour, no cardiac or other comorbidities) who have performed overnight polysomnography due to symptoms, such as snoring, disrupted sleep, witnessed apneas, morning headache, morning fatigue and daily hypersomnolence (Epworth Scale ≥ 12). We have found that 55% of patients had clinically meaningful anxiety, 60% depression and 50% alexithymia. Apart from a correlation between anxiety and sleep latency, there was not any other correlation between the abovementioned psychologic measures and age, AHI, oxygenation parameters, such as the average pulse oxygen saturation (avg SpO2), the lowest SpO2, and the % of total sleep time (TST) with a SpO2<90%, sleep latency and sleep efficiency. We found a cut-off level of AHI≥70 events/hour and age≥58 years old where all 6 patients in that specific subgroup had anxiety, depression and alexithymia. In conclusion, anxiety, depression and alexithymia are significantly more common in patients with OSAS as compared to the general population. Older age and more severe OSAS are factors predisposing to these psychologic disturbances. However, no direct correlation has been reevaluated between the psychologic profile and severity of OSAS, abnormal oxygenation or sleep quality. It seems that other factors, unknown as of yet, may play a role.

P25 - Endothelial Dysfunction in patients with obstructive sleep apnea

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Keywords: Physiology and Pathophysiology, Obstructive Sleep Apnoea

Background: Obstructive sleep apnea (OSA) influences endothelial function and causes cardiovascular diseases. Objectives: our aim was to assess the prevalence of endothelial dysfunction in patients with Obstructive sleep apnea. Methods: Twenty-seven obese patients with OSA and 26 healthy obese subjects were investigated. The presence or absence of OSA was evaluated with a sleep study. Endothelial function was investigated with brachial artery ultrasound examination. Results: Baseline characteristics were equivalent between the two groups. Minimal oxygen saturation and apnea-hypopnea index in the OSA and control groups were [72.1 ± 11.6 versus 86.5 ± 4.5 %, (P =0.000] and 27.9 ± 23.1 versus 2.0 ± 1.5, (P = 0.000) respectively. There was no statistically significant difference in percentage change 2 of BAdS:nitrates between patients and control groups (P=0.05) i.e. endothelial independent dilatation. Flow-mediated dilatation (FMD) percentage change 1 showed highly significant lower in OSA patients in comparison to control group [Mean=SD: 3.1±2.8 vs 10.6±6.9, (P=0.000)] respectively. i.e. endothelial dysfunction. Conclusions: We detected a prominent deterioration in endothelial function in obese OSA patients compared with healthy obese subjects. This deterioration may occur due to ongoing hypoxemia and it may be a possible cause of cardiovascular diseases in patients with OSA.

P26 - Oxidative stress in patients with moderate to severe obstructive sleep apnea

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Keywords: Obstructive Sleep Apnoea, Physiology and Pathophysiology

Background: Obstructive sleep apnoea is considered a risk factor for hypertension, myocardial infarction, stroke, and increased mortality. Intermittent hypoxia results in oxidative stress, which in turn is linked to the pathogenesis of hypertension and endothelial dysfunction. Objective: The aim of this work is to evaluate the oxidative stress in patients with moderate to severe OSA by measuring the level of some antioxidants in the blood (Superoxide Dismutases, and Reduced glutathione, and the plasma levels of malondialdehyde (MDA) as a marker of oxidative stress and its association with vascular insults. Subjects and Methods: this study included 30 patients with moderate to severe OSA and 15 obese controls. They were subjected to clinical assessment, anthropometric evaluation, polysomnography with AHI, MinO2 saturation and Oxygen desaturation index (ODI) recording, and measurement of SOD, GTPx and MDA as markers of oxidative stress Results: nine patients (30%) had evidence of vascular ischemia (whether cerebral or cardiac). A high statistically significant difference was detected between patients with OSA and controls in the mean values of MDA, GTPx and SOD. A significant correlation was detected between oxidative stress markers and both anthropometric measures and polysomnographic parameters. Patients with vascular insult have significantly more oxidative stress in comparison to those without vascopathy. Conclusion: We can conclude that patients with moderate to severe OSA have significant oxidative stress in comparison to obese controls. These findings may explain the occurrence of cardiovascular and neurovascular complications of OSA patients and further throw light on the management strategy.

P27 - Chronic alcoholism affects adversely the course of narcolepsy with cataplexy. A case.

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Keywords: Narcolepsy with cataplexy, Alcohol abuse, REM sleep abnormalities

Background: The coincidence of both of the disorders led to full social disability and isolation of the patient. The cumulation of REM abnormalities (unusual predisposition to transition rapidly from wakefulness into REM and dissociated REM sleep events) result into core narcolepsy symptoms. REM abnormalities were also documented in chronic alcoholism. Alcohol-ics showed significantly reduced stage 2 and 3 NREM sleep, latency to the onset of REM sleep, but increased REM pressure. The possible interactions in the course of narcolepsy with cataplexy in the case of a male with alcohol dependence are discussed. The diagnose of narcolepsy was stated in 44-year-old male in 2007 based on 4 years lasting history of excessive daytime sleepiness (EDS) and sporadic cataplectic attacks, and polysomnography followed by MHIT (mean sleep latency: 3.2 min, 3 SOREMs). The cumulation of the cataplexy up to 40 attacks per day was the primary reason for polysomnographic examination of the patient during mild alcohol withdrawal syndrome. Administered antidepressants SSRI (citalopram) reduced their number to 1 attack per day. In 2008 was patient admitted to the hospital because of increase number of cataplexy accompanied irregular citalopram intake and complaints on vivid aggressive dreams. Video-polysomnography showed SOREM, disturbed night sleep and abnormal motor behavior accompanied by increased muscle tone during REM. Citalopram was replaced by anafanil. In 2009 the patient was examined after first generalized tonic- clonic seizure of toxic alcohol origin, being complaining on severe sleepiness. Moderate obstructive sleep apnea was shown to participate on daytime sleepiness. Alcohol dependence limited EDS treatment. The coincidence of both of the disorders led to full social disability and isolation of the patient.
P28 - Evolution of treatment with CPAP over 21 months of follow-up in patients with Sleep Hypopnea Syndrome
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Keywords: Obstructive Sleep Apnoea, Therapy and Treatment

OBJECTIVES: 1) Analyse the evolution of the hours/days ratio of the use of CPAP in patients with sleep apnea hypopnea syndrome over a period of 21 months. 2) Study the factors related to poor treatment compliance (<3.5 hours/night)

MATERIAL AND METHOD: A total of 83 patients with sleep apnea hypopnea syndrome (AHI 49 ± 22 h-1) treated with CPAP were included. The utilisation ratio of CPAP was recorded at 3, 6, 9, 12, 15, 18, and 21 months. Anthropometric and socio-work variables were also recorded, as well as sleep and CPAP parameters, Epworth, comorbidity and evolution.

RESULTS: The ratio (hours/day) of real use of CPAP at 3, 6, 9, 12, 15, 18, and 21 months was: 4.9±2.3; 5.1±2.2; 5.3±2.5; 5.2±2.4; 5.3±2.5; 5.2±2.5. A univariate analysis and another adjusted by variables showed that the time of use did not differ significantly over the 21 months.

Patients who did not comply with treatment (31.6%; use < 3.5 h/d) had a lower cervical perimeter (36.6±13 vs 44.7±3.6; p<0.03), lower AHI (38.9±20.1 vs. 53.8±21.5; p<0.005), greater minimum SpO2 (81.2±4.2 vs. 66.5±17.4; p<0.016), lower desaturation index (37.5±17.4 vs. 59±27.9; p<0.007) and lower CPAP pressure (7.8±1.0 vs. 8.8±2.2; p<0.046). The saturation index was an independent predictor of poor treatment compliance (r²=0.465; p=0.003).

CONCLUSIONS: 1) The CPAP use pattern 3 months after starting treatment is stably maintained over a 21 - month period. 2) Those who did not comply with treatment presented less serious sleep parameters, lower cervical perimeters, and lower prescribed CPAP pressure than those who complied.

P30 - Airflow in heavy and light snorers during 3 hour long spirometry in a horizontal position.
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Keyword: Physiology and Pathophysiology

Objective: The study is designed to investigate the airflow characteristics of heavy and light snorers in resting position.

Subjects and methods: 52 patients qualified for sino-nasal procedures in our clinic underwent a 3 hour long spirometry. A specially designed mask was used to divide the nasal and oral airflow. Before the study each patient filled a medical history questionnaire that included VAS evaluation of sino-nasal symptoms severity.

RESULTS: In obese patients (BMI>=30) we observed a statistically significant difference in nasal TV (Total Volume) to total TV ratio (p=0.036), nasal PIF (Peak Inspiratory Flow) (p=0.026), oral PIF (p=0.004), oral TV (p=0.002) and oral VE (Expiratory Volume) (p=0.005) and in percentage of breaths taken by both mouth and nose (p=0.021). Nasal TV to total TV ratio was negatively correlated with weight (p=0.029; R=-0.30) and BMI (p=0.006; R=-0.37). Also weight and BMI were correlated with nasal PIF (p=0.006; R=0.3785 and p=0.012; R=0.3472) and oral PIF (p=0.003; R=0.4076 and p=0.0001; R=0.4957).

Conclusions: Overweight and obese patients have a tendency for a mouth breathing when in horizontal position. This is associated with a decrease of nasal airflow and increase in oral airflow. In conclusion the spirometry findings correspond with frequently studied association of obesity and OSAS.

P31 - Obesity effecting the nasal and oral spirometry at rest in horizontal position.
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Keywords: Obstructive Sleep Apnoea, Quality of Life

Objective: The study is aimed to investigate the influence of obesity on nasal and oral airflow ratio and other spirometry parameters recorded separately for the nasal and oral flow channel.

Subjects and methods: 30 overweight patients (BMI>=25 including 17 obese BMI>=30 patients) and 41 normal weight patients (BMI<25) qualified for sino-nasal procedures in our clinic underwent a 3 hour long spirometry lying in bed in horizontal position. A specially designed mask was used to divide the nasal and oral airflow. Before the study each patient filled a medical history questionnaire that included VAS evaluation of sino-nasal symptoms severity.

Students T-test or Mann-Whitney test was used for comparison of continuous variables as appropriate. Spearman rank correlation coefficients were used for estimation of possible interrelations.

Results: In obese patients (BMI>=30) we observed a statistically significant difference in nasal TV (Total Volume) to total TV ratio (p=0.036), nasal PIF (Peak Inspiratory Flow) (p=0.026), oral PIF (p=0.004), oral TV (p=0.002) and oral VE (Expiratory Volume) (p=0.005) and in percentage of breaths taken by both mouth and nose (p=0.021). Nasal TV to total TV ratio was negatively correlated with weight (p=0.029; R=-0.30) and BMI (p=0.006; R=-0.37). Also weight and BMI were correlated with nasal PIF (p=0.006; R=0.3785 and p=0.012; R=0.3472) and oral PIF (p=0.003; R=0.4076 and p=0.0001; R=0.4957).

Conclusions: Overweight and obese patients have a tendency for a mouth breathing when in horizontal position. This is associated with a decrease of nasal airflow and increase in oral airflow. In conclusion the spirometry findings correspond with frequently studied association of obesity and OSAS.

P32 - Frequency of the systemic disease coincidence in patients with obstructive sleep apnea
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Keyword: Obstructive Sleep Apnoea

The aim of this study is to determine coincidental systemic disease frequency in patients with OSAS. Patients who have undergone PSG during the last year were evaluated for demographic data and their coincidental diseases were noted retrospectively.

A total of 84 patients (54M/30F (62OSAS/ 22 habitual snoring)) included. There were no significant difference found in terms of mean age and BMI between the OSAS and habitual snoring groups. 57 patients (67.9%) were suffering from at least one systemic disease.

Systemic diseases were HT (38.1%), GERD (26.2%), depression (19%), atherosclerotic heart disease (9.5%), diabetes mellitus (8.3%), COPD (8.3%), asthma (7.1%), heart failure (4.8%), hypothyroidism (4.8%) and hyperlipidemia (3.6%) in our study group. While systemic diseases were more common in OSAS group (74.1%) than in habitual snoring group (50), only HT was significantly higher in OSAS patients (p=0.006), HT, atherosclerotic heart disease, heart failure and hyperlipidemia combined as a subgroup of “cardiovascular diseases” and when patient groups were evaluated for cardiovascular disease diagnoses, 35 patient in OSAS group (56.4%) and 4 patients in habitual snoring (18.2%) were suffering at least one of these diseases. All domains were evaluated for coincidental cardiovascular diseases risk and age, smoking and ESS were found significant factors over this disease subgroup. Systemic disease frequency is higher in patient with OSAS. Especially cases with symptomatic OSAS have a higher risk for coincidental cardiovascular disease. Any OSAS patient should be evaluated for these frequent diseases which have an effect on the mortality and morbidity of the patient, carefully.
P33 - Effects of Age on the Polysomnographic Findings of Patients with Obstructive Sleep Apnea Syndrome
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**Keyword:** Obstructive Sleep Apnoea

Background: Aging is a risk factor for obstructive sleep apnea syndrome (OSAS); and there is limited data about differences of polysomnographic (PSG) findings of OSAS patients from distinct age groups.

**Aim:** To evaluate the differences of PSG findings of elderly patients compared to young and middle-aged patients with OSAS.

**Methods:** Anthropometric and overnight PSG findings of 341 patients (Male/Female:258/83; 20-44 yrs (n=94), 45-64 yrs (n=210), 65-84 yrs (n=37)) diagnosed with OSAS (apnea hypopnea index(AHI)>5 events/h) were retrospectively analyzed.

**Results:** Body mass index and the proportion of obese and morbid obese patients were lower in young group than the other groups(p<0.01). Waist circumference was higher in elderly than other 2 groups (p<0.05). There was no significant difference in AHI among three groups (p=0.48); however, AHI during REM sleep was significantly lower in young group than the others (p<0.05). Apnea duration and percentage of time below 90% oxygen saturation was longer in middle aged and elderly patients compared to young ones; whereas average oxygen saturation and lowest oxygen saturation was lower (p<0.05). Total sleep time (r=-0.28; p<0.001) and sleep efficiency (r=-0.35; p<0.001) were decreased with aging, as number of awakenings (r=0.26; p<0.001) and wake time after sleep onset (r=0.33; p<0.001) were increased.

**Conclusion:** Central obesity was observed more often in older groups. Apnea duration and nocturnal oxygen desaturation were similar in elderly and middle-aged ones; and they were longer and more prominent, respectively, compared to young group. Increase in disruption of the sleep architecture with aging was detected, in parallel to the literature.

P34 - Excessive Daytime Sleepiness in Patients with Obstructive Sleep Apnea: Polysomnographic Findings
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**Keyword:** Obstructive Sleep Apnoea

**Introduction:** Excessive daytime sleepiness (EDS) is one of the major symptoms of obstructive sleep apnea (OSAS); however it has not been reported in all patients.

**Aim:** To explore the polysomnographic (PSG) findings predicting EDS in patients with OSAS.

**Methods:** Two hundred consecutive patients diagnosed with OSAS at Baskent University Hospital, Adana, Turkey were enrolled to the study. EDS was defined as Epworth Sleepiness Scale Score (ESSS) being more than 10. The demographic and PSG findings of patients with and without EDS were compared retrospectively.

**Results:** Eighty-nine patients with EDS (mean ESSS:15.4±3.2) and 121 patients without EDS (mean ESSS 5.7±2.9) were compared. The mean age of all patients was 50±10 years, and 78% of the patients were male. There were no significant differences in mean age, body mass index and gender between groups. Higher sleep efficiency, and shorter sleep latency and duration of N1 stage have been detected in patients with EDS, compared to patients without EDS (p<0.05). The apnea-hypopnea index (AHI) (p<0.001), maximum duration of apnea (p<0.001), oxygen desaturation index (p<0.001) and periodic leg movement index (p<0.05) were higher in group with EDS; whereas mean sleep oxygen saturation (p<0.05) and minimum oxygen saturation (p<0.01) were lower. According to multiple linear regression analysis, AHI and duration of N1 stage sleep were determined to be the predictors of EDS.

**Conclusion:** EDS is associated with sleep disruption secondary to respiratory events, oxygen desaturation and periodic limb movements. AHI might be the main polysomnographic finding as a determinant of EDS.

P35 - Gender Differences in Obstructive Sleep Apnea in Turkish Population: Data from a Tertiary Sleep Disorders Unit
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**Keyword:** Obstructive Sleep Apnoea

**Introduction:** Gender difference has been shown to have an impact on polysomnographic (PSG) findings; however this effect might differ regionally.

**Aims:** To examine anthropometric and PSG differences between men and women living in southern Turkey.

**Methods:** The PSG and anthropometric measurements of a cohort of 341 patients (83 female, 258 male) diagnosed with obstructive sleep apnea syndrome (OSAS) by overnight PSG, done within 18 months at Baskent University Hospital, Adana, Turkey, were analyzed retrospectively.

**Results:** Female patients were older than males (55.6±8.8 vs 48.9±10.4 year, p<0.001), and body mass index was higher in females (37.3±7.3 vs 32.3±5.2 kg/m2, p<0.001). There was no significant difference between genders for proportion of patients with neck circumference higher than normal limits. The apnea-hypopnea index (AHI) was higher in females, however this was not significant (33.0±26.9 vs 38.8±26.7 events/h; p=0.09). REM-related OSAS was detected more in females compared to males (43.4 vs 17.5%, p<0.001); whereas positional OSAS was less in females than males (30.4 vs 47.6%, p<0.01). The sleep architecture of women was worse in several aspects compared to men: total sleep time (305.9±46.4 vs 323.7±39.8 min, p<0.05), sleep efficiency (82.5±13.2 vs 88.4±9.9%, p<0.001), sleep latency (16.2±10.8 vs 10.7±22.5 min, p<0.05), wake after sleep onset (53.7±45.7 vs 37.3±36.7 min, p<0.005).

**Conclusion:** Gender differences in patients with OSAS from southern Turkey observed in levels of obesity and some PSG findings were similar with most of the universal data, however a variance in data published from Turkey was detected. Further studies are required to signify this difference.

P36 - Effect Of nCPAP Therapy On Depressive Symptoms In Patients With OSA
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**Keywords:** Obstructive Sleep Apnoea, Therapy and Treatment

**AIMS:** Patients with obstructive sleep apnea often suffer from depressive symptoms. The coincidence of OSA and depression could be observed in a 4 month trial in our center of sleep medicine in 2008. 24.1% (n=77) of 320 patients with OSA (AHI > 10/h) fulfilled the criteria of depression considering ICD 10. Subsequent to this prevalence survey we performed an intervention study with CPAP-treatment.

**PATIENTS AND METHODS:** We included 60 Patients (23 [male] 16; [female], mean age 54.77±9.98) with OSA and depression for treatment with nCPAP for at least 6 month. We examined the change of depressive symptoms under CPAP treatment, considering WHO-5, BDI-II, MADAM, MADRS and PSQI. The follow up could be performed in 39 patients.

**RESULTS:** In our collective we found a significant improvement of OSA (AHI, DI, ESS), depressive symptoms (WHO-5, BDI-II, HAMD, MADRS and PSQI) and sleep quality (PSQI). Patients with CPAP compliance > 75% of nights and > 5h use/night showed a significant better result than patients with poor compliance.

**Conclusions:** The improvement of depressive symptoms in patients with OSA under nCPAP confirms the hypothesis of causal relationship between depression and OSA. The coincidence of both diseases and the treatment success under CPAP also concerning depressive symptoms should lead to a routinely exploration of depression in patients with sleep related breathing disorders and to more frequent examinations of OSA in patients with depression.
P37 - Increased incidence of chronic tonsillitis in patients with OSAS.
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1 Warsaw Medical University, Department of Otolaryngology, Warsaw, Poland

**Keyword:** Obstructive Sleep Apnoea

Objective: The aim of our study was to analyse the histopathological changes in tissue samples taken during operations of patients with sleep apnoea syndrome (OSAS). Subjects and methods: Among patients with OSAS treated in our department in 2010, 23 patients aged 31-69 underwent uvulopalatopharyngoplasty (UPPP). The histopathological specimens from the operations constituted of 20 samples with palatal tonsils, samples containing parts of the uvula and samples with parts of the soft palate altogether. We analysed the results of histopathological tests.

Results: 19 out of 20 samples with palatal tonsils presented chronic tonsillitis and only 1 sample presented no changes. 7 out of 20 samples with soft palate parts presented partial atrophy of muscular tissue and 3 samples presented focal fibrosis. 2 samples containing uvula parts presented focal inflammation and 1 sample contained parts of the soft palate with atrophy of muscle fibers. Conclusions: The results may imply that the vast majority of patients with OSAS suffer from chronic tonsillitis.

P38 - Sleep disorders, daytime and nocturnal gas exchange and pulmonary function like predictors of pulmonary hypertension among patients with sleep apnoea/hypoapnoea syndrome (OSAS), overlap syndrome (OSAS-COPD), and obesity-hypoventilation syndrome (OHS)
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**Keywords:** Obstructive Sleep Apnoea, Obesity Hypoventilation

Objectives: Analyze sleep disorders, daytime and nocturnal gas exchange and pulmonary function like predictors of pulmonary hypertension among patients with OSAS, OSAS-COPD and OHS. Methods: 169 patients: 100 patients with OSAS, diagnosed by polysomnography (Sleep Screen Jaeger), 46 patients with OSAS-COPD and 23 with OHS. We’ve performed in all the patients pulmonary function test and gasometry; and determined with a transthoracic echocardiography (Acuson Sequoia) the systolic pulmonary arterial pressure (PAP), a systolic tricuspid gradient was calculated from Doppler-detected tricuspid regurgitation (we’ve considered pulmonary hypertension with >50 mmHg). We calculated the mean PAP with a validated formula (D Chemla-Chest 2004). Statistics: ANOVA one way (normal distribution) or Kruskal Wallis test.

<table>
<thead>
<tr>
<th></th>
<th>OHS</th>
<th>OSAS-COPD</th>
<th>OAS</th>
<th>p&lt;0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>N= 169</td>
<td>23</td>
<td>46</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>68.7±11</td>
<td>65.5±8.7</td>
<td>61±12</td>
<td>0.04</td>
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<tr>
<td>BMI</td>
<td>40.7±8.9</td>
<td>34.8±5.9</td>
<td>33.6±6.5</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>IAH/h</td>
<td>50.1±28.2</td>
<td>42.6±20.5</td>
<td>51.7±22.9</td>
<td>NS</td>
</tr>
<tr>
<td>PAPs</td>
<td>55.4±9.7</td>
<td>49.4±16.2</td>
<td>36±13</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PAPx</td>
<td>35.4±6</td>
<td>31.7±9.5</td>
<td>23.8±8</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PatO2</td>
<td>58.6±13</td>
<td>61.6±10.1</td>
<td>74.1±10.3</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PatO2</td>
<td>51.4±11</td>
<td>46.8±11.7</td>
<td>38.1±5.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>TD&lt;90%min. Nocturnal Hypoxaemia</td>
<td>272±165</td>
<td>206±157</td>
<td>162.5±104</td>
<td>0.002</td>
</tr>
<tr>
<td>FEV1 cc (%)</td>
<td>1290±570</td>
<td>1557±676</td>
<td>2750±810</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>FVC cc (%)</td>
<td>1812±877</td>
<td>2298±854</td>
<td>3249±951</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Conclusions: OHS have the high obesity and abnormal daytime and nocturnal gas exchange with a highest risk of pulmonary hypertension is we compare with patients with OSAS and OSAS-COPD.

P39 - The correlation between severity of OSA (described as AHI) and amount of most common OSA’s symptoms.
A. Jerzemowska1, J. Drozdowski1, A. Gorzewska1
1 Medical University of Gdansk, Department of Pulmonology, Gdansk, Poland

**Keyword:** Obstructive Sleep Apnoea

Obstructive sleep apnea (OSA) is a common medical condition with significant adverse consequences. Patients with OSA complain of many symptoms, that can indicate the presence of this disease. The aim of the study was to assess the correlation between severity of OSA and quantity of symptoms.

Methods: The study group included 673 patients with obstructive sleep apnea: 172 women and 502 men (mean age 55). In every case the polysomnography was performed and quantity of common symptoms was assessed. Every patient was asked about: snoring, daytime sleepiness, restless sleep, morning headache, reduced libido, intensive sweating during sleep, arousals, difficulty in concentrating, dryness in the mouth, apneas observed by others. All patients were divided into three groups: with slight (AHI<5-15), moderate (AHI <15-33)and severe (AHI>30) form of OSA and correlation was calculate in every group. For statistical analysis the r-Pearson correlation was used. Results: The statistical study didn’t show significant correlation between AHI and quantity of symptoms in all population of examined patients was (r = 0.15; p<0.05). The best correlation between AHI and amount of symptoms was in group of patients with severe OSA (r = 0.23; p<0.05)). There was slight difference among men(n = 0.19; p<0.05) and women. (r = 0.07; p<0.05)

Conclusions: There is no significant correlation between AHI and quantity of symptoms.

P40 - Associations between obstructive sleep apnea syndrome (OSAS) and diabetes in a general Norwegian population
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**Keyword:** Obstructive Sleep Apnoea

Background: There is accumulating evidence linking OSAS to various metabolic disorders, including diabetes.

Aim: To study the relationship between OSAS and diabetes in a general Norwegian population.

Methods: An age and gender stratified random sample of all adults aged 47-48 (middle-aged) and 71-73 (elderly) living in Bergen, Norway, were invited to a cross-sectional study. The 3506 attendants (69%) completed a questionnaire including symptoms of OSAS and self report of ever suffering from diabetes mellitus. Subjects were classified as having OSAS if they reported snoring, breathing cessations, and daytime sleepiness using the Karolinska Sleep Questionnaire, previously validated against polysomnography. Blood samples were collected measuring non-fasting glucose. A glucose level above 11.1 mmol/l was considered as diagnostic for diabetes. Logistic regression analyses were used to examine associations between OSAS and diabetes and non-fasting blood glucose. Results: A total of 142 (4.1%) reported diabetes. Of subjects classified as having OSAS (n=168), based on self reports 8.9% also had diabetes, whereas 3.8 % of subjects without OSAS had diabetes [P=0.004]. Adjusting for age, gender, BMI, waist-hip ratio, smoking status and pack years, we found increasing blood glucose to be associated with increased risk for OSAS; odds ratio (OR) with 95% CI 1.093 (1.00, 1.19). There was a trend for a relationship between blood glucose >11.1 mmol/l and OSAS; OR 2.36 (.879, 6.33)[P=.08].

Conclusions: For every mmol increase in blood glucose, there was a 9.3% increased risk of having OSAS. Our study confirms an association between diabetes and OSAS.
**P41 - The correlation between OSAS and the Hospital Anxiety Depression Scale**

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**Keywords:** Quality of Life, Obstructive Sleep Apnoea

**Introduction:** Obstructive sleep apnoea syndrome (OSAS) is a common disorder defined by repeated episodes of airflow cessation (apneas) that lead to arterial hypoxemia and sleep disruption. OSAS has been associated with increased morbidity and mortality and diminished quality of life. The aim of this cross-sectional study was to assess the impact that OSAS has on the patient’s emotional state as it is measured by the HADS (Hospital Anxiety Depression Scale).

**Methods:** This study consists of 128 subjects referred to the sleep laboratory and underwent full polysomnography between 9:00 pm and 7:00 am. Prior to sleep onset, we registered height and weight, medical history, smoking habits, drug consumption and each patient completed the HADS. Data were analyzed using SPSS.

Results: In univariate analysis, BMI, age, co-morbidity, obesity, and severity of sleep disordered breathing on CRP was examined. 124 subjects were studied. The mean age was 52 years, 73% were male. 65% had moderate or severe OSAS. In univariate analysis CRP correlated significantly with Apnoea-Hypopnoea Index (r=0.26; p=0.006), Oxyhaemoglobin Desaturation Index (r=0.27; p=0.004), and Body Mass Index (BMI) (r=0.32; p=0.001). No correlation was seen between OSAS severity and CRP in non-obese individuals. Following multivariate regression analysis, only BMI independently correlated with CRP (p=0.026; p=0.005).

As in selected trial populations, CRP is elevated in a clinical population with OSAS, but this appears to be driven by the effects of obesity rather than sleep-disordered breathing. Other mechanisms of systemic inflammation appear to predominate in OSAS.


**P43 - Relationships between obstructive sleep apnoea and C-reactive protein in a clinic population**

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**Keyword:** Obstructive Sleep Apnoea

Systemic inflammation drives atherosclerosis, and elevated levels of the inflammatory marker C-reactive protein (CRP) are predictive of future cardiovascular morbidity. Obstructive sleep apnoea syndrome (OSAS) is associated with both systemic inflammation and adverse cardiovascular outcomes, but was not independently associated with CRP levels in a carefully selected trial cohort. We examined the influence of OSAS on CRP in a large, unselected clinical cohort. High-sensitivity CRP was measured prospectively in consecutive newly-diagnosed subjects with OSAS attending our service. The influence of age, co-morbidity, obesity, and severity of sleep disordered breathing on CRP was examined. 124 subjects were studied. The mean age was 52 years, 73% were male. 65% had moderate or severe OSAS. In univariate analysis CRP correlated significantly with Apnoea-Hypopnoea Index (r=0.26; p=0.006), Oxyhaemoglobin Desaturation Index (r=0.27; p=0.004), and Body Mass Index (BMI) (r=0.32; p=0.001). No correlation was seen between OSAS severity and CRP in non-obese individuals. Following multivariate regression analysis, only BMI independently correlated with CRP (p=0.026; p=0.005).

As in selected trial populations, CRP is elevated in a clinical population with OSAS, but this appears to be driven by the effects of obesity rather than sleep-disordered breathing. Other mechanisms of systemic inflammation appear to predominate in OSAS.


**P44 - Diabetes screening and dyslipidaemia prevalence in patients referred for polysomnography for obstructive sleep apnoea syndrome investigation.**

F. Khan¹, S. Walsh¹, R. Rutherford¹, J.J. Gilmartin¹

¹ Merlin Park University Hospital, Respiratory medicine, Galway, Galway, Ireland

**Keyword:** Obstructive Sleep Apnoea

Background: Sleep Apnoea is associated with an increase in the cardiovascular risk factors including diabetes mellitus and dyslipidaemia

**Method:** A retrospective review of 212 consecutive patients admitted for sleep assessment from Jan-Dec 2009 was performed. Of these 40 are already on statins due to significant past history.

**Laboratory results, polysomnographs and charts were analysed.**

<table>
<thead>
<tr>
<th>Mean</th>
<th>OSAS group</th>
<th>Non-OSAS group</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI (kg/m²)</td>
<td>37.82</td>
<td>28.36</td>
</tr>
<tr>
<td>Fasting glucose</td>
<td>5.5</td>
<td>5.02</td>
</tr>
<tr>
<td>2 hr postprandial</td>
<td>7.21</td>
<td>6.27</td>
</tr>
<tr>
<td>T Chol</td>
<td>4.84</td>
<td>4.93</td>
</tr>
<tr>
<td>LDL</td>
<td>3.84</td>
<td>2.84</td>
</tr>
<tr>
<td>HDL</td>
<td>1.05</td>
<td>1.28</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>1.81</td>
<td>1.66</td>
</tr>
</tbody>
</table>

Results: 171/212 patients were diagnosed with OSAS. 76.1% in OSAS group and 50% in the non-OSAS group had dyslipidaemia. Of note, 35 patients in OSAS group were on statins as compared to 5 in non OSAS group. 28/212 were known diabetics pre-study. Of the 184 non-diabetics, all had a fasting glucose and 126 had 2-hour post-prandial plasma glucose done.

**Fasting diagnostic** | **Impaired Fasting Glucose** | **Impaired glucose tolerance** | **2hr PP Diagnostic**
| 15/184 | 30/184 | 18/126 | 9/126

72/184 patients had an abnormal OGTT. 28.07 % had an abnormal fasting glucose in OSAS group while only 9.75% in non OSAS. There is significant association found between AHII and fasting glucose (P value 0.0374) and total cholesterol (P value 0.0422) in sleep...
apnoea group. The relationship of AHI with LDL (P value 0.0519) and triglycerides (P value 0.0579) is approaching significance in the same group.

Conclusion: All patients should have their lipid profile taken and active OGTT screening done when being assessed for OSAS for earlier recognition and treatment. Patients with abnormal OGTT and dyslipidaemia appear to have more severe OSAS.

P45 - Prevalence of symptoms and risks of obstructive sleep apnea in patients with rheumatoid arthritis
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1 Jordan University of Science and Technology, Medicine, Irbid, Jordan

Keyword: Obstructive Sleep Apnoea

Introduction: Obstructive sleep apnea syndrome (OSA) and rheumatoid arthritis (RA) share similar daytime and nocturnal symptoms.

Aims: Evaluate the prevalence of symptoms and risks of OSA among patients with RA and to correlate this risk with their disease activity.

Methods: Patients diagnosed with RA according to the 1987 Revised American College of Rheumatology Criteria were recruited. The study was conducted in the rheumatology outpatient clinics at King Abdullah University Hospital, Irbid, Jordan from December 2008 to May 2009. The Berlin Questionnaire (BQ) was filled and the disease activity score (DAS28) was calculated at the same visit.

Results: A total of 166 patients were recruited, mean age ± SD was 45.8 ± 15 year (range 16-84 years), and 85% were females. Mean DAS28 score was 4.98 ±1.6. High risk for OSA as defined by the BQ was present in 64 patients (38.6%). Snoring was reported in 74 (44.6%), loud in 35 (47.3%) and habitual in 48 (64.9%). Morning fatigue and sleepiness was reported in 86 (51.8%) while daytime fatigue and sleepiness in and 88 (53%). Out of the 36 patients who were drivers 19.4% were sleepy while driving. Hypertension and obesity were present in 47 (28.3%) and 73 (44%), respectively. Patients at high risk for OSA had mean DAS28 index of 5.5 ± 1.6, while patients with low risk for OSA had mean DAS28 index of 4.7 ± 1.5, p = 0.014.

Conclusions: Symptoms and risks of OSA were prevalent among patients with RA. Patients with RA and at high risk for OSA had higher DAS28 scores. Detailed sleep history is relevant in these patients. Patients at high risk for OSA should be referred for proper diagnosis and treatment.

P46 - Modeling of respiratory pattern during defensive airway reflexes: an artificial neural network approach
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2 University of Žilina, Department of Physics, Žilina, Slovakia

Keywords: Central Sleep Apnoea, Physiology and Pathophysiology

Background: Neurophysiological character of aspiration reflex (AspR), short but intense inspir, motor activity resulting in spasmodic inspiration, is similar to gasp [1].

Aim: The main aim was to simulate motor output activity during AspR and to investigate whether its energetic distribution over time and frequency domains shows similar characteristics to gasp and eupnoea.

Methods: We have employed mathematical model of artificial neural network for prediction of respiratory pattern. Simulations are based on the error back-propagation learning algorithm. Wavelet transformation was used to get an optimal time–frequency resolution [2].

Results: Damping of high frequency oscillations typical of high O2 demands is dominant for respir. pattern in AspR, contrary to quiet inspiration (from p = 0.0002 to p = 0.04). This finding is in accordance with previous observations of gasp. Moreover, simulations proved that creation of AspR pattern could require activation of mechanisms that are responsible for generation of gasp.

Conclusions: From the clinical point of view, nasopharyng. stimulation can evoke an arousal reaction and reverse hypoxic apnea employing mechanisms similar to “autoresuscitation by gasping” in infants in danger of imminent death from sudden infant death syndrome.

References:

P47 - Obstructive sleep apnea in idiopathic pulmonary fibrosis
L. Kolikias1, K. Vlami1, E. Manali2, P. Lyberopoulos3, C. Triantafillidou4, D. Markoulaki5, K. Kagouridis6, S. Gyftopoulos1, C. Sotropoulou1, A. Karakatsani1, M. Alchanatis2, S. Papiris3
1 Attikon University Hospital, Athens Medical School, 1st Pulmonary Department, Athens, Attica, Greece, 2 Chest Diseases Hospital of Athens “Sotiria”, Athens Medical School, 1st Department of Pulmonary Diseases, Athens, Attica, Greece, 3 Applied Biomedical Research & Training Center “Mariannthi Simou”, Athens Medical School, Athens, Attica, Greece

Keyword: Obstructive Sleep Apnoea

Obstructive Sleep Apnea is frequent in IPF but its significance is unknown as well as the interdependence of exercise limitation with sleep-disordered breathing. The aim of the present study was to examine sleep characteristics and relationships with clinical and functional parameters of IPF severity and outcome. Treatment naive, stable IPF patients performed NPSG, spirometry, 6MWT, CPET and completed sleep disorders questionnaires. OSA was defined as an apnea-hypopnea index (AHI) of > 5 events/h. Twenty five patients (72% male), a mean age (± SD) of 68.8 (± 7.6) and BMI of 28.57 (± 4.56) were studied. Twelve patients (48%) had a MRC dyspnea score of 2. FVC%, TLC% and DLCO% were 78.80 (±16.31), 56.32 (± 15.31) and 43.32 (± 15.5), respectively. Distance walked, spO2 after 6MWT and VO2 peak ml/min/kg were 382.58 (± 162.16) m, 89.95% (±4.6) and 16.52 (±3.35). Nine patients (36%) had mild and 13 (52%) had moderate to severe OSA. Sleep architecture was disrupted and characterised by S2 sleep disturbed by hypopneas and obstructive apneas, decreased REM sleep, an increased arousal index and wake time after sleep onset with a sleep efficiency of 83.5% (IQR 70.3-92.4). Min spO2 during sleep was 85% (IQR 77.5%-87%). Three patients (13.6%) had an ESS more than 10. AHI was significantly related to BMI, neck circumference, heep diameter, VO2peak% and VO2peak ml/min/kg. Minsp2 was significantly related to functional parameters such as DLCO, TLC%, distance walked, VO2 peak ml/min/kg, spO2 after 6MWT and VO2peak ml/min/kg. Minsp2 was significantly related to functional parameters such as DLCO, TLC%, distance walked, VO2 peak ml/min/kg, spO2 after 6MWT and VO2peak ml/min/kg.

Conclusions: Symptoms and risks of OSA were prevalent among patients with RA. Patients with RA and at high risk for OSA had higher DAS28 scores. Detailed sleep history is relevant in these patients. Patients at high risk for OSA should be referred for proper diagnosis and treatment.

P48 - Obstructive sleep apnea: quality of life and sleep disorders questionnaires in idiopathic pulmonary fibrosis
L. Kolikias1, K. Vlamii1, E. Manali2, C. Triantafillidou1, P. Lyberopoulos1, D. Markoulaki1, S. Gyftopoulos1, K. Kagouridis1, C. Sotropoulou1, A. Karakatsani1, M. Alchanatis2, S. Papiris1
1 Attikon University Hospital, Athens Medical School, 1st Pulmonary Department, Athens, Attica, Greece, 2 Chest Diseases Hospital of Athens “Sotiria”, Athens Medical School, 1st Department of Pulmonary Diseases, Athens, Attica, Greece, 3 Applied Biomedical Research & Training Center “Mariannthi Simou”, Athens Medical School, Athens, Attica, Greece

Keyword: Obstructive Sleep Apnoea

Obstructive Sleep Apnea (OSA) is prevalent in IPF. The aim of the study was to examine the role of sleep disorders and quality of life questionnaires in IPF. OSA was defined as an apnea-hypopnea index (AHI) of > 5 events/h. Stable, treatment naive IPF patients performed NPSG, spirometry, 6MWT and CPET and completed the Epworth Sleepiness Scale, Fatigue Severity Scale, Functional Outcome of Sleep Questionnaire, Athens Insomnia Scale and the Depression Anxiety Stress Scale 42. Twenty five patients (72% male), mean age ± SD of 68.8 (± 7.6) and BMI of 28.57 (± 4.56) were included. Twelve patients (48%) had a MRC chronic dyspnea score of 2. FVC%, DLCO%, distance walked and saturation of oxygen after the 6MWT were 78.80 (±16.31), 43.32 (± 15.5), 382.58 (± 162.16) m and

References:
Abstracts

P49 - Serum Erythropoietin and VEGF Levels in Sleep Apea Patients with Acute Myocardial Infarction.

W. Kukwa1, R. Glowczyńska2, A. Kukwa3, G. Opolski2, K. Filipiaki2, Z. Gronkiewicz2, A. Galazka1

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Keywords: Obstructive Sleep Apnoea, Physiology and Pathophysiology

Objective: High Erythropoietin (EPO) Level in patients with acute myocardial infarction is a known protective factor for ischemia-reperfusion-induced apoptosis. A higher serum EPO level can predict a smaller infarct size. Obstructive sleep apnea syndrome (OSAS) is a well known risk factor for the cardiovascular diseases. In contrast to the harmful effects of OSAS, protective effects have also been described. We have measured the EPO and vascular endothelial growth factor (VEGF) levels in OS patients during acute myocardial infarction (AMI).

Subjects and methods: The study enrolled 37 men at age below 65 years (mean age 52.1 +/- 6.5 years). AMI was diagnosed according to the universal definition of myocardial infarction. Coronary angiography, as well as coronary angioplasty with stent implantation, was performed at admission in every patient. Serum was obtained on the day of admission and on the 3rd day of hospitalization. All-night complete polysomnography was performed at reference center for sleep disorders and then reviewed by experienced physician.

Results: Both admission day and 3rd day of hospitalization EPO levels showed statistically significant difference in OSA positive and negative patient groups (p=0.003; p=0.018). The day 1 and 3rd day VEGF levels showed no statistically significant difference in examined groups. The maximum Troponin (Tn) level was negatively correlated with normal saturation time (p=0.03; R=0.35).

Conclusions: Acute myocardial infarction in patients with OSAS may be associated with normal saturation time (p=0.03; R=0.35). EPO levels showed no statistically significant difference in examined groups. The maximum Troponin (Tn) level was negatively correlated with normal saturation time (p=0.03; R=0.35).

P50 - Daytime PaO2 in OSAS and in Overlap Syndrome: which difference?

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Keywords: Obstructive Sleep Apnoea, Chronic Respiratory Failure

Background: OSAS and COPD are often associated with daytime hypoxemia. The association between both diseases Overlap Syndrome (OS) increases the risk of hypoxemia. The aim of this study was to investigate the mechanisms which could justify the low oxygen’s level in these patients and the effect of CPAP therapy. Methods: 395 consecutive OSAS patients were enrolled. According to pulmonary function test they were divided in 2 groups. Group 1: 324 OSAS/COPD +/-; Group 2: 71 patients OSAS/COPD +++. All patients underwent blood gases, nocturnal polysomnography, postbronchodilatory blood gases, before and after one year of CPAP therapy. Results: The groups were matched for age (59.8±12.9 vs 62.7±7.1, p>0.5) and BMI (23.32±3.57 vs 31.73±9.29, p>0.05), but not for AHI (44.4±28.2 vs 37.2±19.9, p<0.05).

OS group showed lower level of daytime PaO2 compared with OSAS patients (70.3±9.3 vs 77.8±10.4 mmHg, p<0.001), the alveolar-to-arterial oxygen partial pressure difference (AaDO2) was higher in OS than in OSAS (30.3±9.1 vs 24±9.7, p<0.01). In group 1 diurnal PaO2 and AaDO2 correlated with BMI (R=0.23; R=0.20, p<0.001) but not with AHI, while in group 2 any correlation was found with BMI and AHI. In both groups, patients with good compliance (>4H/night) of CPAP improve daytime PaO2 (p<0.001) whereas, in patients with poor compliance PaO2 was reduced (p<0.001).

Conclusions: Our data suggest that daytime hypoxemia in OSAS patients is largely determined by the increased of body weight. In the overlap patients daytime hypoxemia has a more complex origin. However CPAP therapy has been shown to improve daytime PaO2 value in both OSAS than in OS patients with good compliance.

P51 - Correlation between the SF-36 questionnaire and the SaO2 and RDI in patients with Obstructive Sleep Apea

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Keywords: Obstructive Sleep Apnoea, Quality of Life

Introduction: Obstructive sleep apnea syndrome (OSAS) is a common disorder defined by repeated episodes of airflow cessation (apneas) that lead to arterial hypoxemia and sleep disruption. OSAS has been associated with increased morbidity and mortality and diminished quality of life. This cross-sectional study aimed to assess the impact of OSAS on the patients’ Quality of Life measured by the Medical Outcomes Study Short Form-36 (SF-36).

Methods: This study consists of 128 subjects referred to the sleep laboratory and underwent full polysomnography between 9:00 pm and 7:00 am. Prior to sleep onset, we registered height and weight, medical history, smoking habits, drug consumption and each patient completed the SF-36. Data were analyzed using SPSS.

Results: 25 subjects which were not diagnosed with sleep apnea (RDI<5) were excluded and remained 103 subjects (77 male and 26 female). The Correlation Coefficient (r) for Average SaO2 desaturation and Sleep RDI was respectively: Physical functioning -0.19*/-0.25*, Role limitations-physical problems -0.04/-0.13, Bodily pain -0.03/-0.14, General health -0.01/-0.01, Vitality -0.06/-0.11, Social functioning 0.02/-0.05, Role limitations-emotional problems -0.14/-0.08, Mental health -0.07/-0.11. Only physical functioning had a statistically significant correlation with Av. SaO2 desat and Sleep RDI (p=0.045 and 0.009 respectively).

Conclusions: In our study, the physical functioning was strongly correlated to both average SaO2 desaturation and Respiratory Disturbance Index in sleep apnea patients. The other aspects of quality of life as they are measured by SF-36 have no statistically significant correlation to the severity of sleep apnea.

P52 - Refractory persistent hypoxia in Obesi Hyperventilation syndrome patients: A distinct subgroup requiring a different approach?

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Keywords: Obesity Hypoventilation, Therapy and Treatment

Background: Nocturnal hypoxia in Obesity hypoventilation syndrome patients is a recognised feature in overnight studies and is thought to be due to interplay of various factors; however not infrequently, we come across patients with disproportionate and severe hypoxia. Objective: We present a cohort of patients who presented with previously unrecognised OHS but had disproportionate and refractory hypoxia.

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Group analysis:

<table>
<thead>
<tr>
<th>BMI</th>
<th>Apnea/ Hypopnea index</th>
<th>Average overnight saturation %</th>
<th>Cumulative time &lt;90%(on overnight 02 with NIV)</th>
<th>Daytime PaO2: Kpa</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>34</td>
<td>78</td>
<td>100</td>
<td>7.8</td>
</tr>
<tr>
<td>55</td>
<td>45</td>
<td>81</td>
<td>80</td>
<td>8.1</td>
</tr>
<tr>
<td>60</td>
<td>38</td>
<td>85</td>
<td>82</td>
<td>8.4</td>
</tr>
<tr>
<td>54</td>
<td>33</td>
<td>84</td>
<td>75</td>
<td>7.9</td>
</tr>
<tr>
<td>61</td>
<td>42</td>
<td>74</td>
<td>74</td>
<td>7.4</td>
</tr>
<tr>
<td>HRCT</td>
<td>Pulmonary artery(cm)</td>
<td>TLC0%/ KC0%</td>
<td>FEV1/FVC %</td>
<td>V/O scan</td>
</tr>
<tr>
<td>Mild emphysema</td>
<td>3.1</td>
<td>71/118</td>
<td>68</td>
<td>Few matched defects</td>
</tr>
<tr>
<td>Normal parenchyma</td>
<td>2.6</td>
<td>54/82</td>
<td>64</td>
<td>Right lung ventilation to 24% of total ventilation</td>
</tr>
<tr>
<td>Apical peripheral nodules</td>
<td>3.34</td>
<td>45/72</td>
<td>72</td>
<td>No defects</td>
</tr>
<tr>
<td>Atelectasis</td>
<td>3.45</td>
<td>64/88</td>
<td>54</td>
<td>No shunting</td>
</tr>
<tr>
<td>Occasional Bronchietasis</td>
<td>2.95</td>
<td>68/72</td>
<td>82</td>
<td>Unmatched ventilation defect</td>
</tr>
</tbody>
</table>

Investigations failed to reveal a cause and the hypoxia remains uncorrected with oxygen therapy and non-invasive ventilation. Limited polysomnography revealed cumulative time spent <90% saturation at > 80% of sleep time in all patients.

Conclusions: The potential mechanisms of uncorrected hypoxia may include a state of chronic nocturnal hypoxia leading to irreversible pulmonary vascular changes with fixed shunting and/or a generalised reduction in airway diameter with cumulative reduction in critical ventilation. Further studies to identify the pathophysiology may help early identification and intervention in this group before they develop irreversible hypoxia.

**P55 - Tonsillotomy in algorithm of sleep breathing disorders treatment in childhood confirmed by polysomnography**

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**Keywords:** Obstructive Sleep Apnoea, Therapy and Treatment

In the period 2006-2010 were examined 42 pediatric patients in age from 2 to 10 years old. All patients have tonsillar hypertrophy. Apnea and snoring were positive anamnestic symptoms of all these children. Overnight polysomnography test of all children had to realize. Obstructive sleep apnea syndrome with AHI > 1 (apnea-hypopnea index ) were confirmed in 25 patients. The value of AHI were in the range of 1.2 to 42. The remaining 17 patients were confirmed only nonobstruction with AHI < 1. Both side tonsillotomy was made in the group of 18 patients. 7 children were indicated for bilateral tonsillectomy because of incidence of tonsillitis. The control polysomnography of all children was performed.

Results: The group to polysomnographic examination before and after tonsillotomy, included 25 patients with OSAS. AHI value was zero after tonsillectomy. AHI value was zero after tonsillotomy in 17 children. Only 1 patient was found AHI of 0.9. The value AHI of this patient before operation was 42. All children improve breathing. No recurrent tonsillitis were found.

Conclusion: Tonsillotomy reduces symptoms of sleep apnea syndrome in childhood. No more frequent relapses of palatine tonsils hypertrophy after tonsillectomy. Therapeutic effect of tonsillotomy (success rate 94.4%) is comparable with tonsillectomy (success rate in literature 70-90%). Reduction radikality does not change the effect of treatment with obstructive sleep apnea syndrome, while maintaining the functional part of the palatine tonsils in children age is importance for the development of the immune system and it is positive effect of tonsillectomy.

**P56 - Severity of sleep apnea does not differ between men and women in REM sleep**

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**Keywords:** Obstructive Sleep Apnoea, Physiology and Pathophysiology

Background: It has been shown previously that sleep apnea (SA) is substantially more severe in men than women. The precise mechanisms explaining gender differences in pathophysiology of SA remain unknown.

Method: A retrospective chart review was performed on 199 consecutive adults who underwent polysomnography in our sleep lab over the past 2 years. Exclusion criteria were: total sleep time <6 hours, sleep efficiency (SE) <70%, and CPAP treatment. Employing a matched-pair design, we explored gender differences in SA severity. Primary endpoints included the total apnea-hypopnea index (AHI), AHI during REM (REM-AHI) and NREM sleep (NREM-AHI), mean oxyhemoglobin saturation during sleep (MeanSaO2), 3% oxyhemoglobin desaturation index (ODI), and Epworth Sleepiness Scale score (ESS).

Results: We identified 39 male-female pairs matched individually for age (mean±standard deviation 53±9 y) and BMI (31.3±5.6 Kg/m2).

Despite similarities in age, BMI, SE, and ESS, compared to women, men had higher total AHI [median(interquartile range) 22.6(10.2-43.4) vs. 10.9(2.3-32.9); P=0.003], NREM-AHI [23(8.7-43.7) vs. 8.1(1.1-30.3); P<0.001], ODI [26(3.13-51.2) vs. 16.4(3.1-31.5); P=0.001], and lower MeanSaO2 [93(91-94) vs. 94(92-96); P=0.006] and REM-AHI/NREM-AHI ratio ([0.89(0.51-2.01) vs. 1.57(0.65-3.95); P=0.004]. There was no statistical difference in REM-AHI between men and women [26.9(9.4-48.3) vs. 16.1(4.4-60); P=0.878].

Conclusions: Although SA occurring during NREM sleep was more...
severe in men, there was no significant difference in REM SA severity between the two sexes. The findings suggest that REM sleep may be associated with defects in neuromuscular control, diminishing gender differences in SA severity.

**P57 - Sleep quality in patients with lung cancer**
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**Keyword:** Quality of Life

**Background:** Patients with cancer often describe daily fatigue and sleepiness but it is yet unknown whether these symptoms are related to every night sleep quality. The aim of this study was to determine the subjective sleep quality and its correlation with the degree of daytime fatigue and sleepiness in patients with newly diagnosed lung cancer before and during anti-cancer therapy.

**Material and methods:** Forty-eight patients (age 60.7±10.9 years) with early diagnosed LC were included in the study. Eighteen patients were re-examined after 2-3 cycles of anti-cancer treatment. Sleep quality was assessed by the Pittsburgh Sleep Quality Index (PSQI), daytime sleepiness was evaluated by the Epworth Sleepiness Scale (ESS) and daytime fatigue with Fatigue Severity Scale (FSS). Anthropometric characteristics were collected at the same time.

**Results:** All patients expressed daily fatigue (FSS>4) and low sleep quality perception (PSQI>5). For all patients a significant correlation was found between PSQI and FSS (r=0.428, p=0.002) and analysis of principal components of PSQI suggested a close relation between FSS and Subjective Sleep Quality (r=0.547, p=0.000), Sleep Duration (r=0.365, p=0.011) and Daytime Dysfunction (r=0.345, p=0.016). In patients undergoing chemotherapy a significant correlation was found between FSS and Habitual Sleep Efficiency (r=0.380, p=0.000), Subjective Sleep Quality (r=0.517, p=0.027) and Sleep Disturbances (r=0.528, p=0.024). No statistically significant correlation was found between FSS and ESS in both groups.

**Conclusions:** Daytime fatigue and sleep quality impairment were prevalent in newly diagnosed lung cancer patients and continued to exist during chemotherapy. Daytime fatigue was strongly related with several PSQI components.

**P58 - Periodic breathing and oxygenation in infants with and without bronchopulmonary dysplasia**
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**Keywords:** Diagnostic, Physiology and Pathophysiology

**Objective.** Periodic breathing (PB) is a common breathing pattern in premature infants. Our aim was to study PB occurrence and its impact in oxygenation in infants with and without bronchopulmonary dysplasia (BPD).

**Methods.** We performed pneumography on 25 premature infants with BPD and 25 non-BPD premature comparable in gestation age (26-30 weeks). Infants were examined 1-3 times at ages of less than 29 days, 29-50 days, more than 50 days. Incidence of main neurologic abnormalities appeared not to differ among groups.

**Results.** PB was found in less infants of both groups examined before 29th day of life compared with later examinations (difference did not reach statistical significance). Occurrence of PB was rather lower in infants with BPD than in non-BPD premature at all ages. PB duration in both groups was minimal in the first 28 days with later significant rise from 0.9±0.6 to 12.4±7.0% of recording length in BPD group (P<0.05) and from 1.9±0.7 to 15.8±3.7% in non-BPD group (P<0.05). In most cases PB was accompanied by arterial O2 saturation (SpO2) oscillation. The minimal SpO2 values during this oscillation were >80% in all except one cases of PB in infants without BPD. In BPD group in 5 of 9 PB cases at 29-50 days and 5 of 15 PB cases at 50 days and older SpO2 was 80% and lower with minimal value of 70%. Heart rate oscillation was within 11% from baseline and did not differ between groups and age intervals.

**Conclusion.** Our data of PB occurrence confirm previous reports and support the concept of impaired peripheral chemoreceptor activity in infants with BPD. PB may be connected with significant desaturations in infants with BPD.

**P59 - Incidence and persistence of apnea in infants with and without bronchopulmonary dysplasia**
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**Keywords:** Central Sleep Apnoea, Obstructive Sleep Apnoea

**Objective.** Apnea is a common breathing pattern in premature infants especially those with bronchopulmonary dysplasia (BPD). Treatment of different types of apnea has its features. Our objective was to describe occurrence of apnea including episodes of different nature in infants with and without BPD at consecutive ages.

**Methods.** We performed pneumography on 25 premature infants with BPD and 25 non-BPD premature comparable in gestation age (26-30 weeks). Infants were examined 1-3 times at ages of less then 29 days, 29-50 days, more than 50 days. The main neurologic abnormalities appeared not to differ among groups.

**Results.** Similar number of infants with and without BPD had apnea before 50 days of life. There was a tendency to decrease of apnea incidence from first to second age interval. Among 20 infants with BPD examined after 50th day 10 had apnea while most of non-BPD premature where already discharged. Risk factors of longer apnea persistence in infants with BPD were recurrent intubations and absence of “honeymoon” period in oxygen dependence but not neurologic factors. In the first age interval less infants in whom BPD was diagnosed at 28th day than those without BPD had central apnea (CA), rather more demonstrated obstructive apnea (OA). At 29-50 days frequency of different types of apneas did not vary among groups. CA were prevalent. After 50th day infants with BPD demonstrated mostly CA.

**Conclusion.** During the first month of age OA are common in infants with developing BPD. Persistent abnormalities of breathing control system in older infants with BPD are mostly central in origin and probably due to oxidative status disorder but not neurologic factors by themselves.

**P60 - The role of nocturnal hypoxemia on lipid status and coagulation profile in obstructive sleep apnoea patients**
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**Keywords:** Obstructive Sleep Apnoea

Obstructive sleep apnoea (OSA) is defined by increased apnoea/ hypopnoea index (AHI) per hour of sleep followed by intermittent hypoxia and nocturnal hypoxemia is not observed in all of the patients. Nocturnal hypoxemia aggravates endothelial dysfunction by synthesis of acute phase proteins like fibrinogen and high sensitivity C reactive protein (hs-CRP). Dyslipidemia is a risk factor of arteriosclerosis as well. Aim: to evaluate the role of nocturnal hypoxemia on lipid status and coagulation profile in OSA patients. Methods: Newly diagnosed OSA patients having no comorbidities and normal daytime oxygen saturation were included. OSA was confirmed by the whole-night polysomnography, when AHI was >5/h. hs-CRP, d-dimmer, activated partial thromboplastin time (APTT), SPA, fibrinogen concentrations, lipid status were measured. All patients were divided into two groups according to mean nocturnal oxygen saturation (MeanSpO2). The cut point was 90%. Results: 14 of 24 OSA patients (mean AHI 52.7/h) had meanSpO2<90%. There was no statistical difference between age, daytime oxygen saturation within the groups. Fibrinogen, hs-CRP and triglyceride concentrations were higher in the group with MeanSpO2<90% than with MeanSpO2≥90% (mean=SEM respectively: fibrinogen 3.9±0.4 and 2.9±0.3 g/l, hs-CRP 4.8±1.0 and 1.3±0.2 mg/l, triglyceride 4.1±1.5 and 1.9±0.3 mmol/l, Mann-
Cirignotta 1,2 and uvulopalatopharyngoplasty in a single session is well tolerated resolved within two months. Four patients had an ulceration of the base of the tongue after No serious adverse events occurred. Two patients had a postoperative was significantly improved from 10.6 to 7.3, snoring level decreased saturation was unchanged. Subjectively, Epworth sleepiness scale...p<0.05). There was no difference in d-dimer, APTT, pApA has generally been accepted as an alternative to

P62 - Sleepiness and simulated driving performance in OSAS patients before and after n-CAPAP
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Keywords: Obstructive Sleep Apnoea, Therapy and Treatment

Background: Patients with obstructive sleep apnea syndrome (OSAS) have increased accident-related mortality and daytime sleepiness. We aim to test the effect of OSAS resolution with n-CAPAP on driving ability.

Methods: Twenty men (mean age=52±9 years) with severe OSAS (mean AH1=59±19/h) and valid driving licenses undergoing stable n-CAPAP treatment (16±6 months; mean AH1=1.1±1.5/h) underwent Multi-night study of Sleepiness (MWT), subjective sleepiness assessment (Epworth sleepiness scale, ESS), four sessions of our 30-min driving simulation test, and questionnaires on driving history at baseline and 1-year follow-up.

Results: Nasal-CAPAP improved alertness (MWT sleep latency: 18±13 versus 31±11 minutes, p<0.0005), subjective sleepiness (ESS score: 11±5 versus 5±2, p<0.0005), simulated driving performance (crashes: 1.7±3.7 versus 0.3±0.4, p=0.007; lane position variability: 0.53±0.25 versus 0.42±0.16, p=0.009), and on-road driving ability (21% versus 0% of patients with car crashes, p=0.030). Simulated driving performance correlated with objective alertness and subjective sleepiness at baseline and at follow-up, whereas the relative changes of performance were mainly related to the subjective sleepiness improvement. Conclusions: Nasal-CAPAP improved daytime sleepiness, simulated driving performance and on-road driving ability. Our driving simulation test is a reliable measure of sleepiness also for the follow-up of OSAS patients, providing potentially useful information on their fitness to drive.

P63 - Combined bipolar radiofrequency surgery of the base of the tongue and uvulopalatopharyngoplasty for obstructive sleep apnea
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Keyword: Obstructive Sleep Apnoea

The aim of the study was to investigate the effectiveness of combined bipolar radiofrequency surgery of the tongue base and uvulopalatopharyngoplasty in a single session for obstructive sleep apnea and whether this combination is safe and well tolerated. 73 patients with obstructive sleep apnea and both palatal and retroglossal obstruction underwent uvulopalatopharyngoplasty with bipolar radiofrequency surgery of the base of the tongue. All-night sleep study, snoring, and Epworth sleepiness scale were used to assess outcome before and after surgery. Apnea-hypopnea index significantly decreased from 28.7 to 14.1. Oxygen desaturation index decreased from 15.1 to 10.3. Mean oxygen saturation was unchanged. Subjectively, Epworth sleepiness scale was significantly improved from 10.6 to 7.3, snoring level decreased from 8.4 to 6.0. Overall treatment success rate was 45.7%. No serious adverse events occurred. Two patients had a postoperative bleeding from tonsillar bed after uvulopalatopharyngoplasty. Four patients had an ulceration of the base of the tongue after radiofrequency surgery of the base of the tongue with spontaneous cure. One patient had a drastic change in a half of the tongue that resolved within two months. Combined bipolar radiofrequency surgery of the base of the tongue and uvulopalatopharyngoplasty in a single session is well tolerated and safe surgery in the treatment of obstructive sleep apnea. It is effective in reducing of respiratory parameters and subjective symptoms of obstructive sleep apnea. Next advantages are a single session, simple feasibility, bipolar technique and short time of the procedure.

Supported by the grant 2B06106.

P64 - Catathrenia in Narcolepsy with Cataplexy under Sodium Oxybate Therapy
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Keywords: Central Sleep Apnoea, Therapy and Treatment

Objectives. Sodium oxybate (SO), a central nervous system depressant, can increase central apneas and oxygen desaturation in narcolepsy with cataplexy (NC), also at therapeutic doses. The aim of this study was to investigate the SO related side-effects in a group of NC patients, with particular focus on possible sleep disordered breathing (SDB).

Methods. Fifty-one patients with NC starting a treatment with SO were prospectively studied with semi-structured clinical interviews to monitor possible SO side-effects. Complete polysomnography (PSG) was recorded at the baseline and after 3 months of SO treatment to evaluate the onset and/or worsening of SDB.

Results. At the baseline, 8 out of 51 (15.7%) NC patients showed a concomitant obstructive SDB. After 3 months of SO treatment, 28 out of 51 patients (54.9%) showed SO related side-effects, including symptoms suggesting de novo occurrence of SDB (9/51, 17.6%). Within the latter group, full PSG with microphone allowed the recognition of catathrenia as a possibly benign SO side-effect in 7 out of 51 NC patients (13.7%).

Conclusions. Catathrenia under SO treatment should be considered in the differential diagnosis of SDB to avoid unnecessary withdrawal.

P65 - Obstructive sleep apnoea syndrome – a case of chordoma of the nasopharynx
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Keywords: Obstructive Sleep Apnoea, Diagnostic

We present a case report of a 32 years old woman with incidentally diagnosed chordoma of the nasopharynx which is a very rare benign tumour with a local malignancy. The diagnose was set during routine procedures connected with the clinical trial on the group of pathologically obese patients, who had been referred to the Sleep Lab of the Otolaryngology Department of Medical University of Warsaw from the Bariatric Surgery Subdepartment of Transplant and General Surgery Department of MUW for sleep disordered breathing workup. We have performed full polysomnography and CT scans of nose and nasopharynx. The patient had OSAS confirmed and the CT scans revealed the mass in the nasopharynx. Therefore we emerged with more specific diagnostics and the patient was operated. The biopsy and the subsradial removal of the mass was performed. The histological diagnosis was chordoma. Although the patient rejected further oncological treatment, the proper nasal airflow was achieved and the OSAS cured. The results of control PSG revealed no OSAS. We suggest by this experience that every obese and not obese patient with history of sleep disordered breathing should have not only PSG but full ENT examination to rule out the obstruction of the upper airway before any treatment of OSAS is initiated.

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Keywords: Therapy and Treatment, Obstructive Sleep Apnoea

Introduction APAP has generally been accepted as an alternative to...
CPAP in the treatment of OSAS. Meta-analysis has shown that APAP can control OSAS as effectively as CPAP. It remains to be examined whether greater reductions of the mean pressure can be attained by using the lowest possible minimum level and by limiting the maximum pressure to a different extent.

Objective: The aim of this study is to investigate whether a new adjusted mode of APAP lowers the mean applied pressure so compliance will increase.

Method: New diagnosed OSAS patients are selected for a single blind randomized cross-over trial. Patients receive for 12 weeks two different PAP therapies, CPAP and restricted APAP (RAPAP). Prior to starting up PAP therapy patients receive a manual CPAP PSG titration. The titration night is used to set the CPAP and RAPAP. The RAPAP pressure is set 2 cmH2O around the titrated pressure. After 6 weeks there is a transition to the other PAP therapy. Data is collected by questionnaires like ESS, Quebec Sleep Questionnaire (QSO) and SF-36, REMstar Auto (Respirnosics) data, and home polygraphy.

Results: 39 OSAS patients were recruited of which already 21 completed the study. After 6 weeks with RAPAP, the mean QSO, ESS and AH1 was improved significantly. Similar effects were achieved with CPAP. Compliance showed similarities between therapies (RAPAP:6.6 [4.3–7.9] hours/night, p = 0.13). The mean applied pressure during RAPAP was 8.5 [6.0–11.5] cmH2O and for CPAP 8.5 [5.5–12.4] cmH2O (p = 0.17). Conclusion: Analysis of 21 patients showed that RAPAP and CPAP therapy has similar treatment effects in OSAS patients. RAPAP fits the current therapy.

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2 Netzer NC.SleepBreath2010

P67 - A model of modulation diminished vagus nerve activity using the vagal nerve stimulation

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Keywords: Therapy and Treatment, Physiology and Pathophysiology

One main function of the vagus nerve is to monitor and control the activity of internal organs and glands such as the heart, lungs, stomach, bladder and pancreas. Because the vagus is associated with many different functions and brain regions, research is being performed to determine its usefulness in treating other illnesses such as anxiety disorders, Alzheimer’s disease, migraine, fibromyalgia and sleep and breathing disorders. In many diseases, including hypertension, atrial fibrillation and heart failure, vagus activity is diminished and unresponsive. The vagus reduction has been previously reported in adults with refractory epilepsy, in children with complex partial seizures and in patients with major depression and sleep and breathing disorders. The aforementioned diseases are now known to be accompanied by a reduced heart rate variability. Numerous studies have proposed left vagus nerve stimulation as a useful therapy for treating various heart conditions and as an adjunctive treatment for certain types of intractable epilepsy and major depression and sleep and breathing disorders. One of the greatest problems in LVNS used worldwide is non-selective stimulation of particular superficial regions as well as non-selective stimulation of fibers innervating an internal organ. In practically all studies in humans, LVNS refers to stimulation of the cranial nerve X, using specific devices. The study to be presented, intends to develop a model for modulation of vagus activity via efferent selective stimulation of specific superficial regions and certain population of nerve fibers within a cranial nerve X, using specific devices installed in the cervical region.

P68 - Does an association exist between metabolic markers and Obstructive sleep apnea hypopnea syndrome in childhood?

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Keyword: Obstructive Sleep Apnoea

Obstructive sleep apnea hypopnea syndrome (OSAHS) is a common sleep disorder that is being increasingly recognized in children and in adults it is associated with an increased risk for cardiovascular morbidity and mortality. Atherosclerosis has been shown to occur in OSAHS patients free of any other significant risk factors. The purpose of our study was to explore the presence of existing correlation between Apnea-hypopnea index (AHI) and metabolic markers, such as triglyceride, cholesterol, low density (HDL) and high-density lipoprotein (LDL) cholesterol levels, Apolipoproteins A and B (ApoA, ApoB) and lipoprotein a [Lp (a)] in childhood.

In 53 children, 2-15 years old, 62.3% males who referred to Sleep laboratory due to snoring, overnight polysomnography were performed. Data were analysed using SPSS for Windows version 18.0.

24 children (45.3%) had mild degree OSAHS, 16 (30.2%) medium degree, 13 (24.5%) severe OSAS. AHI ranged between 1.3-94.2 apneic events per hour of sleep, Cholesterol levels: 90-232 (154.68 ± 31.56) mg/dl, triglycerides: 26-542 (79.05 ± 72.95) mg/dl, LDL: 21-97 (55.68 ± 16.21) mg/dl, LDL: 19-152 (82.35 ± 29.96) mg/dl, ApoA: 69-197 (140.82 ± 26.67) mg/dl, ApoB: 7.6-105 (59.34 ± 18.23) mg/dl, and Lp(a): 0.10-209.5 (21.18 ± 34.61) mg/dl.

Regression analysis showed no significant associations between the severity of OSAS and: age (p=0.528), sex (p=0.533), cholesterol levels (p=0.946), triglycerides (p=0.683), HDL (p=0.409), LDL (p=0.903), ApoA (p=0.483), ApoB (p=0.834) and Lp(a) (p=0.736). Conclusively, our study doesn’t support the hypothesis for associations between OSAHS and dyslipidemia in childhood and further studies are needed.

P71 - A linear discriminant analysis model to analyze nocturnal pulse oximetry - sufficient to differentiate normal breathing, obstructive and central sleep apnea?

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Keywords: Central Sleep Apnoea, Diagnostic

Background: Sleep disordered breathing (SDB) is associated with high costs. The diagnostic standard for SDB is the costly polysomnography (PSG). Nocturnal pulse oximetry (PO) is an affordable attractive alternative. Marcos (Med Eng Phys 2009; 31:971f) proposed algorithms to optimise the diagnostic performance of PO for obstructive sleep apnea (OSA).

Aim of our study: We reproduced the findings of Marcos and tested it in central sleep apnea (CSA). We expanded the analysis and developed new features to analyze PO, to increase the diagnostic power in differentiating OSA, CSA and normal patients.

Material and methods: The PO curves were extracted out of 52 PSG’s (OSA n= 32, CSA n= 9 , normal n= 11). From a training set of 15 typical PO’s (5 from each group) we built a model based on the spectral and nonlinear analysis previously described.

Results: In our training set we reached a prediction accuracy of 87%. In the test set, however, the accuracy decreased to 30%

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<tr>
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<th>Training Set (n=15)</th>
<th>Test Set (n=37)</th>
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<tr>
<td></td>
<td>Sensitivity</td>
<td>Specificity</td>
</tr>
<tr>
<td>Normals</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>OSAS</td>
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<td>CSA</td>
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Discussion: Using linear discriminant analysis, it was possible to find PO characteristics describing typical PO curves in a highly selected set of OSAS, CSA and normals. However, in the test set, the accuracy of the model was low. Many OSA patients were classified as CSA. Since oximetry curves in OSA and CSA are very similar, it was not possible to replace respiratory signals by a more sophisticated PO analysis.

P72 - CPAP therapy in Idiopathic Pulmonary Fibrosis patients with Obstructive Sleep Apnea

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Methods: Five male patients with newly diagnosed IF and moderate to severe OSA were included. CPAP therapy was initiated. The patients completed the Epworth Sleepiness Scale (ESS), the Pittsburgh Sleep Quality Index (PSQI), the Functional Outcomes in Sleep Questionnaire (FOSQ), the Fatigue Severity Scale (FSS), the SF-36 quality of life questionnaire and the Beck Depression scale (BDS) before and 1 month after CPAP therapy.

Results: Small, although not statistically significant, improvement was noted in ESS score (11.6 ± 12.8), PSQI (14.8 ± 15.2), FOSQ (15.2 vs 14.8), FSS (38.6 vs 41), SF-36 (66.2 vs 62.6) and BDS (10.2 vs 11) after one month of CPAP therapy. Three out of 5 patients had difficulties in CPAP acceptance (nocturnal cough, claustrophobia, insomnia) and needed intense follow up by the CPAP clinic.

Conclusion: One month of CPAP therapy did not show statistical significant improvement in parameters related to sleep quality, overall quality of life and depression in IF patients with OSA. The possibility of CPAP poor compliance was high and could only be eliminated with intense follow up by the CPAP clinic. Despite all mentioned difficulties CPAP therapy should be tried in these patients and long-term studies are needed in order to assess possible positive influences in quality of life but also disease related morbidity and mortality.

P74 - Sleep disordered breathing in patients with atrial fibrillation

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Keywords: Obstructive Sleep Apnoea, Therapy and Treatment

RATIONALE: Atrial fibrillation (AF) is the most common arrhythmia. In the last few years, medical literature is accumulating that suggests untreated SDB is an important treatable AF risk factor. In previous studies, patients with untreated Obstructive Sleep Apnea (OSA) had a higher recurrence rate after cardioversion and a lower recurrence rate when their OSA was treated with CPAP; on the basis of questionnaires a SDB was monitored in 49 percent of AF patients admitted to hospital for electrical cardioversion. In our study we used portable sleep apnea monitoring to confirm SDB diagnosis in AF-patients.

METHODS: We included 67 patients (43 male, 24 female, mean age: 63.1 ± 9.6years, BMI: 29.2± 5.6kg/m², LVEF (%)= 57.7± 5.6%) with a documented AF. All patients had an indication for rhythm control therapy as recommended in actual guidelines. Before treatment the Berlin Questionnaire was completed by all patients. In addition we examined all patients for SDB with polygraphy (PG) by recording nasal flow, breathing movements, oxygen desaturation and ECG with an EMBLETTA X 30 system.

RESULTS: The BG classified 34 patients (51%) as being at high risk for having SDB. Using the polygraphy, SDB could be detected in 40 subjects (60%); AHI 12.2 ± 6.9/h, cut-off: 5/h).

CONCLUSION: It has been formerly shown that treating SDB in patients with AF can reduce recurrence of AF after electrical cardioversion. A PG should become part of the diagnostic evaluation of AF because SDB is common, but often undiagnosed and untreated. A remarkable prevalence of SDB was observed in patients with atrial fibrillation and indication for rhythm control therapy.

P75 - Primary hypothyroidism in patient with severe obstructive sleep apnoea

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Keywords: Obstructive Sleep Apnoea, Therapy and Treatment

The prevalence of hypothyroidism among subjects with obstructive sleep apnoea (OSA) is low (1–3%) but OSA can occur in 50–100% of subjects suffering from clinical hypothyroidism. Several signs and symptoms of OSA and hypothyroidism are similar. In previous studies, thyroid hormone replacement therapy resulted in variable improvement of OSA severity. This case study investigated the effect of thyroid treatment on the parameters of sleep apnoea in a patient with OSA and concurrent hypothyroidism.

A 55-year-old man with a history of snoring, excessive daytime sleepiness (Epworth Sleepiness Score, ESS=11), and weight gain was examined by polysomnography (PSG) that proved severe OSA (apnoea-hypopnoea index, AHI 57.3/hour, oxygen saturation, SpO2<90% during 18% of sleep). Concurrently, a severe primary hypothyroidism was detected. Four months of thyroid hormone replacement therapy resulted in reduction of weight (by 3kg) and hypersomnolence (ESS=8). Nevertheless, repeated PSG while on thyroid demonstrated only minor improvements of sleep apnoea (AHI 40.5/hour; SpO2<90% during 31.8min). Therapy with positive airway pressure (CPAP) was initiated, and resulted in effective abolishment of OSA (AHI 2.8/hour; SpO2>90% during 0.5min, ESS=4).

Conclusion: Thyroid function testing should be considered in patients with a discrepancy between OSA severity and symptoms of sleep-disordered breathing, or in patients who do not show satisfactory improvement after effective therapy of OSA. Our case study suggests that some patients with severe OSA and hypothyroidism benefit from thyroid hormone replacement therapy in terms of reduced daytime sleepiness, however, CPAP therapy is required to abolish OSA.

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P76 - Change of hemodynamic parameters during a short period of stable sleep. Is there a difference between NREM and REM sleep?
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**Keywords:** Obstructive Sleep Apnoea, Physiology and Pathophysiology

Introduction: Obstructive sleep apneas (OSA) are considered a risk factor for the development of arterial hypertension. We analyzed the effect of obstructive sleep apnea (OSA) on various hemodynamic parameters (HP) during a short period of stable sleep.

Methods: We investigated 16 patients with OSA (IAH>15/h) and 15 without OSA (NOSA) and analysed the following HP via the volume clamp method: systolic/diastolic blood pressure (Sys/Dia), mean arterial pressure (MAP), and stroke volume (SV). We selected 10 minutes of N2 and REM sleep and compared the changes of the HP by subtracting the values from baseline of those observed after 10 min. sleep. Results are demonstrated as means +/- standard error (SEM). A p<0.05 was considered significant.

Results: There was no significant difference in age (OSA 46.2 +/-3.0, NOSA 51.8 +/-2.2), but OSA patients had a higher BMI (OSA 33.7 kg/m\textsuperscript{2} +/-1.2, NOSA 27.9 kg/m\textsuperscript{2} +/-0.6). At baseline no HP parameter was significantly different, however, after 10 min. of REM sleep the Sys and SV changed significantly in OSA

<table>
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<tr>
<th>Difference</th>
<th>N 2</th>
<th>Sys [mmHg]</th>
<th>Dia [mmHg]</th>
<th>CO [L]</th>
<th>SV [L]</th>
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<tbody>
<tr>
<td>NAOS</td>
<td>-0.13 (1.3)</td>
<td>-0.14 (0.6)</td>
<td>-0.7 (1.2)</td>
<td>-0.1 (0.4)</td>
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<tr>
<td>AOS</td>
<td>+0.6 (1.6)</td>
<td>+0.1 (1.2)</td>
<td>2.7 (1.8)</td>
<td>-0.4 (0.9)</td>
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Discussion: We could show that during 10 minutes of sleep the existence of OSA influence the HP in REM sleep. While the increase in Sys might be explained by stimulation of the sympathetic nervous system due to apneas and arousals the increase in SV is not clear and needs further investigation.

P77 - Sleep apnoea syndrome in kidney transplant patients
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**Keywords:** Obstructive Sleep Apnoea, Diagnostic

Introduction: Renal transplant patients have more striking sleep disorders than healthy individual of the same age. Obstructive sleep apnoea syndrome (OSAS) improves in less than 30% of patients with end-stage renal disease following successful kidney transplantation. The pathophysiology of sleep apnea in kidney transplanted patients is not clear and its association with on-going renal dysfunction controversial. Obesity has a prevalence of up to 50% in transplant patients.

Objective: To describe the demographic and clinical characteristics of kidney transplant patients and the risk factors for OSAS.

Methods: Retrospective study of all kidney transplant patients that did a sleep study, between January 2008 and June 2010. Socio-demographic data, history of renal disease, medication, comorbidities and laboratory parameters were collected.

Results: Thirteen kidney transplant patients (10 men and 3 women) with a mean age of 58.2 years and a mean body mass index (BMI) of 31.4 Kg/m\textsuperscript{2} were evaluated. Obstructive sleep apnoea was diagnosed in all patients. Mild sleep apnoea was present in 3 (23.1%) patients, moderate in 5 (38.5%) and severe in 5 (38.5%). The apnoea-hypopnoea index (IAH) was significantly correlated with BMI (p<0.05). The IAH was largely independent on both eGFR and serum creatinine.

Conclusions: In our study population all patients had sleep apnoea which is in accordance with the high prevalence of this disease in the kidney transplanted population, described in literature. The high prevalence of obesity in our transplant patients seems to be a risk factor for obstructive sleep apnoea syndrome. OSAS severity was not associated with reduced renal function.

P78 - Reduced renal function and obstructive sleep apnoea syndrome
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**Keyword:** Obstructive Sleep Apnoea

Introduction: Sleep-related breathing disorders are common in patients with end-stage renal disease (ESRD) but are often unrecognized and undertreated. More than 50% of patients with ESRD have sleep apnoea. Patients with chronic kidney disease (CKD) can develop central apnoea, but the most common form of sleep-disordered breathing is obstructive sleep apnoea syndrome (OSAS).

Objective: To describe the demographic and clinical characteristics of patients with CKD and the prevalence and risk factors for OSAS.

Methods: Retrospective study of all patients with CKD (estimated glomerular filtration rate - eGFR < 60 ml/min/1.73 m\textsuperscript{2}) that did a sleep study between January 2008 and June 2010. Kidney transplanted patients were excluded. Patients were divided in two groups based on the apnoea-hypopnoea index (AHI): AHI<15/h; AHI\geq15/h.

Results: Twenty-nine CKD patients with a mean age of 67.1 years and a mean body mass index (BMI) of 32.1 Kg/m\textsuperscript{2} were evaluated. Mean serum creatinine was 3.11 mg/dl and eGFR 34.4 ml/min/1.73 m\textsuperscript{2}. OSAS was diagnosed in 96.5% of patients. Mild sleep apnoea was present in 5 patients (17.2%), moderate in 12 (41.4%) and severe in 11 (37.9%). The AHI was largely independent on both eGFR and serum creatinine. There was no correlation between AHI and BMI. OSAS severity was associated with the presence of comorbidities such as diabetes and dyslipidemia (p<0.05). Patients with AHI \geq15/h had significantly higher levels of serum uric acid.

Conclusions: We found that reduced renal function was not associated with higher AHI or OSAS severity. The high prevalence of sleep apnoea in our patients with CKD was not in association with BMI but was associated with the presence of comorbidities.

P79 - Determination of new predicting formula of optimal nasal continuous positive airway pressure in a Turkish population
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**Keywords:** Obstructive Sleep Apnoea, Therapy and Treatment

Race or ethnicity plays an important role in determining body size, severity of OSAS and effective continuous positive airway pressure (CPAP) (Peff). This study aimed to determine prediction formula of CPAP pressure (Ppred) in Turkish population using 250 OSAS patients and to assess the performance of formula in130 OSAS patients as control group.

Peff of all patients diagnosed as moderate/severe OSAS with standard PSG were calculated by full-night manual titration. Ten anthropometric and polysomnographic variables were included in the analysis: Age, neck circumference (NC), waist circumference, body mass index (BMI), apnoe/hypopnoea index (AHI), desaturation index, nadir and mean oxyhemoglobin saturation, duration and percentage of desaturation. Multiple linear regression was used to model the effects of anthropometric and polysomnographic variables on Peff.

In order to determine formula of Ppred, 250 patients (mean age 52.3±10.3 yrs, 194 men) were included in the study. Except for age, all nine parameters were significantly associated with Peff. The final prediction formula was determined as Ppred = 0.122xNC+0.045xBMI+0.032xAHI. When Peff of 130 control OSAS patients (mean age 51.5±10.6 yrs, 103 men) were assessed to control the performance of our new prediction formula, it was observed that mean Peff was 8.42±2.04 cmH\textsubscript{2}O and Ppred was 8.39±1.15 cmH\textsubscript{2}O and there was strong correlation between two pressures (r=0.666, p<0.001).
We conclude that level of CPAP pressure can be successfully predicted from new equation, using NC, BMI and AHI in Turkish OSAS patients. Prediction formula may be useful in calculating the starting pressure for initiating CPAP titration.

**P80 - The relationship between obstructive sleep apnea syndrome and obesity, impaired fasting glucose and diabetes mellitus**
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**Keywords:** Obstructive Sleep Apnoea, Physiology and Pathophysiology

**Aim:** To evaluate relationship between OSAS and DM, 983 patients undergoing polysomnography between January 2005-2010 were retrospectively analysed. Result: The mean age of 660 male and 323 female cases was 48.7±10.9. In 109 cases apnea-hypopnea index (AHI) was <5; of 874 cases, 23.9% were mild, 22.8% moderate, 42.2% severe OSAS. Of the whole group, 77.5% were obese (BMI>27), 22.5% had normal BMI. 91 patients (9.3%) had morbid obesity (BMI>40). 106 cases had known DM, 59 (6%) got new diagnosis (fasting glucose level-FGL>126 mg/dl) and 173 (17.6%) had impaired fasting glucose (FGL=100-125 mg/dl). The frequency of OSAS in these groups was 93.4%, 89.8% and 90.1%, respectively. Of 874 patients with OSAS, 152 (17.4%) had DM, 156 (17.8%) had impaired FGL whereas in non-OSAS group (n=109), 13 (11.9%) cases had DM and 17 (15.6%) had impaired FGL. The mean BMI was 31.9 kg/m² in OSAS and 30 kg/m² in non-OSAS groups, with a significant difference, however 2 groups did not show differences due to frequency of DM and impaired FGL. In cases with severe OSAS, DM and impaired FGL were more frequent than cases with mild and moderate OSAS (p<0.0001). In case of DM and impaired FGL, age, BMI, AHI, apnea index (AI), obstructive AI and oxygen desaturation index (ODI) were higher and minimum saturation was lower, with statistical significance. In terms of central AI, sleep efficiency, sleep latency, percentages of sleep stages and REM latency, both groups were similar. Logistic regression analysis revealed age and BMI as independent risk factors. Conclusion: We conclude that DM and impaired FGL are correlated to degree of OSAS, depending on age and BMI, but have no effect on sleep architecture.

**P81 - The relationship between obstructive sleep apnea syndrome and Hypothyroidism**
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**Keywords:** Obstructive Sleep Apnoea, Physiology and Pathophysiology

**Aim:** To evaluate the relationship between OSAS and DM, 983 patients undergoing polysomnography between January 2005-2010 were retrospectively analysed. Result: The mean age of 660 male and 323 female cases was 48.7±10.9. In 109 cases apnea-hypopnea index (AHI) was <5; of 874 cases, 23.9% were mild, 22.8% moderate, 42.2% severe OSAS. Of the whole group, 77.5% were obese (BMI>27), 22.5% had normal BMI. 91 patients (9.3%) had morbid obesity (BMI>40). 106 cases had known DM, 59 (6%) got new diagnosis (fasting glucose level-FGL>126 mg/dl) and 173 (17.6%) had impaired fasting glucose (FGL=100-125 mg/dl). The frequency of OSAS in these groups was 93.4%, 89.8% and 90.1%, respectively. Of 874 patients with OSAS, 152 (17.4%) had DM, 156 (17.8%) had impaired FGL whereas in non-OSAS group (n=109), 13 (11.9%) cases had DM and 17 (15.6%) had impaired FGL. The mean BMI was 31.9 kg/m² in OSAS and 30 kg/m² in non-OSAS groups, with a significant difference, however 2 groups did not show differences due to frequency of DM and impaired FGL. In cases with severe OSAS, DM and impaired FGL were more frequent than cases with mild and moderate OSAS (p<0.0001). In case of DM and impaired FGL, age, BMI, AHI, apnea index (AI), obstructive AI and oxygen desaturation index (ODI) were higher and minimum saturation was lower, with statistical significance. In terms of central AI, sleep efficiency, sleep latency, percentages of sleep stages and REM latency, both groups were similar. Logistic regression analysis revealed age and BMI as independent risk factors. Conclusion: We conclude that DM and impaired FGL are correlated to degree of OSAS, depending on age and BMI, but have no effect on sleep architecture.

**P82 - The relationship of cardiovascular diseases and hypertension with sleep architecture and stage of obstructive sleep apnea syndrome**
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**Keywords:** Obstructive Sleep Apnoea, Physiology and Pathophysiology

**Aim:** Hypertension and cardiovascular diseases are well-known consequences of obstructive sleep apnea syndrome (OSAS). In order to evaluate their relationship with degree of OSAS and sleep architecture, the files of 983 patients admitted to sleep laboratory between January 2005 and January 2010 were retrospectively analysed.

**Material/method:** Sleep records from Viasys Sleep Screen apparatus were scored according to Rech-Schaffen Kales criteria. The demographical and medical data were recorded. Statistical analyses were made using Chi-square and Student’s T tests.

**Result:** The mean age of 660 (67.1%) male and 323 (32.9%) female cases was 48.7±10.9. In 109 cases apnea-hypopnea index (AHI) was <5; 874 cases having OSAS were grouped as mild (235, 23.9%), moderate (224, 22.8%) and severe (415, 42.2%). OSAS was accompanied with hypertension in 317 (36.3%) and cardiovascular diseases (coronary artery disease and heart failure) in 90 (10.3%) patients. The age, AHI, apnea index (AI), oxygen desaturation index (ODI) were significantly higher (p<0.05) whereas sleep efficiency and minimum saturation were significantly lower (p<0.05) in the group with cardiovascular diseases. The percentages of sleep stages and REM latency were similar in both groups. Hypertensive cases had significantly higher age, AHI, AI and ODI, significantly lower minimum saturation and significantly longer REM latency and stage 1 sleep. Conclusion: Our findings suggest that the presence of cardiovascular diseases and hypertension are related to the stage of the disease and cause disturbed sleep architecture in OSAS patients.

**P83 - The cooking profession and obstructive sleep apnoea syndrome**
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**Keyword:** Obstructive Sleep Apnoea

**Background:** We asked ourselves the following questions. Does the cooking profession contribute to a higher prevalence of obstructive sleep apnoea syndrome (OSAS)? Is the prevalence of the cooking profession abnormally higher in the group of OSAS patients when compared to the prevalence of cooking profession in the Czech population? According to a 2007 report by the Czech Institute of Statistics the prevalence of the cooking profession in the Czech Republic was 1.58%.

**Methods:** From a group of 486 consecutive patients with OSAS we selected the professional cooks. We used the Chi-square test to measure the difference in prevalence of the cooking profession in the OSAS group against that of the Czech population.

**Results:** In 486 patients with OSAS 19 (3.91%) were professional cooks, of that 15 males and 4 females, mean age was 55.6 years, mean BMI was 39.6, mean cumulative time with saturation lower than 90% was 64.6%, mean oxygen desaturation index was 46.5. The prevalence of professional cooks is significantly higher (p=0.0001) in the group of OSAS patients.

**Conclusion:** The prevalence of cook is significantly higher (p=0.0001) in the group of OSAS patients (3.91%) when compared with the prevalence of professional cooks in the Czech population (1.58%).
**P84 - Can respiratory parameters predict the need for adaptive servventilation in sleep apnoea?**

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**Keywords:** Central Sleep Apnoea, Diagnostic

**Introduction:** P0.1 as parameter of respiratory drive might help to identify forms of sleep apnoea syndrome (SAS) that will eventually need adaptive servventilation (ASV) as mode of treatment, as respiratory parameters may be different according to the differences in the underlying sleep related breathing disorder such as central, combined and so-called complex forms of SAS.

**Methods:** In a retrospective analysis, values of respiratory drive and capacity as well as related parameters of patients with various forms of sleep apnoea were examined before sleep related treatment with regard to differences between patients who eventually received ASV and those receiving autoCPAP (APAP) or CPAP.

**Results:** Of all patients with a diagnostic polysomnography revealing a significant SAS between July 2007 and August 2008, data of 88 patients were complete including follow-up. 17 finally received ASV, 71 stayed on APAP/CPAP. P0.1 yielded no statistically significant difference between both groups, neither did any of the related parameters (P0.1max%, predicted, Pmax%, predicted, P0.1/PL, P0.1max%predicted). In follow-up, P0.1 showed no difference after treatment.

**Discussion:** Differences in respiratory drive may lead to different disturbances in sleep related breathing, but this could not be confirmed in this study. However, the study is limited by the retrospective design, small sample size and heterogeneity of the groups.

**Conclusion:** Parameters of respiratory drive were not helpful in groups.

**Introduction:** In central sleep apnea with heart failure (CSA) a strong correlation has been shown between apnea-hypopnoea index (AHI) and cycle time (CYT), hyperpnea length, and circulation time (CRT). CRT was also indirectly proportional to cardiac output (CO) and stroke volume (SV). A similar association in OSA has not yet been investigated.

**Aim:** To evaluate the relationship between AHI, CRT, CYT, and cardiovascular parameters in OSA patients with preserved baseline heart function and with different responses to stress echocardiography.

**Methods:** 56 OSA patients (AHI>20) [BMI 31.2±6.0, PaCO2 38.8±3.4 mmHg, AHI 54±21] received a full polysomnography, 2D-doppler and m-mode echocardiography. CRT and CYT of 10 obstructive apneas (OA) and 10 hypopneas (H), during Stage 2 sleep, were measured in each patient. 46 patients underwent stress echocardiography for assessment of LV functional response.

**Results:** CRT and CYT in OA and H were within the normal range [CRT-OA 18.9±4.1 s, CRT-H 16.9±4.7 s, CYT-OA 39.4±12.5 s, CYT-H 39.5±9.3 s]. AHI did not correlate with CRT or CYT, while no significant correlations were found between CRT, CYT, and cardiovascular parameters. Sub-analysis according to LV functional response demonstrated no significant differences in CRT or CYT, while no significant correlation could be found with AHI of either group. There was a significant difference in mean SpO2 between the 2 groups (p = 0.02).

**Conclusions:** The relationship between AHI and CRT or CYT, as observed in CSA, cannot be confirmed in OSA patients with preserved baseline cardiac function with or without abnormal stress response. The lower mean SpO2 may contribute to abnormal stress response in OSA patients.

**P85 - Complex sleep apnoea (CompSAS): are patients predisposed or is it an iatrogenic disease ?**

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**Keywords:** Central Sleep Apnoea, Therapy and Treatment

**Introduction:** CompSAS is a prevalent disorder, occurring during CPAP titration in patients with predominantly obstructive sleep apnoea. It could be questioned whether CompSAS is a clinical entity or only a polysomnographic observation. Data on prevalence, gender impact, influence of BMI, and presence of CVD are controversial.

**Aim:** To search for clinical predictors of CompSAS that could differentiate them from ‘normal’ OSA.

**Methods:** Clinical data were obtained from a routine sleep questionnaire, physical examination, blood gases, lung function and PSG.

**Results:** Comparison between ‘normal’ OSA (n=303) and CompSAS (n=41) did not show any significant difference concerning age (51±11 vs 53±9 y), BMI (32±6 vs 31±6 kg/m2), gender, or symptom severity (except for concentration problems and awakenings). CompSAS were heavier smokers (13±20 vs 22±23 packyears), taller (173±9 vs 177±8 cm), had a higher PaO2 (78±11 vs 84±12 mmHg) and SaO2 (95±2 vs 97±1 %) and a lower systolic (139±130 mmHg) and diastolic (90±16 vs 80±14 mmHg) blood pressure. Arterial hypertension (28 vs 29%), and nasal obstruction (34 vs 22%, p=0.15) were equally distributed. VC (94±16 vs 101±15 %) and FEV1 (92±20 vs 101±16 %) were also significantly higher in CompSAS. CompSAS had a higher CAI (3±7 vs 4±5, p=0.04) and more awakenings (96±91 vs 285±139, p=0.01). The degrees of severity, based on hypoxemia time and AHI (57±31 vs 51±27) were comparable.

**Conclusion:** CompSAS demonstrate more awakenings during baseline polysomnography, which are also reported by the patients. This could argue for a predisposition of specific OSA patients to develop CompSAS and against the concept that CompSAS is an iatrogenic disorder.

**Keywords:** Obstructive Sleep Apnoea

**Introduction:** In central sleep apnea with heart failure (CSA) a strong correlation has been shown between apnea-hypopnoea index (AHI) and cycle time (CYT), hypopnea length, and circulation time (CRT). CRT was also indirectly proportional to cardiac output (CO) and stroke volume (SV). A similar association in OSA has not yet been investigated.

**Aim:** To evaluate the relationship between AHI, CRT, CYT, and cardiovascular parameters in OSA patients with preserved baseline heart function and with different responses to stress echocardiography.

**Methods:** 56 OSA patients (AHI>20) [BMI 31.2±6.0, PaCO2 38.8±3.4 mmHg, AHI 54±21] received a full polysomnography, 2D-doppler and m-mode echocardiography. CRT and CYT of 10 obstructive apneas (OA) and 10 hypopneas (H), during Stage 2 sleep, were measured in each patient. 46 patients underwent stress echocardiography for assessment of LV functional response.

**Results:** CRT and CYT in OA and H were within the normal range [CRT-OA 18.9±4.1 s, CRT-H 16.9±4.7 s, CYT-OA 39.4±12.5 s, CYT-H 39.5±9.3 s]. AHI did not correlate with CRT or CYT, while no significant correlations were found between CRT, CYT, and cardiovascular parameters. Sub-analysis according to LV functional response demonstrated no significant differences in CRT or CYT, while no significant correlation could be found with AHI of either group. There was a significant difference in mean SpO2 between the 2 groups (p = 0.02).

**Conclusions:** The relationship between AHI and CRT or CYT, as observed in CSA, cannot be confirmed in OSA patients with preserved baseline cardiac function with or without abnormal stress response. The lower mean SpO2 may contribute to abnormal stress response in OSA patients.

**Keywords:** Intermittent Hypoxia, other Experimental Models, Obstructive Sleep Apnoea

**Rationale:** To analyse relationships between measures of sleep-disordered breathing and neuropsychological functioning in OSA patients with different parameters of hypoxic burden.

**Patients and methods:** In 136 newly diagnosed OSA patients(mean age 60yrs,mean BMI 33) we studied apnoea hypopnoea index(AHI), oxygen desaturation index(DDI),mean and minimum nocturnal saturations(SpO2mean)of the mean of the minimum nocturnal saturations, time with an 02 saturation below 90%(TD90),mean decrease from mean saturation, mini-mental state examination (MMSE), the Rey auditory verbal learning test (RAVLT), the Corsi block-tapping and the digit span task exercises, the speed and capacity of language processing test(SCOLP), Multiple Features Targets Cancellation(MFTC), Raven’s matrices, Stroop test.

**Results:** 34% of patients had neuropsychological deficits. At the univariate linear regression, but not at the multivariate regression, partial pressure of oxygen in the blood during awakening and minimum nocturnal saturation during sleep represented the most number of the abnormal cognitive functions.RAVLT,SCOLP and Raven’s matrices were affected the most.At the multivariate regression SpO2mean correlated with the digit span task exercises,SCOLP test and the Stroop test, whereas AHI correlated only with RAVLT and DDI only with Stroop test.BMI correlated with
RAVLT and SCOLP: T090 with RAVLT. The mean decrease from mean saturation correlated with Corsi and MTFC tests both in severe and in mild-moderate OSA patients.

Conclusion: not only the total time in hypoxia and its severity but also the amplitude of hypoxic/emic swings are associated with the cognitive impairment of OSA patients, and this effect is significant also in mild to moderate cases.

P88 - Obstructive sleep apnea in psoriasis patients
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Keywords: Obstructive Sleep Apnoea, Diagnostic

Background: Psoriasis is a chronic autoimmune inflammatory skin disease which is associated with metabolic syndrome and increased cardiovascular risk. Obstructive sleep apnea (OSA) on the other hand is one of the most important and frequently underestimated risk factor for cardiovascular disease which is also associated with metabolic syndrome.

Aim: We investigated whether sleep apnea is associated with psoriasis.

Methods: Twenty-two consecutive patients (mean age 49±13 years, 12 males), with psoriasis participated in the study. All patients underwent full Polysomnography (PSG). The presence and the severity of sleep apnea was measured using the Apnea Hypopnoea index (AHI), Psoriasis Area and Severity Index (PASI) was used in order to measure the extent and severity of psoriasis.

Results: Fourteen patients with psoriasis were diagnosed to suffer from OSA (p<0.05). Patients with moderate to severe psoriasis (PASI>10) had moderate - severe OSA compared to psoriasis patients with mild disease (AHI=19.14±14.15 vs 7.20±8.40, p<0.05). Multivariable regression analysis, after adjustment for potential confounders (body mass index, smoking, blood pressure), showed that AHI was associated independently with PASI adjusted R²=0.533, (p=0.406, p<0.05).

Conclusion: These findings suggest an association of psoriasis with OSA, independently of obesity, smoking and blood pressure. It is also indicated that severe psoriasis patients are in a greater risk of presenting OSA, than those with mild skin lesions. So the management of severe psoriasis should include investigation for sleep apnea syndrome.


P89 - The Value Of Drug-Induced Sleependoscopy With Simulation Bite Approach In Predicting The Outcome Of Treatment With Mandibular Repositioning Appliances In Patients With Obstructive Sleep Apnea
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Keywords: Obstructive Sleep Apnoea, Therapy and Treatment

Introduction Mandibular repositioning appliances (MRA) are used to treat obstructive sleep apnea (OSA), but prediction of treatment outcome lacks consistency. This study uses drug-induced sleep endoscopy (DISE) with a simulation bite (SB): a custom-made registration of the patient’s maximal comfortable protrusion. During DISE, the upper airway is assessed with SB, without SB and with chin-lift. Decisions based on changes in upper airway collapse are: not/partially/well suitable for MRA therapy.

Objective To assess the value of DISE with SB in outcome prediction of treatment with MRA.

Methods 66 patients with OSA (71.2% male; age 46±8y; apnea/hypopnoea index (AHI) 22.0±14.7/h sleep; BMI 27.9±4.4kg/m²) underwent DISE with SB, before starting MRA treatment. The correlation between treatment response and the results of DISE was evaluated using polysomnography. Treatment success was defined as an important reduction of snoring (visual analogue scale (VAS) ≤3) plus an AHI<5/h sleep and/or a ≥50% reduction in AHI plus a satisfactory decrease of snoring (decrease of VAS ≤3).

Results The results of this study demonstrated a statistically significant correlation between effect of SB during DISE and treatment success with MRA (p<0.001). The effect of the chin-lift maneuver during DISE did not correlate with treatment success.

Conclusion This study suggests that SB used during DISE in patients with OSA might be effective in predicting treatment outcome of MRA therapy in a prospective way. No significant correlation was found between the effect of chin-lift manoeuvre during DISE and treatment success.

P90 - Mortality of SDB after stroke: Longterm-follow-up
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Keywords: Obstructive Sleep Apnoea, Central Sleep Apnoea

Objectives: The prevalence of sleep apnea in stroke patients is high, but data on mortality are inconclusive.

Materials and methods: 90 stroke patients (61 men, 20 women; age 63±8.0 yrs, BMI 27±7.2 kg/m2), in whom full polysomnography was performed during rehabilitation (64±60.4 days after stroke), were divided in three groups (A: RDI<5, B: 5≤RDI<20, C: RDI≥20), matched for age, gender, and BMI. There was no special treatment for SDB. Patients with RDI≥20 declined CPAP or were asymptomatic. Follow-up was by telephone contact. The mean observation time was 9.3±3.8 years (overall 838 patient years).

Results: All patients could be followed up. There were 41 deaths. SDB was not a strong predictor of mortality. The trend did not reach a significant difference between the groups.

Age, prevalence of coronary artery disease, blood glucose, fibrinogen, and number of antihypertensives used were higher among deaths than survivors.

Conclusions: Sleep disordered breathing diagnosed during rehabilitation after stroke is not associated with a higher mortality within 10 years.
sleep disorders in the general population. The association between OSAS and insomnia symptom has received little attention from sleep investigators in the past few decades. This study investigates the prevalence of insomnia symptoms and related factors in patients with OSAS.

Materials and Methods - This is a retrospective study of 126 consecutive patients with OSA who underwent sleep polysomnography. Patients were interviewed about their detailed sleep history. Insomnia and subjective daytime sleepiness was assessed using the Insomnia Severity Index and Epworth Sleepiness Scale. Polysomnographic recordings were compared in patients with and without insomnia symptom.

Results – Of 126 patients with OSAS diagnosis, 81.7% of patients complained from one of the four insomnia symptom. Insomnia was a common complaint in patients being evaluated for obstructive sleep apnea. No significant association emerged between the insomnia symptom with mean nocturnal saturation of oxygen (P>0.05).

Conclusions – Insomnia is a common complaint in patients suffering from OSAS. There was no relationship between insomnia symptom and severity of apnea or oxygen desaturation. Thus, nocturnal hypoxia is less likely to explain the high prevalence of insomnia among patients with OSAS.

Keywords – Obstructive sleep apnea, insomnia, day time sleepiness

P92 - Relationship between Obstructive Sleep Apnea and Morning Headache
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Keywords: Obstructive Sleep Apnoea, Quality of Life

Background: Obstructive sleep apnea syndrome (OSAS) is a common disorder in the general population. Several studies have suggested that headaches, particularly morning headaches, are more common in patients with OSAS than in normal subjects.

Objective: This study investigates whether a correlation between morning headache and polysomnographic sleep parameters exists.

Methods: This is a cross sectional study of 150 consecutive patients with OSA who underwent sleep polysomnography. Patients were interviewed about their headache history. Insomnia and subjective sleepiness was assessed using the Insomnia Severity Index and Epworth Sleepiness Scale. Polysomnographic recordings were compared in patients with and without morning headache.

Findings: Headache and non-headache patients did not differ in the Respiratory Disturbance Index, either in Mean nocturnal SaO2 or sleep efficiency (P>0.05). The headache patients were more likely to be female and spend a lower time in sleep. Insomnia was a common complaint in patients being evaluated for obstructive sleep apnea. No significant association emerged between the Excessive Daytime Sleepiness with headache (P>0.05).

Conclusion: Thus, nocturnal hypoxia is less likely to explain the high headache prevalence among patients admitted for polysomnography.

Keywords: Morning headache, obstructive sleep apnea, polysomnography, respiratory disturbance index

P93 - Polysomnographic findings in obstructive sleep apnea syndrome with and without excessive daytime sleepiness
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Keywords: Obstructive Sleep Apnoea, Quality of Life

Introduction - Obstructive sleep apnea syndrome (OSAS) is a common disorder in the general population. Excessive daytime sleepiness (EDS) is a frequent symptom of patients with OSA. Obstructive sleep apnea and EDS lead to an increased risk of motor vehicle accidents through multiple pathways. We investigate correlation between EDS with polysomnography variables.

Materials and Methods - This is a retrospective study of 126 consecutive patients with OSA who underwent sleep polysomnography. Subjective sleepiness was assessed using the Epworth Sleepiness Scale. Absence of EDS was defined as having an ESS score of < 10. Polysomnographic recordings were compared in patients with and without daytime sleepiness.

Findings – 71 patients with EDS and 55 patients without EDS were studied. Patients with EDS had longer total sleep time, shorter sleep latency, more total Respiratory Disturbance Index, and more total limb movement than patients without EDS (P<0.05). EDS and non-EDS patients did not differ in the sleep efficiency, sleep stage distribution and number of awakening (P>0.05).

Discussion and Conclusion – Our results suggest that there is correlation between excessive daytime sleepiness and respiratory sleep variables and desaturation of oxygen at night. Patients with more severe daytime sleepiness are characterized by more severe nocturnal hypoxemia. Nocturnal hypoxemia may be a major determinant of EDS in OSA patients.
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BMC Medical Co., Ltd. 15
BMC Medical Co., Ltd. is the leading developer, manufacturer and supplier of products for the diagnosis and therapy of sleep-disordered breathing in China. Our products cover Polysomnographic System, Polygraph, Sleep Screener and innovative CPAP, AutoCPAP and BiPAP systems.

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Tel: +86-10-51663880
Fax:+86-10-51663880 Ext. 810
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Website: www.bmc-medical.com

CADWELL Laboratories, Inc 14
The Cadwell® Easy® III and Easy Ambulatory PSG systems set a new standard in state of the art polysomnography the world over.

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CIDELEC 6
CIDELEC is a manufacturer of diagnostic systems for sleep disorders. Our polygraph and polysomnograph use our unique tracheal sound sensor technology in addition to recommended sensors for quality diagnosis. CIDELEC accompany you with strong dedication and high specialization in sleep diagnostic.

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David Vermeiren - European Sales Director
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Tel: +33 1 6446 5201 – Fax: +33 1 6446 5221
E-mail: c.s@fphcare.fr

Grass Technologies, An Astro-Med Inc. Subsidiary 5
World leader in sleep diagnostic systems, Grass Technologies’ dependable line of instruments includes lab-based, wireless, and portable at-home monitors, useful in clinical and research applications. Versatile Grass software is used for database management, acquisition, and analysis. A full line of electrodes, transducers, etc. is available. Ask about our famous Lifetime Warranty!

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Senefelderstraße 1, D-63110 Rodgau, Germany
Tel: +49 (0)6106-28368-0 – Fax: +49 (0)6106-771121
Grass Technologies, An Astro-Med Inc. Subsidiary
E-mail: grass@astromed.com
Website: www.grasstechnologies.com

HOFFRICHTER 2
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Inspire Medical Systems 19
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E-mail: hervejanssens@inspiresleep.com
Website: www.inspiresleep.com

MPV TRUMA Gesellschaft für medizintechnische Produkte mbH 16
MPV TRUMA is a German based manufacturer and distributor of respiratory care equipment with an international orientation. We offer high quality products from aerosol and ultra-sonic nebulizers, sleep apnea therapy and diagnosis devices to highly sophisticated ventilation and home ventilation systems.

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D- 85640 Putzbrunn, Germany
Tel: +49 (0) 89 4617 2369 – Fax: +49 (0) 89 4617 2390
E-mail: y.liu@mpv-truma.com
Website: www.mpv-truma.com
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Philips Respironics
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92150 Suresnes, France
E-mail: manuela.leurent@philips.com
Website: www.philips.com/respirronics

Plastiflex Healthcare

Plastiflex Healthcare focuses on the development, manufacturing and marketing of tubing system technologies for respiratory care, including sleep therapy, non invasive and critical care ventilation. The Hybernite® Rainout Control System is a new universal heated tubing system for sleep therapy.

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Division of Plastiflex Group NV
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Website: www.hybernite.com

ResMed Europe

ResMed is a leading developer, manufacturer, and marketer of medical equipment for diagnosis and treatment of Sleep Disordered Breathing (SDB). ResMed is committed to education and awareness by supporting leading physicians and researchers exploring the link between SDB and life-threatening diseases.

ResMed Europe
c/o ResMed Norway AS
Fjordveien 1, 1363 Høvik , NORWAY
Tel: +47 67 11 88 50 – Fax: +47 67 11 88 55
E-mail: post@resmed.no
Website: www.resmed.com

SIAD Czech spol. s r.o.

Devices and equipment for sleep diagnostic - cardiorespiratory, PSG, EEG, accessories - producer Compumedics (Australia). Devices for non-invasive ventilation - CPAP, BPAP, accessories - producer Hoffrichter (Germany).

SIAD Czech spol. s r.o.
Branany c.p.193
435 22 Branany u Mostu - Czech Republic
Tel.: +420 235 097 532 – Fax: +420 235 097 525
E-mail: siad@siad.cz

Somnomed AG Europe

SomnoMed AG EUROPE is a medical device company and designs, manufactures and markets a range of oral sleep appliances for the treatment of sleep apnea, snoring and bruxism. Operates in 20 countries and received registration approvals FDA, TGA, CE, ISO for its patented sleep appliances SomnoDent.

SomnoMed AG Europe
Kreuzstrasse 54
CH-8032 Zürich
Website: www.somnomed.eu

SOMNOmedics GmbH

SOMNOmedics is a company that designs, manufactures and distributes products dedicated to sleep diagnostics. Our products comply with the APSS standards and guidelines. SOMNOmedics devices are small, light weight and completely compatible with in lab diagnostics as well as home sleep testing.

SOMNOmedics GmbH
Am Sonnenstuhl 63
D-97236 Randersacker
E-mail: info@somnomedics.de
Website: www.somnomedics.eu

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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.

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