BULGARIAN SOCIETY OF OBSTRUCTIVE SLEEP APNEA AND SNORING
MEDICAL UNIVERSITY „PROF. PARASKEV STOYANOV“ OF VARNA

SECOND NATIONAL SYMPOSIUM ON OBSTRUCTIVE SLEEP APNEA AND SNORING WITH INTERNATIONAL PARTICIPATION

SCIENTIFIC PROGRAMME

Comorbidity in Obstructive Sleep Apnea

Cherno more Interhotel
Varna, August 26–27, 2016

PRECEDING EDUCATIONAL COURSE

Contemporary surgical management with coblation of obstructive sleep apnea

St. Marina University Hospital of Varna
Varna, August 25, 2016

Under the auspices of Prof. Krasimir Ivanov
Rector, Medical University „Prof. Paraskev Stoyanov“ of Varna

Chairman of the Symposium: Assoc. Prof. Mario Milkov

Chairman of the Scientific Committee: Prof. Roumen Benchev
Chairman of the Local Organizing Committee: Prof. Plamen Nedev
Chairman of the Dental Committee: Prof. Tsvetan Tonchev

Local Organizing Committee:
Todorka Kostadinova, Hristina Grupcheva, Pavel Dimov, Dilyana Vicheva, Anna Tolekova, Nikolay Sapundzhiev, Petya Mineva, Angel Mirchev, Dimitar Tomov, Petar Petrov, Georgi Iliev, Lyudmil Matev, Petya Genova, Christiana Madjova, Dobromir Dzhikov

Official languages: Bulgarian and English

THURSDAY, AUGUST 25, 2016

09:30-13:30	ENT Clinic at St. Marina University Hospital of Varna Prof. Plamen Nedev and Dr. Georgi Iliev Live surgery in patients with obstructive sleep apnea and snoring

FRIDAY, AUGUST 26, 2016

08:00-16:00	**Registration: Hall One, Cherno more Interhotel**
09:00-11:00	**First Scientific Session: Hall One, Cherno more Interhotel**
	Chairman: W. Pirsig
	Secretary: D. Vicheva
09:00-09:30	W. Pirsig. History of sleep disordered breathing
09:30-09:55	L. Öztürk, G. Öztürk, E. Bulut. Genetics of obstructive sleep apnea syndrome and other sleep disorders
09:55-10:15	P. Dimov. Snoring and otitis media with effusion. Must decide on?
10:15-10:40	G. Öztürk, E. Bulut, L. Öztürk. Obstructive sleep apnea syndrome and physical exercise
10:40-10:50	T. Marinova, H. Grupcheva. In vivo laser-scanning confocal microscopy - diagnostic and prognostic approach
10:50-11:00	Discussion
11:00-11:20	Break
11:20-12:50	**Second Scientific Session: Hall One, Cherno more Interhotel**
	Chairman: L. Öztürk
	Secretary: P. Dimov
11:20:11:50	ArthroCare Symposium
11:50-12:05	M. Milkov. Natural shield against pain in aphthous stomatitis. Berlin-Chemie firm presentation
12:05-12:20	R. Benchev. 'INXS' in obstructive sleep apnoea
12:20-12:30	A. Valkov, B. Duhlenski, G. Nikolov, A. Hvarchilkova. Coblation and snoring - a pilot study
12:30-12:40	G. Öztürk, L. Öztürk, A. Yilmaz, N. Süt, H. Özlece. To what extent do we investigate obstructive sleep apnea syndrome? The importance of institutionalisation
12:40-12:50	Discussion
12:50-13:50	Lunch

14:00-16:10	**Third Scientific Session: Hall One, Cherno more Interhotel**
	Chairman: A. Neagos
	Secretary: G. Anastopoulos
14:00-14:15	W. Pirsig. The role of the nose and its surgery in obstructive sleep apnea
14:15-14:25	N. Süt, İ. Umut, E. Ucar, L. Öztürk. Identification of obstructive sleep apnea by digital signal processing methods: statistical multivariate analyses and artificial neural networks
14:25-14:50	A. Neagos. Obstructive sleep apnea - clinical and polysomnographic investigations
15:30-15:40	D. Vicheva. Obstructive sleep apnea in women
15:40-16:00	A. Neagos. Sleep investigation and correlation between its parameters
16:00-16:10	Discussion
16:10-16:30	Break
16:30-18:40	**Fourth Scientific Session: Hall One, Cherno more Interhotel**
	Chairman: C. Vicini
	Secretary: M. Suurna
16:30-16:50	C. Vicini. Palate surgery for obstructive sleep apnea: is pendulum swinging from midline to lateral wall?
16:50-17:10	M. Suurna. Surgical treatment of sleep disorders - where we are and what is the future of sleep apnea surgery
17:10-17:30	M. K. Adali. Expansion sphincter pharyngoplasty. Why, whom, how?
17:30-17:50	W. Pirsig. Muscle preserving uvulopalatopharyngoplasty (UPPP and tonsillectomy with a minimum of complications)
17:50-18:10	F. Yildiz. Sleep disordered breathing and turbinate hypertrophy. Therapy options with radiofrequency
18:10-18:30	G. Anastopoulos. Office procedures under topical anesthesia for the reduction of snoring and sleep apnea
18:30-18:40	Discussion
18:40-19:00	Opening ceremony
20:00	Cocktail

SATURDAY, AUGUST 27, 2016

08:30-10:50	**Fifth Scientific Session: Hall One, Cherno more Interhotel** Chairman: J. U. Sommer Secretary: M. Stankovic
08:30-08:40	G. Arabadzhiev, D. Arabadzhiev, L. Manchev, P. Dimov. Relations of intraabominal hypertension and sagittal abdominal diameter with obstructive sleep apnea in an intensive care unit

08:40-09:05	J. U. Sommer. When anatomy is not the cause - the role of hypoglossal nerve stimulation in the treatment of obstructive sleep apnea
09:05-09:15	C. Ünver. Hypoglossal nerve stimulation (Imthera technigue)
09:15-09:35	M. Stankovic. Adenotonsillectomy and pediatric obstructive sleep apnea. Current trends and challenges
09:35-09:45	P. Genova. Surgical techniques of tonsillotomy
09:45-09:55	C. Ünver. Genioglossal advancement surgery (sleep-in technique)
09:55-10:10	F. Yildiz. Oral appliances in the therapy of snoring and obstructive sleep apnea. An update
10:10-10:20	Discussion
10:20-10:50	Olympus firm presentation
10:50-11:10	Break
11:10-12:50	**Sixth Scientific Session: Hall One, Cherno more Interhotel**
	Chairman: H. Negm
	Secretary: P. Nedev
11:10-11:30	H. Negm. Laser treatment of oropharygeal vascular lesions
11:30-11:40	S. Angelova, Ju. Kostadinov, M. Milev, G. Nenova, M. Milkov Innovative approaches to the treatment of sleep apnea
11:40-11:50	P. Mineva. Obstructive sleep apnea and diseases of the nervous system
11:50-12:00	P. Chipev. Hypoventilation syndrome in obesity (Pickwick syndrome)
12:00-12:10	K. Terzijski. Central sleep apnea - a melody without rhythm
12:10-12:20	A. Draganova. Breathing disorders during sleep among chronic heart failure outpatients with preserved systolic function: a pilot investigation in Bulgaria
12:20-12:40	A. Bucci. Sleep endoscopy - our experience
12:40-12:50	Discussion
12:50-13:50	Lunch
14:00-15:40	**Seventh Scientific Session: Hall One, Cherno more Interhotel**
	Chairman: M. K. Adali
	Secretary: P. Petrov
14:00-14:15	P. Petrov, M. Popovska. Sleep questionnaires in the clinical assessment of patients with obstructive sleep apnea
14:15-14:25	M. Popovska, P. Petrov. Obstructive sleep apnea and atrial fibrillation - a case report
14:25-14:55	Löwenstein P. Petrov Medical firm presentation
14:55-15:10	P. Hristova, T. Vekilov, A. Tolekova, M. Milkov. Hormonal aspects of sleep regulation

15:10-15:20	R. Tiholov. Obesity, hypoventilation syndrome and obstructive sleep apnea
15:20-15:30	I. Kiselov. Salvage therapy with CPAP and BIPAP in patients with chronic obstructive pulmonary disease
15:30-15:40	Discussion
15:40-16:00	Break
16:00-17:50	**Eighth Scientific Session: Hall One, Cherno more Interhotel**
	Chairman: R. Benchev
	Secretary: N. Sapundzhiev
16:00-16:10	A. Raynov, T. Andreeva. Methods of objectifying the pathophysiological changes accompanying pregnancy-related sleep disordered breathing
16:10-16:20	A. Mirchev, M. Milkov, D. Dzhikov, L. Matev, P. Nedev. Management of obstructive sleep apnea in professions dealing with vehicles
16:20-16:30	S. Gradanska, V. Yordanov, M. Dzhinova. Screening and comprehensive evaluation for SRBD performed by dentists in everyday clinical practices
16:30-16:40	C. Madjova. Oral appliances in temporomandibular joint disorders
16:40-17:00	GlaxoSmithKline firm presentation
17:00-17:10	Zh. Ruseva, N. Sapundzhiev, M. Milkov, M. Mihailova, V. Madjova. Significance of physical factors in treating children with sleep-disordered breathing
17:10-17:20	P. Baev, L. Matev, Ts. Tonchev, M. Milkov. Lateral cephalometric radiographic values in diagnosing the obstructive sleep apnea. Sex differences
17:20-17:30	T. Marinov, A. Varbanova, M. Yordanova, K. Moneva, M. Doichinova. Radiotherapy - a pathogenetic or a therapeutic factor in obstructive sleep apnea
17:30-17:40	D. Markovski. Our experience with the management of obstructive sleep apnea in children
17:40-17:50	Discussion
17:50-18:10	Break
18:10-19:00	Round table discussion
19:00-19:20	Closing ceremony
20:00	Official dinner

Second National Symposium on Obstructive Sleep Apnea and Snoring with International Participation

Abstracts

History of sleep disordered breathing

W. Pirsig

Analysing harmless and apnoic snoring and some of its treatment was started in Ancient Greece. Even surgical instruments for removal of nasal polyps or of the uvula are described from this Greek period. Bronce instruments to treat snoring have been excavated from the Roman period. In the Middle Ages, ancient medical knowledge was transferred and enriched by the Arabians who left us detailed techniques how to destroy the uvula. Leonardo da Vinci's anatomical depictions of the oral cavity and airways were inspiring milestones for the medicine in the Renaissance which triggered a broad medical development including surgical instruments. The 19th centrury provided the basis for today medicine, also for the diagnostics and therapy of sleep disordered breathing (SDB), for instance, with nasal surgery, uvulectomy, tonsillotomy, adenotomy and tracheotomy. In the second half of the 20th century, we find new surgical milestones for SDB such as uvulopalatopharyngoplasty, maxillofacial procedures, multi-level surgery or techniques of tongue advancement including the most recent procedure of hypoglossus nerve stimulation.

Genetics of obstructive sleep apnea syndrome and other sleep disorders

L. Öztürk, G. Öztürk, E. Bulut

Over the last two decades, it has been clearly understood that sleep with its timing, duration and intensity is under genetic control. Homeostatic and circadian regulation of sleep have some genetic determinants, too. Genetic studies provide new ways to address both function of sleep and management of sleep disorders. Twin studies show heritability of sleep duration, sleep quality, and electroencephalographic characteristics. Genes implicated in circadian oscillation in mammals are *Clock, Bmal1, Per1, Per2, Cry1 and Cry2*. *Clock* gene polymorphism is related with various circadian tendencies. Wakefulness or sleep deprivation leads to expression of certain genes in brain tissues. Similarly, sleep period is associated with gene expression. Recent studies provide strong evidence of the genetic basis of various sleep disorders including fatal familial insomnia, restless legs syndrome, circadian rhythm disorders, and obstructive sleep apnea syndrome (OSAS). The complex nature of OSAS makes it difficult to study genetic basis of the disease. Nowadays, the term of 'intermediate phenotypes' has been coined to describe each risk factor for OSAS including obesity, craniofacial morphology, upper airway control, and ventilatory control. The relative contribution

of each intermediate phenotype is investigated in association with OSAS. The following main conclusions might be extracted from the present review: (i) specific genes affect sleep and sleep may affect gene expression in the brain, (ii) sleep and wakefulness are under genetic control, (iii) sleep disorders such as fatal familial insomnia, restless legs syndrome, narcolepsy, circadian rhythm disorders, and OSAS present with a strong genetic component, and (iv) studies of OSAS intermediate phenotypes reveal the genetic basis of the disease and (v) these phenotypes represent a promising area for treatment approaches for OSAS.

Snoring and otitis media with effusion. Must decide on?

P. Dimov

Snoring and obstructive sleep apnea syndrome (OSAS) is often a pathology accompanying otitis media with effusion (OME). Many etiological factors can play an important role for lesions of nasal breathing and of the middle ear mucosa. Eustachian tube dysfunction can be caused by multilevel anatomical obstruction of pharynx as hyperplasia of adenoids and tonsils, chronic regional infection and allergy of upper respiratory tract, etc. All these factors lead to changes in middle ear mucosa, negative pressure in the middle ear cavities and overproduction of effusion (serous or mucosal) from the secretory cells. Children and adults acquire obstruction of breathing, snoring and, finally, hearing loss. Our aim was to study the presence of OSAS and snoring in OME. Some 205 patients with chronic OME were examined. Examinations included medical history, status, audiometry, tympanometry, image diagnostics and applications of Shuller' x-ray and Tos' plamemetric methods, too. The common operations as adenoidectomy, tonsillectomy, adenoidectomy+tonsillectomy were done for OSAS and snoring Landmark (indications) of each OME patient for conservative or operative snoring treatment were introduced. OSAS medical history was the following: 39 (19%) - OSA; 139 (68%) - snoring. Pharynx examination findings showed 21 (10%) obstructive, large adenoids, 51 (25%) middle adenoids, 18 (9%) 3rd grade tonsillar hypertrophy, and 70 (34%) 2nd grade tonsillar hypertrophy. In 54% of the patients, surgical treatment was applied. Sixty-eight regional surgical approaches were applied: adenoidectomy (34), tonsillectomies (8), adenoidectomy+tonsillectomies (18), correction of nasal septum (7), and sinus maxillaries punitions (8). Some 92% of mastoids were with small and without pneumatization. The following local surgical approaches were done: 132 myringotomies and aspirations, and 83 grommet+T-tube ventilations. The rest 46% of the patients underwent conservative treatment (nasal drops, antihistamines, Eustachian tube maneuvers Politzer, Valsalva, Toynbee, antibiotics, etc.). After one-year follow-up study, the functional results demonstrated that OSAS operative treatment pre/post ABG = 29,05 dB/12,22 dB, grommets pre/post ABG = 33,07dB/12,64 dB, and conservative treatment pre/post ABG = 29,71 dB/21,41 dB. The normal nasal breathing and hearing function success were acheived only after strong individual selection. Our results are comparable with those of leading otosurgeons in the European Union countries.

Obstructive sleep apnea syndrome and physical exercise

G. Öztürk, E. Bulut, L. Öztürk

Physical exercise in patients with obstructive sleep apnea syndrome (OSAS) may be a useful intervention for treatment. Furthermore, cardiopulmonary exercise test may be used to predict cardiovascular mortality of this patient group and to investigate the adaptive changes to intermittent hypoxia which is a hallmark of the disease. Here, we reviewed implications of physical exercise in OSAS. First, studies that assessed physical activity levels in OSAS were reviewed. Many previous studies investigated response to cardiopulmonary exercise in this patient group and found out a limited exercise capacity, lower maximal oxygen uptake, blunted heart rate response, and lower maximal working capacity. Some other studies were devoted to the effects of various treatment modalities on exercise capacity. Continuous positive airway pressure (CPAP) or surgery improved exercise performance in OSAS. Exercise may also be used as an intervention in OSAS patients and various physical exercise programs reduced apnea-hypop-

nea index and daytime sleepiness independent of weight loss. In conclusion, OSAS patients have impaired or limited exercise capacity. Cardiopulmonary exercise tests may be used safely in such patients. Exercise programs may improve patients' energy perception, help to weight management and increase vitality. The cardiopulmonary exercise tests may help to predict the risk of cardiovascular mortality, efficacy of treatment, and evaluation of adaptive responses in OSAS.

'INXS' in obstructive sleep apnoea

R. Benchev

The vast majority of the patients with obstructive sleep apnoea syndrome (OSAS) present with overweight and anatomical characteristics predisposing to breathing impairment during sleep. Except the overweight these patients have hypertrophy of the nasal turbinates, palatal tonsils, tongue and soft palate. The golden standard in the treatment of OSA is the use of continuous positive airway pressure. The aim of the surgical methods is to widen the narrowed respiratory tract. In the current presentation, some of the most frequently used surgical methods for reduction of the tonsils, the tongue, soft palate and nasal turbinates are reviewed. The role of the otorhinolaryngologist in the diagnostic and treatment process in OSAS is discussed.

Coblation and snoring - a pilot study

A. Valkov, B. Duhlenski, G. Nikolov, A. Hvarchilkova

This study was designed to apply coblation as a surgical treatment of snoring in children with obstructive syndrome and in adults with hypertrophy of the tonsils, palatine pillars and the uvula as well as to summarize the clinical outcomes of coblation compared to cold steel method. The study was funded by Medical University of Pleven, Project No 19/2016. It was approved by the Research Ethics Committee of the university. The aims of the investigation were the following: i) to select a group of patients by comparable criteria for their local and general status; ii) to create a questionnaire of unified criteria for the subjective complaints, and iii) to analyze patients' objective status and subjective complaints on the 1st, 2nd and 15th postoperative day. The participants were randomly selected from the contingent referred to the Clinic of Otorhinolaryngology at University Hospital of Pleven by their primary physicians. A total of 25 patients (13 children and 12 adults) who met the inclusion criteria were enrolled in the study. Informed consent on both surgical procedures was obtained from all subjects *a priory*. Both surgical methods (coblation and cold steel tonsillectomy) were applied in each case. The plasma coblation was used on the left patient's side, while the cold steel method was applied on the right one. Both methods were successfully applied and no intraoperative and early postoperative complications were observed in any patients regardless the surgical approach. On clinical follow-up, the left patient's side recovered faster. Besides it was significantly less painful and presented with better local status.

To what extent do we investigate obstructive sleep apnea syndrome? The importance of institutionalisation

G. Öztürk, L. Öztürk, A. Yilmaz, N. Süt, H. Özlece

The prevalence of obstructive sleep apnea syndrome (OSAS) in adult general population varies between 2,1% to 4,5%. OSAS may lead to important comorbidities such as systemic hypertension, ischemic heart disease, depression, gastroesophageal reflux and metabolic syndrome. From a socioeconomic perspective, it may lead to traffic accidents, marriage problems, reduction in quality of life, and loss of workforce. In this study, we investigated the publications and studies from Turkey regarding OSAS. We performed data-base search in *PubMed* by using the keywords 'obstructive sleep apnea syndrome and Turkey' to the date of May 31, 2016. We retrieved 664 citations. Then, we examined all the abstracts and excluded 26 citations (irrelevant studies and studies of out-of-Turkey address). Finally, we analyzed 638 citations as original articles, reviews, and letters. We also recorded the affliation of the first author. Then we calculated the percentage of the publications that contributed to general literature year-by-year. The first Turkey-addressed publication

on OSAS was in 1996. There were two angle point years in Turkey-addressed publications: the first one was 1996 (initial publications started to occur) and the second one was 2010 (the contribution of Turkey addressed publications passed over 2,5% of total publications). Both years were related to foundation of two sleep societies in Turkey, namely Turkish Sleep Medicine Society (founded in 1992) and Sleep Society (founded in 2006). We concluded that institutionalisation and regular annual meetings encouraged studies and publications on OSAS in Turkey.

The role of the nose and its surgery in obstructive sleep apnea

W. Pirsig

In the first part of the presentation, the anatomical conditions and some pathophysiological concepts for the development of obstructive sleep apnea (OSA) with focus on the nose are demonstrated. In this context, the anterior nose with the nasal valve area functioning according to the Bernoulli phenomenon plays a crucial role. In tge second part, some surgical techniques to improve breathing in this region of the nose are explained. However, nasal obstruction is only considered as a cofactor in the pathophysiology of sleep disordered breathing (SDB). Nasal surgery is not a primary treatment for SDB and its effect on OSA is less than 10%. Nasal surgery improves breathing, sleep quality and daily alertness. Patients with continuous positive airway pressure need less positive pressure following successful nasal surgery. Results concerning the role of the nose according to the newest German S2r-guideline: 'ENT-specific therapy of obstructive sleep apnea in adults' (*Sleep Breath*., 2016) are briefly presented.

Identification of obstructive sleep apnea by digital signal processing methods: statistical multivariate analyses and artificial neural networks

N. Süt, İ. Umut, E. Ucar, L. Öztürk

The aims of this study are to obtain EEG frequency using digital signal processing (Fourier transformation) and to classify obstructive sleep apnea syndrome (OSAS) based on EEG frequency using the multivariate statistical analyses (discriminant analysis and logistic regression analysis) and multilayer perceptron (MLP) neural networks. Data were retrospectively obtained from the EEG records of patients who were treated in the Sleep Disorders Unit of Trakya University Hospital between July 2009 and June 2010. Raw data was obtained from EEG channels that contained 8-hour records (22:00 to 06:00), polysomnography of OSAS 58 patients and 30 controls. Five-second EEG recordings prior to apnea for OSAS group and randomly selected five-second EEG recordings for the control group were analyzed. Percentages of delta (0,5-4 Hz), theta (4-7 Hz), alpha (8-12 Hz), and beta (15-30 Hz) frequency bands were calculated from EEG recordings that were taken from C4A1 and C3A2 channels and transformed by Fourier method. Various patients' demographic characteristics such as age, weight, height, neck circumference, and gender as well as alpha, beta, delta and theta frequencies obtained by Fourier transformation were statistically analyzed along with MLP neural networks in the classification of OSAS. Univariate analysis showed that body weight and delta and beta EEG frequency from C4A1 and C3A2 channels were statistically significantly different between OSAS and controls ($p<0,05$). MLP positive predictive value and accuracy rate (87,5% and 84,0%) in the classification of OSAS were higher than discriminant analysis (83,3% and 75,0%) and logistic regression analysis (78,3% and 78,4%, respectively). The results provide a higher accuracy for MLP than discriminant and logistic regression analyses based on delta and beta EEG frequency taken from C4A1 and C3A2 channel and body weight. Therefore, usagee of MLP should be considered in the classification of OSAS.

Obstructive sleep apnea – clinical and polysomnographic investigations

A. Neagos

Obstructive sleep apnea syndrome (OSAS) is a disease with implication in quality of life. Many people and, especially, males between 40 and 60 years old, smokers and with a deficient sleep

hygiene suffer from this pathology. That is why it is necessary to timely diagnose the sleep apnea. Flexible pharyngoscopy during sleep correlating with polysomnography are the essential examinations for diagnosis of OSAS. This method along with drug-induced sleep endoscopy is important for the evaluation of the upper airway sizes and collapse degree during sleep. The investigator's experience is important, because sleep endoscopy is a subjective examination. The results must be correlated with polysomnography, before to establish the treatment options. Proper evaluation of the status of the upper respioratory tracts and tinely diagnosis of OSAS are crucial in achieving the best therapeutic results.

Obstructive sleep apnea in women

D. Vicheva

Obstructive sleep apnea (OSA) is the most common form of sleep-disordered breathing. It is typified by repetitive complete or partial collapses of the upper airway during sleep. It has been suggested that discrepancies between males and females in the prevalence of OSA could result from the circumstance that women are more commonly misdiagnosed or underdiagnosed. Hormonal differences are partly to blame for the distinctions in sleep patterns, while anatomical differences also play a role. Women are more likely than men to experience insomnia, depression and daytime fatigue. They benefit from more deep sleep than men, too. Better knowledge of gender differences in OSA will contribute to the further improvement of the awareness and timely diagnosis of OSA in women.

Sleep investigation and correlation between its parameters

A. Neagos

Physical exercise in patients with obstructive sleep apnea syndrome (OSAS) may be a useful intervention for treatment. Furthermore, cardiopulmonary exercise test may be used to predict cardiovascular mortality of these patient groups and to investigate the adaptive changes to intermittent hypoxia which is a hallmark of the disease. Here, we reviewed the implications of physical exercise in OSAS. First, studies that assessed physical activity levels in OSAS were analyzed. Many previous studies investigated the response to cardiopulmonary exercise in this patient group and found limited exercise capacity, lower maximal oxygen uptake, blunted heart rate response, and lower maximal working capacity. Some other studies focused on the effects of various treatment modalities on exercise capacity. Continuous positive airway pressure or surgery improved exercise performance in OSAS. Exercise may also be used as an intervention in OSAS patients. Various physical exercise programs reduced apnea-hypopnea index and daytime sleepiness independent of weight loss. In conclusion, OSAS patients have impaired or limited exercise capacity. The exercise programs may improve energy perception of patients, help to weight management and increase vitality. The cardiopulmonary exercise tests may be used safely in patients with OSA and help to predict the risk of cardiovascular mortality, efficacy of treatment, and evaluation of adaptive responses in OSAS.

Surgical treatment of sleep disorders – where we are and what is the future of sleep apnea surgery

M. Suurna

Multiple health risks associated with obstructive sleep apnea (OSA) have been recognized, emphasizing the importance of diagnosis and treatment of the affected patients. The gold standard for the treatment of OSA is continuous positive airway pressure (CPAP). However, compliance with CPAP treatment is less than 40%. Airway obstruction often occurs at multiple levels and pathophysiology is still poorly understood. Patients often look for alternative to CPAP treatments. Proper patient evaluation and individualized medical and surgical approach are important in order to achieve optimal OSA treatment results. The goal of this presentation is to discuss current surgical treatment options

for patients who failed CPAP use. It will focus on innovative techniques and advances in surgical treatment. Besides it will address patient evaluation strategies that would help guide sleep physicians and surgeons in their decision process.

Expansion sphincter pharyngoplasty. Why, whom, how?

M. K. Adali

Obstructive sleep apnea (OSA) is a common disorder which is characterized by the collapse of the pharyngeal airway. One of the causes of obstruction in OSA is the collapse of lateral pharyngeal walls. The expansion sphincter pharyngoplasty is a technique that stiffens the lateral pharyngeal walls and prevents its collapse in OSA patients. The surgery is performed under general anesthesia. The technique consists in a tonsillectomy, expansion pharyngoplasty, palatopharyngeus muscle rotation, a partial uvulectomy, and closure of the anterior and posterior tonsillar pillars by sutures with absorbable material. The technique is characterized by good postsurgical outcomes in appropriate cases, according to our experience and literature data available. Patient's preoperative evaluation and selection for this technique are of crucial importance.

Muscle preserving uvulopalatopharyngopl asty and tonsillectomy with a minimum of complications

W. Pirsig

In the last two decades of the 20th century, most uvulopalatopharyngoplasty (UPPP) procedures included the resection of too much velar tissue which is important for functions such as phonation and nonphonetic functions as swallowing, lubrication, blowing, playing wind instruments, whistling, coughing, gagging or withholding a sneeze. To achieve these functions a complex synergism of the palatal and pharyngeal muscles, of muscle spindles in the palatoglossus muscles and tensor palati muscle, of an intact sensory innervation of the palatal mucosa, and of small submucosal salivary glands are necessary. The velum with the uvula is especially needed for the transport of the mucus from the nasal septum into the pharynx. Histological examinations of the palatal tissues revealed an irreversible polyneuropathy in patients with obstructive sleep apnea (OSA), and functional studies showed a significant impairment in sensory detection threshold for OSA versus control subjects in the oropharynx, velopharynx, and at the larynx. Based on these anatomico-pathological and functional data one can conclude that any type of aggressive surgery to the velum in OSA patients will enhance the preexisting polyneuropathy. With this anatomico-pathological and physiological knowledge of the soft palate in mind, a tissue preserving technique of UPPP, partially based on Ikematsu's procedure, is presented here. We have successfully utilized it since 1996 onwards in selected patients with sleeping disordered breathing and with a minimum of long-term side effects. This is achieved by protecting the anterior palatine arch and the uvula in its muscle containing part. Recently, the first two-center randomized controlled trial about this technique has been published (*Dtsch Arztebl Int*, 2016; 113: 1-8. doi: 10.3238/arztebl.2016.0001).

Sleep disordered breathing and turbinate hypertrophy. Therapy options with radiofrequency

F. Yildiz

Sleep related breathing disorders (SDB) such as habitual snoring or obstructive sleep apnea (OSA) often originate from obstructions at different levels in the naso- and oropharynx. These obstructions are usually caused by a combination of various indications. Limiting the treatment to only one of these indications can lead to unsatisfactory results. OSA is seldom caused by nasal obstruction alone. The nasal cavity can be obstructed by swelling of the turbinates, septal deviation, and nasal polyps. Nasal surgery as the sole intervention effectively treats OSA in a subset of patients. The overall success rate is about 17% for apnea hypopnea index reduction by 50% and to less than <20/hour as summarized by Verse *et al.* (2003). Nasal surgery alone can not heal the OSA but can improve qual-

ity of life and facilitate the treatment of OSA using continuous positive airway pressure (CPAP). Nasal obstruction hampers CPAP if it is impossible to tolerate. The surgery to open the nasal passages markedly improves tolerance to CPAP (Sugiura, 2007). It may also facilitate OSA treatment by using oral appliances. Non-responders to oral appliance therapy have higher nasal resistance when compared with responders (Zeng, 2008). There are many different methods of the turbinate reduction. I prefer the Celon RFITT method which is a minimally invasive procedure for the thermo-ablation of the turbinate tissue. It is a state-of-the-art and safe, low-impact procedure based on radiofrequency energy. The objective of treatment by the Celon method is to reduce the nasal conchae back down to their normal size by means of targeted thermotherapy. The mucous membrane on the surface of the nasal conchae, which is very important for filtering and cleaning the respiratory tract remains intact. The minor procedure can be performed under local anesthesia. The entire treatment usually takes not longer than 15 minutes.

Office procedures under topical anesthesia for the reduction of snoring and sleep apnea

G. Anastopoulos

Given the limited success of major operations under general anesthesia for the treatment of snoring and sleep apnea, the high percentage of complications, and the low acceptance rate for continuous positive airway pressure (CPAP) devices we have been using for almost a decade a number of office procedures under topical anesthesia with an ultrasonic surgical device. Using this device we perform operations to correct nasal septum deviations, reduce the size of inferior turbinates and tonsils, cut an elongated uvula, or increase the rigidity of the soft palate. Anesthesia is achieved by topical application of cotton pledgets soaked with lidocaine and submucosal infiltration of mepivacaine. So far we have operated on over a thousand of patients. Complication rates are extremely low with the major complaint being the pain after operations inside the oral cavity. The vast majority of patients are satisfied experiencing reduction of snoring and sleep apnea. The advantages of this technique are obvious including the lack of need for hospitalization, early return to the previous activities and reduced cost for the patient and the health system. We strongly recommend this technique as an alternative to major procedures under general anesthesia or to the application of CPAP devices.

When anatomy is not the cause - the role of hypoglossal nerve stimulation in the treatment of obstructive sleep apnea

J. U. Sommer

Being an increasingly prevalent clinical problem, obstructive sleep apnea (OSA) affects both personal and public health. Continuous positive airway pressure (CPAP) has demonstrated excellent efficacy and low morbidity. The long-term adherence rate is nearly 50%. Although traditional upper airway surgical procedures target the anatomic component of obstruction, alternatives to CPAP are lacking when the anatomy is normal. Upper airway stimulation tackles the twin goals of improving anatomic and neuromuscular pathology. After decades of trials demonstrating proof of concept of hypoglossal nerve stimulation in animal and human subjects, the results of multiple large multicenter, prospective trials were recently published. These trials demonstrate that the hypoglossal nerve stimulation leads to significant improvements in objective and subjective measurements of OSA severity. This novel approach is the first to combine sleep surgery techniques with a titratable medical device for OSA treatment. Right now, CPAP still seems to be the adequate first-line treatment option according to the guidelines. However, when taking these new insights on pathophysiology into account, the hypoglossal nerve stimulation looks like a natural, effective and very promising technique.

Adenotonsillectomy and pediatric obstructive sleep apnea. Current trends and challenges

M. Stankovic

The influence of adenotonsillectomy (T&A) on resolution of pediatric obstructive sllep apnea (OSA) is still controversial. There are many important questions to be discussed. Are there specific clinical or pathological features of OSA that indicate a threshold below which T&A is of low clinical value in children and adults? Are there specific developmental or social indications for T&A in children and adults with OSA? Is T&A an effective treatment for OSA or snoring in children and adults? Is there evidence of clinical examinations or tests that can assist surgeons in determining which children and adults will benefit from T&A for OSA? Is any one of the three commonly used surgical techniques (cold steel, coblation and diathermy) more effective than another in reducing the secondary (>24 hours after surgery) bleeding in children and adults having undergone T&A for tonsillitis or OSA? First-line T&A is benefitial in 74% of uncomplicated cases of moderate to severe childhood OSA, in 60-70% of children with significant tonsillar hypertrophy, and in 10-25% of obese children, while 60- 88% of patients present with persistent sleep disordered breathing (SDB) following surgery. Polysomnography should be performed in children with SDB and complex medical conditions involving obesity as well as with Down syndrome, craniofacial abnormalities, neuromuscular disorders, and sickle cell disease. There is, however, insufficient data enabling the specific recommendations regarding surgical technique (coblation, diathermy or cold dissection tonsillectomy).

Surgical techniques of tonsillotomy

P. Genova

Tonsillotomy has gained popularity in the last 20 years as an alternative surgery to the traditional tonsillectomy in the management of sleep-disordered breathing in children. All the intratonsillar techniques aim to avoid exposure and direct injury of the pharyngeal muscles. There are different concepts to reduce the size of the tonsils with only two of them acceptable as a true intratonsillar dissection technique with a stepwise resection of tonsillar tissue: tonsillotomy (TT) and subtotal/intracapsular/partial tonsillectomy (SIPT). CO_2-laser, microdebrider, radiofrequency, monopolar needle, cold scissor and a surgical knife have been applied for this purpose**.** We present a review of relevant publications retrieved in several electronic databases and share our own experience gained with the application of different surgical techniques of tonsillotomy.

Oral appliances in the therapy of snoring and obstructive sleep apnea. An update

F. Yildiz

There is a variety of treatments for obstructive sleep apnea (OSA) ranging from external appliances like continuous positive airway pressure (CPAP) to surgical procedures. Oral intervention like a mandibular advancement device (MAD) is another popular option. This device is used by night only and brings the mandible forward in order to increase the upper airway volume and prevent total upper airway collapse during sleep. However, its efficiency varies significantly from patient to patient. The guidelines of the American and German Society of Sleep Medicine (AASM/DGSM) recommend intraoral appliances for treatment of snoring and mild forms of OSA. There are different types of MADs like monoblock, two parts, prefabricated thermoplastic (boil and bite) devices, and individual custom-made devices. The thermoplastic material softens when heated in a boiling water bath and can be formed according to the individual tooth and jaw formation. The indications include primary snoring and mild to moderate OSA in adult patients with body mass index of 30 kg/m^2 or less in whom CPAP treatment fails or cannot be tolerated as well as upper airway

resistance syndrome. The contraindications are the following: central OSA, temporomandibular joint (TMJ) disorder, (strong) gag reflex, larger gaps between the teeth, unstable dental crowns, parodontosis, and limited mandibular advancement. The main advantages of the MAD are non-invasiveness, low cost, better blood pressure lowering as compated to CPAP, higher acceptance (adherence to MAD at one year of 80% but to CPAP of 50%), possible combination with other invasive and non-invasive therapies (e.g. CPAP), and performance as a single-stage procedure in an outpatient setting. To the disadvantages belong patient suitability, TMJ dysfunction and pain, long-term problems of 'bite' and malocclusion, hypersalivation, and pressure on teeth in the morning. The following requirements of long-lasting MAD usage should be met: individual and adjustable, movable mandible, cost-effective, fast and accurate refit possible, well-tolerated and durable.

Laser treatment of oropharygeal vascular lesions

H. Negm

Multiple health risks associated with obstructive sleep apnea (OSA) have been recognized, emphasizing the importance of diagnosis and treatment of the affected patients. Continuous positive airway pressure (CPAP) is the gold standard for OSA treatment. However, compliance with CPAP treatment is less than 40%. Airway obstruction often occurs at multiple levels and pathophysiology is still poorly understood. Patients often look for alternative to CPAP treatments. Proper patient evaluation and individualized medical and surgical approach are important in order to achieve optimal OSA treatment results. The goal of the presentation is to discuss current surgical treatment options for patients who failed CPAP use. It will focus on innovative techniques and advances in surgical treatment. Besides it will address patient evaluation strategies that would help guide sleep physicians and surgeons in their decision process.

Obstructive sleep apnea and diseases of the nervous system

P. Mineva

Obstructive sleep apnea (OSA) occurs at any age. It is proved in 17% of males and in 9% of females aged between 50 and 70 years. Headache in the morning at waking-up represents one of the significant OSA symptoms. There is a relationship between OSA and cerebral atheroclerosis. OSA causes hypoxia and endothelial dysfunction. It disturbs brain autoregulation, too. OSA creates an increased risk for ischemic heart disease, depression, type 2 diabetes mellitus, arterial hypertension, home injuries and traffic accidents, cardiac arrhythmias, heart failure, stroke and death. OSA can influence upon a variety of pathogenetic mechanisms in single cerebral infarction subtypes. There is evidence that long-lasting OSA can induce stroke at waking-up, especially, when combined with a right-left shunt. A recent study demonstrates that in young females aged between 20 and 35 years, OSA is related to a high stroke risk which decreases with advancing age. In addition, OSA can lead to durable structural alterations in white and gray brain matter and thus to cognitive functions deterioration. Along with increasing OSA severity and duration, the importance of this disease as a risk factor for cognitive decline and dementia among elderly individuals aged over 75 years increases, too. The investigation and awareness of the relationships between OSA and cerebrovascular diseases is of crucial significance for the early detection of high-risk subjects.

Hypoventilation syndrome in obesity (Pickwick syndrome)

P. Chipev

The obesity hypoventilation syndrome (best known in the Bulgarian clinical practice as Pickwick syndrome) is one of the most common sleep-related breathing disorders (SRBD). According to the International Classification of Sleep Disorders 3rd edition (ICSD-3), three criteria should be met in order to establish the diagnosis: (i) presence of daytime hypercapnia with $PaCO_2$ >45 mm Hg, (ii) presence of obesity with body-mass index higher

than 30 kg/m^2, and (iii) absence of other reasons for hypoventilation from the respiratory, cardiovascular, neural and muscular system. Patients with obesity hypoventilation syndrome often have a co-morbid obstructive sleep apnea. Both SRBDs might be clinically undistinguishable. The diagnostic algorithm for the obesity hypoventilation syndrome includes blood gas analysis and broad spectrum of instrumental investigations to establish the differential diagnosis of those patients. Main goal of the treatment for this syndrome is significant weight loss, which sometimes necessitates the use of bariatric surgery. For these patients, BiPAP therapy is the most commonly used method for non-invasive support of ventilation.

Central sleep apnea - a melody without rhythm

K. Terzijski

Central sleep apnea (CSA) in chronic heart failure (CHF) is a separate nosological entity in somnology that has been improperly underestimated. To a great extent, it stays in the shadow of obstructive sleep apnea due to a number of reasons, including the low clinical profile of this pathology, scanty study data as well as the difficulties in its diagnosis and treatment. All these characteristic features of CSA find their explanation in its pathogenesis. It is based on the 'loop gain' theory and the complex interactions between its components - 'controller gain', 'plant gain', and 'feedback gain'. The 'controller gain' reflects the central regulation of breathing according to the changes of the blood gases. The 'plant gain' describes predominantly the effectiveness of the ventilatory mechanisms for carbon dioxide elimination. The 'feedback gain' demonstrates the relationship between the 'controller gain' and the 'plant gain' in relation to the altered chemosensitivity and phasic changes of the system. Comprehensive knowledge on these mechanisms gives the opportunity for a better therapeutic approach in patients with CHF and CSA.

Breathing disorders during sleep among chronic heart failure outpatients with preserved systolic function: a pilot investigation in Bulgaria

A. Draganova

Sleep-disordered breathing (SDB) is a highly prevalent concomitant condition in chronic heart failure (CHF). The presence of both central and obstructive sleep apnea in this patient population is associated with an increased number of hospitalizations and adverse prognosis. We investigated SDB prevalence in Bulgarian ambulatory patients with CHF who presented with preserved ejection fraction. Sixty-three patients, 42 men and 21 women, at a mean age of 67,4±7,9 years and mean body mass index of 29,5 kg.m^{-2} (range, 17,3-48,1 kg.m^{-2}) with stable CHF (NYHA classes I-II and mean ejection fraction of 50,7±8,9%) were recruited. They underwent a clinical investigation by a cardiologist, echocardiography, anthropometry, questionnaires, blood-gas analysis, pulmonary function testing, body plethysmography, and polysomnography. The patients diagnosed with SDB were further subjected to a therapy with continuous positive airway pressure (CPAP) under polysomnographic control. The results showed a high SDB prevalence (75%) of which 70% account for CSA/Cheyne-Stokes respiration. CPAP treatment for a single night lowered the apnea-hypopnea index (57,3±20,8 versus 20,7±21,6; p<0,001) and improved the nocturnal oxygen status and sleep architecture in CHF patientsh.

Sleep questionnaires in the clinical assessment of patients with obstructive sleep apnea

P. Petrov, M. Popovska

Obstructive sleep apnea (OSA) is one of the most prevalent and socially significant sleep disorders. Epidemiology data show that it affects 10 to 17% of the adult male and 3 to 9% of the adult female population. It is characterized by apneas during sleep due to frequent episodes of upper airway collapse. Untreated OSA is an independent risk factor for cardiovascular diseases (arrhythmias, arterial

hypertension, heart failure, and ischemic heart disease), cerebrovascular disease (stroke) and abnormal glucose metabolism. Its detrimental effect on sleep quality and ensuing daytime sleepiness is also well-known. The latter increases the risk of falling asleep while driving and is one of the major causes of traffic accidents. Starting the continuous positive airway pressure (CPAP) therapy in these patients significantly increases their quality of life and prevents the development of serious complications. Therefore, early recognition, diagnosis and prescription of CPAP therapy is crucial. Numerous sleep questionnaires for assessment of clinical probability of OSA have been developed. Here we present three questionnaires which are most extensively used in our practice: the Epworth Sleepiness Scale, Berlin Quest and MANA screening questionnaire. They serve for a quick and easy assessment of the patients. If suspicion for OSA is raised, the patients should be referred to a sleep specialist for sleep polygraphy or polysomnography and for prescription of CPAP therapy.

Obstructive sleep apnea and atrial fibrillation - a case report

M. Popovska, P. Petrov

Atrial fibrillation (AF) is the most prevalent cardiac arrhythmia that is associated with significant morbidity and mortality rates. A strong relationship exists between obstructive sleep apnea (OSA) and AF. There are numerous plausible pathophysiological mechanisms linking both of them. OSA increases AF inducibility, in addition to left atrium dilatation, and slowing atrial conduction. Epidemiological studies suggest that OSA is a risk factor for new-onset AF and that its presence reflects a poorer prognosis after AF interventions. Patients with untreated OSA present with a higher AF recurrence rate after cardioversion than those without any polysomnographic evidence of OSA. Appropriate treatment with continuous positive airway pressure (CPAP) in OSA patients is associated with a lower AF recurrence rate. Whether OSA therapy directly affects AF incidence or frequency has never been studied in clinical trials yet. We report a 35 year-old man who was diagnosed with AF three years ago and with arterial hypertension four years ago. Despite treatment with different antiarrhythmic drugs the patient was hospitalized many times because of incident rapid rate AF attacks. Most attacks occurred during sleep. He was offered treatment with radiofrequency ablation but he refused. Since the patient was diagnosed with OSA and started CPAP therapy he was asymptomatic and did not presented with any new attacks of arrhythmia.

Hormonal aspects of sleep regulation

P. Hristova, T. Vekilov, A. Tolekova, M. Milkov

Good quality of sleep is strongly related with life quality and mental and physical health as well. Sleep regulation results from very complex interplay between many neural and humoral factors. The purpose of this study is to classify some main systems of hormones that influence upon sleep. A key player in sleep regulation is melatonin. At night there is a peak of melatonin secretion in both dark and light active species. It is referred to as a substance that keeps ‘dark appropriate’ behaviour. It is related with sleep promotion and it may help in sleep disorders. Other very important systems include two different hypothalamo-pituitary axes with reciprocal interactions - hypothalamo-pituitary-somatotrophic (HPS) and hypothalamo-pituitary-adenocortical (HPA) systems. The final effect on the sleep regulation depends on the ratio between growth hormone-releasing hormone (GHRH) and *corticotropin-releasing hormone (*CRH). The change in GHRH:CRH in favour of CRH plays a role in the sleep-endocrine alterations during depression and aging. Enhanced activity of the hormones of HPA-system is thought to contribute to the downregulated melatonin levels and higher leptin levels in depression. Besides melatonin levels get lower after repetitive administration of CRH (the HPA-system inhibits melatonin effects). In the literature available, there are very interesting publications about separate regulation of the two types of sleep - slow wave sleep (SWS) and rapid eye movement sleep (REMS). GHRH promotes NREMS (in males) while CRH exerts the opposite effect as it promotes wakefulness. Some studies suggest that CRH promotes REMS.

It is also suggested that GHRH plays a role in sleep promotion after sleep deprivation. There are other neuropeptides (except those produced by the HPA and HPS systems) - galanin and neuropeptide Y. They have an effect on sleep regulation by stimulating SWS. Steroid hormones participate in sleep regulation, too. The main hormone among them is cortisol. It promotes SWS and suppresses REMS in humans. We can conclude that there are tree main systems in sleep regulation - melatonin and HPS and HPA system, acting reciprocally and some other accompanying hormones, making a link between them or acting in concert with them to enhance or decrease their effects.

Significance of physical factors in treating children with sleep-disordered breathing

Zh. Ruseva, N. Sapundzhiev, M. Milkov, M. Mihailova, V. Madjova

According to recent studies abroad, the prevalence rate of obstructive sleep apnea syndrome (OSAS) is about 1,0%-4,9% in children aged 2-18 years. The main causes for OSA in children are hypertrophy of adenoid or tonsil and nasal diseases. There is evidence that sleep-disordered breathing in children is a risk factor for developmental delay. The treatment methods include the resection of adenoid or tonsil, and drug therapy as well. However, no agreement on the selection of the most suitable treatment method is available to date. During the recent decades, different physical factors in the physiotherapeutic setting are increasingly applied in the management of tonsillar hypertrophy. Here belong, for instance, ultrahigh frequency therapy and polarized, polychromatic (with wavelength of 480-3400 nm), incoherent (out of phase light) and low energy light, the so-called Bioptron light therapy system. The initial results from the application of these two methods in our practice with children aged between 6 and 12 years and presenting with snoring due to hypertrophic tonsils are promising. The role of the effective collaboration between the specialists of pediatric otorhinolaryngology, physical therapy and sleep medicine is emphasized.

Lateral cephalometric radiographic values in diagnosing the obstructive sleep apnea. Sex differences

P. Baev, L. Matev, Ts. Tonchev, M. Milkov

Cephalometric analysis is used in dentistry, and especially in orthodontics, to gauge the size and spatial relationships of the teeth, jaws, and cranium. This analysis informs treatment planning, quantifies changes during treatment, and provides data for clinical research. The objective of the present study was to describe the connection between different specialists such as orthodontists and otolaryngologist, who, in most cases, could diagnose this condition and work as a team. A self-controlled study was carried out. All the patients were examined in the Faculty of Dental Medicine, Medical University of Varna. The patients visited the Department of Otorhinolaryngology and cephalometric radiographs were made. The results demonstrated obvious gender differences. In order to evaluate the severity of the obstructive sleep apnea syndrome (OSAS), different anthropometric and cephalometric measurements should be used for men and women. The craniofacial skeletal characteristics that contribute to OSAS severity were in the anterior lower portion of the profile in men and in the posterior portion of the profile in women.

Radiotherapy - a pathogenetic or a therapeutic factor in obstructive sleep apnea

T. Marinov, A. Varbanova, M. Yordanova, K. Moneva, M. Doichinova

The diagnosis of obstructive sleep apnea (OSA) is becoming more common due to increased prevalence of risk factors, increase in awareness and facilitated diagnostic approaches. Radiation therapy is a frequently used therapeutic method in head and neck cancer (HNC) patients because of the greater accessibility. Some of the etiological and risk factors for OSA development such as myxedema, laryngeal edema, muscular dystrophy,

and xerostomia coincide with some of the effects of radiation therapy in HNC patients. The aim of this review is to assess the prevalence of OSA in HNC patients and to compare the pathogenetic changes that occur after radiotherapy and those in OSA. Relevant articles were retrieved, data were objectively analyzed and a systematic review was compiled. Radiotherapy in HNC patients may exert a pathogenetic or a therapeutic effect on OSA development depending on individual patient's reactivity, TNM assessment, HNC location, and radiotherapy duration. During the last decade, an increase of OSA incidence rate among HNC patients is observed, possibly due to the increased awareness of bstructive sleep disorders, the development of better diagnostic approaches and the wider application of radiotherapy in HNC. In conclusion, more studies should be focused on the issues of prevalence and pathogenetic changes associated with OSA in HNC patients. We encourage the screening for OSA in the patients with tumours of the hypopharynx, larynx, tongue base and floor of the mouth as well as in those with HNC who have undergone radiotherapy. When diagnosing OSA one must take into consideration the laryngeal tumours as a possible etiological factor, too.

Our experience with the management of obstructive sleep apnea in children

D. Markovski

Obstructive sleep-disordered breathing is common in children. From 3% to 12% of children snore, while obstructive sleep apnea syndrome (OSAS) affects between 1% and 10% of this population. The majority of these children present with mild symptoms, and many outgrow the condition. Consequences of untreated OSAS include failure to thrive, enuresis nocturna, attention-deficit disorder, behaviour problems, poor academic performance, and cardiopulmonary disease. The most common etiology of OSAS is adenotonsillar hypertrophy. Clinical diagnosis of OSAS is reliable. However, the gold standard evaluation is overnight polysomnography. Unfortunately, in our Department of Otorhinolaryngology, this diagnostic tool is not at our disposal by economic reasons yet. That is why we perform fiber rhinohypopharyngoscopy with diagnostic purposes. Sometimes, in older patients, we combine it with drug therapy, e. g. dormicum in order to identify the location of the collapse of pharyngeal tissue. Adenotonsillectomy is curative in most patients. Uvulopalatopharyngoplasty by a technique that combines cold knife with harmonic scalpel as well as correction of deviated septum with compensatory turbinate hypertrophy are the rest common operations that we do.