World Journal of Otorhinolaryngology

Submit a Manuscript: http://www.wjgnet.com/esps/
Help Desk: http://www.wjgnet.com/esps/helpdesk.aspx
DOI: 10.5319/wjo.v5.i1.1

World J Otorhinolaryngol 2015 February 28; 5(1): 1-4
ISSN 2218-6247 (online)

EDITORIAL

Obstructive sleep apnea: An interdisciplinary challenge for otorhinolaryngologists

Haralampos Gouveris

Haralampos Gouveris, Department of Otorhinolaryngology, Medical Centre of the University of Mainz, 55131 Mainz, Germany
Author contributions: Gouveris H solely contributed to this manuscript.
Conflict-of-interest: The author has no conflict of interest related to the present manuscript to declare.

Correspondence to: Haralampos Gouveris, MD, PhD, Department of Otorhinolaryngology, Medical Centre of the University of Mainz, Langenbeckstr.1, 55131 Mainz, Germany. hagouve@yahoo.de
Telephone: +49-6131-177361
Fax: +49-6131-176637
Received: December 11, 2014
Peer-review started: December 13, 2014
First decision: December 26, 2014
Revised: January 5, 2015
Accepted: Janurary 15, 2015
Article in press: January 15, 2015
Published online: February 28, 2015

Abstract

Otolaryngologists play a pivotal role in the diagnosis and management of sleep-related breathing disorders (SRBD) in both adults and children. Otolaryngologists are often the first medical specialists to be contacted by patients with complaints as snoring, episodic sleep apnea observed by the bed partners with or without reported excessive daytime sleepiness and therefore emerge as important gatekeepers of the general health of an individual by means of an active preventive, and in many cases therapeutic, role. Comprehensive diagnosis and treatment of SRBD requires a team approach and hence building interdisciplinary teams with other involved relevant specialties is necessary from the patients' perspective.

Key words: Apnea; Surgery; Obstructive; Continuous positive airway pressure; Sleep

Core tip: Otolaryngologists are quite often the first medical specialists to be contacted by patients with such complaints as snoring, episodic sleep apnea observed by the bed partners with or without reported excessive daytime sleepiness and may therefore emerge as important gatekeepers of the general health of an individual by means of an active preventive, and in many cases therapeutic, role.

Gouveris H. Obstructive sleep apnea: An interdisciplinary challenge for otorhinolaryngologists. *World J Otorhinolaryngol* 2015; 5(1): 1-4 Available from: URL: http://www.wjgnet.com/2218-6247/full/v5/i1/1.htm DOI: http://dx.doi.org/10.5319/wjo.v5.i1.1

INTRODUCTION

Otolaryngologists may play a pivotal role in the diagnosis and management of sleep-related breathing disorders (SRBD) in both adults and children. The importance of such a role can be appreciated by the fact that otolaryngologists are often the first medical specialists to be contacted by patients with complaints as snoring, episodic sleep apnea observed by the bed partners with or without reported excessive daytime sleepiness.

The overall prevalence of severe obstructive sleep

apnea (OSA) may be as high as 38% in patients aged 2 to 18 years who undergo tonsillectomy or adenotonsillectomy[1]. Obstructive sleep apnea syndrome (OSAS) is a common disease, affecting approximately 2% of women and 4% of men residing in Western countries. A similar prevalence has been found in the general population in some eastern countries[2,3]. Patients with SRBD require a holistic approach to management involving both diagnosis and therapy.

DIAGNOSTICS

A complete medical history including in particular information on arterial hypertension (with emphasis on hypertensive syndromes refractory to medical therapy)[4], cardiovascular and cerebrovascular disease, pulmonary disease, diabetes mellitus[5] and the metabolic syndrome[6] should be taken. In patients with the metabolic syndrome, the prevalence of moderate to severe OSA is 60%[6]. Hypertension, age, and obesity have been associated with OSA severity in males, whereas only age and obesity are associated with OSA severity in females[4]. Nondiabetic patients with OSA are at increased risk of developing insulin resistance and diabetes. Insulin resistance and diabetes are factors independently contributing to increased cardiovascular and cerebrovascular morbidity and mortality[5]. The prevalence of atherosclerosis, as assessed by coronary artery calcification, carotid intima-media thickness, brachial artery flow-mediated dilation and pulse wave velocity was found higher in OSA patients and correlated with the severity and duration of OSA. Obstructive sleep apnea is therefore an independent predictor of subclinical cardiovascular disease[7]. Moderate-to-severe OSA is independently associated with an increased risk of all-cause mortality, incident stroke, and cancer incidence and mortality[8]. On the contrary, in a large cohort, the severity of obstructive sleep apnea was not independently associated with either prevalent or incident cancer. More studies are needed to elucidate whether there is an independent association with specific types of cancer[9].

Additionally, a thorough history involving social and psychological status is always relevant. Especially the frequent coexistence of insomnia and depression (or related disorders) with SRBD[10,11] necessitates an evaluation of the respective patients during the first contact visit by means of historical information and clinical assessment as well as by means of the respective standardized specific questionnaires (*e.g.*, the Regensburg Insomnia Scale)[12]. Such an association is more common in case of obese obstructive sleep apnea syndrome (OSAS) patients with posttraumatic stress disorder or major depressive disorder[13]. Social and psychological factors are confounders of nutrition in these patients.

Polysomnography (PSG) and structured standardized questionnaires (such as the Epworth Sleepiness Scale) improve diagnostic accuracy and guide treatment in SRBD[14]. The impact of the first-night effect on PSG-findings, especially in patients with nose and throat pathology should always be considered[15]. Drug-induced sleep endoscopy emerges as an important diagnostic method, especially for the selection of candidate patients for implantation with an hypoglossal nerve stimulator[16]. Notably, in recent reports, OSAS has been definitely associated with increased cancer incidence, especially cancer of the lung[17,18]. Chronic or intermittent hypoxia (such as the one associated with OSAS) may lead to tumour growth and resistance to radiotherapy. Obesity-associated OSAS may provide a possible mechanism by means of which obesity may promote cancer development. Obesity and intermittent hypoxia increased tumor growth in a mouse model of sleep apnea, but did not exhibit any synergistic effects[19]. Moreover, increased hypoxia during sleep in OSAS patients has been associated with increased cancer incidence in males and in patients younger than 65 years of age[20].

THERAPEUTICS

Oral appliance therapy should be seriously considered as an effective treatment alternative to continuous positive airway pressure (CPAP) in patients with mild to moderate OSAS. In patients with severe OSAS, continuous positive airway pressure (CPAP) remains the treatment of first choice[21]. Definitive treatment of severe and moderate OSAS is CPAP treatment[22]. Moreover, in patients with cardiovascular disease or multiple cardiovascular risk factors, the treatment of OSAS with CPAP, results in a significant reduction in blood pressure in addition to treatment of OSAS[23]. Additionally, treatment of OSA with CPAP may lead to improvement in insulin sensitivity, hemoglobin A1c levels, systemic hypertension, and other components of the metabolic syndrome[5].

Isolated nasal surgery in OSAS patients experiencing daytime nasal obstruction reduces therapeutic CPAP device pressures and increases CPAP use and compliance in select patients[24,25]. Reduced compliance with CPAP therapy is an important factor that limits CPAP efficacy in both the adult and pediatric OSAS populations. Hypoglossal nerve stimulation emerges as a possible treatment option in OSAS patients who do not tolerate CPAP treatment[26]. By means of a surgical procedure the stimulation electrode is placed on the hypoglossal nerve, the sensing lead is placed between the internal and external intercostal muscles to detect ventilatory effort and the neurostimulator is implanted in the right ipsilateral mid-infraclavicular region[26]. Patients with pronounced anatomical abnormalities (such as tonsils visible beyond the pillars or extending to midline) or with complete concentric collapse at

the retropalatal airway during drug-induced sleep endoscopy are not suitable candidates for hypoglossal nerve stimulation[16,26]. Surgery of the soft palate[27] and tongue base as well as hyoid suspension[28], minimally invasive surgery of the inferior turbinates, such as radiofrequency tissue ablation[29] and surgery of the nasal septum provide satisfactory and definitive treatment in patients with mild or even moderate OSAS[30].

Adenotonsillectomy remains the treatment of first choice in pediatric OSAS. Nonetheless, many children, especially the obese or those with other underlying medical conditions, have residual OSAS after adenotonsillectomy. CPAP could be an effective treatment modality in these children. Nonetheless, poor adherence and compliance appears to be a significant frequent limitation of CPAP in this pediatric group. Therefore, new treatment modalities for the pediatric OSAS are needed, such as anti-inflammatory substances[31], treatment by means of an oral appliance, high-flow nasal cannula, and measures to promote weight loss. To date there are few randomized controlled trials assessing the effectiveness of these therapies[32].

CONCLUSION

Given the enormous systemic impact of SRBD, otolaryngologists emerge as important gatekeepers of the general health status of an individual by means of an active preventive, and in many cases therapeutic, role. Other disciplines involved in diagnosis and therapy of SRBD are internal medicine, neurology, pediatrics and even sleep medicine as own discipline in some countries. Consequently, sleep medicine can be associated with the ENT department and the internal medicine department. Providing comprehensive diagnosis and treatment of SRBD requires a team approach and hence building interdisciplinary teams with other involved relevant specialties is necessary from the patients' perspective.

REFERENCES

1 **Jiang N**, Muhammad C, Ho Y, Del Signore AG, Sikora AG, Malkin BD. Prevalence of severe obstructive sleep apnea in pediatric adenotonsillectomy patients. *Laryngoscope* 2014; **124**: 1975-1978 [PMID: 24668559 DOI: 10.1002/lary.24692]

2 **Sharma SK**, Kumpawat S, Banga A, Goel A. Prevalence and risk factors of obstructive sleep apnea syndrome in a population of Delhi, India. *Chest* 2006; **130**: 149-156 [PMID: 16840395]

3 **Mirrakhimov AE**, Sooronbaev T, Mirrakhimov EM. Prevalence of obstructive sleep apnea in Asian adults: a systematic review of the literature. *BMC Pulm Med* 2013; **13**: 10 [PMID: 23433391 DOI: 10.1186/1471-2466-13-10]

4 **Yu Q**, Yin G, Zhang P, Song Z, Chen Y, Zhang D, Hu W. Distinct associations between hypertension and obstructive sleep apnea in male and female patients. *PLoS One* 2014; **9**: e113076 [PMID: 25402499 DOI: 10.1371/journal.pone.0113076]

5 **Morgenstern M**, Wang J, Beatty N, Batemarco T, Sica AL, Greenberg H. Obstructive sleep apnea: an unexpected cause of insulin resistance and diabetes. *Endocrinol Metab Clin North Am* 2014; **43**: 187-204 [PMID: 24582098 DOI: 10.1016/j.ecl.2013.09.002]

6 **Drager LF**, Togeiro SM, Polotsky VY, Lorenzi-Filho G. Obstructive sleep apnea: a cardiometabolic risk in obesity and the metabolic syndrome. *J Am Coll Cardiol* 2013; **62**: 569-576 [PMID: 23770180 DOI: 10.1016/j.jacc.2013.05.045]

7 **Ali SS**, Oni ET, Warraich HJ, Blaha MJ, Blumenthal RS, Karim A, Shaharyar S, Jamal O, Fialkow J, Cury R, Budoff MJ, Agatston AS, Nasir K. Systematic review on noninvasive assessment of subclinical cardiovascular disease in obstructive sleep apnea: new kid on the block! *Sleep Med Rev* 2014; **18**: 379-391 [PMID: 24650521 DOI: 10.1016/j.smrv.2014.01.004]

8 **Marshall NS**, Wong KK, Cullen SR, Knuiman MW, Grunstein RR. Sleep apnea and 20-year follow-up for all-cause mortality, stroke, and cancer incidence and mortality in the Busselton Health Study cohort. *J Clin Sleep Med* 2014; **10**: 355-362 [PMID: 24733978 DOI: 10.5664/jcsm.3600]

9 **Kendzerska T**, Leung RS, Hawker G, Tomlinson G, Gershon AS. Obstructive sleep apnea and the prevalence and incidence of cancer. *CMAJ* 2014; **186**: 985-992 [PMID: 25096668 DOI: 10.1503/cmaj.140238]

10 **Povitz M**, Bolo CE, Heitman SJ, Tsai WH, Wang J, James MT. Effect of treatment of obstructive sleep apnea on depressive symptoms: systematic review and meta-analysis. *PLoS Med* 2014; **11**: e1001762 [PMID: 25423175 DOI: 10.1371/journal.pmed.1001762]

11 **Gupta MA**, Knapp K. Cardiovascular and psychiatric morbidity in obstructive sleep apnea (OSA) with insomnia (sleep apnea plus) versus obstructive sleep apnea without insomnia: a case-control study from a Nationally Representative US sample. *PLoS One* 2014; **9**: e90021 [PMID: 24599301 DOI: 10.1371/journal.pone.0090021]

12 **Crönlein T**, Langguth B, Popp R, Lukesch H, Pieh C, Hajak G, Geisler P. Regensburg Insomnia Scale (RIS): a new short rating scale for the assessment of psychological symptoms and sleep in insomnia; study design: development and validation of a new short self-rating scale in a sample of 218 patients suffering from insomnia and 94 healthy controls. *Health Qual Life Outcomes* 2013; **11**: 65 [PMID: 23601161 DOI: 10.1186/1477-7525-11-65]

13 **Babson KA**, Del Re AC, Bonn-Miller MO, Woodward SH. The comorbidity of sleep apnea and mood, anxiety, and substance use disorders among obese military veterans within the Veterans Health Administration. *J Clin Sleep Med* 2013; **9**: 1253-1258 [PMID: 24340286 DOI: 10.5664/jcsm.3262]

14 **Bausmer U**, Gouveris H, Selivanova O, Goepel B, Mann W. Correlation of the Epworth Sleepiness Scale with respiratory sleep parameters in patients with sleep-related breathing disorders and upper airway pathology. *Eur Arch Otorhinolaryngol* 2010; **267**: 1645-1648 [PMID: 20563592 DOI: 10.1007/s00405-010-1250-y]

15 **Gouveris H**, Selivanova O, Bausmer U, Goepel B, Mann W. First-night-effect on polysomnographic respiratory sleep parameters in patients with sleep-disordered breathing and upper airway pathology. *Eur Arch Otorhinolaryngol* 2010; **267**: 1449-1453 [PMID: 20127101 DOI: 10.1007/s00405-010-1205-3]

16 **Vanderveken OM**, Maurer JT, Hohenhorst W, Hamans E, Lin HS, Vroegop AV, Anders C, de Vries N, Van de Heyning PH. Evaluation of drug-induced sleep endoscopy as a patient selection tool for implanted upper airway stimulation for obstructive sleep apnea. *J Clin Sleep Med* 2013; **9**: 433-438 [PMID: 23674933 DOI: 10.5664/jcsm.2658]

17 **Nieto FJ**, Peppard PE, Young T, Finn L, Hla KM, Farré R. Sleep-disordered breathing and cancer mortality: results from the Wisconsin Sleep Cohort Study. *Am J Respir Crit Care Med* 2012; **186**: 190-194 [PMID: 22610391]

18 **Bakker JP**, Montesi SB, Malhotra A. Obstructive sleep apnoea: new associations and approaches. *Lancet Respir Med* 2013; **1**: e15-e16 [PMID: 24321811 DOI: 10.1016/S2213-2600(12)70059-0]

19 **Almendros I**, Montserrat JM, Torres M, Bonsignore MR, Chimenti L, Navajas D, Farré R. Obesity and intermittent hypoxia increase tumor growth in a mouse model of sleep apnea. *Sleep Med* 2012; **13**: 1254-1260 [PMID: 23149216 DOI: 10.1016/j.sleep.2012.08.012]

20 **Campos-Rodriguez F**, Martinez-Garcia MA, Martinez M, Duran-Cantolla J, Peña Mde L, Masdeu MJ, Gonzalez M, Campo Fd, Gallego I, Marin JM, Barbe F, Montserrat JM, Farre R. Association

between obstructive sleep apnea and cancer incidence in a large multicenter Spanish cohort. *Am J Respir Crit Care Med* 2013; **187**: 99-105 [PMID: 23155146 DOI: 10.1164/rccm.201209-1671OC]

21 **Doff MH**, Hoekema A, Wijkstra PJ, van der Hoeven JH, Huddleston Slater JJ, de Bont LG, Stegenga B. Oral appliance versus continuous positive airway pressure in obstructive sleep apnea syndrome: a 2-year follow-up. *Sleep* 2013; **36**: 1289-1296 [PMID: 23997361 DOI: 10.5665/sleep.2948]

22 **Giles TL**, Lasserson TJ, Smith BH, White J, Wright J, Cates CJ. Continuous positive airways pressure for obstructive sleep apnoea in adults. *Cochrane Database Syst Rev* 2006; **(3)**: CD001106 [PMID: 16855960]

23 **Gottlieb DJ**, Punjabi NM, Mehra R, Patel SR, Quan SF, Babineau DC, Tracy RP, Rueschman M, Blumenthal RS, Lewis EF, Bhatt DL, Redline S. CPAP versus oxygen in obstructive sleep apnea. *N Engl J Med* 2014; **370**: 2276-2285 [PMID: 24918372 DOI: 10.1056/NEJMoa1306766]

24 **Camacho M**, Riaz M, Capasso R, Ruoff CM, Guilleminault C, Kushida CA, Certal V. The Effect of Nasal Surgery on Continuous Positive Airway Pressure Device Use and Therapeutic Treatment Pressures: A Systematic Review and Meta-Analysis. *Sleep* 2014 [PMID: 25325439]

25 **Poirier J**, George C, Rotenberg B. The effect of nasal surgery on nasal continuous positive airway pressure compliance. *Laryngoscope* 2014; **124**: 317-319 [PMID: 23575772 DOI: 10.1002/lary.24131]

26 **Strollo PJ**, Soose RJ, Maurer JT, de Vries N, Cornelius J, Froymovich O, Hanson RD, Padhya TA, Steward DL, Gillespie MB, Woodson BT, Van de Heyning PH, Goetting MG, Vanderveken OM, Feldman N, Knaack L, Strohl KP. Upper-airway stimulation for obstructive sleep apnea. *N Engl J Med* 2014; **370**: 139-149 [PMID: 24401051 DOI: 10.1056/NEJMoa1308659]

27 **Maurer JT**, Sommer JU, Hein G, Hörmann K, Heiser C, Stuck BA. Palatal implants in the treatment of obstructive sleep apnea: a randomised, placebo-controlled single-centre trial. *Eur Arch Otorhinolaryngol* 2012; **269**: 1851-1856 [PMID: 22228439 DOI: 10.1007/s00405-011-1920-4]

28 **Verse T**, Baisch A, Maurer JT, Stuck BA, Hörmann K. Multilevel surgery for obstructive sleep apnea: short-term results. *Otolaryngol Head Neck Surg* 2006; **134**: 571-577 [PMID: 16564374]

29 **Gouveris H**, Nousia C, Giatromanolaki A, Riga M, Katoto-michelakis M, Ypsilantis P, Sivridis E, Danielides V. Inferior nasal turbinate wound healing after submucosal radiofrequency tissue ablation and monopolar electrocautery: histologic study in a sheep model. *Laryngoscope* 2010; **120**: 1453-1459 [PMID: 20564657 DOI: 10.1002/lary.20913]

30 **Sundaram S**, Bridgman SA, Lim J, Lasserson TJ. Surgery for obstructive sleep apnoea. *Cochrane Database Syst Rev* 2005; **120**: CD001004 [PMID: 16235277]

31 **Kuhle S**, Urschitz MS. Anti-inflammatory medications for obstructive sleep apnea in children. *Cochrane Database Syst Rev* 2011; **(4)**: CD007074 [PMID: 21249687 DOI: 10.1002/14651858]

32 **Tapia IE**, Marcus CL. Newer treatment modalities for pediatric obstructive sleep apnea. *Paediatr Respir Rev* 2013; **14**: 199-203 [PMID: 23931720 DOI: 10.1016/j.prrv.2012.05.006]

P- Reviewer: Ciuman R, Noussios G **S- Editor**: Ji FF
L- Editor: A **E- Editor**: Lu YJ

Published by **Baishideng Publishing Group Inc**
8226 Regency Drive, Pleasanton, CA 94588, USA
Telephone: +1-925-223-8242
Fax: +1-925-223-8243
E-mail: bpgoffice@wjgnet.com
Help Desk: http://www.wjgnet.com/esps/helpdesk.aspx
http://www.wjgnet.com