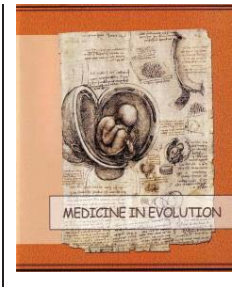


Treating obstructive sleep apnea - the role of nasal and oropharyngeal surgery



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Abstract

Background: Sleep disorders are a family of pathologies that have gain a lot of visibility in the recent years due to the fact that more and more people are diagnosed with such problems. The high incidence of risk factors especially obesity, nicotine and alcohol abuse and the modern and fast way of life have made the incidence of sleep disorders to rise. Otolaryngologist have always tried to be in the front line of treating sleep disordered breathing spectrum like upper airway respiratory syndrome or obstructive sleep apnea. Treating sleep disorders is a daunting task due to the fact that the mechanism of sleep disorders still puzzles doctors all over the world. Patients with sleep disorders are complex patients and should be evaluated in a multidisciplinary team for a correct approach to the disease.

Methods: We present our experience in diagnosing and treating 45 patients with sleep breathing disorders specifically obstructive sleep apnea and the results we have obtained after surgical interventions were performed.

Results: Many patients with sleep disorders especially obstructive sleep apnea are treated with continuous positive airway pressure without being informed of surgical options. Although CPAP is considered the gold standard in treating obstructive sleep apnea the advances in technology have made surgical options to have similar results if done correctly.

Conclusion: Patients with sleep breathing disorders are complex patients that need to be assessed in a multidisciplinary team. Surgical options can alleviate symptoms and improve both subjective and objective parameters and can improve the overall quality of life. Treating sleep disorders is necessary due to the fact that left untreated they can pose serious problems for the patient and can even have fatal consequences.

Keywords: sleep, surgery

INTRODUCTION

Sleep disorders have gained a lot of popularity in recent years due to the more increasing number of patients that are diagnosed yearly. There is a small group in this vast and complex family of disorders that has caught the attention of otorhinolaryngologist, sleep breathing disorders. This group is formed by three entities that have in common the obstruction partial or complete of the upper airway causing sleep disturbances. These entities: snoring, obstructive sleep apnea and upper airway resistance syndrome are sometimes intertwined.

Obstructive sleep apnea is characterized by a partial or incomplete collapse of the upper airway during sleep causing arterial desaturations, while the upper airway respiratory syndrome has the same symptoms, sleep fragmentation seen on sleep studies as for obstructive sleep apnea but without arterial desaturations.

Epidemiology

Obstructive sleep apnea is defined as an apnea/hypopnea index of more than 5 an hour. In the Wisconsin Sleep Cohort the prevalence of obstructive sleep apnea was 24% in men and 9% in women with ages ranging from 30 to 60 years of age [1]. But the fact obstructive sleep apnea is one of the most underdiagnosed disease could mean that those numbers could be higher than expected. The raise in obesity around the world the increased number of people who smoke drink alcohol and use sedatives could mean a raise in the incidence and prevalence of sleep disorders and especially obstructive sleep apnea.

Signs and symptoms.

Sleep breathing disorders can have a lot of signs and symptoms but the problem with these are that sometimes they can be easily overlooked by both patients and doctors. They are usually classified in daytime symptoms and nighttime symptoms. Nighttime symptom are comprised of snoring, apneas and dyspnea. It's important to understand that many of these nighttime symptoms are unknown to the patient and this is where a correct history is of utmost importance and has to be done with the participation of a spouse if possible. Other nighttime signs and symptoms are bruxism, dry mouth or even drooling. Daytime symptoms are usually are recognized by the patient but sometimes are not given any attention. They range from fatigue, morning headaches, sexual dysfunction and can even get to excessive daytime sleepiness, neurocognitive impairment and mood and personality changes. All of this affect the quality of life of the patient. It is thus important to know and recognize these symptoms and explain to the patient the possibility of having a sleep disorder.

Diagnosis.

As mentioned before one of the most important aspect of diagnosing sleep disorders is a correct approach to history taking. Sometimes patients will ignore or underestimate the importance of some symptoms especially like fatigue or daytime sleepiness. The doctors should always ask for these particular signs and symptoms of there is a suspicion of sleep disorders. Bedpartners should also be asked for symptoms where that is possible. Questionnaires like Epworth, STOP-BANG, Berlin, Stanford have proven their importance in assessing the subjective way the patients feel and are used routinely in patient with sleep disorders.

A complete ENT examination is mandatory for locating the possible site of obstruction. A clinical examination including an endoscopy of the upper airway is the key part of the ENT examinations and attention must be given to the most frequent sites of obstructions. The examination of the oral cavity is also of great importance in assessing the tonsils and the position of the soft palate. One of the setbacks of the ENT examination is the fact that usually it is done in a state of wakefulness that changes the behavior of the anatomical structures. Sleep endoscopy should be performed on a regular basis to complete the ENT examination.

As for imaging CT scanning or MRI have both provided valuable insight sleep breathing disorders although no protocols or guides mention the regular use of them in diagnosing sleep breathing disorders.

The ENT examination is an important step in diagnosing and especially treating sleep breathing disorders assessing the topographic diagnosis of the obstruction. Although highly suggestive the ENT examination is not enough for diagnosing sleep breathing disorders.

The sleep study via a polysomnography is the gold standard in the diagnosis of sleep disorders, having the capacity to differentiate between different entities.

Treatment

Treating sleep disorders especially obstructive sleep apnea is a complex task and many studies have shown the advantages and disadvantages of different treatment choices. There are three important directions in treating obstructive sleep apnea. First is the conservative treatment that usually aims at weight loss, sleep position and other risk factors like nicotine and alcohol abuse or the use of sedatives. The second major way of treating obstructive sleep apnea is by using positive pressure devices considered to be the standard treatment [2] that although have the best results patient compliance is usually low. The third way is by surgical intervention. Surgical treatment of obstructive sleep apnea has gained a lot of recognition in the last 20 years and the advances made in both technique and equipment lowered the complications and increased the success rates.

MATERIAL AND METHODS

We decided to evaluate the performance objective and subjective, of two of the most common used surgical interventions used for treating obstructive sleep apnea uvulopalatopharyngoplasty (UPPP) and septoplasty with turbinate reduction. Figure 1 represents enlarged tonsils, while Figure 2 represents a deviated septum and hypertrophic turbinates Our evaluation consisted of 45 patients with a confirmed diagnosis of obstructive sleep apnea and were referred to our specialty for surgical treatment.

Patient history was taken with emphasis on the most common signs and symptoms and each patient underwent a complete ENT examination and the surgical approach was elected in accordance with the endoscopic findings. As for all admissions in the ENT clinic all patients signed the informed consent and assessed their daytime sleepiness using a visual analog scale (VAS) with a range from 0 to 10, 0 no daytime sleepiness and 10 excessive daytime sleepiness. Patient data was collected before the surgery and 6 months after surgery and consisted in general data like body mass index (BMI), sex, age and specific data like the result of the sleep study apnea hypopnea index, mean oxygen saturation and the results of the visual analog scale. The 45 patients were divided in 2 groups 27 for UPPP and 18 for septoplasty and turbinate reduction depending on the surgical intervention. Before surgery all patient underwent a preanesthetic examination, blood tests and all underwent surgery under general anesthesia. All of the measurements were introduced in a Excel database and then analyzed using a statistical analysis software.



Figure 1. Enlarged tonsils



Figure 2. Deviated septum and hypertrophic turbinates

RESULTS

Out of the 45 patients 30(66%) were males and 15(33%) females. The mean age was 40.55 (range 32-51) and as for the age specifically for each gender the mean age for males was 40.8 and 40 for females.

As for the most important risk factors found the mean body mass index was 28.40 (27.92 for females and 28.94 for males). Smoking was present in 70% of the patients and alcohol in 35%. The results of bot preoperative and postoperative measurements are synthetized in Table 1.

We also measured the BMI 6 months after surgery to observe if people lose or gain weight. The mean BMI before surgery was 28.40(±3.08) and We observed that there were no significant changes in the BMI after surgery in our group. This was also a positive thing because the results could be attributed only to surgical effects on our patients. The best results concerning AHI and oxygen saturation we found in the UPPP group while in the septoplasty and turbinate reduction although some improvements were seen they were not significant. As for how patient assessed their daytime sleepiness, we observed that although the best result on a sleep study was seen in UVPP group patients seem to feel better after septoplasty and turbinate reduction.

Table 1. Results of preoperative and postoperative evaluation of AHI (apnea hypopnea index), O₂(oxygen saturation), VAS (visual analog scale) Mean scores with standard deviation

	UPPP		SEPTOPLASTY-TURBINATES	
	Initial	6 months	Initial	6 months
MEAN AHI	29.0(±10.3)	22.8(±7.9)	14.83(±2.3)	13.11(±2.1)
MEAN O ₂ %	93.8(±1.8)	95.6(±1.5)	94.6(±1.4)	95.0±(1.2)
MEAN VAS	7.4(±1.1)	6.2(±1.1)	7.8(±1.4)	6.4(±1.2)

DISCUSSIONS

Surgical treatment of obstructive sleep apnea is still controversial mostly because surgical outcomes are hard to back by randomized controlled trials. Comparing the surgical results rates to those of the positive pressure demonstrate that surgical success rate is sometimes variable. The variability of the success rate depends on a plenitude of aspect ranging from the level of obstruction, patient characteristics to the type of surgery and experience of the surgeon. In a study by Lin et all [3] only 25% of patients have a uni-level obstruction. obstructive sleep apnea is a complex disease and the knowledge that multi sites of obstruction can maintain airway obstruction in sleep is a factor for thinking of multilevel

surgery is sometimes needed especially for patient that can't or wont use positive pressure devices. Riley et all [4] determined that multilevel surgery can reach success rates up to 95%.

Nasal surgery in obstructive sleep apnea is also been debated for a long time and many studies have shown that results are sometimes unsatisfactory. In a prospective study done by Sufioglu et all [5] on 31 patients demonstrated that although improvements in snoring daytime sleepiness and subjective complaint occurred there were no significant differences between preoperative and postoperative AHI values. Thus, is important to tell our patient the reality of nasal surgical procedures and what they can objectively expect from them. But nasal obstruction is one of the most important factors for positive pressure device failure and Nakata et all [6] demonstrated that nasal surgery can result in a significant decrease in nasal resistance and raise the compliance to CPAP.

UPPP was first introduced in 1981 by Fujita and was considered for a long time as a quintessential procedure in treating obstructive sleep apnea. A study by Kham et all [7] showed that only 24% of patients achieved an AHI of 5 or less and 33% an AHI of 10 or less. Elshaug[8] also reported on the success rate 16.1% and 34.1% respectively. But recent advances both in understanding and treating obstructive sleep apnea have changed the way we manage this disease. Using an only surgical procedure as a definitive treatment is now known not to have the desired results and also changes in how a successful outcome is defined in respect to treating obstructive sleep apnea.

In recent years with the more increasing use of drug induces sleep endoscopies a lot of studies have demonstrated the role that the epiglottis plays in obstructive sleep apnea. It is considered that 12-30% have a complete collapse of the epiglottis. [9-10] Hybášková et all [11] showed use of drug induced endoscopy changed the surgical plan in 60.8% of the patients. Azarbarzin et al [12] showed that endoscopic studies reveal that epiglottic collapse renders patients at higher risk of failed oral appliance therapy and can even worsen the obstructive sleep apnea with CPAP use.

CONCLUSIONS

Surgical treatment for obstructive sleep apnea although not a cure can decrease the mortality and morbidity of the disease and improve the overall quality of life. It remains controversial in the sense that success rates depend on a lot of factor like surgical technique, patient characteristic and surgeon experience. It also depends on the correct assessment of the patient and electing the best method for that patient in particular. The understanding that multiple sites of obstruction can occur in the same patient has given rise to the concept of multilevel surgery especially in patient that are uncompliant or can't use CPAP. One should also keep in mind that dealing with the obstructive sleep apnea patient is a daunting task and a multidisciplinary evaluation of the patient is mandatory.

CONFLICT OF INTEREST

The authors have no conflict of interest.

CONTRIBUTION OF AUTHORS

All authors have equally contributed to this work

ETHICAL APPROVAL

All procedures performed in this study were in accordance with the ethical standard of the institution and with the 1964 Helsinki declaration and its later amendments

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