COMMENTARY

Interpretative review of practice parameters for the management of obstructive sleep apnea

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Obstructive sleep apnea (OSA) afflicts an estimated 15 million to 20 million people in America. Similar prevalence is suspected in the Indian subcontinent. It is a significant problem that affects up to 4 percent of middle-aged adults. The most common complaints include loud snoring, disrupted sleep and excessive daytime sleepiness. The prevalence of obstructive sleep apnea syndrome in the middle-aged population is approximately 4% in men and 2% in women. In the elderly, estimates range form 28% to 67% in men and 20% to 54% in women.

The American Academy of Sleep Medicine has recommended evidence based practice parameters for positive airway pressure therapy, oral appliance therapy as well as medical therapy for the management of OSA. This commentary discusses the practical implications of these practice guidelines based on review of the current literature and the quality of the clinical evidence. This provides foundation for making the best practice recommendations.

The available options for management of OSA can be divided in to non-surgical and surgical approaches. The decision to select one over the other depends on both, the severity of the apnea and the characteristics of an individual patient.

Current evidence from randomized controlled trials (RCTs) indicates that improvements with treatment can be noted in symptomatic patients with apnea-hypopnea index (AHI) of 15 events per hour of sleep or a 4% drop in oxygen saturation during sleep with a frequency of 10 or more events per hour. There is some evidence of benefit from the treatment of symptomatic individuals with AHI of 5-14 events per hour of sleep.

Positive airway pressure (PAP) is the first line of therapy for moderate to severe OSA. Types of PAP treatment include continuous PAP (CPAP), bi-level PAP, and automatic adjusting PAP (APAP). CPAP functions as a pneumatic splint to maintain upper airway patency throughout all stages of sleep. CPAP eliminates respiratory disturbances, thereby reducing the AHI compared to placebo, conservative management or positional therapy. There is somewhat stronger evidence supporting improved Stage N3 sleep and decreased EEG arousals with CPAP. However, whether CPAP yields significant consistent improvement in overall sleep architecture or fragmentation is less clear. Most patients require lifelong treatment. Randomized controlled trials indicate that CPAP improves daytime sleepiness, cognitive function, vigilance, mood and quality of life. Objective improvements are documented in symptomatic patients with AHI over15 events per hour of sleep or more than ten events with 4% oxygen desaturation per hour.

Major side effects of CPAP use (epistaxis, sinusitis) are rare, but minor side effects (rhinitis, nasal bridge sores, discomfort, claustrophobia, abdominal bloating) are common. Almost all side effects can be managed with meticulous attention to the details and close follow up.

The compliance with CPAP remains a major drawback. The occurrence of patient complaints related to pressure intolerance or interface (mask) problems are

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the most commonly reported CPAP-related side effect. On an average, patients use CPAP for three to five hours nightly. The early pattern of CPAP use predicts long term usage profile. Less than two hours of CPAP use per night seems to be of discriminating value that predicts poor compliance. Discontinuation of CPAP either one night or even half of the night results in the recurrence of obstructive respiratory events and the clinical sequelae of untreated OSA including hypersomnia. There is a positive correlation between severity of symptoms and CPAP use. Patient with higher apnea hypopnea index (AHI) tend to accept and use CPAP therapy more than patients with lower AHI.

Bi-level positive airway pressure (BIPAP) machines provide separate inspiratory and expiratory pressures. There is no evidence to support BIPAP over CPAP in sleep apnea patients. BIPAP therapy seems more appropriate for patients with ventilatory failure. The clinical evidence supports that patients with co-existing lung disease or hypercapnia show some gas exchange benefit with BiPAP as compared to CPAP. BiPAP improves gas exchange and sleep in patients with restrictive lung disease. There is no evidence that bi-level PAP improves efficacy or compliance in the management of OSA in first time users of PAP but the evidence thus far at least supports equivalency for efficacy and compliance.

Auto-titration CPAP adjusts the pressure delivered throughout the sleep time according to changes in airflow or other set parameters. These devices can be used in the sleep laboratory titration to establish the pressure required for later home use. Lower average pressures obtained by auto-titration may produce less mask leakage and may lead to better tolerance. There is no evidence, however that outcomes are any better than CPAP.

Another alternative for the treatment of snoring and obstructive sleep apnea are oral appliances. These are recommended as an alternative for sleep apnea patients who have mild to moderate OSA, are unable to tolerate CPAP therapy or unwilling to accept other complex interventions. Oral appliances (OA) in general work by anterior advancement of the mandible and therefore render larger airway patency. The tongue retaining devices that keep the tongue in an anterior position are less popular. The success rates of favorable change in apnea-hypopnea index with OA compared to no treatment in patients with mild to moderate OSA have been variable. Oral appliances may have a better role in patients with simple snoring. Hypersalivation and teeth discomfort are common side effects.

There is less reliable evidence to support pharmacological treatment for OSA. There is no medication that demonstrates any consistent response. Drugs which suppress rapid eye movement (protryptyline, acetozolamide and progesterone) do not show clinical benefit in treating OSA in controlled trials. There is some evidence to suggest that the addition of drugs such as modafanil may have an alerting effect on daytime sleepiness in patients who remain sleepy despite good CPAP compliance. Theophylline in trials show an improvement in Cheyne- Stokes breathing. Hypnotics, such as benzodiazepines, may worsen OSA and are not recommended. Pharmacological therapy should not be used as first line therapy for OSA.

Weight reduction of 10-15% has been associated with improvement in symptoms, oxygen desaturation index and other markers of OSA. There is a poor correlation between the amount of weight loss and clinical response. Weight loss should be encouraged as an adjunct to the CPAP or oral appliance therapy. The role of gastro-intestinal by-pass surgery for weight reduction in obese patient is controversial but may be considered as an option. Additionally, alcohol and other sedatives should be avoided as these alter airway dilator function and worsen the sleep apnea. Positional therapy in the form of avoiding sleeping in supine position may have minor role in the management of sleep apnea or asymptomatic snoring.

Surgical interventions are used in the treatment of OSA with the intent of increasing pharyngeal diameter and reduction in pharyngeal resistance during sleep. Two systematic reviews concluded that there was no strong evidence supporting the use of uvulopalatopharyngoplasty (UPPP) in OSA. Uncontrolled case series indicated a 50% improvement in 50% of patients. In addition, UPPP may have an adverse effect on the patient's subsequent ability to use nasal CPAP. A meta-analysis of laser-assisted uvulopalatopharyngoplasty (LAUP) also concluded that LAUP and related procedures should not be used for any severity of OSA.

Tracheostomy was the first surgical treatment for OSA. It bypasses the site of obstruction completely. There have been no controlled trials to assess long term outcomes. The potential complications of a tracheostomy are significant and should be considered carefully before recommending this option.

Other surgical interventions are more invasive and may require more than one surgical procedure. Mandibular and maxillary advancement considerably reduces OSA severity and improves symptoms in patients followed up for two years. It requires a specially trained surgeon and meticulous post operative care.

Treatment options and their advantages and disadvantages should be discussed with the patient and their partner, involving them in the decision making process. This is likely to improve compliance and possibly treatment outcomes. The effective treatment of OSA significantly improves symptom scores. Other consequences of daytime sleepiness including work, home and social environment may improve as well. Physicians engaging in sleep medicine practice must be well acquainted with the strengths and weaknesses of the proposed therapeutic interventions and avoid use of treatments without reasonable clinical evidence.

Suggested reading

Kushida Clete A, et al. Practice parameters for the treatment of snoring and obstructive sleep apnea with oral appliances: An update for 2005. *SLEEP* 2006; 29(2).

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