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Obstructive sleep apnea: Review of literature and Ayurvedic treatment options

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Abstract

The present modern era has brought about a dramatic change in the life style of people leading to a more sedentry habit with unhygienic food intake. These changes in the human life have led to the emergence of various chronic co-morbid diseases like obesity, obstructive sleep apnea and cardiac problems. Obstructive sleep apnea is a chronic condition characterized by frequent episodes of upper airway collapse during sleep. Its effect on nocturnal sleep quality and ensuing daytime fatigue and sleepiness are widely acknowledged. Increasingly, obstructive sleep apnea is also being recognized as an independent risk factor for several clinical consequences, including systemic hypertension, cardiovascular disease, stroke, and abnormal glucose metabolism.

Therefore a concerted effort by health care professional across specialties is needed to identify this health problem and treat it at an early stage. In ayurveda *ahara*(diet), *Nidra*(Sleep), *Bramhacharya* (celibecy) are considered as sub pillar of life. As treatment includes a change in life style and food habit of the individual, an holistic Ayurvedic approach has a better answer for this chronic problem than the modern treatment modalities.

Keywords

Obstructive Sleep Apnea, Upper Airway Collapse, Obesity, Nidra, Ayurveda

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INTRODUCTION

Obstructive sleep apnea (OSA) is a chronic condition characterized by repetitive episodes of complete or partial collapse of the upper airway during sleep resulting in complete cessation (apnea) or reduction (hypopnea) of airflow leading to arousal and hypoxia. Risk factors of sleep apnea include obesity, gender, age, menopause, familial factors, craniofacial abnormalities, and alcohol. Sleep apnea has been increasingly recognized as a major health burden associated with hypertension and increased risk of cardiovascular disease and death. Overnight stay in the hospital with digital polysomnography is the gold standard for diagnosing the disease along with the typical clinical presentation.While modern treatment modalities like CPAP (continuous positive airway pressure), and UPPP (uvulopharyngoplasty) have their own limitations, an ayurvedic method of controlling the disease has shown better long term results and patient compliance.

AIMS AND OBJECTIVES

Role of Ayurveda in management of obstructive sleep apnea.

Risk factors and Clinical Diagnosis of the disease –with changing life style and food habit of individuals the risk of developing chronic diseases like obstructive sleep apnea is very high,

Thus knowledge of risk factors for obstructive sleep apnea is crucial to properly direct diagnostic attention at those with the highest risk. In the following sections, several of the key risk factors for obstructive sleep apnea are briefly discussed.

Age- various studies have shown that ageing process has a simple linear relationship with developing obstructive sleep apnea.Different hypotheses have been proposed and tested.

Function and structure of the upper airway have been a focus of interest in various reports investigating increasing age and upper airway pathophysiology. For example, aging is associated with increased upper airway resistance, increased parapharyngeal fat, decreased pharyngeal size, and impairment of pharyngeal muscle reflexes that are important to maintain upper airway patency, the latter of which is independent of BMI and gender.

Gender - OSA is more common in men, with a male-to-female ratio of 4:1 in community-based studies and approximately 10:1 in sleep clinic referral samples. The

disparity between the gender-based community and the clinic prevalence of OSA may be explained by fact that women often do not have the classic symptoms of OSA. Men tend to have more fat in the upper body including the neck (android), thereby predisposing to upper airway collapse compared with women who tend to have lower body fat (gynoid). Consistent with this observation is that the measurement of neck circumference and waist circumference is better correlated with the severity of OSA than BMI.

Obesity – An unquestionable link exists between obesity and development of obstructed sleep apnea. Studies have shown that increase in body weight can alter normal upper airway mechanics during sleep through several distinct mechanisms including: (*1*) increased parapharyngeal fat deposition resulting in a smaller upper airway, (*2*) alterations in neural compensatory mechanisms that maintain airway patency, (*3*) respiratory control system instability, and (*4*) reduction in functional residual capacity with a resultant decrease in the stabilizing caudal traction on the upper airway. Various indicators like BMI, neck circumference, waist circumference can be linked with development of the disease. Neck circumference of more than 17 inches in males and more than 16 inches in females with inceasedBMI(>30), and increased waist circumference increase the chances of developing OSA in an individual.

Race - several studies have been undertaken to characterize the disease burden in countries including China, India, and Korea . These studies have shown that the prevalence of obstructive sleep apnea in Asians is comparable to that documented in North American and European samples. An interesting and unexpected observation that has emerged is that, while Asians are less obese than whites, disease prevalence in the East is no less than in the West. Moreover, for a given age, sex, and BMI, Asians have greater disease severity than whites. Differences in craniofacial features between Asians and whites have been demonstrated and are considered as the etiologic factors for the increased risk and greater severity of obstructive sleep apnea in Asians despite lesser degrees of obesity.

Craniofacial abnormality - Different craniofacial characteristics have been associated

with the development of OSA by causing narrowing of the upper airway and increased

upper airway collapsibility including inferiorly positioned hyoid bone, posterior placement

of maxilla and mandible, enlarged tongue and soft palate, and smaller velopharyngeal cross-sectional area.

Smoking and alcohol consumption - The inflammatory effect of smoking on airway and the

change in lung volumes may predispose to increase upper airway collapsibility, and the effect of nicotine on sleep stability and ventilatory drive may also play a role. Whether smoking is a true risk factor for OSA or a public health problem that is prevalent in a population that is at high risk for OSA remains unclear. Similarly alcohol exacerbates OSA via different mechanisms including selective reduction of genioglossal muscle activity, decreased ventilatory responses to hypercapnia and hypoxia, increased upper airway resistance, and increased tendency of an unstable upper airway to collapse.

Clinical features of OSA-

Usually the patient relatives complain of excessive snoring during sleeping, along with episodes of apnea and arousal from sleep. Because of frequent arousal during the night time the quality of sleep is poor. Patient experiences early morning headaches and excessive sleepiness during the day time. Due to sleepiness during the day time the work performance is reduced, for younger population school performance is affected. Increase in road traffic accidents is seen in patients related to driving profession. Reduced quality of life can cause behavioural changes in the individual. Patients usually become more irritant and short tempered leading to frequent fight at home. Family life is reduced with increased separation from spouses. Long standing OSA can lead to hypertension, stroke, coronary artery disease, dementia, mood changes like depression andoccupational, as well as automobile accidents. For thisreason, OSA has been increasingly recognized as a majorpublic health issue imposing great economic burden, therebymandating early recognition and treatment.

Ayurvedic interventions –

***Nidra* is prime among the factors responsible for sustenance of the body.Sleep destroys half the diseases**

Changing unhealthy food habits –patients should restrict themselves from taking junk food, carbonated drinks, and more of fatty food as these cause weight gain and worsen the symptoms of OSA. Eating wholesome

die(*pathyahara*)and balanced diet (*hitaahara*)which includes intake of the following foods: such as *RaktaSali*(oryza sativa),*Mudga*(phaseolus radiates Linn.),rain water,rocksalt,*jivanti*(Leptadenia reticulate),garlic,ginger,grapes ,honey are considered as most conducive food articles.Diet having the property of *vata*alleviation&*kapha,meda* alleviation should be recommended.Enema of hot, sharp,dry drugs& dry massage(*udvartana)*wihdry,*kasaya rasa*dravya powders are indicated in obesity.

Regular exercise and yoga-Regular practice of yogasanas like *suryanaskar,paschhimoutanasa,sarvangasana,*[*Tadasana*], triangle pose [*Trikonasana*], revolved triangle pose [*ParivrttaTrikonasana*], standing forward bend [*Uttanasana*], Hands to feet [*PadaHastasana*], tree pose [*Vrksasana*], lotus pose [*Padmasana*], half spinal twist [*ArdhaMatsyendrasana*], wind relieving poses [*Pavanamuktasana*], bow pose [*Dhanurasana*], *Pranayama or Anuloma-Viloma* [Alternate nostril breathing-I], *Anuloma-Viloma* [Alternate Nostril Breathing-II], *Surya Bhedan*[Right Nostril Breathing], *Ujjayi, Bhramari, Pranayama* from *Hatha Yoga* [*Surya Bhedan, Bhasrika, Ujjayi, Shitali, Sitkari, Bhramari, Murchha, and Plavini Pranayama*] on a long term basis can keep patients healthy and reduce symptoms of obstructive sleep apnea. Several studies have shown that adults practicing Yoga regularly had better overall sleep quality, less episodes of disturbed sleep, took less time to fall asleep, less day time dysfunction, less use of sleep medications and also felt more rested and energetic in the morning. One possible reason explained for better sleep quality in Yoga practitioners is that Yoga exercises involve stretching and relaxing of muscles causing significant physical and mental exertion resulting in less sleep latency, more deep sleep, less sleep disturbances, and better sleep efficiency

Drugs to reduce obesity

Various Ayurveda yogas like*Vidangadichurnam, erandakshra,louharasayana,navakaguggula, amrutadiguggula, Triphalachurnam, louharistamcan*be used on a regular basis for controlling weight gain. Regular use of the medicines along with exercise /yoga and proper healthy dietary habits can help reduce the morbidity and mortality due to obstructive sleep apnea to a minimum.

Herbs and sleep:

Shows the herbs with proven sedative activity in various researches conducted earlier.

Table 1 Herbs with proven sedative activity .

S no	Latin name	Chemical constituents
1	Acoruscalamus Linn [36,37]	Asarone and β-asarone, Acorus oil
2	Bacopamonnieri Linn [41]	Alcoholic extract Plant extract
3	CelastruspaniculatusWilld [37, 42]	Crude seed oil, brahmoside and brahminoside
4	Centellaasiatica Linn [44]	Alcoholic extract
5	Nardosachysjatamansi DC[41,30.51]	Jatamansone,valeranone
6	Withaniasomnifera Linn[38.50]	Ethanolic extract of roots
7	Papaversomniferum Linn[53.56]	Morphine
8	Rauvolfia serpentine[41.59,60]	Reserpine,Rescinnamine
9	Derris indicaLamk[48]	Pongamol

CONCLUSION

Various studies have now revealed adequate information regarding the risk factors associated with OSA and the natural history of the disease. Proper education of medical professionals at all levels along with awareness among general people regarding the disease at the community level can help us control the incidence.By adopting *swasthavritta*(healthy life style), Various *yogasana*techniques along with regular exercise and *hita and pathyahara(* healthy food habit) can help us lead a life free from chronic diseases like OSA.

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