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Mini Review

Obstructive Sleep Apnea: A Mini Review

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Abstract

Somnipathy is a disorder of sleep pattern of an individual. Obstructive sleep apnea is the most common form of sleep disorder characterized by repetitive full or partial collapse of the upper airway during sleep resulting in hypopnea or apnea. Various factors may cause obstructive sleep apnea but the most common is obesity. As rates of global obesity continue to consistently increase, the incidence of obstructive sleep apnea may likely rise also. Patient with sleep apnea shows increase level of the inflammatory markers C-reactive protein and serum amyloid A which is patho physiologically related to sleep deprivation or intermittent hypoxemia. These inflammatory pathways are playing a major role in the periodontitis development and progression. The relationship between periodontal disease and systemic disease has been studied widely, and many studies have shown greater prevalence of periodontitis in patients with diabetes, cardiovascular disease, rheumatoid arthritis, and osteoporosis. The relationship between periodontal disease and obstructive sleep apnea had gone uninvest gated until Gunaratnam., et al. Gunaratam and colleagues hypothesized that the presence of obstructive sleep apnea was linked to increased risk of periodontal disease because sleep apnea is associated with an elevated inflammatory response.

Keywords: Obstructive Sleep Apnea; Periodontitis; Somnipathy; Polysomnography

Abbreviations

OSA: Obstructive Sleep Apnea; AHI: Apnea-Hypopnea Index; ESS: Epworth Sleepiness Scale; SACS: Sleep Apnea Clinical Score; CPAP: Continuous Positive Airway Pressure; VPAP: Variable Positive Airway Pressure.

Introduction

Sleep disorders categorized into primary or secondary [1-9]. Primary sleep disorders majorly characterised by defect in sleep-wake cycle, disorganised sleep timings results in changes in behaviour of a person. Physical and mental illness results into sleep deprivation considered under secondary sleep disorder.

Primary sleep disorder may be divided into two broad categories

1. **Parasomnias:** These are unusual experiences or behav iors that occur during sleep which include sleep terror disorder and sleepwalking and nightmare disorder.
2. **Dyssomnias:** This includes abnormalities in the sleep pattern, excessive or short sleep with disturbances, wakefulness, irritability. They include inability to sleep, daytime sleepiness, breathing disorder like obstructive sleep apnea and circadian rhythm disturbances in sleep pattern.

Sleep apnea majorly of 3 types:

Obstructive Central and Complex Sleep Apnea.

In obstructive sleep apnea, due to large surface area of throat tissue which relaxes during sleep causes airway obstruction may leads to breathing problem and snoring. Amongst three it is found more often [10].

Central sleep apnea name itself suggest that it is due to disturbances in central nervous system which control over muscles involved in breathing leads to failing of signals to reach by the central nervous system. It is found rarely [11].

Complex sleep apnea is nothing but the presence of both the obstructive and central apnic conditions [12]. Day by day obstructive sleep apnea is an increasing major health concern in between 30-45 years age group in the population.

Possible causes of Obstructive Sleep Apnea are:

1. Obesity (most common) due to increased soft tissue around the airway.
2. Premature aging.
3. Neurological disorders and brain injuries.
4. Muscle wasting decrease muscle tone due to alcohol consumption or by drugs.
5. Hereditary, genetic components, family history.
6. structural features that give rise to a narrowed airway.
7. Depression, anxiety disorders.
8. Damaged peripheral nerve, memory loss disorders, stroke and others neurological manifestations.
9. Asthma, Chronic obstructive pulmonary disease (COPD).
10. Paroxysmal nocturnal haemoglobinuria (PNH).
11. Person with Down syndrome, Treacher Collins syndrome and Pierre Robin sequence are more likely to have obstructive sleep apnea.
12. In infectious mononucleosis due to enlargement of lymphoid tissue which is due to acute infection Epstein-Barr virus results in obstruction in breathing.

Men's are more prone to OSA than do women in general, but they are at higher risk during pregnancy [8].

There are peripheral and central chemoreceptors in the body [13]. Peripheral chemoreceptors excitation caused by carotid bodies of internal carotid arteries whereas central chemoreceptors excitation caused by brainstem. Peripheral chemoreceptors are made to respond oxygen tension in blood (hyoxia, apnea) and carbon dioxide (hypercapnia, hypocapnia) and acid base balance is maintained by the central chemoreceptors [14]. Bradicardiac, sympathetic and ventilatory responses excitation occurs by the activation of baro reflexes results in peripheral chemoreflex excitation [15-18].

In normal healthy person, when person is awake chemoreceptors response is active and while sleeping response chemoreceptors suppresses [19]. In obstructive sleep apnea, collapse airways and effortful breathing lead to raise response of peripheral chemoreceptors due to hypoxemic condition [20]. This abrupt ventilatory response causes decrease in pleural pressure in OSA patients. In some cases, hypoxemic long-time hypoxemic condition exacerbates cardiac vagal activity with marked raise in sympathetic output of muscles and blood vessels due to this diving reflex [21-25].

Patient with OSA feels irritable, sleepy during day time, reacts slowly, difficulty in concentrating, tiredness, headache, feels guilty, shy as they snore while sleeping. In some cases of children seems very active or too tired especially young child with more tendency to sleep during days hours are major concern with obstructive sleep apnea. This condition may call as excessive sleepiness or hypersomnolence. Behaviour of this chid is quite different than do normal one [26-28].

Gunaratnam., et al. stated the strong association between OSA and periodontitis. He suggested that patients with periodontitis are more likely prone to OSA and true vice versa also. Both the conditions mimicking some conditions like Diabetes, smoking, hypertension, nasal obstruction, effort full breathing, old age, high BMI, consumption of alcohol, lifestyle etc. Many associative studies are carried out to find out their association and it is proved that people with periodontitis 4 times are more likely to risk for OSA than without periodontitis. Factors associated with OSA and periodontitis are more or less similar [30-35].

OSA can be graded on the basis of apnea-hypopnea index (AHI). It calculates the number of series or events of hypopnea and apnic conditions. In apnic episodes breathing completely ceased for 10-20 seconds while in hypotonic condition breathing is ceased for 10seconds with 50% reduction of airflow [26-30].

AHI graded on the following scores:

AHI	Rating
< 5	Normal
5 - 15	Mild
15 - 30	Moderate
> 30	Severe

Table 1

Various methods to detect the OSA includes polysomnography, Home oximetry, ESS (Epworth Sleepiness Scale), SACS (Sleep Apnea Clinical Score), AHI (Apnea Hypopnea Index). Patient with high risk are diagnosed with ESS scale rather than Polysomnography. Higher score of ESS and SACS scales indicates patient with severe sleep apnea. Hone oximetry have drawback over other methods as it doesn't represent apnic and hypopnic events and thus doesn't gives AHI score. So, it is less likely considered over ESS and SACS scales.

Treatment of OSA includes:

1. Weight loss by improving lifestyle, healthy diet, exercise.
2. Moderate daily exercise may improve the condition.
3. Treating periodontal diseases to restore lost periodontal tissues, maintaining good oral hygiene improves its prognosis but it is not sufficient enough the associated diseases have to be treated [36-37].
4. Currently positive airway pressure gain popularity in treating OSA patients. It may give in two different forms that is continuously and variably. Continuous positive airway supplies a controlled and continue airflow through nasal or mouth mask helps to open up blocked airways. While in Variable Positive Airway Pressure provides fluctuated airflow pressures during inhalation and exhalation. This pressure fluctuation is monitored by a mechanical device. It not cost effective. Another Continuous Positive Air Pressure is monitored automatically according to patients breathing mechanisms and supplies air pressure as and when required. Now a day's nasal devices are also available which on applies produce a positive air pressure by utilising patients own breathing cycles and thus provide relief in obstructive breathing.
5. Manualy prepared appliances and splints to hold lower jaw forward and in such position thus facilitates breathing and relive airway obstructions.
6. Changing usual sleep position making it slightly raise helps to smoothens airway passage. This raised position helps for forward placement of tongue and thus avoid obstruction of air passage by tongue [42,43].
7. Exercise by playing wind instruments and mouth organs also play an important role to relive this condition. Doing this many patient gets rid of snoring during sleep many experimental studies proven this.
8. Mandibular advancement by surgeries or by appliances helps to reposition mandible in a such way that it doesn't cause any airway obstruction and reposition the tongue in forward position. This modality is specially used with a person who were not suitable to positive air pressure therapy.
9. Surgical treatment in severe cases includes uvu lopala to pharyngoplasty, Pillar palatal implant, Tracheostomy.
10. Some are believing in giving medications like fluoxetine, paroxetine, acetazolamide and tryptophan to improve the condition.
11. Airway passage improvement by mandibular advancement with tongue repositioning by cutting the tongue base and repositioning of the muscles of the tongue thereby it doesn't block the airways helps to get rid of OSA and snoaring [44].
12. Forward placement of hyoid bone up to laryngeal level also clears the obstructions of airways [45].

Conclusion

Obstructive sleep apnea is a health hazard and usually affects middle-aged, overweight adults. It causes not only snoring but also repeated obstruction to breathing while the person is sleeping. This leads to drop in oxygen saturation within the blood which can damage organs such as the heart and the brain. There is association between OSA and periodontitis; treatment of periodontitis helps to recover OSA and vice versa. It is diagnosed with polysomnogram of patients with mild to moderate sleep apnea. More advance case will require CPAP. Treatment improves a person's overall health by improving the quality of sleep. Some severe cases may require surgical modalities and regular fallow up to check improvement of the disease condition. Thus, early diagnosis and treatment of underlying cause help to combat OSA.

Bibliography

1. Benumof JL. "Obstructive sleep apnea in the adult obese patient: implications for airway management". *Journal of Clinical Anesthesia* 20.4 (2001): 789-811.
2. Strohl KP and Redline S. "Recognition of obstructive sleep apnea". *American Journal of Respiratory Cell and Molecular Biology* 154 (1996): 279-286.
3. Guilleminault C., *et al*. "The sleep apnea syndromes". *Annual Review of Medicine* 27 (1976): 465-484.

4. Grossi SG., *et al*. "Periodontal disease and diabetes mellitus: a two-way relationship". *Annals of Periodontology* 3 (1998): 51-61.

5. Lőe H. "Periodontal disease. The sixth complication of diabetes mellitus". *Diabetes Care* 16 (1993): 329-334.

6. Gunaratnam K., *et al*. "Obstructive sleep apnea and periodontitis: a novel association?" *Sleep Breath* 13 (2009): 233-239.

7. Edwards., *et al*. "Sleep-Disordered Breathing in Pregnancy". *Sleep Medicine Clinics* 3 (2008): 81-95.

8. Sleep Apnea. "Risk Factors Archived 2011-12-17 at the Way back Machine., Mayo Clinic (2010).

9. Ford DE and Kamerow DB. "Epidemiologic study of sleep disturbances and psychiatric disorders. An opportunity for prevention?" *JAMA* 262 (1989): 1479-1484.

10. "Sleep related breathing disorders in adults: recommendations for syndrome definition and measurement techniques in clinical research". The report of an American Academy of Sleep Medicine Task Force". *Sleep* 22 (1999): 667-689.

11. Hosselet J., *et al*. "Classification of sleep disordered breathing". *American Journal of Respiratory Cell and Molecular Biology* 163 (2001): 398-405.

12. Sean M., *et al*. "Obstructive sleep apnea". *Annals of Internal Medicine* 142 (2005): 187-197.

13. Heistad DD., *et al*. "Interactions of baroreceptor and chemoreceptor reflexes. Modulation of the chemoreceptor reflex by changes in baroreceptor activity". *Journal of Clinical Investigation* 53 (1974): 1226-3636.

14. Somers VK., *et al*. "Interaction of baroreceptor and chemoreceptor reflex control of sympathetic nerve acttivity in normal humans". *Journal of Clinical Investigation* 87 (1991): 1953-1957.

15. Somers VK., *et al*. "Parasympathetic hyperresponsiveness and bradyarrhythmias during apnoea in hypertention". *Clinical Autonomic Research* 2 (1992).

16. Lugliani R., *et al*. "Effect of bilateral carotid body resection on ventilatory control at rest and during exercise in man". *The New England Journal of Medicine* 285 (1971): 1105-1111

17. Gelfand R., *et al*. "Dynamic respiratory response to abrupt change of inspired CO2 at normal and high PO2". *Journal of Applied Physiology* 35 (1973): 903-913.

18. Douglas NJ., *et al*. "Respiration during sleep in normal man". *Thorax* 37 (1982): 840-844.

19. Narkiewicz K., *et al*. "Selective potentiation of pheripheral chemoreflex sensitivity in obstructive sleep apnea". *Circulation* 99 (1999): 1183-1199.

20. Heistad DD., *et al*. "Interaction of baroreceptor and chemoreceptor reflexes. Modulation of the chemoreceptor reflex by changes in baroreceptor in baroreceptor activity". *Journal of Clinical Investigation* 53 (1974): 1226-1236.

21. Somers VK., *et al*. "Interaction of baroreceptor and chemoreceptor reflex control of sympathetic nerve activity in normal humans". *Journal of Clinical Investigation* 87 (1991): 1953-1977.

22. Bradley TD., *et al*. "Hemodynamic effects of stimulated obstructive apneas in humans with and without heart failure". *Chest* 119 (2001): 1827-3551

23. Shamsuzzaman AS., *et al*. "Elevated C-reactive protein in patients with obstructive sleep apnea". *Circulation* 105 (2002): 2462-2464.

24. Sean M., *et al*. "Obstructive sleep apnea". *Annals of Internal Medicine* 142 (2005): 187-197.

25. Narkiewicz K., *et al*. "Altered cardiovascular variability in obstructive sleep apnea". *Circulation* 98 (1998): 1071-1077.

26. "Sleep-related breathing disorders in adults: recommendations for syndrome definition and measurement techniques in clinical research. The Report of an American Academy of Sleep Medicine Task Force". *Sleep* 22 (5): 667-89.

27. Mulgrew AT., *et al*. "Diagnosis and initial management of obstructive sleep apnea without polysomnography: a randomized validation study". *Annals of Internal Medicine* 146 (2007): 157-166.

28. White DP. "The pathogenesis of obstructive sleep apnea: advances in the past 100 years". *American Journal of Respiratory Cell and Molecular Biology* 34 (2006): 1-6.

29. Sher AE., *et al*. "The efficacy of surgical modifications of the upper airway in adults with obstructive sleep apnea syndrome". *Sleep* 19 (1996): 156-177.

30. Nuha Ejaz Ahmad., *et al*. "Obstructive sleep apnea in association with periodontitis: a case-control study". *The Journal of Dental Hygiene* 87 (2013).

31. Saito T., *et al*. "Relationship between upper body obesity and periodontitis". *Journal of Dental Research* 80 (2001): 1631-1666.

32. Nuha E Ahmad. "Obstructive sleep apnea in association with periodontitis: A case control study". *Journal of Dental Hygiene* 87.4 (2012): 188-199.

33. Ahmad NE., *et al*. "Obstructive sleep apnea in association with periodontitis: a case control study".

34. Nuha E Ahmad. "Obstructive sleep apnea in association with periodontitis: A case control study". Chapel Hill (2012).

35. Seo WH., *et al*. "The association between periodontitis and obstructive sleep apnea: a preliminary study". *Journal of Periodontal Research* 48.4 (2103): 500-506.

36. Newman., *et al*. "Caranza's clinical periodontology".11th edition

37. Epstein LJ., *et al*. "Clinical guideline for the evaluation, management and long-term care of obstructive sleep apnea in adults". *Journal of Clinical Sleep Medicine* 5 (2009): 263-276.

38. Bellard RD. "Management of patients with obstructive sleep apnea". *The Journal of Family Practice* 57 (2008): 24-30.

39. Basner RC. "Continuous airway pressure for obstructive sleep apnea". *The New England Journal of Medicine* 356 (2007): 1751-1758.

40. Epstein LJ., *et al*. "Clinical guideline for the evaluation, management and long-term care of obstructive sleep apnea in adults". *Journal of Clinical Sleep Medicine* 2009 Jun 15 5(3):263-76 127.

41. Basner RC. "Continuous airway pressure for obstructive sleep apnea". *The New England Journal of Medicine* 356 (2007): 1751-1758.

42. Chan AS., *et al*. "Dental appliance treatment for obstructive sleep apnea". *Chest* 132 (2007): 693-699.

43. Caples SM., *et al*. "Surgical modifications of the upper airway for obstructive sleep apnea in adults: a systemic review and meta-analysis". *Sleep* 33 (2010): 1396-1407.

44. Giles., *et al*. "Continuous positive airways pressure for obstructive sleep apnoea in adults". *The Cochrane Database of Systematic Reviews* (2006): CD001106.

45. "Submucosal Ablation of the Tongue Base for OSAS". *American Academy of Otolaryngology-Head and Neck Surgery* (2013).

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