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SHORT COMMUNICATION

OBSTRUCTIVE SLEEP APNEA- A MISSED LINK IN DIABETES AND PREDIABETES

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ABSTRACT

Obstructive sleep apnea (OSA) is a breathing disorder during sleep that has implications beyond disrupted sleep. It is being increasingly associated with diabetes and prediabetes. Yet this disorder remains undiagnosed in a substantial portion of population, especially in developing countries like India. It is imperative for all physicians to remain vigilant in identifying patients with signs and symptoms consistent with OSA.

Key words:

Obstructive sleep apnea, Type
2 diabetes, Pre diabetes

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INTRODUCTION

OSA is characterized by repetitive upper airway closures or partial collapses that occur during sleep. These respiratory disturbances have two main consequences: (a) intermittent hypoxia which is characterized by cyclic hypoxic episodes alternating with periods of normoxia and (b) transient arousals which restore airflow but lead to sleep fragmentation and poor sleep quality.¹ Clinical characteristics of OSA may variably include daytime symptoms such as excessive sleepiness, fatigue, impaired concentration and attention, dry mouth, morning headaches, depressed mood and personality changes; and night time symptoms such as snoring, observed apneas, restless sleep, insomnia and nocturia. Notably, women with OSA are more likely to present with “non-classical symptoms” including insomnia, fatigue or mood disturbances, rather than snoring or daytime sleepiness, thus there may be a gender bias in the diagnosis and treatment of OSA.² Polysomnography (PSG) remains the criterion standard for diagnosis of OSA. Apnea- Hypopnea index (AHI) is an index used to diagnose the OSA in patients. It is the average number of disordered breathing events per hour. Typically, OSA syndrome is defined as an AHI of 5 or greater with associated symptoms (eg, excessive daytime sleepiness, fatigue, or impaired cognition) or an AHI of 15 or greater, regardless of associated symptoms.³

Connecting link between OSA, Diabetes and Prediabetes

Despite the demonstrated efficacy of lifestyle interventions and the availability of multiple pharmacological treatment options, the economic and public health burden of diabetes remains enormous, especially in developed countries like India. Prediabetes is defined by elevated glucose levels not sufficient to meet the diagnostic criteria for diabetes. Specifically, prediabetes refers to either impaired fasting glucose (IFG) and/or impaired glucose tolerance (IGT) in response to oral glucose.⁴ IFG was defined by fasting plasma glucose levels of 100 to 125 mg/dL and IGT was defined by 2-hour post-load glucose levels of 140 to 199 mg/dL. Both IFG and IGT represent an insulin resistant state and are major risk factors for progression to overt diabetes.⁵ Both Type 2 diabetes and prediabetes is associated with increased risk for OSA. Numerous studies have shown robust associations between OSA and insulin resistance, glucose intolerance and type 2 diabetes, independently of obesity.

The prevalence of prediabetes, as defined by the presence of either IFG and/or IGT have been found to be significantly higher in OSA patients than those without OSA and the estimates have ranged between 20 and 37%.^{6,7} When the prevalence of OSA in patients with type 2 diabetes was assessed by methods other than the gold standard full PSG (e.g,

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limited PSG or overnight oximetry), estimates have been highly variable, ranging from 2 to 70%.^{8,9} The most commonly used markers of severity of OSA were AHI and the degree of intermittent hypoxia. Chronic intermittent hypoxia and sleep fragmentation seen during OSA leads to generation of reactive oxygen species and neurohumoral changes. These keys triggers initiate a low grade inflammation leading to metabolic syndromes like insulin resistance etc.

Treatment

OSA treatment is recommended in patients with an AHI greater than 15 or in those with an AHI greater than 5 who have daytime sleepiness or cardiovascular disease.¹ Continuous positive airway pressure (CPAP) is the treatment of choice for OSA. CPAP provides a “pneumatic splint” and keeps the upper airway open during sleep. Treatment with Continuous Positive Airway Pressure (CPAP) has been shown to positively influence numerous pathophysiological factors that contribute to insulin sensitivity and glycemic control. OSA causes intermittent hypoxia and sleep fragmentation, which are capable of activating the sympathetic nervous system and the hypothalamic-pituitary axis.¹⁰ By decreasing this activation via OSA treatment, one might expect short-term improvements in glycemic control and in slowly responding measurements such as insulin sensitivity and hemoglobin A1c (HbA1c).¹¹ Various Intraoral devices - Mandibular advancement devices(MAD), Tongue retaining appliances and Palatal lift appliances have also been developed as an alternative treatment for OSA.

References

1. Pamidi S, Aronsohn RS, Tasali E. Obstructive sleepapnea: role in the risk and severity of diabetes. *Best Pract Res Clin Endocrinol Metab* 2010; 24:703–715.
2. Punjabi NM. The epidemiology of adult obstructive sleep apnea. *Proc Am Thorac Soc.* 2008; 5:136-143.

3. American Academy of Sleep Medicine; European Respiratory Society; Australasian Sleep Association; American Thoracic Society. 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.* 1999 ; 22: 667-89
4. Standards of medical care in diabetes--2009. *Diabetes Care* 2009; 32 1:S13–61.
5. Nathan DM, Davidson MB, DeFronzo RA, et al. Impaired fasting glucose and impaired glucose tolerance: implications for care. *Diabetes Care* 2007; 30:753–759.
6. Seicean S, Kirchner HL, Gottlieb DJ, et al. Sleep-disordered breathing and impaired glucose metabolism in normal-weight and overweight/ obese individuals: the Sleep Heart Health Study. *Diabetes Care* 2008; 31: 1001–1006.
7. Tamura A, Kawano Y, Watanabe T, Kadota J. Relationship between the severity of obstructive sleep apnea and impaired glucose metabolism in patients with obstructive sleep apnea. *Respir Med* 2008 ; 102: 1412–1416.
8. Brooks B, Cistulli PA, Borkman M, et al. Obstructive sleep apnea in obese noninsulin-dependent diabetic patients: Effects of continuous positive airway pressure treatment on insulin responsiveness. *J Clin Endocrinol Metab* 1994; 79: 1681–1685.
9. Katsumata K, Okada T, Miyao M, Katsumata Y. High incidence of sleep apnea syndrome in a male diabetic population. *Diabetes Res Clin Pract* 1991; 13:45–51.
10. Punjabi NM, Polotsky VY. Disorders of glucose metabolism in sleep apnea. *J Appl Physiol* 2005; 99: 1998–2007.
11. Dawson A, Abel SL, Loving RT et al (2008) CPAP therapy of obstructive sleep apnea in type 2 diabetics improves glycemic control during sleep. *J Clin Sleep Med* 4: 538–42.

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