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Prevalence of Obstructive Sleep Apnea in Type 2 Diabetes

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Abstract:
Introduction: Diabetes are common disorder that often coexist as they have similar risk factors including obesity. As 10% increase in weight accelerates the risk of OSA by 10%it is not surprising to see both disorder in the patient. **Methods:** All the patients who attended to our sleep clinic in OM Hospital and Research Centre were asked about diabeteic history.Those who are already diagnosed as diabetics and on medications or diet control were enrolled into the study. STOP BANG questionnaire was used to categorize the patients for probable obstructive sleep apnea. **Results:** Among 67 patients who underwent diagnostic polysomnography 22 patients had normal AHI, 19 had intermittent snoring and rest had normal diagnostic polysomnography. Among 45 patients 5 had predominantly central sleep apnea and 40 had obstructive sleep apnea. **Conclusion:** In our study that OSA is very common in patients with Type 2 diabetes and worse glycaemic control is a high index of suspicion and sleep history especially for OSA should be included in all the patients of type 2 diabetes. Any patients with uncontrolled diabetes despite medications independent of obesity should be screened for OSA.

Key Words: Diabetes, obstructive sleep apnea, polysomnography

INTRODUCTION:

Obstructive sleep apnea (OSA) is a common sleep disorder characterized by episodic cessation of breathing during sleep with intermittent hypoxaemia and sleep fragmentation. The recurrent obstruction of the upper airway obstruction result in recurrent oxygenation desaturation/resaturation, cyclic changes in the intrathoracic pressure and recurrent micr-oarousals that cause sleep fragmentation and reduction in slow wave and rapid eye movement. The prevalence of OSA is approximately 3-7% for adult males and 2-5% for adult females in the general population.[1-3] Diabetes is another disease with a global prevalence of 382 million (8.3%)and expected to rise to 592 million (10.1%)by 2035.4OSA and Diabetes are common disorder that often coexist as they have similar risk factors including obesity. As 10% increase in weight accelerates the risk of OSA by 10%it is not surprising to see both disorder in the patient. Weight gain results in an increased risk of incident OSA and worsening preexisting OSA in those with and without OSA respectively.[5,6] As OSA often go undiagnosed though physician understand the algorithms for the diagnosis of sleep apnea ,the majority are unable to identify the patients for whom diagnostics are needed.[7] As OSA is independently associated with glucose intolerance and insulin resistance, it is very important to include history of snoring, witnessed apnea and sleep pattern in all patients with diabetes.[8,9] OSA is associated with poorer glycaemic control despite adjustment for a wide range of confounders including age, sex, race, body mass index number of diabetes medications, level of exercise, diabetes duration and total sleep time in some studies.[10-12].All studies show high prevalence of OSA in patients with diabetes. In a study done by Einhorn et al the prevalence of OSA in patients with was reported to be 48%.6 In a study by Shim et al 50.8% of the patiuents were at high risk of OSA according to Berlin Questionnaire.[13] Study from Jordan revealed 48.5% of the patients with diabetes were at high risk of OSA.[14] All

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studies show high prevalence of OSA in diabetic patients.It has also been demonstrated that the association between OSA and diabetes is bidirectional as neuropathy associated with diabetes can affect the central control respiration and upper airway neural reflexes resulting in OSA.[15] In a couple of studies nighttime hypoxia has found to be responsible for glucose intolerance and insulin resistance.[16]

As there seems to be high prevalence of OSA in patients with type 2 diabetes and the fact that OSA could worsen the complications of diabetes and complicate the disease management we carried out this study to recognize the prevalence of OSA in patients with type 2 diabetes.

METHODOLOGY:

All the patients who attended to our sleep clinic in OM Hospital and Research Centre were asked about diabeteic history.Those who are already diagnosed as diabetics and on medications or diet control were enrolled into the study. STOP BANG questionnaire was used to categorize the patients for probable obstructive sleep apnea. STOP BANG questionnaire include eight components which were snoring, daytime tiredness, observed apnea, high blood pressure, body mass index (>35 kg/m2), age (>50 yrs), neck circumference (male>42cm, female>40cm) ,gender(Male).According to the scoring system of the STOPBANG score, if it was 3vs.0-2,the risk of obstructive sleep apnea 2.5 fold. If the score was 4 vs. 0-2, the risk of obstructive sleep apnea is 4 fold, 5 vs. 0-2, the risk was 5 fold. If the score was 6vs 0-2, the risk of obstructive sleep apnea was 6 fold and if 7 vs. 0-2, the risk of obstructive sleep apnea was 7 fold.[18] All the patients with score more than 3 underwent diagnostic polysomgraphy with or without titration.[18] They undergo level A diagnostic polysomnography in the presence of sleep technician. For scoring events, an "event" can be either an apnea, characterized by complete cessation of airflow for at least 10 seconds, or a Hyp-opnea in which airflow decreases by 50 percent for 10 seconds or decreases by 30 percent if there is an associated 4% decrease in the oxygen saturation or an arousal from sleep. To grade the severity of sleep apnea, the number of events per hour is reported as the apnea-hypopnea index (AHI). An AHI of less than 5 is considered normal. An AHI of 5-15 is mild; 15-30 is moderate and more than 30 events per hour characterize severe sleep apnea.[20]

RESULTS:

Among 197 patients referred for polysomnography 67 were already diagnosed as diabetics and were on medication or diet control.

Table 1. Baseline characteristics of diabetic patients undergoing polysomnography

Age (years)	**Number (n)**
Less than 40	17
40- 60	30
More than 60	20
Gender	Number
Male	40
Female	27
BODY MASS INDEX (kg/m2)	NUMBER
Less than 23.9	18
23.9-30	32
More than 30	17

Age (years)	Number (n)
COMPONENTS OF STOP BANG QUESTIOONAIRE	
Snoring	65
Witnessed Apnea	50
Morning Headache	43
Daytime tiredness or somnolence	57
Hypertension	43

TABLE 2: SCORING OF PATIENTS USING STOP BANG QUESTIONNAIRE

Less than 3	1
More than 3 or equal to 5	40
More than 5	26

Among 67 patients who underwent diagnostic polysomnography 22 patients had normal AHI. Among them 19 had intermittent snoring and rest had normal diagnostic polysomnography. Among 45 patients 5 had predominantly central sleep apnea and 40 had obstructive sleep apnea.

TABLE 3: Patients having Obstructive sleep apnea and AHI Score:

Number of Patients	AHI Score
AHI < 5	22
AHI 5-15	12
AHI 15-30	
AHI >30	16
17	

Among 45 patients who had significant obstructive sleep apnea only 7 had HBA1C level less than 7.

DISCUSSION:

In our study more number of male patients attended our sleep clinic than females, this supports the notion that frequency of OSA is more in men (2-4%) than females (1-2%).This might also be due to cultural reason in our part of the world where male patients seek medical attention more than females. Most number of presenting patients were in the middle age group which is consistent with the finding that it is more prevalent in the middle age group.[21] Among the STOP BANG questionnaire snoring was the most common symptoms followed by witnessed apnea and daytime somnolence which are more common in OSA. 66 patients STOP BANG questionnaire was more than 3 which needs diagnostic polysomnography. Among the patients who went under diagnostic polysomnography 17 had severe obstructive sleep apnea and 16 had moderate sleep apnea which are both indications for CPAP treatment. It has also been seen that significant patients with moderate to obstructive sleep apnea had poor glucose control as it has been that insufficient sleep was associated with short and long term hyperglycaemia. Thus alteration in sleep pattern were proposed as a risk factor for developing type 2 DM.

CONCLUSION:

As it has been seen in our study that OSA is very

common in patients with Type 2 diabetes and worse glycaemic control a high index of suspicion and sleep history especially for OSA should be included in all the patients of type 2 diabetes. Any patients with uncontrolled diabetes despite medications independent of obesity should be screened for OSA.

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