Prevalence of sleep apnoea in patients with open angle glaucoma

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Abstract

Aim: To determine the prevalence of sleep apnoea in patients with glaucoma.

Methods: 34 Patients with open angle glaucoma underwent overnight polysomnogram. Sleep apnoea was graded into mild, moderately severe and severe according to AHI (Apnea Hypopnea Index)
< 15 mild
15– 30 moderate
> 30 severe

Results: Out of 34 patients with glaucoma 10(29.41%) were found to have severe sleep apnoea (AHI > 30). 13(38.23%) had moderately severe sleep apnoea (AHI 15 to 30) and 11(32.35%) had mild sleep apnoea (AHI less than 15)

Discussion: This is a preliminary study of patients with open angle glaucoma to show that 67.6%(total of moderately severe and severe groups) had significant sleep apnoea.

Sleep apnoea is being more and more recognised as a risk factor in open angle glaucoma. Treatment of sleep apnoea also treats glaucoma and arrests progression especially normal tension glaucoma and hence all glaucoma patients should be screened for sleep apnoea.

Introduction

Sleep apnoea is a potentially serious sleep disorder in which breathing repeatedly stops and starts during sleep.

While a number of risk factors associated with the development of glaucomatous optic neuropathy have been identified, the aetiology of this condition remains unclear. Sleep apnoea has been implicated as a possible risk factor for the development of open angle glaucoma1 and normal tension glaucoma2. It has been suggested that repeated intermittent periods of hypopnea may influence the development of ganglion cell loss3.

While a consecutive case series of normal tension glaucoma patients1 and a separate series of patients with open angle glaucoma2 have suggested a higher prevalence of sleep disorders than expected in the general population, few case control studies have been performed4,5.

Methods: 34 patients with primary open angle glaucoma, 28 POAG and 6 NTG cases underwent overnight polysomnogram in a sleep lab. Angle closure glaucomas and secondary glaucomas were excluded from the study. This test records the patient’s blood-oxygen level, breathing rate, brain waves, and heart rate, in addition to the patient’s leg movements and eye movements as they sleep. As the patient slept, the following were monitored:
• Brain waves
• Heart rate
• Blood oxygen level
• Limb movement
• Eye movements
• Breathing pattern
• Body position
• Snoring and other noises the patient makes while sleeping

The diagnostic criteria for glaucoma included applanation tonometry, disc evaluations, gonioscopy and Humphrey 24-2 visual fields. General conditions like hypertension, cardiac disease, diabetes, cerebrovascular disease, dyslipidaemia were noted but not taken into account for the study purpose. The apnea-hypopnea index (AHI) is an index of severity that combines apnoeas and hypopneas. Combining them both gave an overall severity of sleep apnoea including sleep disruptions and desaturations (a low level of oxygen in the blood). The apnea-hypopnea index, is calculated by dividing the number of apnoeas and hypopneas by the number of hours of sleep. (AHI values were categorized as 5-15 Mild, 15-30 Moderate, and above 30 listed as Severe sleep apnoea as set by the American academy of sleep medicine)

Results

Out of a total 34 number of POAG patients studied, 28 were POAG and 6 were NTG. An equal no of males and females (17 each) ratio was seen. The mean age of the patients was 64.14. The mean IOP was 22.23 mm of Hg. 10 of these were found to have severe sleep apnoea with AHI of more than 30 (29.41%), 13 had moderately severe sleep apnoea (38.23%) and the remaining 11 had only a mild grade of sleep apnoea (32.35%) of the 34 who were categorised into the mild sleep apnoea group had a significant central component.

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Discussion

This study has demonstrated that a 67.6% of patients with glaucoma have significant sleep apnoea syndrome.

Almost all of us stop breathing during sleep but some tend to do so more often. Sleep apnoea is a potentially serious sleep disorder in which breathing repeatedly stops and starts during sleep. The most common kind of sleep apnoea is called Obstructive Sleep Apnoea Syndrome. It is characterized by repetitive episodes of upper airway obstruction that occur during sleep, usually associated with a reduction in blood oxygen saturation. In other words, the airway becomes obstructed at several possible sites. The upper airway can be obstructed by excess tissue in the airway, large tonsils, a large tongue and usually includes the airway muscles relaxing and collapsing when asleep. Another site of obstruction can be the nasal passages. Sometimes the structure of the jaw and airway can be a factor in sleep apnoea. There are only a few studies showing a positive association between sleep apnoea and POAG\(^4,5,6\) and NTG\(^3\) and no studies from India have been reported.

OSA has been identified as an independent risk factor for the development of high blood pressure\(^7\). Each apnoea event per hour of sleep adds about 1% to the risk of having hypertension\(^7\).

People with OSA face several health challenges – at worst they are at risk of dying of oxygen deprivation when breathing stops or slows during sleep. OSA can contribute to high blood pressure, diabetes, obesity and other systemic problems.

In the eye, prevalence of glaucoma in patients with obstructive sleep apnoea is an estimated 27%\(^9\). On the other hand our study has shown that 67.6% of glaucoma patients have significant sleep apnoea.

Because of the vascular consequences of OSA many ophthalmic manifestations exist. Non arteritic optic neuropathy has an increased incidence in people with OSA\(^8\). People with OSA may also have a higher incidence of papilledema\(^10\).

Conclusions

This, to the best knowledge of the authors, is the first study to show the prevalence of sleep apnoea in patients with open angle glaucoma in the Indian population and shows a staggering no of glaucoma patients have significant obstructive sleep apnoea.

About one in 10 middle aged people suffer from sleep apnoea and this is an underdiagnosed risk factor for POAG and hence all patients with POAG have to be screened for sleep apnoea. Treatment of sleep apnoea also treats glaucoma and arrests progression especially in NTG\(^10\).

Acknowledgement

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References

10. Kawasaki MD; Robert D, Arch ophthalmol 2000; 118;1626-1630

Table 1

<table>
<thead>
<tr>
<th>No.</th>
<th>POAG</th>
<th>NTG</th>
<th>Mean Age</th>
<th>Mean IOP</th>
<th>Mild OSA</th>
<th>Moderately severe OSA</th>
<th>Severe OSA</th>
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<tr>
<td>34</td>
<td>28</td>
<td>6</td>
<td>64.14</td>
<td>22.23mmhg</td>
<td>11(32.35%)</td>
<td>13(38.23%)</td>
<td>10 (29.41%)</td>
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