Night-time Bradyarrhythmia in a Patient with Mild Obstructive Sleep Apnea Syndrome is Reversed With CPAP Treatment

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Abstract: Nocturnal cardiac arrhythmia is a common clinical feature of obstructive sleep apnea syndrome. Pathologically relevant rhythm disturbances such as atrioventricular block or ventricular tachycardia are known to occur mainly in patients with a high apnea-hypopnea index and marked oxygen desaturation. We report on a patient with mild obstructive sleep apnea syndrome who nevertheless showed intermittent second-degree atrioventricular block during stages of rapid eye movement sleep-associated hypopneas. Cardiac arrhythmia was reversed with the initiation of nasal continuous positive airway pressure treatment. Based on this case report and taking into account known facts from the literature, the finding of intermittent second-degree atrioventricular block in our patient with mild obstructive sleep apnea syndrome supports careful evaluation of electrocardiogram recording acquired during polysomnography in all patients with suspected obstructive sleep apnea syndrome.

Keywords: Arrhythmia, sleep apnea, CPAP


CASE REPORT

A 63-year-old male retired postal worker was admitted to our sleep laboratory because of a long-standing history of nocturnal snoring and mild daytime sleepiness. History taking was remarkable for POEMS syndrome (polyneuropathy, organomegaly, endocrinopathy, monoclonal gammopathy, and skin changes) diagnosed 5 years before, arterial hypertension, and hypercholesterolemia. Neurologic examination revealed muscle wasting, weakness, and hypoesthesia in the distal legs. The ankle tendon reflexes were absent, and the knee tendon reflexes were diminished on both sides. The remainder of the patient’s neurologic status was normal. Electrocardiogram recording was normal.

Nocturnal cardiac arrhythmia, especially apnea-associated bradycardia with or without alternating tachycardia, has been frequently reported in patients with obstructive sleep apnea syndrome (OSAS).1-6 The occurrence of pathologically relevant rhythm disturbances—such as second- or third-degree atrioventricular block (AV block), ventricular tachycardia, or complex ventricular ectopy—is supposed to be a feature of severe OSAS. Thus, a significant correlation between OSAS severity and the severity of rhythm disturbances was documented by Harbison et al.7 Furthermore, Guilleminault reported that bradycardic arrhythmias exclusively occurred during apneas with oxygen saturation below 72%.1 Finally, Becker et al found bradycardic arrhythmias only in patients with an apnea-hypopnea index (AHI) of 60 or more per hour.8

Here we wish to report on a patient with mild OSAS who nevertheless presented with pathologically relevant nocturnal bradyarrhythmia and therefore does not fit in known patterns.

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Disclosure Statement

Drs. Dziewas, Imai, Dittrich, Humpert, Hopmann, Boentert, and Young have indicated no financial conflicts of interest.

Submitted for publication November 23, 2005
Accepted for publication April 3, 2006

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Journal of Clinical Sleep Medicine, Vol. 2, No. 4, 2006
Figure 1—Electrocardiogram recordings during the first night of polysomnography showing second-degree atrioventricular block (A = high time resolution, B = low time resolution).

Figure 2a—Hypnogram, oxygen saturation, respiratory events (obstructive hypopneas), and heart rate during the first night without treatment. Recurring episodes of intermittent second-degree atrioventricular block are marked with *.
per hour is remarkable.

However, one has to take into account that our patient suffered from POEMS syndrome, which is known to be associated with different cardiac complications and may even lead to congestive heart failure. Hence, the observed nocturnal arrhythmia may be partly due to an underlying cardiomyopathy, which was aggravated by obstructive apneas.

Pathophysiologically, apnea-associated hypoxemia is supposed to cause vagal stimulation, leading to bradycardia, which can be prevented by vagal blockade with atropine. Furthermore, a substantial increase in the number of bradycardic arrhythmias during REM sleep has been reported. Although apneas are generally longer and desaturation is therefore more pronounced during this sleep stage, in the study of Becker and coworkers, REM sleep proved to be an independent factor contributing to heart block, after adjusting for desaturation and apnea duration. Interestingly, both mechanisms may be also relevant in our patient because second-degree AV-block nearly exclusively occurred during clusters of obstructive hypopneas that were found in REM sleep.

In line with our observation, few studies have shown that nCPAP effectively treats night-time arrhythmia. Thus, Becker and coworkers reported that the number of arrhythmias was reduced from 1575 to 165 episodes per night in 17 patients. Confirming these findings, 2 other studies have demonstrated reversal of heart block in 13 of 15 patients and in 7 of 8 patients, respectively, after initiation of therapy with nasal CPAP.

Taken together, the finding of intermittent second-degree AV-block in our patient with mild OSAS only supports careful evaluation of electrocardiogram recording acquired during polysomnography in all patients with suspected OSAS. Treatment with nasal CPAP effectively prevents arrhythmias in 80% to 90% of patients.

ACKNOWLEDGMENT

The authors are grateful to Angelika Okegwo for expert technical assistance with the sleep study. This work was supported by “Innovative Medizinische Forschung” (IMF DZ 120140).

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