



## Obstructive Sleep Apnea Awareness

# Case Vignette: OSA and Cardiac Rhythm Disorder

### Presenting Complaints

A 46-year-old man presented to his primary care physician with a one-year history of chest discomfort and dizziness lasting 10–20 sec. Lately, he has been feeling that his heartbeats are irregular. Symptoms occurred mainly during the daytime with an average frequency of 4 to 5 times a week. He also occasionally awoke during sleep because of these symptoms.

### Past History

Patient is a smoker (1–2 pack a day) and social alcohol drinker.

### Physical Exam

- BP- 130/90mmHg
- Weight- 200 lb. (BMI- 35.8 kg/m<sup>2</sup>)
- Routine laboratory workup – Normal
- Medications: Lercanidipine 10 mg a day for 1 year

### Testing

Patient was admitted and a cardiac consultation was initiated. A twenty-four hour Holter monitoring demonstrated symptomatic sinus pauses (2.0–7.1 s). Electrocardiography, coronary angiography, cardiac echocardiography, and a treadmill test showed no abnormality.

Under a diagnosis of sick sinus syndrome, he received a cardiac pacemaker implant with atrial single chamber pacing. Despite atrial pacing, his symptoms persisted. After 2 days, follow-up Holter monitoring showed occasional 2:1 and 3:1 atrioventricular (AV) block during wakefulness and sleep. These rhythm disturbances were depicted as frequent drops in heart rate.

Because in his history, he had complained of snoring every night and excessive daytime sleepiness, his physician administered the Epworth Sleepiness Scale (ESS).

*The ESS subjectively assesses excessive daytime sleepiness by asking patients to rate their chance of dozing off from 0 (would never doze) to 3 (high chance of dozing) for 8 commonly encountered scenarios, with a total maximal score of 24.*



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Would never doze	Slight chance of dozing	Moderate chance of dozing	High chance of dozing	
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Sitting and reading
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Watching TV
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Sitting inactive in a public place (e.g. cinema or in a meeting)
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Being in a car for an hour as a passenger (without a break)
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Lying down to rest in the afternoon (when possible)
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Sitting and chatting to someone
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Sitting quietly after lunch (not having had alcohol)
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	In a car when you stop in traffic for a few minutes

Calculate Score

Your Score

12

**Figure 1. Results of ESS Questionnaire**

### Test results:

The ESS score generated was 12/24 (Figure 1). ESS scores of 11-24 represent increasing levels of 'excessive daytime sleepiness' (EDS). A score in the range of 11-12 is interpreted as Mild Excessive Daytime Sleepiness. [[About the ESS](#)]

The attending cardiologist had noticed a high percentage of his patients' manifesting signs and symptoms of sleep apnea in his private practice. So, he ordered a PSG. The patient underwent nocturnal polysomnography that revealed severe OSA (*apnea-hypopnea index, AHI, 55.5; minimum SpO<sub>2</sub>, 67%*). Electrocardiography on PSG showed frequent atrial pacing and 2:1 AV block during NREM and REM sleep (*NREM, 3 times; REM, 19 times*).



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### Discussion of Treatment Plan

Continuous positive airway pressure (CPAP) titration was conducted during the following night. A CPAP at 15 cm H<sub>2</sub>O resolved obstructive sleep disordered breathings, atrial pacing, and AV block.

### Outcome of Case

After application of CPAP therapy, his chest discomfort subsided with improvement of daytime sleepiness. One week after ongoing CPAP, no further atrial pacing or AV block was present on Holter monitoring.

6 months after CPAP therapy, the patient was free from symptoms with no atrial pacing and AV block on Holter monitoring. His AHI was 6.3; average nocturnal usage, 6 hours; and an F/u Epworth Sleepiness Scale score revealed a score of 7.

### Teaching Points

This case report demonstrates a middle aged patient with obesity and arterial hypertension accusing irregular heartbeats. Despite a normal resting ECG and echocardiography the patient presented with bradyarrhythmias revealed on the 24h Holter ECG. Considering the association between cardiac disorders and sleep apnea, the cardiologist is presented with an interesting opportunity to take a leadership role in identifying sleep apnea in this patient.

Over the last decade, the association between OSA and cardiac rhythm disorders has garnered the attention of researchers from different clinical subspecialties. Sleep apnea related consequences such as hypoxia, sympathovagal imbalance, impaired baroreflex, atrial dilatation, myocardial ischemia, and hemodynamic fluctuation may have persistent impact on cardiac conduction. Obstructive apnea is associated with myocardial ischemia (silent or symptomatic), acute coronary events, stroke and transient ischemic attacks, cardiac arrhythmia, pulmonary hypertension, and heart failure. Cardiac arrhythmias are presumed to be a common problem in patients with OSA, although the true prevalence and clinical relevance of cardiac arrhythmias remain unknown. Nocturnal and daytime sympathetic activity is elevated after sleep apnea.

The presence and complexity of bradyarrhythmias and tachyarrhythmias may influence morbidity, mortality, and quality of life for patients with OSA. Repetitive pharyngeal collapse during sleep, leading to markedly reduced or absent airflow, followed by oxyhemoglobin



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desaturation, persistent inspiratory efforts against an occluded airway and termination by arousal from sleep are plausible mechanisms.

**This report illustrates the development of daytime and nocturnal sinus pauses and AV blocks in this patient as a consequence of (undiagnosed , hence) untreated OSA.** OSA should be considered one of potential mechanisms for nocturnal and even daytime cardiac arrhythmia, especially in patients with high risk factors for OSA, such as obesity, habitual snoring, or observed apneas.

*Adapted from: Ji KH, Kim DH, Yun CH. [Severe obstructive sleep apnea syndrome with symptomatic daytime bradyarrhythmia](#). J Clin Sleep Med. 2009 Jun 15;5(3):246-7. PMID: 19960646; PMCID: PMC2699170.*

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### Additional Reading

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