



Obstructive Sleep Apnea Awareness

Case Vignette: OSA and Heart Disease

Presenting Complaints

A 42 year old female of Asian descent was admitted to the ward with complaints of dyspnea and squeezing chest pain without radiation during mild to moderate physical activity, pitting edema of the lower extremities, nocturia and treatment resistant arterial hypertension (AH).

Past History

For the last 6 months, the patient experienced shortness of breath and lower extremities pitting edema which had worsened with time. During this period, the patient reported fatigue, which was related to the aforementioned symptoms from the patient's own words.

She was diagnosed with AH about 6 years ago during a regular outpatient visit. The patient had prior medical history of three unsuccessful pregnancies complicated by gestational AH and preeclampsia with C-section during the last pregnancy. Family history is remarkable for obesity and AH in both of her parents.

The patient denied smoking, alcohol intake or use of any psychostimulating (including caffeine containing products) remedies. The patient has been obese for the last 15 years, but since the last 3 years, she has gained approximately 20 lbs.

Upon questioning, the patient reported loud snoring during sleep, but denied sleepiness during the wake time.

Physical Exam

Upon admission:

- BP- 200/120 mmHg
- Weight- 227lb (BMI- 42.3 kg/m²)
- Abdominal circumference- 134 cm
- Neck circumference- 43 cm
- CV Exam: HR- 85 bpm; no murmurs, rubs or gallops upon auscultation were heard. Bilateral pitting edema was present over the shins.
- Pulmonary exam: Bilateral inspiratory rales were present at the bases with no change on coughing. The respiratory rate was 19/min. Digital pulse oximetry revealed oxygen saturation of 95%.



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Testing

- Complete blood count, Creatinine, electrolytes, glomerular filtration rate, liver function tests (ALT, AST), troponin level, fasting lipid panel, fasting glucose (on 2 separate occasions) and thyroid function tests were all within normal limits.
- Chest X-Ray: Pulmonary venous congestion and cardiothoracic index of 49%.
- ECG: inverted T waves in leads V3-V6.
- Echocardiography: left ventricular end diastolic dimension: 6.45 cm, left ventricular end systolic dimension: 5.01 cm, interventricular septum: 1.36 cm, posterior wall of the left ventricle: 1.27 cm and ejection fraction of 43%. Mild diffuse left ventricular hypokinesis was present. Other parameters were within normal limits.

Discussion of Treatment Plan

The patient's hypotensive regimen at the hospital was as follows:

- Bisoprolol 10 mg a day
- Candesartan 32 mg a day
- Indapamide SR 1.5 mg a day
- Amlodipine 10 mg a day
- Moxonidine 400 mcg a day

The patient was considered to have resistant AH. Since this patient was obese and had high diastolic BP, some possible alternative etiologies were considered such as obesity related AH, hypothyroidism and OSA. Besides the pharmacological intervention, the patient was counseled on proper low fat/calorie diet and other measures to improve her lifestyle.

The hospital stay was 20 days. Since OSA was in the differential list, she was offered a PSG study, which she rejected at that time.

She returned to her PCP after a month for a F/U checkup. The possibility of OSA was again discussed and her PCP asked her to complete the STOP BANG questionnaire.



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Do you snore loudly? Louder than talking or loud enough to be heard through closed doors	No 0	Yes +1
Do you often feel tired, fatigued, or sleepy during the daytime?	No 0	Yes +1
Has anyone observed you stop breathing during sleep?	No 0	Yes +1
Do you have (or are you being treated for) high blood pressure?	No 0	Yes +1
Objective measures:		
BMI	≤35 kg/m ²	0
	>35 kg/m ²	+1
Age	≤50 years	0
	>50 years	+1
Neck circumference	≤40 cm 0	>40 cm +1
Gender	Female 0	Male +1

Figure 1. Results of STOP Bang questionnaire

The patient had responded with a “yes” to 3 out of the 4 STOP questions and with her BMI > 35kg/m², she has a total score of 4, consistent with a high risk for OSA. A PSG study was offered, which she agreed to at that time.

The PCP ordered an overnight PSG. Results revealed the apnea-hypopnea index (AHI) of 46 events per hour, which is consistent with a severe form of the disease. On the next night, during CPAP titration study a pressure of 11 H₂O cm resolved her airway obstructions. The patient was instructed on correct and regular use of the CPAP machine. Follow up was scheduled in 2 months.

Outcome of Case

After 2 months, the patient’s daily CPAP usage time was on average 6 hours per night and 7 days a week. The BP on this visit was 140/92 mm Hg on prior pharmacological regimen and CPAP therapy. One month later, the patient’s BP became 134/82 mm Hg.



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Teaching Points

OSA and AH are common and often underdiagnosed medical disorders, both associated with excessive cardiovascular risk. Preeclampsia is also associated with OSA. The cardiovascular risk is likely much greater with AH and OSA. It is noteworthy to mention that OSA with excessive sleepiness has the strongest association with resistant AH.

This case highlights a possible clinical phenotype of OSA without EDS and its association with resistant AH. Most importantly a good hypotensive response to medical treatment in tandem with CPAP therapy was achieved in this patient. Thus, it is reasonable to include OSA in the differential list of resistant AH, even if EDS is not clinically obvious.

Adapted from: Mirrakhimov: Non drowsy obstructive sleep apnea as a potential cause of resistant hypertension: a case report. BMC Pulmonary Medicine 2012 12:16. [doi:10.1186/1471-2466-12-16](https://doi.org/10.1186/1471-2466-12-16)

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Additional Reading

- Vongpatanasin W. **Resistant hypertension: a review of diagnosis and management.** JAMA. 2014 Jun 4;311(21):2216-24. doi: 10.1001/jama.2014.5180. Erratum in: JAMA. 2014 Sep 17;312(11):1157. Dosage error in article text. PMID: 24893089.
- Kolanis S, Pilavakis M, Sofogianni A, Tziomalos K. **Is There a Role for Continuous Positive Airway Pressure Treatment in the Management of Obstructive Sleep Apnea-related Hypertension?** Curr Hypertens Rev. 2017;13(2):89-92. doi: 10.2174/1573402113666170612094750. PMID: 28606037.
- Guralnick AS. **Obstructive sleep apnea: incidence and impact on hypertension?** Curr Cardiol Rep. 2013;15(11):415. doi:10.1007/s11886-013-0415-x
- Torun D. **Approach to cases with resistant hypertension.** Anadolu Kardiyol Derg. 2014 Mar;14(2):192-5. doi: 10.5152/akd.2014.5287. Epub 2014 Feb 11. PMID: 24566515.
- Tsioufis C, Kasiakogias A, Thomopoulos C, Manolis A, Stefanadis C. **Managing hypertension in obstructive sleep apnea: the interplay of continuous positive airway pressure, medication and chronotherapy.** J Hypertens. 2010;28(5):875-882. doi:10.1097/HJH.0b013e328336ed85