Count on Sleep | Obstructive Sleep Apnea Awareness

Case Vignette: OSA and Meniere's Disease

Presenting Complaints

A 53-year-old Chinese female was first seen at her primary care physician's (PCP) office with an 18-month history of recurrent episodes of vertigo associated with nausea and vomiting. Each of these vertiginous episodes typically lasted for 7-8 hours and appeared to be aggravated by stress. She also experienced fluctuating tinnitus, hearing loss, and aural fullness in the right ear. She had difficulty sleeping, which she attributed to her symptoms.

She complained of headaches; mild to moderate in severity, and usually located at the back or the top of the head. Often occurring after sleep, they were described as dull in nature and not pulsatile.

The patient was anxious about her symptoms which were affecting her quality of life and work.

Past History

The patient had a history of rhinitis. She did not have photophobia, phonophobia, nor visual auras.

Physical Exam

On inspection, the patient was thin built and petite.

- Body weight: 125 lb.
- BMI: 23.1 kg/m^2
- Blood pressure: 123/73 mmHg
- Temperature: 98.2°F

Neuro-otological assessment was unremarkable.

Testing

Audiogram showed sensorineural hearing loss in the right ear, with documentation of fluctuating low-to-midfrequency hearing levels at different time points.

MRI scan of the brain was normal.

This resource was supported by the Centers for Disease Control and Prevention of the U.S. Department of Health and Human Services (HHS) as part of a financial assistance award totaling $704,163 with 100 percent funded by CDC/HHS. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement, by CDC/HHS, or the U.S. Government.

Discussion of Treatment Plan

A clinical diagnosis of Meniere's disease (MD) was made. Lifestyle changes such as a low-sodium and low-caffeine diet were advised. A course of Apotriazide was prescribed for each episode, with Betahistine being used as maintenance.

A follow up appointment was scheduled for 4 weeks.

At her F/U visit, she complained that she continued to have recurrent vertiginous attacks and fluctuating right aural symptoms. She still experienced difficulty sleeping and was referred to a psychiatrist who prescribed Clonazepam and Valdoxan.

After almost 1 year of standard medical therapy, her MD was still not adequately controlled with recurring bouts of vertigo. Having observed her sleeping patterns, her spouse, who was keen to exclude any comorbidity that could have contributed to the disease, mentioned that she snored regularly with apneic episodes during sleep. He recalled hearing a podcast on sleep apnea and wondered if his wife had sleep apnea.

Based on this conversation, the PCP administered a STOP Bang test.

[The STOP-Bang questionnaire is a quick and easy screening tool with eight dichotomous (yes/no) items to assist in triaging patients with suspected OSA. It consists of 4 self-reportable (STOP: snoring, tiredness, observed apnea, and high blood pressure) and 4 demographic (Bang: body mass index [BMI; calculated as weight in kilograms divided by height in meters squared], age, neck circumference, and gender) items.

This resource was supported by the Centers for Disease Control and Prevention of the U.S. Department of Health and Human Services (HHS) as part of a financial assistance award totaling $704,163 with 100 percent funded by CDC/HHS. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement, by CDC/HHS, or the U.S. Government.

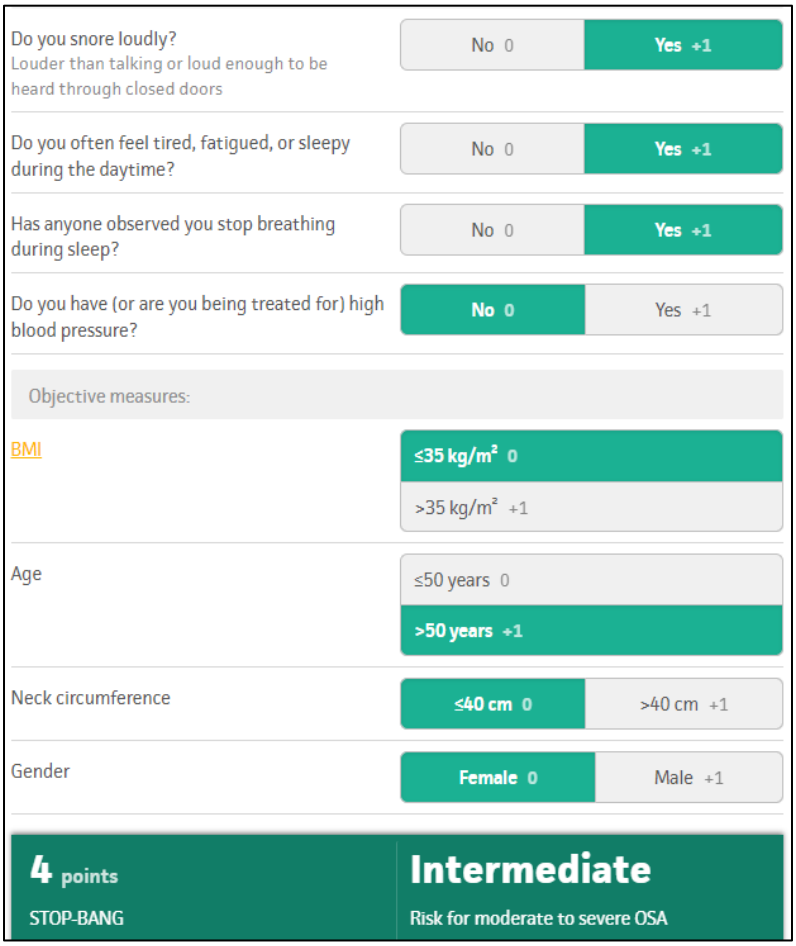

Figure 1. Results of STOP Bang questionnaire

The patient's STOP Bang score of 4 (Figure 1) suggested an intermediate risk for moderate to severe OSA. [about the STOP-Bang]

The patient underwent PSG and the results of the study suggested that the sleep apnea was obstructive with an apnea-hypopnea index (AHI) of 35.6 events per hour. A referral to the sleep physician was documented.
The sleep physician noted that while she did not have any craniofacial features to suggest OSA, a deviated nasal septum was observed along with hypertrophic inferior turbinates. The tonsils were, however, not enlarged. She was started on continuous positive airway pressure (CPAP).

This resource was supported by the Centers for Disease Control and Prevention of the U.S. Department of Health and Human Services (HHS) as part of a financial assistance award totaling $704,163 with 100 percent funded by CDC/HHS. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement, by CDC/HHS, or the U.S. Government.

Outcome of Case

Over a follow-up period of two and a half years, the patient reported that she had complete resolution of vertigo as well as headaches She had continued with betahistine (but not Apotriazide) as maintenance for about 15 months after starting CPAP and used only CPAP thereafter.

Teaching Points

Meniere's disease is a condition characterized by fluctuating and progressive hearing loss, aural fullness, tinnitus, and intermittent attacks of vertigo. Although the etiology of MD is largely unknown, the pathology is the result of hydropic distension of the endolymphatic system.

The transduction mechanism of the inner ear and the transmission of nerve impulses along the auditory way are highly dependent upon the cochlear oxygen supply. Several studies have considered the possibility that obstructive sleep apnea-hypopneas during sleep can interfere with these processes. OSA may cause not only vestibular but also auditory dysfunction. Insufficient supply of blood via the vertebral basilar artery, which supplies the inner ear, may cause hydropic distension of the endolymphatic system and lead to MD. However, few people noticed that in OSA, this insufficient supply might be exacerbated in the night while patients are sleeping.

It is important for clinicians to consider sleep disorders as a cause of hearing and balance problems. Therefore, if the physical symptom does not completely resolve following conventional treatment, it is necessary to refer the patient for examination by a sleep specialist.

This case report highlights that untreated OSA can negatively affect auditory functioning. The patient in this case report, who is Chinese with a BMI of 23.1 kg/sq m, highlighted an important learning point. Concomitant OSA in MD patients is not necessarily obvious to the clinician and can be easily missed. Failure to identify OSA can result in the use of medications that can adversely affect the outcomes. MD patients are often prescribed sedatives such as benzodiazepines to relieve anxiety and insomnia. The use of such sedatives which have muscle relaxant properties may inadvertently further aggravate OSA resulting in a vicious cycle of symptoms.

This resource was supported by the Centers for Disease Control and Prevention of the U.S. Department of Health and Human Services (HHS) as part of a financial assistance award totaling $704,163 with 100 percent funded by CDC/HHS. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement, by CDC/HHS, or the U.S. Government.

Adapted from: Low WK, Lim EJ. Concomitant Obstructive Sleep Apnoea in Patients with Meniere's Disease: A Case Report and Literature Review. Case Rep Otolaryngol. 2021 Mar 23;2021:5592611. doi: 10.1155/2021/5592611. PMID: 33859856; PMCID: PMC8009700.

Copyright © 2021 Wong Kein Low and Esther Jiayi Lim.

This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Additional Reading

- Pisani LR, Naro A, Caminiti F, De Salvo S, Bramanti P, Marino S. Obstructive sleep apnea syndrome with Ménière's disease: a misdiagnosed case. Sleep Med. 2017 Apr;32:284. doi: 10.1016/j.sleep.2016.12.004. Epub 2016 Dec 18. PMID: 28057499.
- Gallina S, Dispenza F, Kulamarva G, Riggio F, Speciale R. Obstructive sleep apnoea syndrome (OSAS): effects on the vestibular system. Acta Otorhinolaryngol Ital. 2010 Dec;30(6):281-4. PMID: 21808447; PMCID: PMC3146317.
- Martines F, Ballacchino A, Sireci F, Mucia M, La Mattina E, Rizzo S, Salvago P. Audiologic profile of OSAS and simple snoring patients: the effect of chronic nocturnal intermittent hypoxia on auditory function. Eur Arch Otorhinolaryngol. 2016 Jun;273(6):1419-24.
- Sowerby LJ, Rotenberg B, Brine M, George CF, Parnes LS. Sleep apnea, daytime somnolence, and idiopathic dizziness--a novel association. Laryngoscope. 2010 Jun;120(6):1274-8. doi: 10.1002/lary.20899. PMID: 20513051.
- Mastino P, Rosati D, de Soccio G, Romeo M, Pentangelo D, Venarubea S, Fiore M, Meliante PG, Petrella C, Barbato C, Minni A. Oxidative Stress in Obstructive Sleep Apnea Syndrome: Putative Pathways to Hearing System Impairment. Antioxidants (Basel). 2023 Jul 15;12(7):1430. doi: 10.3390/antiox12071430. PMID: 37507968; PMCID: PMC10376727.
- Nakayama M, Kabaya K. Obstructive sleep apnea syndrome as a novel cause for Ménière's disease. Curr Opin Otolaryngol Head Neck Surg. 2013 Oct;21(5):503-8. doi: 10.1097/MOO.0b013e32836463bc. PMID: 23989598.
- Chi JC, Lee SD, Huang RJ, Lai CH, Liu SY, Tsai YJ, Fu PH, Ting H. CPAP Treatment Improves Pure Tone Audiometry Threshold in Sensorineural Hearing Loss Patients with Sleep-Disordered Breathing. Int J Environ Res Public Health. 2021 Jun 24;18(13):6768. doi: 10.3390/ijerph18136768. PMID: 34202447; PMCID: PMC8297118.

This resource was supported by the Centers for Disease Control and Prevention of the U.S. Department of Health and Human Services (HHS) as part of a financial assistance award totaling $704,163 with 100 percent funded by CDC/HHS. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement, by CDC/HHS, or the U.S. Government.