CENTRAL SLEEP APNEA
Controversies in Management

Timothy Morgenthaler, MD
Peter Gay, MD
Kara Dupuy-McCauley, MD
Mayo Clinic in Rochester
DISCLOSURE OF RELEVANT FINANCIAL RELATIONSHIP(S) WITH INELIGIBLE COMPANIES

• Drs Morgenthaler and Dupuy are PI and sub-PI on the réST trial assessing long-term outcomes of transvenous phrenic nerve stimulation therapy.

REFERENCES TO OFF-LABEL USAGE(S) OF PHARMACEUTICALS OR INSTRUMENTS

• Nothing to disclose

All relevant financial relationships have been mitigated.
LEARNING OBJECTIVES

• Review the treatment modalities for central sleep apnea
• Explore two cases highlighting controversies in the management of central sleep apnea
CASE 1
CENTRAL SLEEP APNEA IN HEART FAILURE

• King Kamehameha is a 67-year-old man with a past medical history significant for hypertension, coronary artery disease, and heart failure with EF of 48%

• He has been having awakenings at night feeling short of breath, and feels excessively sleepy during the day, which is new since last year.

• His wife is with him and says that he doesn’t snore but sometimes she leans over and pokes him to make sure he is still alive because it doesn’t look like he is breathing at night.
CASE 1
CENTRAL SLEEP APNEA IN HEART FAILURE

• His overnight oximetry shows the following:
CASE 1
CENTRAL SLEEP APNEA IN HEART FAILURE

• A polysomnogram is recommended and he reluctantly agrees, although he says that he doesn’t want that C-crap.

• After the sleep medicine provider discusses all of the therapies for sleep apnea and the rationale for each one, the patient agrees to proceed with a split-night polysomnogram with PAP titration if absolutely necessary.
The polysomnogram reveals an AHI of 57/hr with most of the events being central-appearing apneas. The obstructive apnea index is 5/hr. All the hypopneas are central-appearing.

A titration is performed in the second half of the night.

Because of his hesitancy to commit to PAP therapy, oxygen alone is tried first. But after titrating up to 3L/min via nasal cannula, the oxygen nadir improves, but the disordered breathing events do not decrease in frequency.
CASE 1
CENTRAL SLEEP APNEA IN HEART FAILURE

• CPAP is tried and proven ineffective due to persistent centrally-mediated disordered breathing events accounting for over half of the total AHI, which remains elevated in the 50s.

• ASV is initiated and at an EPAP pressure of 5 cmH2O with pressure support of 3-15 cmH2O, disordered breathing events are effectively controlled with a residual AHI of just 3 per hour.
CASE 1
CENTRAL SLEEP APNEA IN HEART FAILURE

• King Kamehameha reluctantly agrees to a trial of ASV, but when he presents for follow up three months later, he says that using ASV is not going to be realistic for him long term because he hates everything about the therapy.

• He states he has used it every day, but he finds the mask uncomfortable even after trying “every mask in the store.” He has trouble tolerating the pressure even after two adjustments of the pressure support range, and he states that it has been making his sleep quality worse.

• The download shows an average of over 6 hours of nightly use, minimal mask leakage, and a residual AHI of 2/hr. He says, “I gave it a good try and it’s just not going to work for me. What else can I do? I need to sleep!”
QUESTION 1: WHICH OF THE FOLLOWING WAS DISCOURAGED IN THE AASM GUIDELINE FOR TREATING THIS PATIENT?

1. Adaptive servo-ventilation targeted to normalize the AHI

2. Nocturnal oxygen therapy

3. Bilevel positive airway pressure in a spontaneous timed mode targeted to normalize the AHI

4. CPAP therapy targeted to normalize the AHI

5. Acetazolamide or theophylline

6. Zolpidem or Triazolam

✓
ANSWER TO QUESTION 1: WHICH OF THE FOLLOWING WAS DISCOURAGED IN THE AASM GUIDELINE FOR TREATING THIS PATIENT?

**Answer**

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E. Acetazolamide or theophylline

F. Zolpidem or Triazolam

**Rationale**

• Zolpidem or triazolam may be considered for treatment of primary CSAS only if the patient does not have underlying risk factors for respiratory depression

• All of the others are listed as indicated in the 2011 Guideline

Aurora RN; Chowdhuri S; Ramar K; Bista SR; Casey KR; Lamm CI; Kristo DA; Mallea JM; Rowley JA; Zak RS; Tracy SL. The treatment of central sleep apnea syndromes in adults: practice parameters with an evidence-based literature review and meta-analyses. *SLEEP* 2012;35(1):17-40.
QUESTION 2: WHICH OF THE FOLLOWING POTENTIAL THERAPIES WAS ABSENT AT THE TIME THE LAST AASM PRACTICE GUIDELINE FOR TREATMENT OF CENTRAL SLEEP APNEA WAS DEVELOPED?

1. Auto-adjusting adaptive servo ventilator devices
2. Atrial overdrive pacing
3. Cardiac resynchronization therapy
4. Phrenic nerve stimulation
5. Optimizing medical therapy of congestive heart failure
ANSWER TO QUESTION 2: WHICH OF THE FOLLOWING POTENTIAL THERAPIES WAS ABSENT AT THE TIME THE LAST AASM PRACTICE GUIDELINE FOR TREATMENT OF CENTRAL SLEEP APNEA WAS DEVELOPED?

A. Auto-adjusting adaptive servoventilator devices

B. Atrial overdrive pacing

C. Cardiac resynchronization therapy

D. Phrenic nerve stimulation

E. Optimizing medical therapy of congestive heart failure

- Autoadjusting ASV was FDA approved in 2007
- Both atrial overdrive pacing and cardiac resynchronization therapy was considered in the AASM paper and were FDA approved. Both can lead to improvement in CSA as a result of improved cardiac function, with CRT having a slightly greater effect
- FDA approval for phrenic nerve stimulation therapy was granted in 2017, and was not considered in the guideline

Aurora RN; Chowdhuri S; Ramar K; Bista SR; Casey KR; Lamm CI; Kristo DA; Mallea JM; Rowley JA; Zak RS; Tracy SL. The treatment of central sleep apnea syndromes in adults: practice parameters with an evidence-based literature review and meta-analyses. SLEEP 2012;35(1):17-40.
DISCUSSION: HOW TO TREAT THIS PATIENT
DISCUSSION: HOW TO TREAT A SIMILAR PATIENT WITH AN EJECTION FRACTION OF 35%
CASE 2
MODERATE ASYMPTOMATIC CENTRAL SLEEP APNEA

- A 74-year-old kāne presents to clinic for “abnormal overnight oximetry.” He has paroxysmal atrial fibrillation, hypertension, and hyperlipidemia and recently had an ST-elevation myocardial infarction. As part of his routine workup in cardiology clinic prior to starting cardiac rehab, an overnight oximetry was ordered and showed this:
CASE 2
MODERATE ASYMPTOMATIC CENTRAL SLEEP APNEA

- His BMI is 23 kg/m², he does not snore, examination of the oropharynx reveals a Friedman 1 grading with preserved AP and lateral diameters
- His ejection fraction has recovered and is now 60%
- When asked what brings him to the sleep clinic he says, “You tell me! I sleep fine.”
- A PSG finds him to have an AHI of 20/hr with CAI of 15/hr, the rest are a mix between hypopneas and obstructive apneas
QUESTION 3: WE CAN CONFIDENTLY TELL THIS PATIENT THAT TREATMENT THAT IS EFFECTIVE IN REDUCING THE AHI WILL ACCOMPLISH:

1. Improve their ejection fraction
2. Reduce sleepiness
3. Reduce the frequency of desaturation events
4. Reduce hospitalizations
5. Reduce risk of developing persistent atrial fibrillation
QUESTION 3: WE CAN CONFIDENTLY TELL THIS PATIENT THAT TREATMENT THAT IS EFFECTIVE IN REDUCING THE AHI WILL ACCOMPLISH:

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- The effects of positive airway pressure therapies have been mixed with regard to ejection fraction, effects on sleepiness, hospitalization, and atrial fibrillation

- Phrenic nerve stimulation has been associated with reducing ejection fraction and improving QOL, though only about 40% of patients in the trials had HFrEF

- Nearly all therapies that reduce the AHI in CSA also reduce the ODI

Voit et al., Am J Cardiol 2020;127:73–83
DISCUSSION: HOW WOULD YOU TREAT THIS PATIENT?
QUESTIONS & DISCUSSION
QUESTIONS & DISCUSSION