

OBSTRUCTIVE SLEEP APNEA WITH CHEYNE-STOKES RESPIRATIONS IN AN AIR TRANSPORT PILOT

CASE REPORT, BY AJIRI IKEDE, MD, MPH

Obstructive sleep apnea (OSA) has an estimated prevalence of 2-25% in adults and has a strong association with obesity. With the ongoing rise in obesity rates, it stands to reason that an increasing number of aviators may be at risk of developing OSA. This article presents the case of an air transport pilot with moderate sleep apnea.

Case Presentation

A 52-year-old commercial airline pilot and flight instructor with approximately 15,000 flight hours presented to his aviation medical examiner to renew his medical certificate. The pilot's medical history was significant for mild seasonal allergies, acid reflux, mild myopia, and slightly elevated cholesterol, none of which was disqualifying. Thus far in his career, the applicant had always received clear medical certificates. He was also seen by a neurologist for a voice tremor and was successfully treated with Botox. However, the details of this medical issue and treatment were not on his Federal Aviation Administration (FAA) medical file.

During his most recent FAA exam, the airman reported that his weight has been slowly increasing over the last few decades. A review of his records showed that he had indeed gained 50 pounds since his initial certification 30 years ago. On physical exam, he was found to have a body mass index of 31 and neck circumference of 18 inches. Given his risk factors for sleep apnea, the aviation medical examiner (AME) initiated screening of detailed sleep history in search of any associated signs and symptoms of sleep apnea.

The airman denied any episodes of falling asleep or feeling overly drowsy while flying, but he did report feeling more fatigued than usual. His wife had informed him that he sometimes has pauses in his breathing while sleeping. With a history and physical exam highly suggestive of obstructive sleep apnea, the AME deferred the certificate to allow time for further investigations. The airman completed polysomnography (PSG) that showed an apnea/hypopnea index (AHI) of 20.5 with both central and obstructive events, consistent with a diagnosis of moderate complex sleep apnea with Cheyne Stokes breathing pattern. The lowest oxygen saturation recorded during PSG was 89%. A trial of continuous positive airway pressure (CPAP) and bilevel positive airway pressure (BiPAP) reduced the obstructive events but did not effectively treat the central apneic events. He was subsequently treated with auto servo ventilation with favorable results, reducing his AHI to less than 6, and perhaps most importantly, eliminating his symptoms of fatigue.

ETIOLOGY & MANAGEMENT OF OBSTRUCTIVE SLEEP APNEA

Obstructive sleep apnea is defined as a periodic reduction or cessation of airflow as a result of narrowing of the upper airway, resulting in disruptions of normal sleep patterns, as well as poor oxygenation during sleep. The prevalence of OSA in adults is estimated to range from 2% to 25%.^{1, 5} Furthermore, a strong link between obesity and OSA has been demonstrated.^{1, 2, 4, 6}

The diagnosis of OSA is based on a history, physical examination, and screening tests, of which polysomnography is the gold standard. Symptoms of OSA include daytime sleepiness, non-restorative sleep, morning headaches, sore throat, decreased memory function and concentration. Risk factors for OSA include obesity, hypertension, polycythemia, large neck circumference, snoring, and witnessed apneas while sleeping.⁴ Cheyne-Stokes respiration (CSR) is a form of central sleep apnea that can be associated with OSA and demonstrated during a sleep study. CSR is defined as a lack of central respiratory drive, characterized by cycles of waxing and waning respiratory efforts, followed by periods of no breathing efforts.³ All forms of sleep apnea result in decreased oxygenation and fragmented sleep and are associated with long-term complications, which include hypertension, heart disease, and stroke.

Once a diagnosis of OSA has been confirmed by a PSG showing an AHI of >5, appropriate treatment should be initiated. For mild OSA (i.e., AHI of 5-15), behavioral changes such as weight loss and avoidance of sedatives may be sufficient to resolve symptoms. Oral appliances that help to reposition the upper airway are also indicated in the treatment of mild-to-moderate OSA (i.e., AHI <30). In cases of severe or refractive OSA, positive airway pressure treatment is indicated.¹

Continuous positive airway pressure (CPAP) is the most common treatment of obstructive sleep apnea. This therapy maintains a patent upper airway by providing a constant pressure during both inspiration and expiration. Bilevel positive airway pressure (BiPAP) provides assistance during inspiration by creating a pressure in the airway that is above that of which would help maintain a patent airway. During the expiration phase, the BiPAP essentially functions in the same way as CPAP. Auto servo ventilation (ASV) is similar to BiPAP, with an important distinction. ASV has the ability to detect decreases in respiratory effort, as seen in central apneas. When this occurs, the ASV system not only maintains the patency of the airway like CPAP and BiPAP but is also capable of maintaining a respiratory rate until the spontaneous respiration resumes.

The treatment goal for all patients with sleep apnea is a reduction of AHIs and complete resolution of symptoms. The efficacy of treatment, as well as compliance, can be determined by reviewing the recorded information on the positive airway pressure devices.

Aeromedical Concerns

This airman has moderate sleep apnea that is being successfully treated with auto servo ventilation. Sleep apnea is disqualifying under Title 14 of the Code of Federal Regulations part 67 due to risk of acute incapacitation from excessive somnolence. However, this airman may qualify for an AME assisted special issuance. Once authorized for special issuance, an AME may re-issue a medical certificate, provided that a current report from the airman's treating physician clearly indicates compliance with treatment and no symptoms of sleep apnea. If there are any issues about response or compliance, a maintenance of wakefulness test will be required.

Outcome

The documentation regarding sleep apnea diagnosis and treatment was reviewed by an FAA respirologist. This airman was able to document compliance as well as successful response to treatment of his sleep apnea, thereby qualifying for a Special Issuance. However, his medical certification remained deferred to allow more time to gather more information about the medical care he received from the neurologist.

References

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