

International Classification of Sleep Disorders 2 and American Academy of Sleep Medicine Practice Parameters for Central Sleep Apnea

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KEYWORDS

- Central sleep apnea • Cheyne-Stokes breathing pattern • Congestive heart failure
- Periodic breathing • Sleep apnea of infancy • Adaptive servoventilator

KEY POINTS

- Though central sleep apnea syndromes are treated with positive airway pressure therapies, further long-term studies are required to address the effects on hospital admission rates, morbidity, and mortality.
- Additional studies comparing the relative cost-effectiveness, risks, and benefits of various treatment modalities are needed.
- More research on multimodality titration polysomnograms that use a different device when the previous one seems to be unsuccessful may eventually help reduce testing time and health care costs.

INTRODUCTION

Sleep disorders are classified into 8 main categories based on the International Classification of Sleep Disorders, Second Edition (ICSD-2).¹ The ICSD-2 helps provide a consistent framework for clinicians and researchers to categorize and define sleep and arousal disorders in a structured, scientific, rational, and practical manner. It is compatible with the International Classification of Diseases, Tenth Revision (ICD-10). Central sleep apnea syndromes (CSASs) are in the category of sleep-related breathing disorders (SRBDs) and are characterized by apneas with diminished or

absent respiratory effort that occur in a cyclic or intermittent pattern. These apneas may be idiopathic or secondary to environmental causes, drugs, or underlying medical conditions. The various types are listed and discussed later.

The American Academy of Sleep Medicine (AASM) practice parameters are evidence-based clinical guidelines developed by the Standards of Practice Committee (SPC) for the treatment of various common sleep disorders. These parameters are approved by the Board of Directors of the AASM before publication. The practice parameters are freely accessible on the AASM Web site

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and are widely used by physicians engaged in treating patients with sleep disorders, and are therefore capable of influencing not only medical decision making and patient outcomes but also health care costs.

A recent practice parameters article by Aurora and colleagues² discussed the treatment recommendations for CSAS in adults. The central sleep apnea (CSA) task force under the SPC conducted a PubMed search for articles from 1966 to 2010 on the medical treatment of CSAS, defined as greater than 50% central disordered breathing events including periodic breathing (if subjects presented with both CSAS and obstructive sleep apnea). Of those that met initial criteria, 77 articles were included.² Assessment of the quality of evidence was performed using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) process, which begins with clearly specifying the question to be answered, collecting and summarizing available data, using explicit criteria for rating the evidence, and then providing recommendations according to the strength of supporting evidence.³ Levels of recommendations used by the AASM based on GRADE are shown in **Table 1**. All practice parameter articles published after the CSA article have used the GRADE methodology. This article summarizes the various CSASs in adults based on the ICSD-2 and the treatment options and recommendations using the practice parameters as a guide (**Box 1**).

PRIMARY CSA

Definition

As per the ICSD-2, primary CSA is characterized by at least 1 of the following: excessive daytime sleepiness, frequent arousals and awakenings during sleep, insomnia complaints, awakening short of breath, and by polysomnography (PSG) showing 5 or more central apneas per hour of sleep. The disorder is not better explained by another current

sleep disorder, medical or neurologic disorder, medication use, or substance use disorder.¹

Features

Primary CSA is idiopathic, characterized by recurrent pauses in breathing with no ventilatory effort occurring in a repetitive manner during sleep. Studies suggest that the disorder is rare, with a male predominance, and is more commonly seen in middle-aged and older individuals.⁴

Increased ventilatory response to partial pressure of carbon dioxide in blood (P_{aCO_2}) leading to instability in ventilatory control seems to be the predominant predisposing factor. A low normal P_{aCO_2} of less than 40 mm Hg is typically seen during wakefulness in patients with this disorder. Even a small increase in ventilation in these chemosensitive individuals causes the P_{aCO_2} level to decrease to less than the apnea threshold, triggering cessation in breathing.^{5,6} Insomnia, nasal obstruction, and neurologic disorders with autonomic dysfunction are other reported predisposing factors.^{7,8}

Central apneas are seen more commonly at sleep onset and during non-rapid eye movement (NREM) sleep than rapid eye movement (REM) sleep. These respiratory events are usually associated with only mild oxyhemoglobin desaturation. In general, patients with primary CSA do not develop pulmonary hypertension, cor pulmonale, or other adverse cardiovascular unless there is accompanying nocturnal hypoventilation with hypercapnia.

Treatment

Summary of evidence

A few small nonrandomized trials directly examining therapeutic options for primary CSA showed significant improvement in the Apnea-Hypopnea Index (AHI) with a low dose (250 mg per day) and a high dose (1000 mg per day) of acetazolamide

Table 1
AASM levels of recommendations

Final Standards of Practice Recommendations	Overall Quality of Evidence			
	High	Moderate	Low	Very Low
Assessment of Benefit/Harm/Burden				
Benefits clearly outweigh harm/burden	Standard	Standard	Guideline	Option
Benefits closely balanced with harm/burden or uncertainty in the estimates of benefit/harm/burden	Guideline	Guideline	Option	Option
Harm/burden clearly outweighs benefits	Standard	Standard	Standard	Standard

From Aurora RN, Chowdhuri S, Ramar K, et al. The treatment of central sleep apnea syndromes in adults: practice parameters with an evidence-based literature review and meta-analyses. *Sleep* 2012;35:21; with permission.

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