

## Training/Practice Contemporary Issues in Cardiology Practice

# When to Suspect Sleep Apnea and What to Do About It

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### ABSTRACT

Obstructive sleep apnea (OSA), which is characterized by recurrent upper airway obstruction during sleep with resultant hypoxia-reoxygenation and sleep fragmentation, is prevalent among patients with cardiovascular disease. Refractory hypertension, nocturnal angina or arrhythmias, and stroke in particular should prompt consideration of OSA. The symptoms of OSA include snoring and excessive daytime sleepiness; risk factors include obesity and reduced upper airway dimensions. Up to 50% of patients with congestive heart failure (CHF) may manifest OSA, central sleep apnea-Cheyne-Stokes respiration (CSA-CSR), or both. Patients with CSA-CSR may present with fatigue, disrupted sleep, and paroxysmal nocturnal dyspnea. Objective sleep recording is required to document the nature and severity of sleep apnea. The gold standard is in-laboratory overnight polysomnography (PSG), including monitoring of electroencephalography and other signals to determine sleep-wake state, and recording of body position, airflow, respiratory effort, and pulse oximetry. Portable cardiorespiratory recorders are now approved for diagnosis in patients without

### RÉSUMÉ

L'apnée obstructive du sommeil (AOS), qui est caractérisée par l'obstruction récurrente des voies respiratoires supérieures durant le sommeil ayant comme conséquence l'hypoxie-réoxygénation et la fragmentation du sommeil, est répandue chez les patients souffrant de maladies cardiovasculaires. Il faut immédiatement envisager l'AOS dans les cas d'hypertension réfractaire, d'angine nocturne ou d'arythmies, et d'accident vasculaire cérébral en particulier. Les symptômes de l'AOS comprennent le ronflement et la somnolence diurne excessive; les facteurs de risque comprennent l'obésité et la diminution de la taille des voies respiratoires supérieures. Jusqu'à 50 % des patients souffrant d'insuffisance cardiaque congestive (ICC) peuvent manifester une AOS ou une apnée centrale du sommeil associée à la respiration de Cheyne-Stokes (ACS-RCS), ou les deux. Les patients souffrant d'une ACS-RCS peuvent présenter de la fatigue, des perturbations du sommeil et une dyspnée paroxystique nocturne. L'enregistrement objectif du sommeil est nécessaire pour documenter la nature et la gravité de l'apnée du sommeil. L'étalon or est la

The most common form of sleep-disordered breathing encountered in clinical practice is obstructive sleep apnea (OSA). OSA is characterized by repeated episodes of complete (apnea) or partial (hypopnea) upper airway obstruction during sleep (Fig. 1). Airway obstruction results in progressive hypoxemia and hypercapnia, increasing inspiratory efforts, and then typically transient arousal from sleep, re-opening of the airway and reoxygenation. Sleep fragmentation and hypoxia-reoxygenation are the key pathophysiologic factors leading to the clinical symptoms and complications of OSA. OSA is prevalent in the general population, affecting an estimated 6% of women and 14% of men.<sup>1</sup> However, studies indicate that OSA is even more prevalent among patients with cardiovascular disease.<sup>2</sup> For example, OSA has been reported to be

present in approximately two-thirds of patients with refractory hypertension, patients admitted with acute coronary events, and patients with cerebrovascular events. Sleep apnea also affects 40%-50% of patients with chronic congestive heart failure (CHF). In the population with CHF, both OSA and central sleep apnea-Cheyne-Stokes respiration (CSA-CSR) (Fig. 2) may be observed. CSA-CSR is characterized by a crescendo-decrescendo pattern of tidal volume with hypoventilation alternating with apnea, with attendant fluctuations in oxygenation and sleep fragmentation. Given the prevalence of sleep apnea among patients with cardiovascular disease, and the evidence pointing to adverse effects of OSA and CSA-CSR on cardiovascular function,<sup>2</sup> there should be a high index of clinical suspicion for these conditions when evaluating patients with cardiovascular disease.

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### Clinical Signs and Symptoms

The cardinal symptoms of OSA are heavy habitual snoring and excessive daytime sleepiness (EDS).<sup>3</sup> Ideally, when evaluating a patient for OSA, the bed partner should be questioned as well. Although many patients with OSA manifest

comorbidities. Full PSG is recommended for diagnosis in all other cases, although OSA and CSA-CSR can be identified from portable recorders in some patients with CHF and other conditions. The objectives of treatment are to improve symptoms, quality of life, and cardiovascular outcomes. The mainstay of treatment for moderate-to-severe OSA is positive airway pressure (PAP). Automated PAP devices may be used in uncomplicated OSA, whereas continuous fixed PAP is the treatment of choice for other patients with OSA, and may also treat a proportion of patients with CSA-CSR. A form of bi-level PAP known as adaptive servoventilation is effective in treating a majority of patients with CSA-CSR.

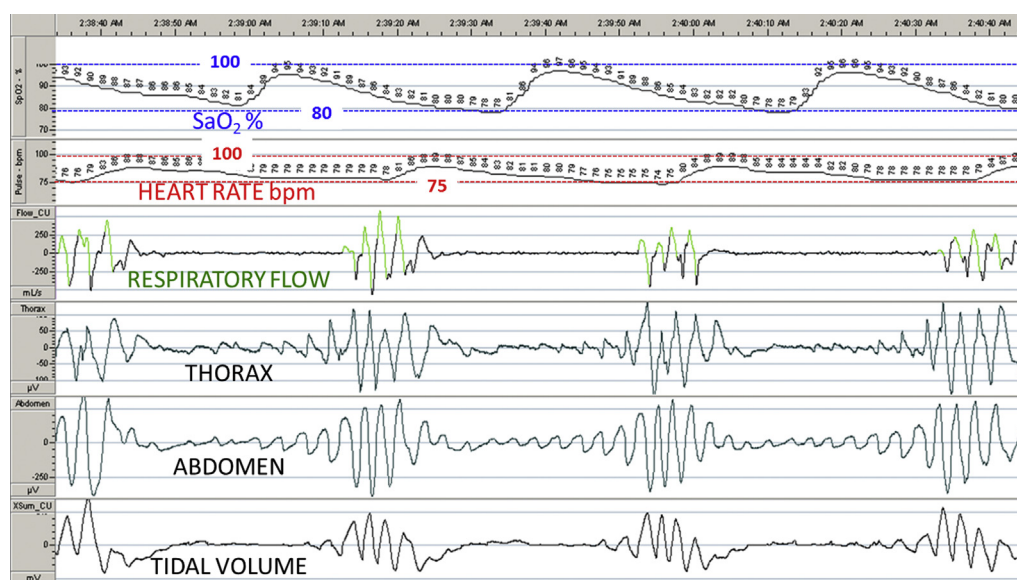
polysomnographie (PSG) nocturne en laboratoire qui comprend la surveillance de l'électro-encéphalographie et des autres signaux pour déterminer le rythme veille-sommeil, et l'enregistrement de la position du corps, le débit d'air, l'effort respiratoire et l'oxymétrie de pouls. Les enregistreurs cardiorespiratoires portables sont maintenant approuvés pour le diagnostic des patients n'ayant pas de comorbidités. La PSG complète est recommandée pour le diagnostic de tous les autres cas, bien que l'AOS et l'ACS-RCS puissent être déterminées par les enregistreurs portables chez certains patients souffrant d'ICC et autres conditions. Les objectifs du traitement sont l'amélioration des symptômes, de la qualité de vie et des résultats cardiovasculaires. Le traitement de l'AOS modérée à grave repose sur la pression positive continue (PPC). Les dispositifs automatiques de PPC peuvent être utilisés dans les cas non-complicés d'AOS, tandis que le PPC fixe est le traitement de choix pour les autres patients souffrant d'AOS et peut également traiter une partie des patients souffrant d'ACS-RCS. Un type de PPC à bi-niveaux connu sous le nom de servoventilation adaptée est efficace dans le traitement de la majorité des patients souffrant d'ACS-RCS.

loud, disruptive snoring, snoring is not specific for OSA. An important finding is a bed partner report of witnessed apneas. Although the frequency or duration of events reported may not be accurate, a description of episodes during which breathing stops, followed by loud gasping or snorting, is highly suggestive of OSA. Patients themselves are often unaware of apneic episodes, and it is somewhat uncommon for them to report nocturnal choking related to OSA. Other nocturnal symptoms include restless sleep, nocturia, enuresis (in severe cases), diaphoresis, and reduced libido and impotence.

Patients may complain of dry mouth on awakening, often waken feeling unrefreshed, and morning headache may be present. The hallmark daytime symptom of OSA is EDS, defined as a propensity to fall asleep in unwanted situations during normal waking hours despite adequate nocturnal sleep opportunity and

duration. EDS may develop insidiously and be under-recognized by the patient, with some patients describing symptoms of fatigue or lack of energy rather than sleepiness per se. Other symptoms of OSA include cognitive impairment such as difficulty with concentration or memory loss, mood disturbances such as irritability or depression, and reduced quality of life.

Clinical risk factors associated with OSA include obesity, reduced upper airway dimensions (Mallampati class 3 or 4), large neck circumference (> 17 cm in men, > 16 cm in women), type 2 diabetes, hypothyroidism, and postmenopausal status in women. Cardiovascular conditions that should particularly prompt consideration of OSA include refractory hypertension, nocturnal angina, nocturnal arrhythmias including atrial fibrillation and bradycardia, transient ischemic attack and stroke, and CHF.



**Figure 1.** Portable monitor recording demonstrating obstructive sleep apnea. Periods of absent respiratory airflow and tidal volume are associated with persistent efforts on the thorax and abdominal belts. Recurrent  $O_2$  desaturation and recovery, with heart rate accelerations, are evident.

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