

Approach to outpatient management of adult sleep apnea

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ABSTRACT

OBJECTIVE To describe an approach to sleep apnea for family physicians based on a review of current practice limitations for Canadian family physicians, validated risk prediction tools, and ambulatory sleep apnea technologies.

SOURCES OF INFORMATION Published epidemiologic studies focused on family practice management of sleep apnea, clinical practice guidelines, risk prediction tools for sleep apnea, randomized controlled treatment trials, and the author's community practice audit. Evidence was levels I, II, and III.

MAIN MESSAGE Sleep apnea is commonly encountered in family practice, but many family physicians are unfamiliar with sleep medicine. The pretest probability of sleep apnea can be accurately predicted using any one of several simple risk prediction tools. Screening for other common sleep disorders is important, especially when the pretest probability of sleep apnea is low to intermediate; one-third of sleep apnea patients have additional sleep disorders. The use of home-based rather than laboratory-based diagnostic testing and treatment titration is controversial, but the former setting is often used when referral access is limited.

CONCLUSION There are several tools that allow family physicians to make accurate sleep apnea risk assessments. There is growing evidence to guide home- versus laboratory-based diagnosis and treatment of sleep apnea.

RÉSUMÉ

OBJECTIF À partir des limitations actuelles que rencontre le médecin de famille canadien dans sa pratique, d'outils validés de prédiction des risques et des techniques de soins ambulatoires de l'apnée du sommeil, décrire comment le médecin de famille peut traiter cette affection.

SOURCES DE L'INFORMATION Les études épidémiologiques publiées portant surtout sur le traitement de l'apnée du sommeil en pratique familiale, les directives de pratique cliniques, les outils de prédiction du risque pour cette affection, des études randomisées contrôlées sur le traitement les expériences de la clinique communautaire de l'auteur. Les preuves étaient de niveau I, II et III.

PRINCIPAL MESSAGE Les cas d'apnée du sommeil sont fréquent en pratique familiale, mais plusieurs médecins sont peu familiers avec la médecine du sommeil. On peut prédire la probabilité d'apnée du sommeil au prétest en utilisant l'un des nombreux outils simples pour évaluer le risque. Il est important de rechercher les autres troubles fréquents du sommeil, surtout quand la probabilité d'apnée du sommeil au prétest est faible ou intermédiaire; un tiers des patients souffrant d'apnée du sommeil présentent d'autres troubles du sommeil. L'utilisation des tests diagnostiques à domicile plutôt qu'en laboratoire est controversée, mais c'est souvent ce qui se fait quand l'accès au spécialistes est limité.

CONCLUSION Le médecin de famille dispose de plusieurs outils pour faire une évaluation précise du risque d'apnée du sommeil. Il existe de plus en plus de données probantes pour favoriser le diagnostic et le traitement de l'apnée du sommeil à domicile plutôt qu'en laboratoire.

This article has been peer reviewed.

Cet article a fait l'objet d'une révision par des pairs.

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Case description

A woman and her 43-year-old husband come to your small-town family practice clinic with their mutual complaints of his disruptive snoring and excessive daytime sleepiness. There is no local sleep medicine specialist or sleep laboratory, but the couple asks you about a local respiratory therapy company advertising sleep apnea services.

Approach to ambulatory sleep medicine

Specialist guidelines favour specialist referral and laboratory-based testing for diagnosis and treatment of sleep apnea; however, such referral and testing might only be available for many Canadian patients at distant centres after long waits. Should the man in this case be offered ambulatory diagnosis and treatment for sleep apnea? This paper presents a sequentially developed approach to outpatient management of adult sleep apnea that encompasses family practice barriers to care, evidence-based enhancement of ambulatory diagnostic skills, and a balance of new ambulatory and standard laboratory technology. Given Canada's vast geography, usually minimal sleep medicine training for family physicians, and often poor access to sleep medicine specialists, Canadian family physicians can feel disadvantaged when confronted with their patients' sleep complaints.

Sources of information

PubMed was searched on June 13, 2007, using the term *sleep apnea* with either *family practice*, *general practice*, *primary care*, or *family physician*. Level II evidence was found for knowledge and practice barriers in Canadian family physicians' sleep apnea management. In this paper, evidence-based and family physician-focused tools for outpatient sleep apnea management by family physicians are developed using level I evidence, clinical practice guidelines (levels I to III), and Canadian community practice audit results (level III). Clinical caveats are interjected where prudent (level III).

Knowledge and practice barriers

Sleep apnea education, training, and community-based practice guidelines for Canadian family physicians are lacking. A recent international survey found long referral waits for Canadian sleep specialists and sleep laboratories (level II evidence).¹ As of September 9, 2008, there were only 84 certified sleep specialists in Canada, almost all residing in larger urban centres.²

The literature focusing on sleep apnea in family practice is scant. A PubMed search for the term *sleep apnea* with either *family practice*, *general practice*, *primary care*, or *family physician* yielded only 10 relevant references containing only level II evidence. Family physicians' knowledge and identification of sleep apnea was found in worldwide surveys to be lacking,³⁻⁸ including in a

Canadian sample (level II evidence).⁸ This knowledge deficit is worrisome given the 23.6% to 32% prevalence of patients at high risk for sleep apnea found among patients attending American, German, and Spanish family practices (level II evidence).^{9,10} The prevalence of sleep apnea in Canadian family practices has not been reported. Despite the high prevalence of sleep apnea in family practice, only 11% of one American health maintenance organization's primary care physicians referred 0.13% of their patients for sleep studies (level II evidence).¹¹ When tertiary sleep specialists instituted an educational program, supplied diagnostic equipment, and provided ongoing support to a group of community physicians in Walla Walla, Wash, sleep test referrals increased from 0.27% to 2.1% over 2 years, with a 99% diagnostic yield and a high therapy rate (level II evidence).¹² When family physicians, as opposed to other specialists, were able to refer patients directly for sleep studies, the only reported difference in outcomes determined from patient surveys was patients' slightly reduced recall of their sleep apnea diagnoses.¹³

Family physicians' knowledge and identification of sleep apnea must improve to increase testing of the many undiagnosed patients in their practices. The desired increase in sleep apnea testing can only occur with improved referral access, increased community-based testing, or both.

Identifying and treating sleep apnea

Practical evidence-based risk prediction tools for sleep apnea. Informal clinical assessment of sleep apnea can result in diagnostic frustrations. First, screen all patients for snoring and excessive sleepiness (level III). Although family physicians commonly recognize obesity and male sex as risk factors for sleep apnea, the predictive power of these factors alone was shown in the large longitudinal Sleep Heart Health Study to be suboptimal (level II evidence).¹⁴ The use of an evidence-based clinical prediction tool to accurately assess the pretest probability of sleep apnea can outperform clinical estimates by sleep specialists (level II evidence).¹⁵ One such tool is the adjusted neck circumference calculation (**Figure 1**¹⁶).

Screening for other common or serious sleep disorders. It is important to screen for other sleep

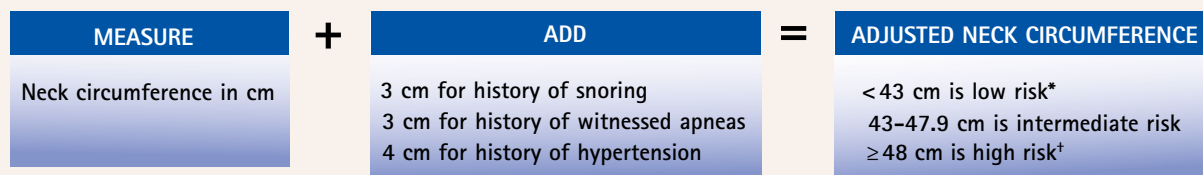
Levels of evidence

Level I: At least one properly conducted randomized controlled trial, systematic review, or meta-analysis

Level II: Other comparison trials, non-randomized, cohort, case-control, or epidemiologic studies, and preferably more than one study

Level III: Expert opinion or consensus statements

Figure 1. Adjusted neck circumference calculation for probability of sleep apnea: Evidence is level II.



*Pretest probability is 17%.
†Pretest probability is 81%.
Adapted from Flemons et al.¹⁶

disorders, as one-third of sleep apnea patients have additional sleep disorders.¹⁷ Three additional sleep disorders to screen for among sleepy patients or those with suspected sleep apnea are narcolepsy, insomnia, and insufficient sleep. Narcolepsy is as common as multiple sclerosis, is frequently underdiagnosed, and requires complicated management beyond the scope of this article. Suspected narcolepsy patients are probably best referred to sleep specialists. The mnemonic *CHES* helps recall the 5 principal features of narcolepsy (Figure 2). It is difficult to diagnose any sleep disorder when insomnia is present, and sleep laboratory referral is probably necessary to diagnose concomitant sleep apnea or other sleep disorders. The amounts of sleep required by individuals vary enormously, but a trial of sleep expansion (simply having the patient try to sleep for a longer period) is a simple diagnostic and therapeutic intervention for the common problem of insufficient sleep.

Home-based testing. When prompt specialist referral is not available, home-based sleep apnea testing is a tempting alternative. It is, however, also controversial. The most recent specialist sleep testing guidelines, published in 2007, based on collected reviews (level II evidence) favour the use of specialist-supervised laboratory testing over ambulatory testing, while recognizing a role for the latter.¹⁸ Additional evidence should also be considered in addition to older guidelines. In 2005, a Canadian study showed no difference between home- or laboratory-based sleep apnea testing on compliance or improvements in sleep apnea-specific quality of life, one of the only verified outcomes of sleep apnea therapy.¹⁹ Additional mild improvements in hypertension²⁰ and reduced automobile accidents²¹

have also been confirmed (level I evidence). Modified exclusion criteria for this study should serve as a list of contraindications to ambulatory sleep apnea testing (Table 1¹⁹). This study suggests that an ambulatory approach to sleep apnea management is potentially efficacious and safe for uncomplicated outpatients.

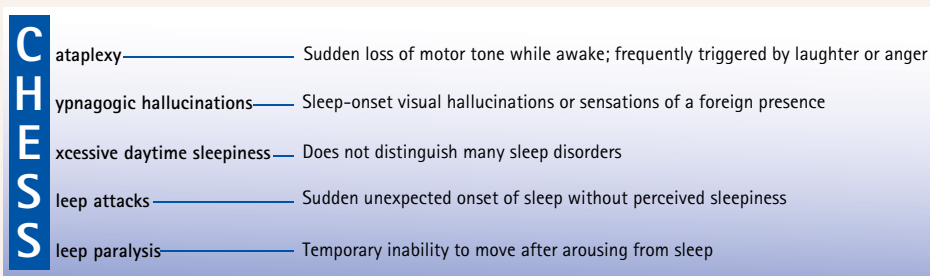
The preliminary results from 2 Canadian studies have also clarified the role of unattended home-based sleep apnea testing. A total of 130 Saskatoon, Sask, sleep clinic patients without other sleep disorders or cardiac or lung problems underwent both home monitoring and laboratory testing. Home- and laboratory-monitoring results were not significantly different, with home testing

Table 1. Suggested contraindications to unattended home diagnostic sleep studies: Evidence is level I.

CONTRAINDICATIONS
Congestive heart failure
Stroke
Cor pulmonale
Chronic obstructive pulmonary disease
Hypoventilation
Other serious medical disorders (eg, seizures, psychosis, valvular heart disease, asthma, kidney or liver failure)
Absence of daytime symptoms

Adapted from Whitelaw et al.¹⁹

Figure 2. The mnemonic CHES for the features of narcolepsy



having an 85% diagnostic accuracy and a 10% technical failure rate (level II evidence).²² An audit of Edmonton, Alta, area family physicians' referrals for home sleep apnea testing showed that 96% of referred patients had moderate to high pretest probabilities of sleep apnea. The audit also showed a 12% technical failure rate for home monitoring and discoordinate pretest risk and test results in 21% of patients (level II evidence).²³ These results emphasize the importance of appropriate risk-based referral, technical quality control, and a continuing need for sleep laboratory access for some patients.

Home-based treatment titration. Treatment options for sleep apnea include weight loss (level II evidence),²⁴ continuous positive airway pressure (CPAP) devices (level I evidence),²⁵ mandibular advancement devices fitted by dentists (level II evidence),²⁶ and surgical airway reconstruction (level III evidence).²⁷ Most patients in Canada are initially treated with CPAP, consistent with the recommendation of White and colleagues (level I evidence).²⁵ Weight loss and dental appliances might work well for those with mild sleep apnea (level II evidence). Dental appliances are suggested for patients who cannot tolerate CPAP (level II evidence).²⁶ Surgery is only offered by select ear, nose, and throat surgeons, with a growing number of operations from simpler office-based procedures to extensive facial reconstruction. The number of surgeons and operations make simple advice on surgical treatments difficult (level III evidence).²⁷

Continuous positive airway pressure can be titrated to effect with monitoring in a sleep laboratory. This is prudent for patients prone to hypoventilation, as suboptimal levels of CPAP can actually worsen their hypoxia. If a sleep laboratory is not available, many patients undergo unattended automated home titration.^{28,29} Protocols to enhance posttitration CPAP compliance have been developed in Canada (level II evidence),³⁰ and physicians should encourage vendors to offer such follow-up to their patients. The intricacies of home-based automated CPAP titration are beyond the scope of this article, but a prudent family physician should rely only on experienced CPAP vendors, preferably backed by sleep specialists. Further study is needed to better define the role of home-based sleep apnea diagnosis and therapy.

Case resolution

The presented history was inadequate for an evidence-based sleep apnea risk prediction. Eliciting a history of witnessed apneas or hypertension along with measurement of the patient's neck circumference would allow calculation of his adjusted neck circumference. Screening for other important sleep disorders, potential driving impairment, and sedative (including alcohol) use would be prudent. A low predicted risk for sleep apnea (adjusted neck

circumference <43 cm), complicating comorbidity, or suspicion of another sleep disorder might favour specialist referral. Otherwise, referring him to the local respiratory therapy company for home testing might be more expedient than waiting for specialist referral. If the home sleep study suggests sleep apnea, then the patient should be offered advice about driving and sedative avoidance, and treatment with caloric reduction, exercise, and either CPAP or a dental appliance should be pursued. In the absence of a sleep laboratory or patient contraindications (cardiorespiratory disease or features of nocturnal hypoventilation on home testing), automated CPAP titration could also be pursued, as long as the vendor is providing compliance-enhancing follow-up.

Conclusion

Although 30% of family practice patients have a high pretest probability of sleep apnea, their doctors often lack the knowledge and accessible resources to successfully recognize and treat their conditions. Uniform screening for snoring and sleepiness can be followed up using a simple risk assessment tool for sleep apnea. While further evidence is accumulating, straightforward sleep apnea management can be expedited by having home testing and automated CPAP titration if referral is difficult. A low pretest sleep apnea probability with sleepiness, confounding comorbidities (such as insomnia, other sleep disorders, or cardiorespiratory disease), or difficulties during community-based management favour specialist referral.

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EDITOR'S KEY POINTS

- The author presents an approach encompassing family practice barriers to care, evidence-based enhancement of ambulatory diagnostic skills, and a balancing of new ambulatory and standard laboratory technology.
- Adjusted neck circumference predicts the probability of sleep apnea: risk is low with adjusted measurements below 43 cm, intermediate between 43 and 47.9 cm, and high above 48 cm.
- In 2005 a Canadian study showed no difference between home- or laboratory-based sleep apnea testing on compliance or improvements in sleep apnea-specific quality of life.

POINTS DE REPÈRE DU RÉDACTEUR

- L'auteur suggère une approche qui englobe les obstacles qu'on rencontre en pratique familiale, une meilleure capacité de diagnostic chez le patient externe et un équilibre entre les nouvelles techniques ambulatoires et les techniques standard en laboratoire.
- La circonférence ajustée du cou prédit la probabilité d'apnée du sommeil; le risque est faible pour les valeurs ajustées inférieures à 43 cm, intermédiaire entre 43 et 47.9 cm et élevé au-dessus de 48 cm.
- En 2005, une étude canadienne n'a montré aucune différence entre l'évaluation faite à domicile ou en laboratoire de la fidélité au traitement ou de l'amélioration de la qualité de vie reliée à l'apnée du sommeil.

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