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Point/Counterpoint

Should All Congestive Heart Failure Patients Have a Routine Sleep Apnea Screening? Con

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See article by Sériès, pages 935-939 of this issue.

ABSTRACT

Sleep-disordered breathing (SDB) is one of the most common comorbidities in people with congestive heart failure (CHF). Although SDB has major cardiometabolic consequences, the attributable risk of SDB in asymptomatic CHF patients remains unclear. Whether early intervention using positive airway pressure would improve the prognosis in CHF patients is uncertain. As yet, there is insufficient evidence that routine polysomnography screening is cost-effective for asymptomatic CHF patients. Careful clinical risk evaluation and thoughtful use of limited-channel home sleep testing should be considered before the application of routine polysomnography in all CHF patients.

RÉSUMÉ

Les troubles respiratoires du sommeil (TRS) sont l'une des plus fréquentes comorbidités chez les personnes atteintes d'insuffisance cardiaque congestive (ICC). Bien que les TRS aient des conséquences cardiométaboliques majeures, le risque attribuable aux TRS chez les patients souffrant d'ICC qui sont asymptomatiques demeure obscur. L'on ignore si l'intervention précoce par pression positive expiratoire continue améliorerait le pronostic chez les patients souffrant d'ICC. Jusqu'à maintenant, il n'existe pas suffisamment de données probantes montrant que le dépistage systématique au moyen de la polysomnographie est rentable chez les patients atteints d'ICC qui sont asymptomatiques. L'évaluation clinique approfondie du risque et l'utilisation judicieuse du test de sommeil à canaux limités à domicile devraient être considérées avant l'utilisation de la polysomnographie systématique chez tous les patients atteints d'ICC.

The prevalence of sleep abnormalities is high in congestive heart failure (CHF) patients. Epidemiological studies have suggested 40%-70% of people with CHF will have evidence of obstructive sleep apnea (OSA) or central sleep apnea on polysomnography (PSG),[1-3] and the prevalence of clinically important OSA is approximately 6%-13% in the general adult population.[4,5] OSA is defined by ongoing respiratory efforts during the cessation/reduction in airflow leading to intermittent hypoxemia and recurrent arousals from sleep with associated catecholamine surges.[6-8] Central sleep apnea (CSA) refers to stoppages/reductions in airflow without respiratory effort.[9] CSA with Cheyne Stokes Breathing is a form of CSA with a waxing and waning pattern of breathing characterized by a crescendo-decrescendo pattern, also leading to intermittent hypoxemia and recurrent arousals from sleep associated with catecholamine surges. In many CHF patients, features of OSA and CSA are observed, leading some to refer to these collective abnormalities as sleep-disordered breathing (SDB) rather than making an arbitrary distinction between the 2 entities (OSA and CSA). In addition, patients might have insomnia, fatigue, periodic limb movements, and other sleep complaints which are potentially amenable to intervention.[10,11] Data suggest abnormalities are highly prevalent in patients with CHF with preserved left ventricular ejection fraction (EF) and in those with reduced EF,[12] although the bulk of the studies have been in those with systolic dysfunction. Patients with CHF rarely report excessive sleepiness, perhaps because of sympathoexcitation underlying the condition, even when sleep is very disturbed.[13] As a result, the history and physical examination might be unreliable in defining sleep

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abnormalities in CHF patients, which suggests the need for more objective testing.

In this debate, we will review the data regarding sleep abnormalities in CHF and present arguments favouring the need for more data before routine screening can be endorsed. We focus on stable CHF patients although we recognize that acutely decompensated CHF patients might also benefit from positive airway pressure therapy in the inpatient setting.[14] In the acute setting, we do not regard the issue to be related to the need for 'screening' but rather management of the acutely ill patient.[15]

What Is Routine Sleep Apnea Screening?

To clarify, the phrase "routine sleep apnea screening" should be defined. Screening in the context of this debate refers to routine polysomnography for all asymptomatic patients with CHF (ie, those without signs or symptoms of SDB). In contrast, case-finding could involve asking questions in the history during clinical evaluation of CHF patients. A standard polysomnogram records the electroencephalogram, electro-oculogram, chin and anterior tibialis electromyogram, heart rate, body position, airflow, respiratory effort, and blood oxygenation. For limited-channel testing or portable sleep monitors (PMs), airflow, respiratory effort, and blood oxygenation recording are required as basic components.[16,17] Routine PSG is expensive, and data suggest that use of limited-channel testing or PMs can provide satisfactory results for most patients.[18-20] Some patients find PSG to be cumbersome, although clearly much less so than invasive cardiac diagnostics, which are rarely refused.[21] Portable sleep monitoring or limited-channel sleep testing is widely used as an alternative to PSG in the diagnosis of OSA because of its convenience and low cost. As stated, the history can be unreliable in these patients and thus we would favour home sleep testing if a diagnostic test were to be used. Portable sleep monitoring is increasing in popularity for the diagnosis of SDB in patients with heart failure.[22,23] However, because PMs have a substantial false negative rate in the diagnosis of SDB compared with PSG,[24] more evidence is needed regarding its accuracy and reliability in SDB screening in patients with CHF.

Regarding sleepiness, the data suggest that the Epworth Sleepiness Score (ESS) is rarely increased in CHF patients, suggesting that daytime sleepiness is not present.[13,25] Of note, the ESS asks questions regarding the propensity of the individual to fall asleep at inopportune times, which might be insensitive in people who are relatively sedentary. For example, an individual with comorbidities who lies in bed or on the sofa watching television might intermittently fall asleep throughout the day. However, such an individual would deny a high risk of falling asleep in the settings queried in the ESS (eg, falling asleep while driving, as a passenger in a vehicle, or sitting in a theater/church). Thus, the metrics for sleepiness might be unreliable in CHF patients, again suggesting the need for more data. Our clinical experience suggests that although CHF patients are less likely to report excessive sleepiness,[13] especially as judged by the ESS, many afflicted patients do nonetheless have symptoms of disturbed sleep (eg, fatigue, waking up frequently, waking up unrefreshed, falling asleep intermittently during the day). Thus, a careful history can help with case-finding and potentially reduce the need for screening of truly asymptomatic individuals.

Why Do Abnormalities on Sleep Testing Matter?

If a patient with CHF were diagnosed with OSA or CSA, the data are equivocal regarding whether such a finding affects overall prognosis.[3,11,26-31] Many of the existing outcome studies are quite small and several studies have not shown attributable risk of OSA or CSA above and beyond the underlying heart disease. Indeed some data suggest that sympathoexcitation itself might be a function of underlying heart disease rather than from the associated sleep abnormality.[32] In addition, some data suggest that breathing abnormalities might be related to inadequate medical therapy rather than an independent issue requiring intervention. For example, Solin et al. have shown the elimination of CSA with aggressive medical management of hemodynamics.[33] Thus, one could argue that optimization of medical therapy should be encouraged regardless of what sleep testing shows. CSA has been associated with increased risk of hospital readmission after exacerbation of CHF, but again, the role of optimum medical therapy to prevent readmissions in these cases is unclear.[34] Large-scale epidemiological studies of sleep testing in patients who have been medically optimized based on current management approaches would be required to define the independent predictive value (and attributable risk) of OSA and CSA in CHF. Compelling data are currently lacking.

Does a Diagnosis of OSA or CSA Change Management in CHF Patients?

At present, the data are equivocal regarding interventions for OSA or CSA in CHF. The **Can**adian Continuous **P**ositive **A**irway **P**ressure for Patients with Central Sleep Apnea and Heart Failure (CANPAP) trial published in 2005[35] showed no improvement in transplant-free survival with continuous positive airway pressure (CPAP) therapy compared with usual medical care for patients with CSA in CHF. Of note, there was some short-term excess mortality in the CPAP group, but in aggregate the number of events was identical in the CPAP group compared with the medical management group. The mechanism underlying poor outcome in a subset of CPAP-treated patients is unclear, but might relate to volume status because CPAP therapy would be predicted to reduce preload in hypovolemic patients leading to potential compromise in forward flow. In the CANPAP study, some patients had elimination of apnea with CPAP and others had persistence of apneic events despite use of CPAP. Arzt et al.[36] showed that the responder group (ie, those in whom CSA resolved) had a good prognosis compared with those who had persistence of CSA. This finding leads to 1 of 2 interpretations[37]: elimination of CSA might be beneficial for the CHF patient, or resolution of CSA might be associated with a good prognosis (eg, perhaps related to adherence with medications leading to improvement in cardiac function, etc). These 2 possibilities could be tested with new technology, which can eliminate CSA reliably and would be predicted to improve prognosis if the former hypothesis were accurate.[38] Such definitive trials are ongoing but at present the treatment of choice for CSA remains optimized medical management of CHF.

For OSA, there are a few small studies that showed improvement in cardiac function with CPAP therapy in CHF. Kaneko et al.[39] and Mansfield et al.[40,41] showed improved left ventricular EF with CPAP therapy for OSA in CHF. However, both studies were small and relied on surrogate outcome measures. Indeed, in the study by Mansfield et al., some CHF patients in the CPAP group died, albeit unlikely related to CPAP therapy. In addition, in the study by Kaneko et al., left ventricular end-diastolic diameters were reduced with CPAP therapy and the reported left ventricular end-diastolic volumes were increased, leading to some uncertainty about the mechanism of potential benefit.

Medical management of OSA and CSA has also been examined using oxygen or acetazolamide, although currently there are no hard outcome data to support these approaches.[42-47] Similarly, cardiac resynchronization therapy (CRT) might improve OSA and CSA although the data remain unclear as to whether elimination of apnea per se is beneficial or whether CRT treats the underlying heart disease.[48-50] As such, we are not aware of authorities who advocate for CRT as a treatment for SDB. Whether medical treatment of CHF using β-blockers or diuretics has extra benefits for sleep apnea remains unclear.[51,52] Diuretic treatment has been found to decrease apnea-hypopnea index (AHI) in patients with OSA and diastolic heart failure in one study. Mitigation of pharyngeal edema might contribute to the improvement of sleep apnea.[52]

Ongoing randomized trials are examining the role of new technology to eliminate SDB in people with CHF. At present, there are small studies and observational data that support a potential benefit of adaptive servo-ventilation or auto-servo-ventilation in CHF.[38,53-55] However, the results of these large-scale randomized controlled trials will be required to draw any firm conclusions.[56] Issues on patient adherence to therapy and other logistic challenges in clinical practice will also need to be addressed.

Screening Tests in General

Before any screening tests can be recommended, a number of issues should be considered.[57-59] First, is the screening test and subsequent intervention cost effective? Clearly cost effectiveness cannot be meaningfully studied until effectiveness has been demonstrated. Nonetheless, the cost of sleep testing and positive airway pressure therapy would be modest compared with many accepted CHF interventions if the ongoing studies indeed show improved clinical outcomes. Second, one of the caveats to justification of a screening test is the demonstration that early intervention improves prognosis. In the absence of such data, one could argue that waiting for patients to develop symptoms or come to clinical fruition might be acceptable. Again, data are lacking in on SDB in CHF because at present it is unclear how such a diagnosis changes management of the patient. Third, one could argue that the debate about outcome data is academic because one would order appropriate testing for patients with symptoms regardless of what long-term studies might have shown. However, we have made the semantic argument for the purpose of this debate that screening refers to asymptomatic CHF patients, and thus alleviation of symptoms is not relevant to this debate even though such a goal is clearly important. Other issues with screening tests including anxiety about false positive results (eg, benign breast lump) and discomfort associated with the evaluation (eg, colonoscopy) are not particularly relevant to the SDB in CHF discussion.

An early release of data from the SERVE-HF study has suggested increased cardiovascular sudden death among CSA patients with impaired left ventricular systolic function randomized to adaptive servo ventilation compared to controls. Details remain sparse, but clearly further data will be required to know how CHF patients with SDB should be managed.[60]

Conclusions

We hope that this debate will help to raise awareness about the importance of sleep in people with cardiovascular disease or at risk for these conditions. We recommend asking targeted questions in the history regarding sleep for the purpose of case-finding because existing therapies can be provided to alleviate symptoms for patients who suffer from the condition. At present, the data fall short of allowing a recommendation for routine polysomnographic screening of asymptomatic CHF patients.[61] However, ongoing randomized trials will help to inform this debate if and when the suggestive data become more definitive.

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