Preface

Sleep and the Heart: What's Next?

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Editor

The important relationship between cardiovascular disease (CVD) and sleep medicine was recognized in the early years following the emergence of sleep medicine itself as an independent field of Medicine in the 1970s.^{1,2} The study of the relationship between sleep and the heart has grown exponentially over the past few decades. Although the areas of interaction between sleep and cardiovascular health are numerous, most of the focus over the past few decades has been on the relationship between sleep-disordered breathing (SDB) and heart failure or other advanced cardiovascular disorders, such as stroke and coronary disease. This was further spurred by the advent and dissemination of highly effective pressure-based devices that address various types of SDB simultaneously.³ These devices include the various forms of positive airway pressure and the advanced adaptive servo-ventilation technology (ASV).^{4,5} The ability to treat all forms of SDB in different populations of patients with one device resulted in less focus on understanding the mechanism of action in different populations such as heart failure patients. Initial, albeit often small, studies consistently showed cardiovascular benefit from treatment of SDB in patients with heart failure and CVD.^{6–8} However, when more adequately powered randomized controlled trials were conducted, the results were either neutral or negative. More recently, a trial suggested possible harm of treating central sleep apnea in patients with heart failure and reduced ejection fraction.⁹ Another trial showed no effect of treatment of obstructive sleep apnea with continuous positive airway pressure on cardiovascular events in

patients with CVD.¹⁰ These recent p-negative trials showing no benefit from treating SDB in patients with CVD may have stemmed from our inadequate understating of the pathophysiologic relation between SDB and CVD, and from understudy of the effects of positive airway pressure devices. Nevertheless, these trials will unquestionably promulgate critical evaluations of our accepted notions regarding the cardiovascular consequences of SDB. As a result, this field of study is likely to undergo a period of reorganization and consideration of priorities.

On this background, this issue of *Sleep Medicine Clinics* attempts to identify and address this field with a more nuanced view. This issue includes reviews that address the application of current trial findings to clinical practice. In addition, other reviews attempt to address areas in this field that has received less attention in related publications and conferences. The review by Randerath and Herkenrath critically evaluates the current literature on treatment of SDB in patients with CVD, including the recent negative trials, to formulate a nuanced and clinically relevant approach to this important topic.

SDB is associated with increased norepinephrine levels and upregulated sympathetic tone.¹¹ The consequences of increased sympathetic activation are critical in heart failure patients.^{12–14} The consequences of SNA in failing heart include predisposition to ventricular tachyarrhythmia¹⁵ and possibly life-threatening arrhythmia.¹⁶ SDB may therefore represent a critical factor in increasing mortality in HF via arrhythmogenic mechanisms.

The electrophysiologic underpinnings of this relationship remain unclear and understudied. The review by Oldenburg et al focuses on an important area of interaction between SDB and arrhythmia. In another review, Kahwash presents a clinically generalizable management approach to SDB in patients with CVD.

Other reviews in this issue present novel perspectives on areas that are routinely underrecognized in this field. Dr Jafari discusses the role of SDB in the rehabilitation outcome of patients with CVD. Dr Khan addresses the relation between nonrespiratory sleep disorders and cardiovascular outcomes. This relation can have an impact on the functional outcomes and quality of life in patients with established CVD. Nonrespiratory disorders of sleep are also gaining recognition as a risk factor for the development of CVD in otherwise healthy individuals.

In preparing these reviews, the authors attempted to incorporate the most recent literature in their discussion. These reviews, nevertheless, attempt to formulate and present novel and clinically applicable approaches guided by these recent literature findings. We hope that clinicians can use these reviews in their decision-making and management plans, while still challenging many of the accepted concepts and generating more questions that would advance our field.

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