OPEN ACCESS Freely available online

Journal of Sleep Disorders & Therapy

Opinion Article

Technological Innovations in Central Sleep Apnea Management: From Devices to Digital Monitoring

Ruby James*

Department of Psychiatry and Sleep Research, University of Toronto, Toronto, Canada

DESCRIPTION

Central sleep apnea represents one of the most complex and underappreciated disorders within sleep medicine, occupying a peculiar space where neurology, cardiology, and respiratory physiology intersect. Unlike the more widely recognized obstructive sleep apnea, which is often discussed in both medical and lay settings, central sleep apnea carries an aura of mystery, owing to its pathophysiological roots in the brain's control of breathing rather than in the mechanics of the upper airway.

Obstructive sleep apnea is associated with obesity, snoring, and airway collapse, making it an easy target for both awareness campaigns and diagnostic efforts. Central Sleep Apnea (CSA), however, lacks the same obvious external markers. There is also a strong association between central sleep apnea and cardiovascular disease, which makes its underrecognition even more troubling. Patients with heart failure, atrial fibrillation, or stroke show disproportionately high rates of CSA. It is not just a comorbidity but a condition that may worsen cardiac outcomes by contributing to sympathetic nervous system activation, arrhythmia, and worsening ventricular function. Conversely, impaired cardiac function can also destabilize breathing control, creating a vicious cycle. Integrating sleep evaluations into cardiology clinics could potentially improve outcomes, but systemic inertia and lack of awareness often hinder such cross-disciplinary collaborations.

The treatment landscape for central sleep apnea is another area where my views diverge from conventional complacency. For obstructive sleep apnea, Continuous Positive Airway Pressure (CPAP) therapy has long been the gold standard. While CPAP can sometimes alleviate CSA, particularly in patients with overlapping obstructive features, it is not a universal solution. Adaptive Servo Ventilation (ASV) has been hailed as a more effective option for pure CSA, because it adjusts ventilation in real time, countering apneas with dynamic pressure support. However, the controversy surrounding the use of ASV in patients with reduced ejection fraction due to heart failure has created confusion, leaving clinicians hesitant and patients underserved. Some studies suggested increased mortality in this subgroup, which led to guidelines that now discourage ASV use in certain heart failure patients. Yet, this has inadvertently cast a shadow on the entire technology, perhaps discouraging its use even where it could be life-changing. Central sleep apnea is a condition that demands personalized care, and overly cautious restrictions can deprive many patients of therapeutic relief.

Pharmacological approaches remain limited. Supplemental oxygen therapy may stabilize breathing in some patients, but it is not universally effective and comes with practical limitations. Phrenic nerve stimulation, an emerging technology, offers a fascinating glimpse into the future of CSA treatment. By electrically stimulating the nerve that drives the diaphragm, these devices bypass the brain's lapses in signaling and restore respiratory rhythm. Early trials show encouraging results, this technology represents one of the most promising frontiers for CSA. It symbolizes a shift from managing symptoms to directly addressing the underlying failure in respiratory control.

Beyond the clinical and technical dimensions, central sleep apnea has a profound psychological and social toll. Patients with CSA often feel misunderstood. Unlike obstructive sleep apnea, which has gained recognition and even casual familiarity in popular culture, central sleep apnea remains an obscure diagnosis. Many patients report frustration with healthcare providers who dismiss their symptoms or lump their condition under generic insomnia or fatigue. The uncertainty surrounding treatment only compounds this frustration.

Correspondence to: Ruby James, Department of Psychiatry and Sleep Research, University of Toronto, Toronto, Canada, E-mail: jamesr@gmail.com

Received: 20-Mar-2025, Manuscript No. JSDT-25-38532; **Editor assigned:** 24-Mar-2025, PreQC No. JSDT-25- 38532 (PQ); **Reviewed:** 07-Apr-2025, QC No. JSDT-25-38532; **Revised:** 14-Apr-2025, Manuscript No. JSDT-25-38532 (R); **Published:** 21-Apr-2025, DOI: 10.35248/2167-0277.25.14.640.

Citation: James R (2025). Technological Innovations in Central Sleep Apnea Management: From Devices to Digital Monitoring. J Sleep Disord Ther. 14:640.