

CENTRAL SLEEP APNEA AND HEART FAILURE: EFFECTS OF SERVOVENTILATION ON QUALITY OF LIFE**APNEIA CENTRAL DO SONO E INSUFICIÊNCIA CARDÍACA: EFEITOS DA SERVOVENTILAÇÃO NA QUALIDADE DE VIDA****APNEA CENTRAL DEL SUEÑO E INSUFICIENCIA CARDÍACA: EFECTOS DE LA SERVOVENTILACIÓN EN LA CALIDAD DE VIDA**

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ABSTRACT

Introduction: Central sleep apnea results from a failure in the brain's signaling to the respiratory muscles and can exacerbate heart failure. Clinical management includes positive pressure technologies, such as servo-ventilation. **Objective:** To investigate, through an integrative literature review, the effects of adaptive servoventilation in the management of central sleep apnea in patients with heart failure, with an emphasis on clinical outcomes and quality of life. **Method:** An integrative review of publications from 2019 to 2024 in the PubMed, BVS, and SciELO databases. After initial screening of the studies, four articles met the inclusion criteria. **Results:** Adaptive servo-ventilation demonstrated therapeutic potential, with a reduction in the apnea-hypopnea index and improved sleep efficiency, although limitations remain regarding its impact on quality of life and clinical efficacy. **Conclusion:** Benefits of the therapy are evident, but results regarding prognosis are inconsistent, reinforcing the need for robust studies and increased scientific output, especially in physical therapy.

KEYWORDS: Central Sleep Apnea. Noninvasive Ventilation. Nervous System Diseases.

RESUMO

Introdução: apneia central do sono resulta de falha na sinalização cerebral para a musculatura respiratória, podendo agravar a insuficiência cardíaca. O manejo clínico inclui tecnologias de pressão positiva, como a servoventilação. **Objetivo:** Investigar, por meio de revisão integrativa da literatura, os efeitos da servoventilação adaptativa no manejo da apneia central do sono em pacientes com insuficiência cardíaca, com ênfase nas repercussões clínicas e na qualidade de vida. **Método:** Revisão integrativa com publicações entre 2019 e 2024 nas bases PubMed, BVS e SciELO. Após triagem inicial dos estudos, quatro artigos atenderam aos critérios de inclusão. **Resultados:** A servoventilação adaptativa demonstrou potencial terapêutico, com redução do índice de apneia-hipopneia e melhoria da eficiência do sono, embora persistam limitações quanto ao impacto na qualidade de vida e eficácia clínica. **Conclusão:** Evidenciam-se benefícios da terapia, porém com resultados inconsistentes sobre prognóstico, reforçando a necessidade de estudos robustos e maior produção científica, especialmente na fisioterapia.

DESCRITORES: Apneia do Sono Tipo Central. Ventilação não Invasiva. Doenças do Sistema Nervoso.

RESUMEN

Introducción: La apnea central del sueño es el resultado de una falla en la señalización cerebral hacia la musculatura respiratoria, lo que puede agravar la insuficiencia cardíaca. El manejo clínico incluye

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tecnologías de presión positiva, como la servoventilación. Objetivo: Investigar, mediante una revisión integrativa de la literatura, los efectos de la servoventilación adaptativa en el manejo de la apnea central del sueño en pacientes con insuficiencia cardíaca, con énfasis en las repercusiones clínicas y la calidad de vida. Método: Revisión integrativa con publicaciones entre 2019 y 2024 en las bases de datos PubMed, BVS y SciELO. Tras la selección inicial de los estudios, cuatro artículos cumplieron con los criterios de inclusión. Resultados: La servoventilación adaptativa demostró potencial terapéutico, con una reducción del índice de apnea-hipopnea y una mejora en la eficiencia del sueño, aunque persisten limitaciones respecto al impacto en la calidad de vida y la eficacia clínica. Conclusión: Se evidencian beneficios de la terapia; sin embargo, los resultados sobre el pronóstico son inconsistentes, lo que refuerza la necesidad de estudios más robustos y una mayor producción científica, especialmente en el área de la fisioterapia.

DESCRIPTORES: Apnea Central del Sueño. Ventilación no Invasiva. Enfermedades del Sistema Nervioso.

INTRODUCTION

The development of contemporary societies, influenced by the principles of capitalism, has led to significant changes in lifestyles, particularly with regard to the reduction in the amount of time devoted to sleep and the devaluation of sleep. Sleep is a biological process essential for maintaining homeostasis; it plays a role in neuroendocrine regulation, the secretion of hormones such as cortisol, melatonin, and growth hormone, and the proper functioning of the immune system, and is fundamental to physical and mental health^{1,2}.

According to data from the Brazilian Sleep Association (ABSono), between 2018 and 2019 there was a decrease in the population's average sleep duration, from 6.6 to 6.4 hours per night. Given that the association recommends approximately eight hours of sleep for adults, a significant sleep deficit is evident. Poor sleep quality and sleep deprivation are associated with impairments in cognitive performance, mood, memory, body weight control, and immunity, in addition to contributing to the development of conditions such as obesity, hypertension, diabetes mellitus, depression, and sleep disorders, including apnea and insomnia^{3,4}.

In this regard, sleep-related breathing disorders (SRBDs) are associated with a cascade of events occurring in the respiratory tract during sleep, ranging from snoring to interruptions in the respiratory rhythm that lead to hypoxemia, characterized by reduced blood oxygenation. These disorders may manifest as obstructive conditions, resulting in the closure of the upper airways, as in obstructive sleep apnea, or due to abnormalities in the central nervous system, as occurs in central sleep apnea⁵.

Furthermore, central sleep apnea (CSA) is characterized by a temporary interruption in the respiratory center's control of the phrenic nerve and neurons located in the pons and medulla, which are responsible for the basal respiratory rhythm. As a result, during sleep, there is a blockage of the respiratory drive lasting ten or more seconds, with no signs of respiratory effort, until a new neural stimulus occurs. This is due to the dysfunctional respiratory drive that occurs during the apnea period⁶. In certain scenarios of CSA, there may be manifestations of altered respiratory rate, ranging from slow to rapid, including pauses in breathing, known as the Cheyne-Stokes respiratory pattern. In this

regard, patients with heart failure (HF) may trigger ACS due to slower circulation, which hinders the immediate detection of changes in blood oxygen and carbon dioxide levels⁷.

This sleep-related breathing disorder has a higher prevalence in the male population compared to the female population. It is characterized by the occurrence of five or more respiratory events per hour of sleep. Furthermore, it is more common in middle-aged or elderly individuals, as this population segment exhibits higher morbidity associated with aging⁸.

Central sleep apnea, frequently associated with heart failure (HF), is common in clinical practice and is linked to adverse outcomes. In this context, the rise in sleep disorders underscores the importance of this topic for scientific research and for the development of care strategies aimed at promoting health and quality of life. Furthermore, the Federal Council of Physical Therapy and Occupational Therapy (COFFITO), through Resolution No. 536, recognizes the role of physical therapy in treating sleep disorders of various origins, highlighting the physical therapist's role in managing these conditions, especially through respiratory and cardiovascular physical therapy^{9,10}.

Given that adequate sleep is essential for health and the body's functioning, sleep-related respiratory disorders can significantly compromise the functionality and quality of life of affected individuals. In this regard, scientific research is essential to support evidence-based practices and enhance the quality of physical therapy care. In light of this, the present study aims to investigate, through an integrative literature review, the effects of adaptive servoventilation on the management of central sleep apnea in patients with heart failure, with an emphasis on clinical outcomes and quality of life.

METHODOLOGY

This study is characterized as an integrative literature review (ILR), of an exploratory nature and employing a qualitative approach. This type of review enables the systematic identification, selection, and analysis of scientific literature on a specific topic, contributing to the synthesis of available knowledge and the expansion of evidence in the field¹¹. In this context, the study addresses central sleep apnea in individuals with heart failure, focusing on the use of adaptive servo-ventilation as a management strategy, while also considering the role of physical therapy in this setting.

The integrative review was conducted in six stages: (1) formulation of the guiding research question; (2) definition of inclusion and exclusion criteria; (3) data collection; (4) evaluation of the selected studies; (5) analysis and interpretation of the results; and (6) presentation of the synthesis of knowledge in an organized manner¹¹. Thus, the study aims to gather and analyze scientific evidence on the topic, contributing to the advancement of knowledge and the strengthening of evidence-based practices.

To guide the research focus, the PICO strategy was used, which is widely employed in formulating research questions in scientific studies. This strategy comprises four main components: Population (P), Intervention (I), Comparison (C), and Outcome (O)¹². In the present study, the population consists of individuals with central sleep apnea associated with heart failure; the intervention refers to the use of adaptive servo-ventilation; the comparison involves other forms of

noninvasive ventilation; and the outcome relates to the impact on patients' quality of life. Based on these elements, the following guiding question was formulated: What are the effects of adaptive servo-ventilation, compared to other forms of noninvasive ventilation, on the quality of life of individuals with central sleep apnea associated with heart failure?

Regarding the article search strategy, data were collected from the following databases and the Virtual Health Library: *Scientific Electronic Library Online* (SCIELO), *Medical Literature Analysis and Retrieval System Online* (MEDLINE/PUBMED), and *the Virtual Health Library* (BVS). To search for articles to include in the studies, the Health Sciences Descriptors (DeCS) were used, specifically the following terms: "Sleep Apnea," "Central," "Heart Failure," and "Continuous Positive Airway Pressure." Thus, using Boolean operators to combine the search terms resulted in the following search strategy: (Central Sleep Apnea OR Heart Failure OR Sleep-Related Respiratory Disorders AND Continuous Positive Airway Pressure OR servo ventilation).

To ensure the effectiveness of the research, the following inclusion criteria were established for the search and analysis of articles: randomized clinical trials conducted within the last five years (2019 to 2024) involving patients of both sexes aged 18 to 80 years with heart failure; studies in Portuguese and English were also included for analysis.

However, the exclusion criteria related to duplicate studies in the databases, as well as the exclusion of topics tangential to the central theme of the research, in addition to the exclusion of secondary studies, theses, dissertations, letters to the editor, and book chapters, since the focus of this study, a priori, is an integrative review.

Therefore, to ensure greater reliability in this research, the studies will be subjected to an analysis based on the aforementioned criteria, aiming to achieve the highest level of reliability, free from bias, and ensuring that the final results are accurate and impartial, thereby providing the scientific community with original and reliable information¹³.

Data collection began in the first half of 2024, in March, following the application of the search strategy to the selected databases. The study selection process was conducted with the assistance of the *Rayyan* bibliographic management application by two independent reviewers, with any disagreements resolved by consensus. After removing duplicate records, the selection process took place in three stages: analysis of titles, review of abstracts from the selected studies, and, finally, full-text review of the eligible articles.

To guide the search and study selection process, the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA) guidelines were used, ensuring greater methodological rigor and reliability in the organization of information¹⁴.

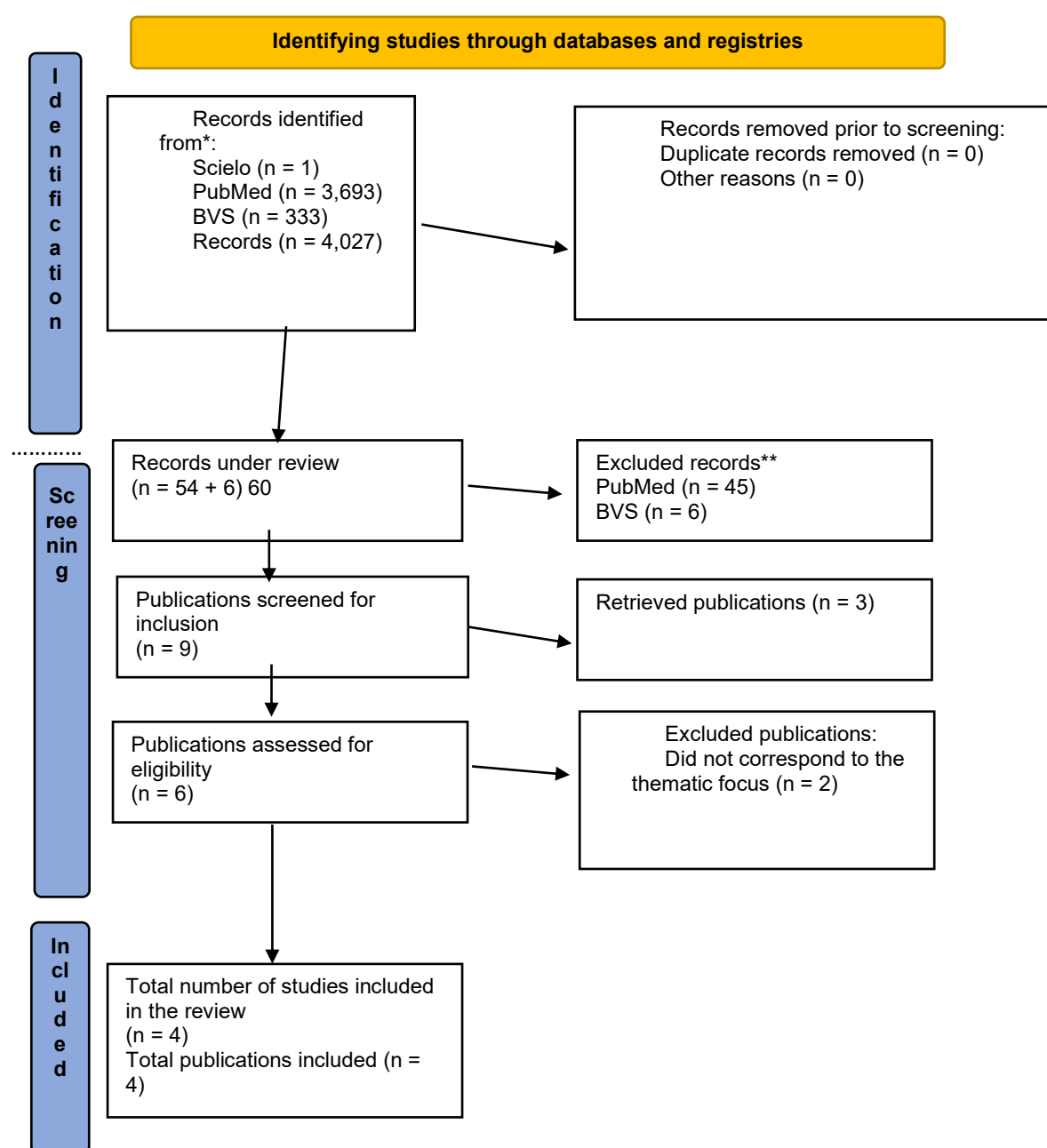
After final selection, the articles were thoroughly analyzed to extract information related to the study's objectives and were organized into a table containing: article code, title, year of publication, method, study type, and main results.

The extracted data were synthesized through a critical descriptive analysis, compiling the main evidence on the topic. In addition, the studies were classified according to the Levels of Evidence (LE) proposed by Souza, Silva, and Carvalho (2010)¹⁵, which range from I to VI: Level I (meta-analyses of

randomized clinical trials), Level II (experimental studies), Level III (quasi-experimental studies), Level IV (descriptive or qualitative studies), Level V (experiential reports or case reports), and Level VI (expert opinion). This process allowed us to select and critically analyze the most relevant studies, ensuring greater focus and scientific consistency in the research.

In addition, to organize the process of final selection of the articles included in the review, a flowchart was created that details this process and follows the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA) guidelines.

Figure 1 – Flowchart used for article selection



RESULTS

The search strategy applied to the VHL, PubMed, and SciELO databases identified 4,027 records. After removing duplicates, the screening process began, initially by reviewing the titles; at this stage, 60 studies were considered potentially eligible because they were relevant to the research topic. Next, the abstracts were analyzed, resulting in the selection of 9 studies for full-text review. After a thorough evaluation of the articles' full content, 4 studies were included in the final sample, while the others were excluded for failing to meet the established methodological criteria or for not aligning with the research objectives.

The study selection process was conducted in accordance with the recommendations of the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA), in conjunction with the use of the Rayyan platform, which contributed to greater organization and methodological rigor in the screening of records. To systematize the information, Table 1 was developed based on the *Oxford Centre for Evidence-Based Medicine* (OCEBM) strategy, including data such as author, year of publication, study title, journal, and level of evidence.

Table 1. Articles included in the review

Title	Authors	DOI	Journal	Language
Transvenous phrenic nerve stimulation improves central sleep apnea, sleep quality, and quality of life regardless of prior positive airway pressure treatment	Schwartz <i>et al.</i> (2021) ¹⁶ .	10.1007/s11325-021-02335-x	Sleep and Breathing	English
Effect of Adaptive Servo Ventilation on Central Sleep Apnea and Sleep Structure in Patients with Systolic Heart Failure: Polysomnography Data from the SERVE-HF Major Substudy	Tamisier <i>et al.</i> (2022) ¹⁷ .	10.1111/jsr.13694	Journal of Sleep Research	English
Effect of adaptive servo-ventilation for central sleep apnea in patients with systolic heart failure on muscle sympathetic nerve activity: a SERVE-HF randomized ancillary study	Tamisier <i>et al.</i> (2022) ¹⁸ .	10.1183/13993003.00384-2022	European Respiratory Journal	English

Adaptive servo-ventilation and mortality in patients with systolic heart failure and central sleep apnea: a single-center experience	Sun <i>et al.</i> (2023) ¹⁹ .	10.1007/s11325-023-02807-2	Sleep and Breathing	English
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Table 2 summarizes the key information from the selected studies, including author/title, objective, and results. It should be noted that all included articles were published in English and were randomized clinical trials published within the last five years, in accordance with the previously established inclusion criteria.

Table 2: Summary of relevant information from the selected articles

Title	Author	Objective	Results
Transvenous phrenic nerve stimulation improves central sleep apnea, sleep quality, and quality of life regardless of prior positive airway pressure treatment	Schwartz <i>et al.</i> (2021)	The primary objective of this post hoc analysis was to examine the differential effects of TPNS on central sleep apnea (CSA), sleep architecture, and patient-reported outcomes in PAP-naïve and previously treated PAP patients enrolled in the remede® System Pivotal Trial.	Patients had moderate to severe central sleep apnea (CSA) at baseline, with more severe CSA in the group previously treated with PAP. After 12 months of transvenous phrenic nerve stimulation (TPNS), a significant reduction in the apnea-hypopnea index and the central apnea index was observed. Both groups showed improvement in daytime sleepiness, fatigue, and overall well-being, as well as high treatment acceptance. Although about one-third of the patients reported discomfort with the stimulation, the treatment discontinuation rate was less than 5%.
Effect of adaptive servo ventilation on central sleep apnea and sleep structure in patients with systolic heart failure: polysomnography data from the SERVE-HF major substudy	Tamiser <i>et al.</i> (2022)	To evaluate the effects of adaptive servo ventilation on central sleep apnea and sleep structure in patients with systolic heart failure.	Patients underwent a complete polysomnography at the start of the study and after 12 months of follow-up. Analysis of the residual apnea-hypopnea index indicated that the observed values did not reach the level considered indicative of effective control (AHI <10 events/h). Although adaptive servo-ventilation (ASV) therapy has been shown to be effective in treating central sleep apnea in patients with heart failure, improvements in sleep quality were small and likely of no clinical relevance, which may explain the absence of significant changes in quality of life observed in the primary analysis of the SERVE-HF study.

Effect of adaptive servo-ventilation for central sleep apnea in systolic heart failure on muscle- r sympathetic nerve activity: a SERVE-HF randomized ancillary study	Tamiser <i>et al.</i> (2022)	To investigate the effects of ASV on sympathetic tone in patients with central sleep apnea and heart failure with a left ventricular ejection fraction of .	The analysis demonstrated that changes in sympathetic tone, as assessed by muscle sympathetic nerve activity, did not show significant differences between the groups treated with adaptive servo-ventilation (ASV) and the control group. Nevertheless, both groups showed improvement in the overall status of heart failure compared to baseline, as evidenced by better performance on the walk test, improved scores on <i>the Minnesota Living with Heart Failure Questionnaire</i> , reduced systolic blood pressure, and increased popliteal arterial blood flow. After three months of treatment, ASV therapy did not result in a significant reduction in sympathetic nervous system activation in patients with heart failure and reduced ejection fraction, indicating that its role in this mechanism remains unclear and requires further investigation.
Adaptive Servo-Ventilation and Mortality in Patients with Systolic Heart Failure and Central Sleep Apnea: A Single-Center Experience	Sun <i>et al.</i> (2023)	To examine the effect of ASV exposure and the role of each type of ASV device on mortality	In a registry of 90 patients with heart failure with reduced ejection fraction and central sleep apnea, the use of ASV for more than 3 hours per night was associated with higher 64-month survival (76% vs. 49%) and improved quality of life. Most patients used peak-flow-targeted devices, while there was a trend toward lower survival among patients who used minute-volume-targeted ASV with fixed EPAP.

DISCUSSION

Cardiometabolic and survival outcomes related to the use of adaptive servo-ventilation

Various modes of noninvasive ventilation have been investigated as therapeutic strategies for the management of acute respiratory distress syndrome (ARDS), especially in patients with heart failure (HF). Previous studies have shown that continuous positive airway pressure (CPAP) was initially widely used in this context¹⁹⁻²⁰. Early clinical trials demonstrated benefits related to a reduction in central apnea and hypopnea events, a decrease in ventricular arrhythmias, lower plasma norepinephrine levels, and an improvement in left ventricular ejection fraction (LVEF), as well as a positive impact on quality of life and a possible trend toward reduced mortality and the need for heart transplantation^{18,21-22}.

However, more recent evidence points to limitations of this therapeutic approach in the context of acute coronary syndrome (ACS) associated with heart failure (HF). In this scenario, adaptive servo-ventilation (ASV) has been introduced as a more specific therapeutic alternative. This device provides end-expiratory positive airway pressure (EPAP) to maintain upper airway patency, combined with

inspiratory pressure support (IPAP) and a variable backup respiratory rate, allowing for greater adaptation to the patient's ventilatory needs²³. This therapeutic modality has been shown to improve parameters related to cardiac function in patients with heart failure with reduced ejection fraction associated with ACS²⁴.

Despite these potential benefits, the results regarding the impact of VAS on major clinical outcomes remain controversial. Studies that evaluated the effect of VAS on composite outcomes, including major cardiovascular events and mortality, did not identify significant benefits in terms of reducing these events²⁵⁻²⁶. However, other studies have observed that the use of ASV was not associated with increased mortality compared to the control group, suggesting that the therapy can be considered safe in the management of ACS associated with heart failure^{17,27-28}.

On the other hand, there is higher cardiovascular mortality in patients undergoing VAS therapy compared to the control group. The authors suggest that this finding may be related to the persistence of sympathetic nervous system hyperactivity, frequently observed in patients with heart failure and associated with an increased risk of arrhythmias and cardiovascular mortality. In this study, no significant reduction in sympathetic activity was identified in the group treated with ASV, indicating that the therapy may not effectively target one of the main pathophysiological mechanisms involved in the progression of heart failure²⁹⁻³⁰.

Furthermore, elevated catecholamine levels and increased sympathetic activity are common features in patients with heart failure with reduced ejection fraction, especially in the presence of Cheyne-Stokes-type periodic breathing. These factors constitute important independent predictors of cardiovascular mortality, which may contribute to the persistence of adverse outcomes in this population³¹.

Effects of Adaptive Servo-Ventilation on Central Sleep Apnea and Quality of Life

Regarding the effects of adaptive servo-ventilation (ASV) on sleep parameters, evidence demonstrates the high efficacy of this therapeutic modality in suppressing central apnea events³². Studies indicate that ASV promotes a significant reduction in respiratory events during sleep, resulting in improved sleep efficiency. However, findings regarding overall sleep quality and quality of life remain inconsistent. Although sleep efficiency may increase, sleep architecture is not always fully restored, possibly due to an increase in periodic limb movements and a higher rate of awakenings associated with these events—factors that may diminish the clinical benefits of the therapy^{33,34}.

Another relevant aspect concerns the tolerability of the therapy. The use of adaptive servo-ventilation may be limited by difficulties in adapting to the device, mainly due to discomfort associated with the interfaces and the occurrence of mask leaks. These factors may compromise treatment adherence and, consequently, reduce its clinical effectiveness. Despite these limitations, evidence indicates that patients with no prior exposure to pressure therapy show significant improvement in sleep architecture parameters, a reduction in apnea events, and better daytime functional performance. These findings suggest that the initial introduction of pressure therapy may produce significant clinical benefits in certain patient groups^{17,35}.

Some studies report increased mortality from cardiovascular causes in patients with heart failure with reduced ejection fraction and central sleep apnea undergoing adaptive servo-ventilation (ASV) therapy. It is hypothesized that factors such as poor treatment adherence and intolerance to positive airway pressure therapy may contribute to these adverse outcomes. In contrast, other studies demonstrate an association between longer duration of ASV use and increased survival. Furthermore, evidence suggests a potentially more protective effect of devices with automatic adjustment of end-expiratory pressure (auto-EPAP) compared to those with fixed EPAP³⁶.

Management of Central Sleep Apnea Associated with Heart Failure: A Comparison Between Adaptive Servo-Ventilation and Other Therapeutic Approaches

Historically, CPAP has been widely used in the treatment of sleep-related breathing disorders, including central sleep apnea. However, evidence accumulated over the years indicates that its efficacy in treating central sleep apnea (CSA) associated with heart failure is limited. Although some studies have demonstrated improvements in respiratory parameters and symptoms related to sleepiness, the results regarding mortality and cardiovascular outcomes remain inconclusive³⁵.

In this context, adaptive servo-ventilation has emerged as a more targeted therapeutic alternative for the treatment of CSA. Studies show that ASV is capable of significantly reducing respiratory events during sleep in patients with heart failure with reduced ejection fraction and predominant central apnea. However, the improvements observed in sleep quality are generally modest and, in some cases, may not be clinically significant^{18,36}.

Another important aspect concerns the variety of ASV modalities available. The results highlighted two main technological approaches: minute-volume-based ASV (ASVmv), which lacks airway patency detection, and peak-flow-guided ASV (ASVpf), which incorporates automatic systems for adjusting end-expiratory pressure. According to the authors, devices based on ASVpf yield better clinical outcomes, whereas devices with fixed EPAP may be associated with worse outcomes¹⁹.

In addition to pressure-based therapies, new therapeutic strategies have been investigated for the treatment of ACS. Among these, transvenous phrenic nerve stimulation (TPNS) stands out, as it directly stimulates one hemidiaphragm, generating negative intrathoracic pressure and promoting pulmonary ventilation¹⁹.

Schwartz et al. (2021) demonstrated that this approach was effective in reducing central apnea events, in addition to promoting significant improvement in sleep quality, reduced daytime sleepiness, and improved quality of life¹⁶. The technique proved effective both in patients who had previously undergone pressure therapy and in those with no prior experience with this type of treatment.

Despite the promising results, TPNS still has significant limitations, including the limited number of available studies, the high cost of the device, and the need for specialized technological infrastructure—factors that may restrict its widespread use in clinical practice^{16,17}.

As a limitation of this integrative review, it should be noted that the established inclusion and exclusion criteria were not sufficiently comprehensive, which may have restricted the identification and incorporation of potentially relevant studies on the investigated topic. This delimitation may have

contributed to the small number of included studies, limiting the breadth of the synthesis of available evidence and the possibility of generalizing the findings.

FINAL CONSIDERATIONS

The results of this integrative review allowed us to analyze the effects of ventilatory therapies on the management of central sleep apnea associated with heart failure. It was observed that adaptive servo-ventilation offers important clinical benefits, such as a reduction in the apnea-hypopnea index, improved sleep efficiency, and decreased daytime sleepiness. However, the studies analyzed indicate that this therapeutic modality still yields inconsistent results regarding its impact on quality of life, sleep architecture, and modulation of sympathetic activity—factors directly related to the prognosis of these patients.

Additionally, the findings show that there is still disagreement in the literature regarding the best therapeutic strategy for treating central sleep apnea in patients with heart failure. Other approaches, such as transvenous phrenic nerve stimulation, have been investigated and show therapeutic potential, although they still lack greater scientific robustness and have limitations related to cost and availability. A significant rate of intolerance to adaptive servo-ventilation was also observed in some patients, which may compromise treatment adherence and clinical outcomes.

Thus, there is a clear need for new clinical studies with greater methodological rigor to investigate effective interventions for the management of central sleep apnea associated with heart failure. Furthermore, we emphasize the importance of expanding scientific research in the field of sleep disorders, particularly with regard to physical therapy practice, thereby contributing to the strengthening of evidence-based practices and the improvement of care for these patients.

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