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BENDOPNEA AS AN EARLY MARKER OF HEART FAILURE IN ADULTS
WITH HYPERTENSION

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Heart failure (HF) is a significant public health issue worldwide. It is especially problematic for adults with chronic high blood pressure such as longstanding hypertension. Chronic high blood pressure contributes to structural and functional changes in the heart muscle over time, in essence, myocardial remodeling. The ability to diagnose heart failure as early as possible is important so that appropriate treatment can happen as soon as possible. Bendopnea, which can be defined as experiencing shortness of breath 30 seconds after bending forward, has recently emerged as a straightforward clinical sign that may indicate that there are high left ventricular filling pressures. Whether the presence of bendopnea in hypertensive patients can be used to predict the potential for progression to heart failure is subject to a review of the existing literature.

The aim of this study is to review and summarize the existing literature regarding the use of bendopnea as an early indicator of heart failure in adults with high blood pressure. The focus of the literature review will be on the prevalence of bendopnea, how bendopnea occurs, and the value of bendopnea in terms of predicting whether patients will develop heart failure.

The literature review was conducted using PubMed, PubMed Central (PMC), and ScienceDirect and included the following types of studies: systematic reviews, cohort and observational studies on adult HF and the prevalence of bendopnea and its clinical association, and prognostic importance in adults with HF. Numerous studies using either large or small sample sizes (120-1243 patients) were identified for the comparative analysis.

The prevalence of bendopnea was variable among various studies and was likely reflective of both different patient populations and HF severity. A systematic review of 891 individuals with the same relative diagnoses demonstrated a pooled prevalence of 31.76% and a strong association between bendopnea and advanced HF symptoms (e.g., dyspnea [OR 69.70], orthopnea [OR 3.02], and New York Heart Association (NYHA) IV status [OR 7.58]). Another study, which as a multicenter cohort study with 482 patients who had bendopnea, demonstrated poorer cardiac function on average (e.g., lower left ventricular ejection fraction: 38.9% vs 42.7%; higher N-terminal pro-B-type natriuretic peptide (NT-proBNP): 1320.5 vs 985.2 ng/L), greater rates of rehospitalization (35.1% vs 22.3%) than those without it, and higher total overall mortality (19.7% vs 12.4%). These findings provided evidence that bendopnea is an independent predictor of poor outcomes (e.g., HR 1.6). Additional studies also supported that established bendopnea as an important prognostic marker (e.g., HR 2.5 for short-term hospitalization and HR up to 4.20 for long-term mortality). Further echocardiographic evaluations have indicated that at least 85.9% of patients with bendopnea have resting NYHA III or IV class symptoms and, therefore, have a strong correlation with advanced cardiac dysfunction. Additionally, bendopnea has been demonstrated to be a dynamic clinical marker, as it decreased from 31.5% to 20.7% following treatment and can therefore be used to monitor treatment response. It was found that patients with chronic hypertension may develop left ventricular hypertrophy and diastolic dysfunction due to elevated left ventricular filling pressures. According to current studies there are significant limitations to the understanding of these limitations; prevalent rates, reliability in diagnosing them, limited amount of hypertension-specific information.

Bendopnea is a clinically important, non-invasive, and easily reproducible indicator that indicates elevated intracardiac pressures, and strongly correlates with heart failure severity and outcomes. The literature demonstrates its performance as an early marker of HF progression, especially among individuals with concomitant hypertension. Thus, the addition of bendopnea into routine clinical assessment may provide opportunities for earlier detection, risk stratification and monitoring of treatment response among adult patients at risk for heart failure.