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EDITORIAL COMMENT

Bendopnea: A new symptom for the differential diagnosis of chronic cardiopulmonary disease?☆

Flexopneia: um novo sintoma a utilizar no diagnóstico diferencial de patologias crónicas cardiopulmonares?

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Bendopnea is a symptom of heart failure (HF) recently described by Thibodeau et al.,[1] characterized by difficulty in breathing when leaning over. It frequently occurs when performing everyday actions such as tying shoelaces or putting on socks.

Dyspnea in its various forms (exertional dyspnea, orthopnea and paroxysmal nocturnal dyspnea) is a major and extremely common symptom in HF. Exertional dyspnea is also found in other conditions, particularly respiratory disease, and is thus a moderately sensitive but relatively nonspecific marker of HF. Orthopnea is more directly associated with increased filling pressures and is thus much more specific.[1,2] In their original description of bendopnea, published in 2014, Thibodeau et al. analyzed the frequency of this symptom in patients with HF with left ventricular systolic dysfunction (HF with reduced ejection fraction [HFrEF]) referred for cardiac catheterization.[1] The investigation of bendopnea in this study was based on an objective assessment, in which the patient adopted the appropriate position in the presence of an investigator, and the symptom was identified in 28% of individuals.

Pathophysiologically, the condition appears to be linked to positional increase in left and right ventricular filling pressures in patients whose baseline pressures are already elevated[1] (although it is not clear whether intrathoracic or intra-abdominal pressures are involved), and generally appears within 30 s of bending over. It is even more common (48.8%) in patients with decompensated HF, with either reduced or preserved ejection fraction.[2] Some authors consider that it may be a valuable marker for early identification of decompensated HF.[3] It also appears to be related to short-term mortality.[2] In functional studies using cardiopulmonary exercise testing, bendopnea was associated with elevated VE/VCO_2.[4]

In their study published in this issue of the *Journal*, Martinez Cerón et al. analyze the association between different forms of dyspnea and chronic non-communicable diseases, particularly cardiopulmonary disease, in primary health care.[5] The study included 633 randomly selected individuals aged 45-99 years who completed a questionnaire and underwent clinical assessment, laboratory testing, electrocardiography and echocardiography. The authors concluded that bendopnea was the only form of dyspnea not associated with chronic obstructive pulmonary disease (COPD), but that it was associated with HF, particularly HF with preserved ejection fraction (HFpEF). Interestingly, they also reported significant associations with depression and diabetes, a finding that merits more detailed investigation.

However, the study has certain limitations that should be borne in mind. Firstly, the questionnaire is highly subjective and does not allow for an objective analysis of the

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symptoms analyzed. For example, difficulty in bending over could be due to musculoskeletal or other problems rather than to dyspnea. The attribution of diagnoses of comorbidities is also inadequate: the presence of COPD is determined only by clinical history and not confirmed by diagnostic tests, and HF was also defined very broadly, without differentiating between left and right HF, and HFpEF was diagnosed solely on the basis of systolic function, without reference to biomarkers such as B-type natriuretic peptide, which are essential to this diagnosis. Other diagnoses also lacked precision, particularly of diabetes, for which a single fasting blood glucose measurement is insufficient without other assessments, particularly determination of HbA1c. In terms of the statistical analysis, another important limitation relates to the sample size. While the overall population size is significant, the subgroups analyzed are small: only 22 participants presented COPD, 35 HFpEF and 29 HFrEF. Statistical analysis, particularly multivariate analysis, on such small samples is unlikely to be conclusive. This may be why the study found no association between bendopnea and HFrEF, unlike previous publications, and the link with diabetes may have been due to chance. Indeed, all the associations – or lack of them – reported in the study should be viewed with considerable caution.

The work has the merit of attempting to address the question of the symptomatology of chronic diseases in a primary health care setting. It also aims to correlate the occurrence of dyspnea, a common symptom in HF, with its occurrence in other conditions. Bendopnea is without doubt a valuable symptom, as shown by the results of Thibodeau et al. However, more detailed analysis of its specificity is required, a task that Martinez Cerón et al. attempt, but only in a limited fashion. Further studies will be needed with larger populations (and hence greater statistical power) of patients with HFpEF, HFrEF and especially COPD and other respiratory diseases, as well as with a control group, using precise definitions that will enable accurate assessment of the different diagnoses under consideration, and a detailed analysis of the specificity and sensitivity of this new and promising symptom.

Conflicts of interest

The author has no conflicts of interest to declare.

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