Spirometric Patterns in Patients with Sleep-Related Breathing Disorders: Some Points to Highlight

Dear Editor,

I read with great interest the study of Mehfooz et al.,[1] aiming to evaluate the correlation between the spirometric indices [e.g., forced expiratory volume in one second (FEV1), forced vital capacity (FVC), FEV1/FVC, maximal mid-expiratory flow] and snoring, apnea hypo-apnea index (AHI), and STOP-BANG questionnaire data.

Such studies are very much encouraged for at least three reasons. First, spirometry is essential to assess and follow-up patients with chronic pulmonary diseases or chronic conditions which respiratory repercussions (e.g., sleep-related breathing disorders (SRBD)).[2] For example, spirometry is recommended in patients with obstructive sleep apnea syndrome (OSA) who they are smokers/ex-smokers or they are obese with respiratory symptoms.[3]

Secondly, the plethysmo-graphic data are implicated in the pathogenesis of SRBD in terms of functional residual capacity.[4] Thirdly, in SRBD patients, the frequencies of the different spirometric patterns are unidentified and the studies examining their spirometric profiles and/or data have contradictory results.[5] For the above aforementioned considerations, it is remarkable to establish the spirometric profile of SRBD patients, especially OSA ones. However, in the paper of Mehfooz et al.,[1] four methodological points related to the spirometric test subsection and the lack of a control-group should be highlighted.

The first point is related to the expression mode of the spirometric data. Mehfooz et al.,[1] have expressed spirometric data as percentages of the predicted value [i.e., Table 1b] without any precision about which norms were applied. In practice, the interpretation basis of spirometric data relies upon comparison of the measured values with the predicted ones from a ‘relevant healthy’ population with a comparable ethnic background.[6] Meanwhile the study was performed during 2018 and 2019, the author can presume that the 2012-global lung initiative (2012-GLI) norms[7] were applied (e.g., as a default set-up) to interpret spirometry in the Indian population. Since no norms for the Indian subcontinent were derived for the 2012-GLI report,[1] their use can be a source of spirometric data misinterpretation.

The second point is related to the bronchodilator test. Mehfooz et al.,[1] have noted the following vague sentence “after spirometry with post-bronchodilator, reversibility were categorized into bronchial asthma and chronic obstructive pulmonary disease “COPD””. Since there is no clear consensus about what constitutes a significant bronchodilator responsiveness, and since the COPD diagnosis is recommendation dependent,[8] it was better to describe the bronchodilator test [i.e., applied medicament and its dose, used spirometric data (FEV1 and or FVC), bronchodilator expression mode (absolute value, increases from predicted or initial value), and applied thresholds (200 ml and/or 12%)].

The third point, probably the most important one, is related to the absence of the applied definitions to retain some spirometric abnormalities (e.g., obstructive and restrictive patterns [Table 1c]). First, nowadays several definitions can be applied to diagnosis an obstructive pattern (e.g., FEV1/FVC <lower limit of normal (LLN) or <0,70, or z-score <‑1.64).[2,9,10]

Secondly, to retain the diagnosis of a restrictive pattern, the total lung capacity (TLC) should be determined, and therefore a plethysmography is needed.[9] In the Indian study,[3] since only spirometry was performed, the more appropriate expression should be “tendency through a restrictive pattern”. Moreover, which definition was applied to retain such a diagnosis? Was it “FEV1, FVC <LLN” and “FEV1/FVC >LLN”? Or was it “FEV1 Z-score and FVC Z-score <‑1.64” and “FEV1/FVC Z-score >‑1.64”? Or was it “FEV1 >80%” and “FVC <80%”? This is a “serious” methodological “omission” since no other researcher can duplicate the Indian study.[3] Thirdly, a recent study aiming to establish the plethysmographic profile of North-African patients with severe OSA treated with continuous positive airway pressure found that 73% and 16% of patients had restrictive (i.e., TLC <LLN) and obstructive (i.e., FEV1/FVC <LLN) patterns, respectively.[8] These two percentages are different from those reported by Mehfooz et al.,[1] where 10% and 40% of patients had “restrictive” and obstructive patterns, respectively.

The last point is related to the lack of a control-group of non-obese or obese participants free from OSA.[9] These points can affect the results and can make the conclusions of Mehfooz et al.,[1] questionable.

In conclusion, additional studies aiming to evaluate the impact of SRBD on the lung function data are needed. However, a rigorous and solid method should be applied.

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