

Editorial

Another parameter for identifying obstructive respiratory disorder – FEV₁/FEV₆ in focus

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The article entitled “Determination of the efficacy of FEV₆ as a surrogate for FVC in the diagnostic screening for chronic obstructive pulmonary disease through the comparison of FEV₁/FVC and FEV₁/FEV₆ ratios”, by Lundgren *et al.*,⁽¹⁾ addresses a number of topics that are highly relevant in pulmonology. Among those, it is important to highlight the role of anti-smoking campaigns and campaigns of diagnostic screening for chronic obstructive pulmonary disease (COPD), from their screening phase to the orientation and appropriate referral of patients. Taking this opportunity, and praising the authors for their vision and qualities, I would like to address some topics that can be listed as follows:

- 1 The use of a fixed value of 70% for the ratio between forced expiratory volume in one second and forced vital capacity (FEV₁/FVC) in the diagnosis of obstructive ventilatory defect, as a complement in the diagnosis of COPD - Since this value is partly dependent on age, the use of a fixed value results in underestimation of the critical diagnostic value in younger individuals, in whom early diagnosis and early measurements are highly relevant, as well as its overestimation in elderly individuals, in whom an FEV₁/FVC ratio of 70% might be normal. False-negative results are as undesirable as false-positive results. However, this is a long-standing debate;
- 2 The use of the FEV₁/FVC ratio or the FEV₁/FEV₆ ratio as a parameter -In fact, I would add the FEV₁/VC ratio as a better parameter for the comparison, since the greater the denominator, the more sensitive the ratio. In order for the parameter to be sensitive and specific, from a pathophysiological point of view, the numerator and the denominator should not be similarly compromised, that is, if the disease tends to decrease both, the ratio will decrease less and this will delay the diagnosis. Unlike other screening tests, which have high sensitivity, the test proposed, FEV₁/FEV₆, will have attributes of higher specificity, that is, it will be useful in ruling out the presence of the disease and not in identifying it, which seems to be what is being inquired into;
- 3 Can the training of personnel to use a simpler device or conduct field research be facilitated? -In this case, the difference in the tests will only be the duration of expiratory time. The training of personnel to perform the up-to-6-second spirometric test and the up-to-15-second spirometric test is the same. Furthermore, the expertise of the technician will be proven through conducting innumerable tests. In addition to instructing the individual that will perform the test, it is essential that special attention be given to undesirable events, as well as to the analysis of the graphic records, especially at the beginning of the maneuver. Therefore, the weight of the duration of expiratory time in relation to the total time of the test is not the same as its simple time reduction;
- 4 Cost of the equipment - It seems that the measurement of FEV allows the use of sensors incapable of identifying the end of expiration. In other words, they do not identify low expiratory flow rates or integrate them in volume. Will this loss of accuracy and precision be limited to the increase in expiration time? Does that compensate for the loss of parameters that are corrected by volume or referenced by volume, such as forced expiratory flow between 25% and 75% of FVC (FEF₂₅₋₇₅), forced expiratory time between 25% and 75% of FVC (FET₂₅₋₇₅), or the ratio of FEF₂₅₋₇₅ to FVC (FEF₂₅₋₇₅/FVC)? After all, will we be limited only to FEV₁/FEV₆? What defines the suspicion of restrictive disease due to decreased VC or FVC in such inquiries?
- 5 Economic aspect - Can physicians afford to purchase a piece of equipment only for the purpose of conducting field research focusing on COPD? In their offices, will physicians charge for a spirometric test? This seems to be against the interests of pulmonology, whereas we ask for quality equipment and experienced personnel to perform tests and analyses;
- 6 Study method - a) We must consider that using one's own device as the gold standard, especially a system intended to offer a surrogate for what is being tested - FVC - is temerity. In addition, there is no specification of the minimum time or flow threshold for determining FVC that approximates the results. The shorter the expiratory time and the lower the flow sensitivity of the device, the closer the FEV and the FVC values will be. Therefore, the direction of the error in the device, as well as in the technique, approximates the results,

negating the differences; and b) As for the sample, the number of individuals in the critical group is reduced. Since the table used to determine sensitivity, specificity, etc. analyzed only the concordances, discordances, false-positive results, and false-negative results, the work of identifying the critical analysis group has been done. With only approximately 20 individuals in the critical group, with a FEV₁/FVC ratio between 65 and 75%, it is practically impossible to identify small differences. The distribution, which is comprehensive and properly shown in the figure, lacks concentration in the critical area.

With these observations, I hope to contribute to the debate.

In the recent past, we had, in Rio de Janeiro, an experience similar to that of Lundgren *et al.* - the Breathe and Live project. We had an interesting flow, from inquiry to spirometry, from individual counseling and medical referral to lectures on COPD and on the hazardous effects of smoking. The advertisement of the project in the media, in conjunction with popular interest, brought health workers into closer contact with the population, and there was an undeniable gain. I would say that it was one of the most successful studies that we

have conducted. However, the spirometer frequently continued to register FVC even after the end of expiration and the withdrawal of the device from the mouth. The team of excellent quality technicians, who came from the main health care facilities in Rio de Janeiro, soon detected the problem and began to change the devices. Finally, the team added an inspiratory maneuver at the end of expiration in order to interrupt the signal integration. I believe this to be the problem that the use of FEV₆ tries to avoid. However, I wonder if this is not just the tip of the iceberg of problems that are not so easily identifiable. Nevertheless, in the remembrances of my closest colleagues, when we refer to that inquiry, before the good things, there always comes the phrase - "but what a device...!"

References

1. Lundgren FLC, Cabral MM, Clímaco DCS, Macedo LG, Coelho MAL, Dias ALPL. Determinação da eficiência do VEF₆ como subtítulo da CVF na triagem diagnóstica da doença pulmonar obstrutiva crônica através da comparação entre as relações VEF₁/CVF e VEF₁/VEF₆. J Bras Pneumol.2007;33(2):148-51.

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