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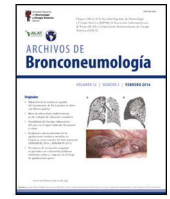

Editorial

Lung Function is Not Outdated☆

La función pulmonar no está pasada de moda

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Health professionals who treat patients with respiratory diseases do not seem to be so keen on conducting lung function tests (LFT) as they used to be. However, LFTs are increasingly important in the diagnosis and treatment of many lung diseases. For example, in the recent development of 2 antifibrotics, pirfenidone and nintedanib, for idiopathic pulmonary fibrosis, effectiveness was assessed in terms of delaying forced vital capacity decline.[1] In addition to spirometry, other lung function parameters, such as carbon monoxide transfer factor (TLco), are considered essential for assessing the effectiveness of other new antifibrotics.[1] In chronic obstructive pulmonary disease, forced spirometry is required for diagnosis and staging.[2] However, increasing numbers of authors believe that other LFT parameters, such as TLco or forced oscillation technique (FOT), are essential for an early diagnosis. These tests correlate well with symptoms and are also useful for assessing the effectiveness of new treatments in these patients.[3] The situation is similar in other highly prevalent diseases, such as bronchial asthma or neuromuscular diseases. Subjects with impaired lung growth have also demonstrated abnormal lung function parameters during their development, leading to a higher prevalence of cardiovascular and metabolic diseases[4,5] and increased risk of mortality from cardiac and pulmonary diseases.[4]

Another characteristic of LFTs is that the same result is often interpreted differently, depending on the laboratory in which the test was conducted, with wide discrepancies in what was defined as the normal range of values observed in a healthy population.[6] The Global Lung Function Initiative (GLI), along with other international scientific societies, such as the American Thoracic Society (ATS) and the European Respiratory Society (ERS), have decided to clarify the interpretation of LFTs, especially with regard to use of the lower limit of normal and the *Z*-score to differentiate between health and disease.[7,8] The ATS has also recently recommended standardizing LFT parameters in the final report by including absolute and reference values expressed as percentages of the mean, lower limit of normal, and *Z*-score, along with a quality grading system.[9] The GLI also standardized reference equations that can be taken as universal for spirometry parameters (2012)[7] and for TLco (2017).[8] Future GLI initiatives will include reference equations for static lung volumes, exhaled nitric oxide, and FOT.

Tools are now being used to facilitate communication between health systems specific to each healthcare site or hospital with the purpose of accessing patient data; one example is the patient electronic health record (EHR). For health data to be entered in the EHR, they must be structured and standardized. In this respect, initiatives have emerged to include forced spirometry data in the EHR in Catalonia[10] and the Basque Country, in order to comply with centralized quality control programs.[11] Access to structured data also makes it easier to incorporate quality control algorithms that improve the conduct of maneuvers during a spirometry test,[12] thus minimizing the proportion of low quality tests in non-specialized centers. Finally, we must highlight the recent initiative led by the ATS to standardize LFT data in a structured format; a consensus document in this regard may be available in early 2020, that will also facilitate the recording of LFTs in the EHR. These strategies and big data analysis methods will help generate valuable new information on the association between LFT parameters and lifelong health that might have relevance in the future.

The incorporation of new technologies has also led to progress in the development of simpler and more sensitive lung function testing equipment. Ultrasound spirometry machines that do not require calibration are now available. The use of these ultrasound spirometers in diffusion testing systems has led to more compact devices that can also measure lung diffusion of nitric oxide, differentiating the capillary components from the membrane components.[13] New technologies using flow interruption techniques can measure lung volumes in compact portable systems, a factor that will contribute to their generalized application.

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Techniques such as FOT and multiple-breath inert gas washout tests are also gradually appearing in our laboratories. Notwithstanding, some basic tests for the diagnosis of respiratory diseases, such ascardiopulmonary exertion testing, continue to be regarded as an exclusively cardiological procedure.

In recent years, national and international respiratory medicine societies have pledged their support for lung function testing with training programs and resident rotations (e.g., the Aquiles, Atenea, and Ulises programs, the ERS-SEPAR spirometry driving license, EOS, etc.).[14,15] Formal training will, without a doubt, lead to a qualitative improvement the quality of lung function laboratories (LFL).

Given the climate of advancement in the field of LFTs, the Spanish Society of Pneumology and Thoracic Surgery's (SEPAR) failure to include LFLs in their accreditation of units of this type appears groundless, but this situation is currently being resolved. Criteria for LFL accreditation are now classified on 3 levels, corresponding to high complexity, advanced and basic units, offering laboratories an opportunity to obtain a certificate of excellence at each level. In this type of LFL accreditation, not only self-evaluation but also the assessment destined for each of the levels will have a very important role. Formal training and LFL accreditation should drive significant improvements in the quality of the tests and promote greater awareness among the new generations of pulmonologists.

In summary, considerable advances have been made in recent years in both technological features and LFT protocols; however, these do not seem to have filtered down to the health professionals who treat patients with respiratory diseases. National and international scientific respiratory medicine societies have opted to promote the profile of lung function testing, but it looks as if we will have to design strategies to motivate professionals to implement and develop their use of LFTs.

References

1. Barratt S, Creamer A, Hayton C, Chaudhuri N. Idiopathic pulmonary fibrosis (IPF): an overview. J Clin Med. 2018;7:201.
2. Pirozzi CS, Gu T, Quibrera PM, Carretta EE, Han MLK, Murray S, et al. Heterogeneous burden of lung disease in smokers with borderline airflow obstruction. Respir Res. 2018;19:223.
3. Zimmermann SC, Tonga KO, Thamrin C. Dismantling airway disease with the use of new pulmonary function indices. Eur Respir Rev. 2019;28:180122.
4. Vasquez MM, Zhou M, Hu C, Martinez FDGS. Low lung function in young adult life is associated. Am J Respir Crit Care Med. 2017;195:1399–401.
5. Agustí A, Noell G, Brugada J, Faner R. Lung function in early adulthood and health in later life: a transgenerational cohort analysis. Lancet Respir Med. 2017;5:935–45.
6. Hall GL, Stanojevic S. The Global Lung Function Initiative (GLI) Network ERS Clinical Research Collaboration: how international collaboration can shape clinical practice. Eur Respir J. 2019;53:1802277.
7. Quanjer PH, Stanojevic S, Cole TJ, Baur X, Hall GL, Culver BH, et al. Multi-ethnic reference values for spirometry for the 3–95-yr age range: the global lung function 2012 equations. Eur Respir J. 2012;40:1324–43.
8. Graham BL, Brusasco V, Burgos F, Cooper BG, Jensen R, Kendrick A, et al. 2017 ERS/ATS standards for single-breath carbon monoxide uptake in the lung. Eur Respir J. 2017;49:1–31.
9. Culver BH, Graham BL, Coates AL, Wanger J, Berry CE, Clarke PK, et al. Recommendations for a standardized pulmonary function report. An official American Thoracic Society technical statement. Am J Respir Crit Care Med. 2017;196:1463–72.
10. Salas T, Rubies C, Gallego C, Muñoz P, Burgos F, Escarrabill J. Requerimientos técnicos de los espirómetros en la estrategia para garantizar el acceso a una espirometría de calidad. Arch Bronconeumol. 2011;47:466–9.
11. Marina Malanda N, López de Santa María E, Gutiérrez A, Bayón JC, Garcia L, Gáldiz JB. Telemedicine spirometry training and quality assurance program in primary care centers of a public health system. Telemed e-Health. 2014;20:388–92.
12. Burgos F, Melia U, Vallverdú M, Velickovski F, Lluch-Ariet M, Caminal P, et al. Clinical decision support system to enhance quality control of spirometry using information and communication technologies. JMIR Med Inform. 2014;2:e29.
13. Puente Maestú L, de Miguel Diez J, López Padilla D. Prueba de difusión por respiración única. La longevidad es la recompensa de la virtud. Arch Bronconeumol. 2018;54:501–2.
14. Brightling C, Genton C, Bill W, Welte T, Gaga M, Heuvelin E, et al. ERS Clinical Research Collaborations: underpinning research excellence. Eur Respir J. 2018;52, 1801534.
15. Programa de formación en Espirometría SEPAR-ERS. Disponible en: https://www.separ.es/?q=node/1467 [consultado 1 octubre 2019].