EDITORIAL

Airway wall thickness in severe and nonsevere asthma: is there a difference?

Gaël Dournes[1,2], Ilyes Benlala[1,2], François Laurent[1,2]

1 University of Bordeaux, INSERM, Cardio-Thoracic Research Center, Bordeaux, France
2 Department of Cardio-Thoracic Imaging, University Hospital of Bordeaux, Pessac, France

RELATED ARTICLE

by Obojski et al

Asthma is a major health issue worldwide, and there is a need for noninvasive assessment tools to better understand the disease process and reproducibly quantify the disease burden in relation to the disease severity. Three-dimensional (3D) computed tomography (CT) has a long-standing and proven efficacy to perform this task, as it enables quantification of the bronchial dimensions, which were previously found to correlate with pathological biomarkers of airway remodeling[1,2]—a key feature that is associated with the development of severe asthma.

The study by Obojski et al[3] provides new insights into noninvasive assessment of quantifiable bronchial parameters. In their study, the authors used 3D CT to perform a quantitative measurement of the airways from the third to the ninth bronchial generation. In the analyzed cohort, the bronchial wall was found to be more thickened in asthmatic patients than in healthy controls, especially in the more distal airways, which is in line with the results of previous studies.[1]

The novelty of the study by Obojski et al[3] lies in their comparison of 2 well-characterized asthma subgroups divided according to the Global Initiative for Asthma classification, that is, individuals with severe (n = 22) and nonsevere asthma (n = 48). All patients were in a stable and controlled phase of the disease during examination. Interestingly, there was no significant difference in the bronchial wall or lumen area between these 2 groups, although the results of pulmonary function tests were found to be more altered in the patients with severe asthma.

This finding is novel and deserves to be commented on. Indeed, if airway remodeling was related to the disease severity, a difference in airway wall thickness between the groups could be expected. Conversely, Obojski et al[3] postulated that the airway remodeling process could start early in the disease course, which would explain the discrepancy between structural and functional test results. The small distal airways were not analyzed in the study; therefore, it remains unclear whether there is a difference between measurements of central and distal airways, which would clarify the lack of correlation between central airway dimensions and pulmonary function test results. However, regardless of whether the small distal airways were similarly altered in the asthma groups or not, it would not affect the observation that a similar level of bronchial remodeling was found for the central airways.

It is also noteworthy that, despite upgrades in the spatial resolution of CT scans, this modality is still limited in its capacity to characterize the airway wall components. Therefore, this study may promote further attempts to obtain a more specific visualization of the airway wall components with tools such as magnetic resonance imaging (MRI) of the lungs or spectral CT. Lung MRI has recently proven its ability to provide high-resolution morphological imaging in asthma,[4] and to enable discrimination between various forms of bronchial inflammatory processes,[5] which should be worth evaluating in asthma. Spectral CT may further improve the spatial resolution of CT scans, with a possibility of additional tissue characterization.[6] Another research group also proposed to quantify the airway wall attenuation to get an additional insight into the airway wall components.[7] Therefore, a key remaining question is, apart from airway dimensions, whether there is a difference in airway wall composition between the groups of patients with varying degrees of asthma severity.

Overall, the result of the study by Obojski et al[3] shed additional light on the airway remodeling process and raised new questions. Future investigations should further explore the underlying mechanisms and clinical consequences of airway remodeling, using more specific imaging tools and longitudinal studies.

Correspondence to:
Gaël Dournes, MD, PhD,
Centre de Recherche Cardio-thoracique de Bordeaux,
INSERM U1045, Université de Bordeaux, 146 rue Léo Saignat,
33076 Bordeaux Cedex, France,
phone: +33 5 57 57 46 02, email:
gael.dournes@chu-bordeaux.fr
Received: March 6, 2022.
Accepted: March 6, 2022.
Published online: March 30, 2022.
Pol Arch Intern Med. 2022;
132 (3): 16225
doi:10.20452/pamw.16225

ARTICLE INFORMATION

DISCLAIMER The opinions expressed by the author(s) are not necessarily those of the journal editors, Polish Society of Internal Medicine, or publisher.

CONFLICT OF INTEREST None declared.

HOW TO CITE Dournes G, Benlala I, Laurent F. Airway wall thickness in severe and nonsevere asthma: is there a difference? Pol Arch Intern Med. 2022; 132: 16225. doi:10.20452/pamw.16225

REFERENCES

1 Montaudon M, Lederlin M, Reich S, et al. Bronchial measurements in patients with asthma: comparison of quantitative thin-section CT findings with those in healthy subjects and correlation with pathologic findings. Radiology. 2009; 253: 844-853.

2 Trivedi A, Hall C, Hoffman EA, et al. Using imaging as a biomarker for asthma. J Allergy Clin Immunol. 2017; 139: 1-10.

3 Obojski A, Patyk M, Zaleska-Dorobisz U. Assessment of airway remodeling by quantitative computed tomography at various degrees of asthma severity defined according to the Global Initiative for Asthma report: a single-center study. Pol Arch Intern Med. 2022; 132: 16152.

4 Benlala I, Dournes G, Girodet P-O, et al. Evaluation of bronchial wall thickness in asthma using magnetic resonance imaging. Eur Respir J. 2021; 59: 2100329.

5 Dournes G, Berger P, Refait J, et al. Allergic bronchopulmonary aspergillosis in cystic fibrosis: MR imaging of airway mucus contrasts as a tool for diagnosis. Radiology. 2017; 285: 261-269.

6 Si-Mohamed SA, Miailhes J, Rodesch P-A, et al. Spectral photon-counting CT technology in chest imaging. J Clin Med. 2021; 10: 5757.

7 Lederlin M, Laurent F, Portron Y, et al. CT Attenuation of the bronchial wall in patients with asthma: comparison with geometric parameters and correlation with function and histologic characteristics. Am J Roentgenol. 2012; 199: 1226-1233.