ATS 2024 Highlights

Respiratory Structure and Function Early Career Professionals

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Get to know members of the RSF Assembly

Is your research clinical, basic science or translational?

Clinical and translational

Tell us about your research?

At the University of California San Francisco, I use quantitative computed tomography imaging and endobronchial biopsy specimens from the Severe Asthma Research Program (SARP) to better understand the biological mechanisms underlying various asthma endotypes. I have recently transitioned back to the University of British Columbia to launch a new line of research in dissecting the heterogeneity and overlap of asthma and COPD in their disease molecular pathophysiology and therapeutic response by endophenotyping.

Where do you see yourself in 5 years?

I will have developed a solid foundation in analysing multi-dimensional transcriptomic, epigenomic, and pulmonary imaging data used in endophenotyping. I will develop a research program that addresses the unanswered questions regarding biological mechanisms underlying asthma and COPD overlap, as a step towards my career goal of becoming an independent clinician-investigator in airways disease research.

What do you find is the major benefit of RSF Assembly Membership?

The RSF Assembly supports ECPs in many ways, such as networking and mentorship opportunities with multi-disciplinary investigators through the assembly meetings at the ATS conference, promoting ECPs research through ATS abstract scholarships, and fostering connections which are vital to career development and research collaboration.

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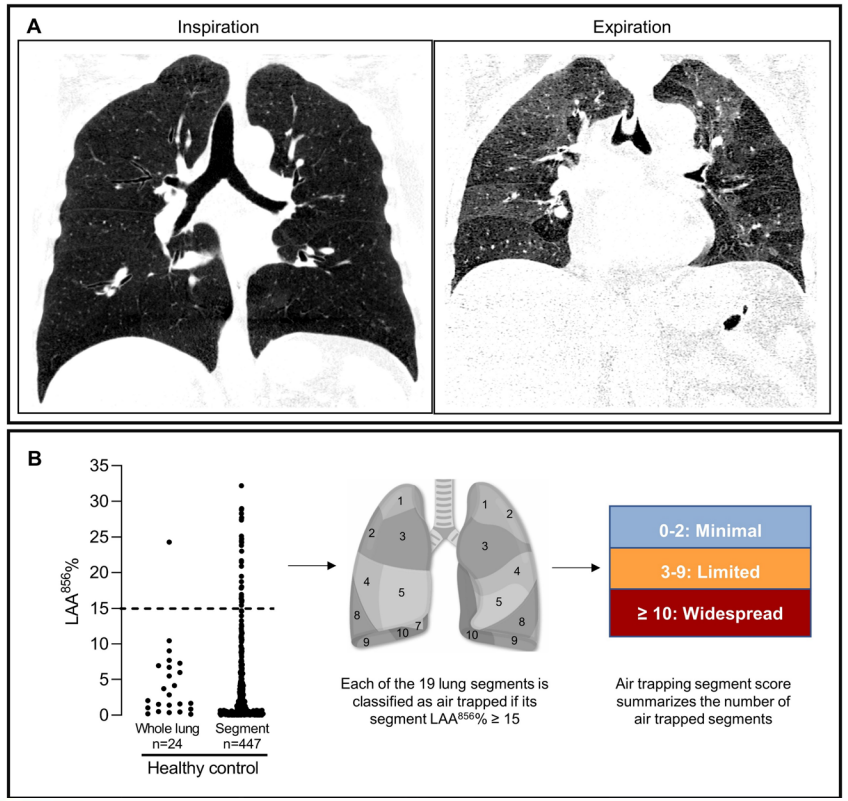

A novel air trapping segment score identifies opposing effects of obesity and eosinophilia on air trapping in asthma

Objective: To develop and apply a segment-based measure of air trapping in asthma to investigate the clinical, physiological, and pathological determinants of air trapping.

Methods: In each of 19 bronchopulmonary segments in CT lung scans from 199 SARP-3 patients, air trapping was categorized as present if lung attenuation was < -856 Hounsfield units at expiration in ≥ 15% of lung area. The resulting air trapping segment score (0-19) was then related to clinical, physiologic, and pathologic outcomes.

Results:. Patients with widespread air trapping (≥ 10 segments) had more severe asthma ($p<0.05$). The mean (± SD) air trapping segment score in patients with a BMI ≥ 30 was lower than in patients with a BMI < 30 (3.5 ± 4.6 vs. 5.5 ± 6.3, $p=0.008$), a difference driven by significantly lower air trapping frequency in the lower lobe segments of obese patients (35 vs. 46%, $p=0.001$). The air trapping segment score in patients with sputum eosinophil % ≥ 2 was higher than in patients with sputum eosinophil % < 2 (7.0 ± 6.1 vs. 3.3 ± 4.9, $p<0.0001$).

Conclusion: Eosinophilia is an important determinant of widespread air trapping in asthma while obesity is linked to less air trapping especially in the lower lobe segments.

(left) Generation of the air trapping segment score in SARP-3 asthma patients. (A) Air trapping appears as regions of decreased attenuation in the expiratory CT scan. (B) Air trapping was quantified by the percent of the lung tissue (voxels) with attenuation less than -856 Hounsfield units (LAA^{856}%) at functional residual capacity. Schematic representation shows how CTs were used to generate the air trapping segment score.

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