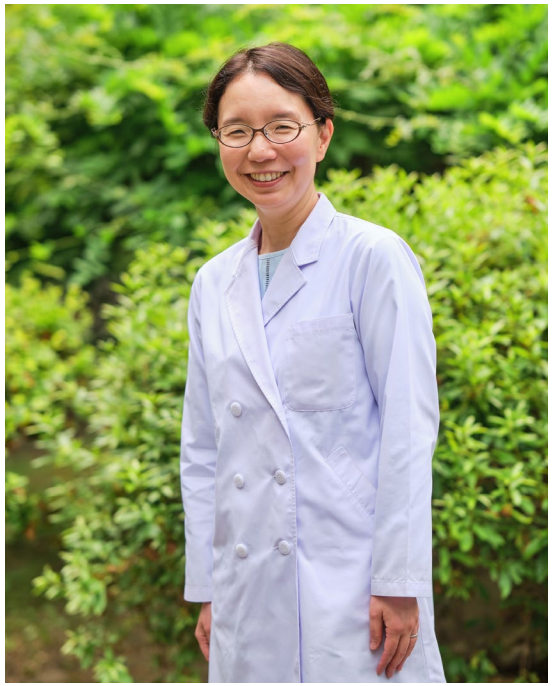
ATS 2026 Highlights
Respiratory Structure and Function Early Career Professionals



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Get to know members of the RSF Assembly

Is your research clinical, basic science or translational?

Clinical.

Tell us about your research?

My expertise is radiological and physiological assessment. I utilize CT-based morphology; airway, parenchyma, and vessels to understand the pathophysiology, together with indices of pulmonary function tests in asthma and COPD, and pulmonary hypertension. The combined assessment of intra-pulmonary indices or morphology with biomarkers may generate the novel hypothesis.

Where do you see yourself in 5 years?

I would like to implement physiology in clinical settings, which might lead to the better management of patients with respiratory diseases. I am also interested in the vascular alterations or circulation in airway diseases, which may determine the novel progression patterns with distinct outcomes.

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

To be familiar with the research from basic to clinical aspects in RSF clinical research may be strengthened by basic findings, and vice versa. RSF covers a broad range of diseases which enables us to explore the common mechanism or features and provides deeper insights into the pathophysiology.

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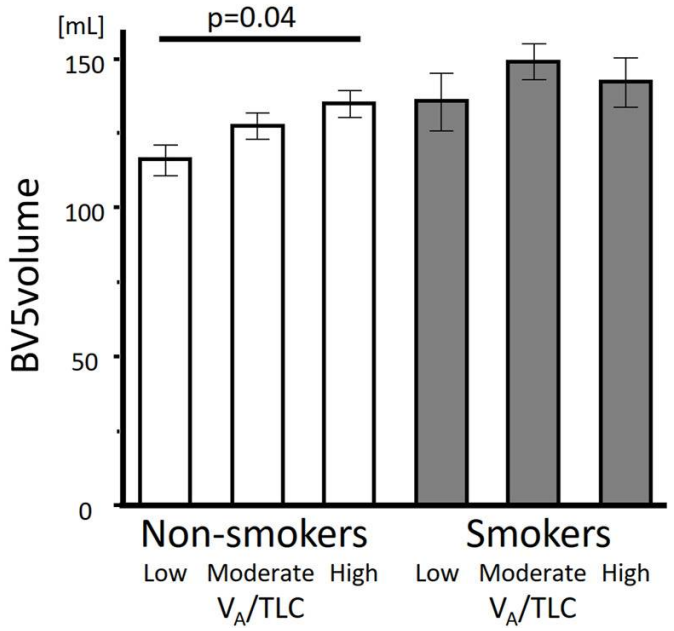

Figure 1. Small vessel volume on CT decreased, as ventilation heterogeneity became severe in non-smokers, but not in smokers.

Relationship of computed tomography-based small vessel indices of the lungs with ventilation heterogeneity and high transfer coefficients in non-smokers with asthma

Objective: To examine whether ventilation heterogeneity defined as a decrease in alveolar volume (VA)/total lung capacity (TLC) is related to a decrease of CT visible intra-pulmonary small vessel volume or number in non-smokers and smokers with asthma.

Methods: Participants were enrolled from the Hokkaido-based Investigative Cohort Analysis for Refractory Asthma (Hi-CARAT) study that included a prospective asthmatic cohort. Pulmonary function tests including Kco, using single breath methods; TLC, using multiple breath methods; and CT, were performed on the same day. The ratio of the lung volume assessed using single breath methods (alveolar volume; VA) to that using multiple breath methods (TLC) was calculated as an index of ventilation heterogeneity. The volume of the pulmonary small vessels < 5mm^2 in the whole lung (BV5 volume), and number of BV5 at a theoretical surface area of the lungs from the plural surface (BV5 number) were evaluated using chest CT images.

Results: The low VA/TLC group (the lowest quartile) had significantly lower BV5 number, BV5 volume, higher BV5 volume/BV5 number, and higher Kco compared to the high VA/TLC group (the highest quartile) in 117 non-smokers, but not in 67 smokers. Multivariable analysis showed that low VA/TLC was associated with low BV5 number, after adjusting for age, sex, weight, lung volume on CT, and CT emphysema index in non-smokers (not in smokers).

Conclusion: Ventilation heterogeneity may be associated with low BV5 number and high Kco in non-smokers (not in smokers). Future studies are needed to determine the dynamic regional system in ventilation, perfusion, and diffusion in asthma.

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