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(U*) (POS-60) Sex Differences in Airway Metrics & Chronic Obstructive Pulmonary Disease

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Introduction: Chronic obstructive pulmonary disease (COPD) is a complex disease defined by fixed airflow obstruction in the lungs, and is currently the 3rd leading cause of death globally. Female smokers are ˜50% more likely than male smokers to develop COPD, yet, the reasons for females' higher susceptibility to COPD remains largely unknown. The objective of this study was to investigate the structural airway differences using computed tomography (CT) imaging between males and females from the Canadian Cohort of Obstructive Lung Disease (CanCOLD) study.

Methods: Participants from the multicenter CanCOLD study with various smoking history (never vs current/ex-smoker) and CT images were evaluated. Airways were quantified on CT following segmentation and labelling using the VIDA Diagnostics software. CT measurements included emphysema quantified as a percentage of low-attenuation areas below −950 HU on inspiratory CT (LAA950) and measurements of airway wall thickness for a 10mm lumen perimeter (Pi10), the average airway lumen area (LA), and the total airway count (TAC) were measured. Multivariable linear regression models (MLR) were constructed for sex with these CT measurements, and adjusted for smoking status, age, CT total lung volume, CT air volume and CT display field of view.

Results: A total of 1294 participants were evaluated: n=226 male and n=220 female never-smokers, and n=524 male and n=324 female ever-smokers. The MLR models found all four CT measurements to be significantly associated with sex. LAA$_{}$ was shown to be significantly different between males and females (estimate=0.73, p=0.03), indicating that males have greater emphysema than females. Further, the multivariable linear regression model found that females have significantly fewer airway counts (TAC: estimate=1.49, p=<0.001), thinner airway walls (Pi10: estimate=0.026, p=0.004) and lower LA than males (LA: estimate=0.907, p=0.026).

Conclusions: Our study finds that females have fewer airways and thinner, narrower airway walls than males with COPD.

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