Transcript Details

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Advancing COPD Care: AI-Driven Tools for Enhanced Imaging

Announcer:
You're listening to *On the Frontlines of COPD* on ReachMD. On this episode, we'll hear from Dr. Muhammad Chaudhary, who's an instructor at the University of Alabama at Birmingham, School of Medicine. He'll be discussing his recent study, which examined an AI-based method to assess functional small airways disease in COPD. Here's Dr. Chaudhary now.

Dr. Chaudhary:
For the past decade or so, functional small airway disease was being measured by just computer tomography scans, and they required at least two CT scans. Now, while that biomarker was gaining traction and was being applied to all sorts of lung diseases, scalability issues were pretty prevalent, and we couldn't scale it to cohorts where only a single scan's required or to patients that couldn't hold their breath for multiple breath hold chest CT scans. So that's what motivated us to design a generative model that could predict one chest computer tomography scan from the other and use both of them in conjunction to predict functional small airway disease only by a single scan.

Deep generative modeling had been around for four or five years by the time we started working on that, and people were generating all those facial pictures to sketches and things like that, so that's the technology we use. We call it image generative models. And we used a very specific class called adversarial networks that generate perceptually realistic images.

I think the main finding was that the functional small airway disease determined by our method, which only used one single chest CT scan, was as reliable as the functional small airway disease evaluated off two or maybe more than two scans. And that was very interesting because it showed a very high correlation. And in follow up to that, it was very interesting to note that our measurement was far more repeatable. And it was expected because it relied on just one scan instead of accounting for the variability of multiple scans. So naturally, we were poised to have a much more repeatable measure.

I think it's much easier now to evaluate small airway disease. So the inspiratory chest CT scans that are used by our method are pretty commonly acquired as part of large screening trials, and they're more commonly acquired in most clinical settings. So that big wealth of chest CT scans can basically be harnessed to extract small airway disease and gain insights out of those. So it would really enable broad applicability in small airways disease.

AI tools are gaining a lot of attention. If you look at COPD detection, airway collapse, lobar collapse, and all sorts of these methods are being developed to understand different parts. AI is being used to segment out the airways, to study the vessels, and study lung tissue, so it's everywhere. Different AI models are helping us to integratively look at the lungs and how they change in COPD—not only at just the imaging level, but at the molecular level. People are using AI to analyze genomics and proteomics data to basically associate with the structural changes that happen due to COPD. It has provided a very integrative framework for analysis and understanding COPD.

Announcer:
That was Dr. Muhammad Chaudhary talking about the use of an AI model to detect functional small airways disease in COPD. To access this and other episodes in our series, visit *On the Frontlines of COPD* on ReachMD.com, where you can Be Part of the Knowledge. Thanks for listening!