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NEWS

RSNA Press Release

CT Shows Changes in Lungs Associated with COPD Flare-ups

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At A Glance

- CT may identify patients with chronic obstructive pulmonary disease (COPD) who are at increased risk for exacerbations.
- COPD exacerbations are episodes when symptoms suddenly worsen.
- The two main structural abnormalities seen in COPD are emphysema and airway disease.
- Being able to predict which patients are at greatest risk for exacerbations may ultimately allow researchers to develop targeted therapies.

OAK BROOK, Ill. (July 27, 2011) — Using computed tomography (CT), researchers have identified two types of structural changes in the lungs of patients with chronic obstructive pulmonary disease (COPD) that are associated with frequent exacerbations, or episodes when symptoms suddenly worsen. Their findings are published online in the journal *Radiology*.

COPD can damage both the airways and the air sacs of the lungs, and is a leading cause of death and illness worldwide. The two main structural abnormalities seen in COPD are emphysema, in which the air sacs of the lung are gradually destroyed, and airway disease, which causes a narrowing of the bronchial tubes.

"COPD is an extremely common problem that is frustrating to physicians," said the study's lead researcher, MeiLan K. Han, M.D., M.S., assistant professor of medicine at the University of Michigan Health System in Ann Arbor, Mich. "For a long time, we have had a one-size-fits-all approach to treating COPD patients."

COPD is currently staged by measuring lung function with a spirometer, a machine that measures how much air the lungs can hold and how fast air is expelled. A handful of medications are typically prescribed for the condition, regardless of what type of COPD patients have.

"Spirometry is inadequate as the sole parameter for assessing risk of exacerbations," Dr. Han said. "Two COPD patients may be identical in terms of lung function yet behave very differently. For instance, there are subsets of patients with severely reduced lung function who do not experience frequent exacerbations."

According to the National Heart, Lung and Blood Institute (NHLBI), an estimated $49.9

billion was spent on COPD in the United States in 2010, the majority of which was related to exacerbations.


MeiLan K. Han, M.D., M.S.

Dr. Han analyzed data from the COPDGene Study, an ongoing multi-center NHLBI-sponsored study, designed to identify genetic factors associated with COPD. In the study, patients who are between 45 and 80 years old with a history of cigarette smoking undergo spirometry and whole-lung volumetric CT examinations.

Dr. Han's study group included the first 2,500 patients enrolled in the COPDGene Study who met criteria for COPD. The researchers studied whether there was an association between a patient's bronchial wall thickness and degree of air sac destruction on CT with frequency of exacerbations.

The analysis revealed that while many patients had a mixture of structural changes related to their COPD, two subgroups predominantly with emphysema or large airway disease could be identified, and both increased airway wall thickness and increased emphysema were associated with greater exacerbation frequency, independent of spirometric measures of lung function.

"Radiologic characterization of COPD patients has prognostic value in the selection of more homogeneous subgroups for clinical trials and possibly for identifying patients at risk of frequent exacerbations for targeted medical therapies," Dr. Han said.

Dr. Han added that her research suggests there may be different disease mechanisms causing inflammation in the two COPD subgroups, and that future studies may help determine if these patients should be treated differently.

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"Chronic Obstructive Pulmonary Disease Exacerbations in the COPDGene Study: Associated Radiologic Phenotypes." Collaborating with Dr. Han on this paper were Ella A. Kazerooni, M.D., David A. Lynch, M.D., Lyrica X. Liu, M.S., Susan Murray, Sc.D., Jeffrey L. Curtis, M.D., Gerard J. Criner, M.D., Victor Kim, M.D., Russell P. Bowler, M.D., Nicola A. Hanania, M.D., Antonio R. Anzueto, M.D., Barry J. Make, M.D., John E. Hokanson, M.P.H., Ph.D., James D. Crapo, M.D., Edwin K. Silverman, M.D., Ph.D., Fernando J. Martinez, M.D., M.S., and George R. Washko, M.D., for the COPDGene Investigators.

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