

Researchers show link between lung disease and heart function

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A new study from Columbia University Medical Center researchers, has found that the heart's ability to pump effectively is diminished among people with a common lung disease, even in people with no or mild symptoms. Published in the Jan. 21, 2010 issue of the *New England Journal of Medicine*, the research is the first to show a strong link between heart function and mild COPD (chronic obstructive pulmonary disease).

COPD is the fourth leading cause of death in the United States, and it is strongly associated with smoking. COPD often involves loss of lung tissue, called emphysema, as well as narrowed airways, persistent cough, and mucus production, known as chronic obstructive bronchitis. Both of these abnormalities impair the flow of air in the lungs and make breathing more difficult over time.

"[Heart failure](#) caused by lung disease is well documented in patients with severe COPD, but was not thought to occur in patients with mild COPD," said Graham Barr, M.D., Dr. PH., assistant professor of medicine and epidemiology at Columbia University Medical Center, an internist at NewYork-Presbyterian Hospital/Columbia, principal investigator of the MESA Lung Study, and lead author of the paper. "We found that there appears to be a linear relationship between lung function and [heart function](#), and even a small hit to the lungs negatively affects heart function as well."

"This study shows that COPD, even in its mildest form, is associated

with diminished heart function," said Susan B. Shurin, M.D., acting director of the National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health, which funded the research. "We now have evidence that the presence of even mild COPD may have important health implications beyond the lungs."

"These results raise the intriguing possibility that treating lung disease may, in the future, improve heart function," said Dr. Barr. "Further research is needed to prove whether treating mild COPD will help the heart work better."

Research, Which Involved Participants of NHLBI's Multi-Ethnic Study of Atherosclerosis (MESA) Lung Study, Shows Lung Disease Has an Important Vascular Component

Using breathing tests and imaging studies of the chest, researchers measured heart and lung structure and function in 2,816 adults (average age of 61 years) who were mostly healthy. Study participants were part of the MESA Lung Study, an extension of the Multi-Ethnic Study of Atherosclerosis (MESA), a large, NHLBI-supported study focused on finding early signs of heart, lung, and blood diseases before symptoms appear.

Using magnetic resonance imaging (MRI) and computed tomography (CT) scans, the scientists found mild abnormalities in both heart and lung function in many participants. "We used sensitive measures to pick-up small differences in healthy people," said Dr. Barr. "We demonstrated that even mild COPD is associated with subclinical reductions in heart function, probably since not enough blood is entering the heart due to vascular problems in the lungs. This phenomenon is well described in very severe lung disease but is appreciated for the first time

in mild and subclinical COPD and emphysema."

The link between lung and heart function was found to be strongest in current smokers, in whom vascular damage is particularly common, and especially in those with emphysema. However, the association also appeared in participants with mild emphysema who had never smoked cigarettes.

"This study suggests that damage to the vasculature in the lungs may affect heart function and contribute to lung disease; we know that smoking causes vascular damage, which causes end-organ disease in the kidneys and brain," said Dr. Barr. "Our next step is to directly measure vascular damage in the lungs and then determine whether cardiac therapies may help treat lung disease, and vice versa."

The larger MESA project, which is a large cohort study similar to the NHLBI's Framingham Heart Study, involves almost 7,000 middle-aged and older men and women from six urban communities across the United States. Participants in MESA come from diverse race and ethnic groups, including African Americans, Latinos, Asians and Caucasians. Researchers have tracked MESA participants since enrollment began in 2000. Because the MESA study population is ethnically mixed and covers a broad age range of apparently healthy people, the results of this study may be widely applicable to the general U.S. population.

Many Sufferers of COPD Don't Recognize Its Symptoms

One in five Americans over the age of 45 has COPD, but as many as half may not even be aware of it. Researchers have long known that severe cases of COPD have harmful effects on the heart, decreasing its ability to pump blood effectively. The new results suggest that these

changes in the heart occur much earlier than previously studied, in mild cases of emphysema and COPD, even before symptoms appear.

Although damage to the airways from COPD is not fully reversible, treatments can substantially improve a patient's daily life. "COPD is one of the big killers in the United States, yet it is unknown to many," said James P. Kiley, Ph.D., director of the NHLBI Division of Lung Diseases. "Unfortunately, many people with COPD don't recognize common symptoms such as having shortness of breath while doing activities they used to be able to do, so it's important that we continue to increase awareness of the signs of COPD and available treatments."

Provided by Columbia University Medical Center

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