Viral infection not responsible for exacerbation of lung disease in most patients

EurekAlert

Acute viral infection does not appear to be a primary cause of acute exacerbation of idiopathic pulmonary fibrosis (IPF), a progressive, deadly disease resulting in thickening and scarring of the lungs, according to a study conducted by researchers from the U.S., Korea and Japan. Previous studies had suggested viral infection might cause exacerbation of IPF in a majority of patients who have the condition, which occurs most often in people between 50 and 70 years of age.

The findings were published online ahead of the print edition of the American Thoracic Society's *American Journal of Respiratory and Critical Care Medicine*.

"The etiology of acute exacerbation of IPF remains unknown, and occult viral infection has been proposed as one possible cause," said Harold Collard, MD, director of the Interstitial Lung Disease Program at the University of California, San Francisco. "The results of this study suggest that the majority of cases of acute exacerbation of IPF are not due to viral infection."

IPF is thought to result from an abnormal fibroproliferative (scar-forming) response in the lung. As lung tissue becomes stiff and thick, lung function and breathing are impaired. In some patients, these changes occur gradually over time, while in others the condition may cause acute periods of severe worsening.

In this study, the researchers enrolled 43 patients with acute exacerbation of IPF from two medical centers between 2006 and 2009. In addition, 69 patients with either stable IPF or acute lung injury (ALI) were enrolled from a single medical center as control subjects. In all cases, bronchoscopy was performed as part of patients' clinical evaluations. Lung fluid and blood samples were collected and analyzed using three separate, highly sensitive viral DNA detection techniques to test for the presence of both known and unknown viruses.

Results of these tests revealed evidence of viral infection in 33 percent of the patients with exacerbation of idiopathic pulmonary fibrosis patients, only four of whom had evidence of common respiratory viral infections. No viruses were detected in the lung fluid from stable patients.

"The presence of respiratory viral infections in these four IPF patients suggests that a small minority of acute exacerbations of IPF may be caused by occult infection with common respiratory viruses," said Dr. Collard, who is also an assistant clinical professor of medicine at UCSF.

Unexpectedly, the researchers also found lung fluid samples from 28 percent of patients in the acute exacerbation group and 24 percent in the ALI control group

tested positive for torque teno virus (TTV), a common virus that usually causes no symptoms in healthy individuals and which often appears in individuals with hepatitis. TTV was not found in stable IPF controls.

Dr. Collard said the presence of TTV in the lung fluid of patients with acute exacerbation of IPF was unexpected and its significance is unclear.

"The fact that a similar percentage of lung fluid samples from patients with ALI also were TTV positive suggests, however, that the presence of this virus may be a marker of lung injury but not causative," he noted. "It will be important to clarify the role of TTV in acute exacerbation of IPF in future studies."

By more clearly defining the relationship between viral infection and acute exacerbation of IPF, Dr. Collard hopes this study will help focus future research on other possible causes of the condition.

"This study uses the most current genomics-based technologies to investigate the possible infectious etiology of acute exacerbations of idiopathic pulmonary fibrosis, and the majority of cases in this study demonstrate no evidence of viral infection when subjected to these technologies," Dr. Collard said. "Future research into the etiology of acute exacerbation of IPF should confirm these findings, further investigate the role of TTV and consider other possible complications, such as aspiration, that may cause acute respiratory worsening in these patients."

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