ICU
MANAGEMENT & PRACTICE

Newly Identified Biomarkers Help Predict Outcome in Deadly Lung Disease

A Yale-led study has identified a gene expression profile that can predict outcomes and lead to better treatment for one of the most lethal lung diseases, idiopathic pulmonary fibrosis (IPF). The study appears in Science Translational Medicine.

IPF causes progressive scarring of the lungs, leading to cough, shortness of breath, and potentially death. In most cases, the cause cannot be identified, and there is no cure other than a lung transplant. While some patients experience a progressive course that leads to death within one to two years, others experience a relative stable disease.

The researchers' goal was to identify changes in expression of genes in the blood that are predictive of poor outcomes among patients with IPF.

Using two cohorts of patients, the researchers from Yale, University of Chicago, and University of Pittsburgh analyzed the expression of the genes in the whole genome of patients with IPF, and identified 52 genes that significantly correlated with outcome. They further found that the decreased expression of four genes — CD28, ICOS, LCK, and ITK — predicted shorter survival time in patients with IPF.

The research team believes discovery of these biomarkers will help physicians better predict disease presence, severity, and prognosis in IPF patients. "Given the fact that lung transplantation is the only therapy that has shown to improve survival in IPF, our test could allow physicians to refer IPF patients for lung transplant at the right time — not too late and not too early," said senior and corresponding author Dr. Naftali Kaminski, professor and chief of pulmonary, critical care, and sleep medicine at Yale School of Medicine.

Right now, at least six drugs are being studied for IPF. First author Jose Herazo-Maya of Yale School of Medicine said that one of the study's major impacts would be on drug studies. "Current drug studies do not address the variability in outcomes of IPF patients," he said. "Our findings may help investigators target patients who are more likely to progress and improve."

The decreased genes that predicted shorter survival time were mostly related to immune activation. Author Imre Noth, leader of the University of Chicago team, said, "Our result may also shed light on disease mechanisms, by supporting the emerging notion that aberrant immunity may play a role in IPF."

Other authors are Brenda Juan-Guardela of Yale; Yong Huang, Rekha Vij, Yves Lussier, and Joe Garcia of the University of Chicago; and Steven Duncan, SunHwan Kim, George Tseng, Eleanor Feingold, Thomas Richards, Kathleen Lindell, Jianmin Xue, Kevin Gibson, and Steven Shapiro of the University of Pittsburgh.

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