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Study finds close linkage between a rare, deadly lung condition and blood cell abnormalities

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Results from a study published in *Blood*, the Journal of the American Society of Hematology reveal a close relationship between pulmonary arterial hypertension (PAH)—exceedingly high blood pressure in the arteries carrying blood from the heart to the lungs—and abnormalities of the blood-forming cells in the bone marrow (known as myeloid abnormalities).

The study, which was conducted by a team of researchers at the Cleveland Clinic, showed that blood progenitor cells (cells that are capable of forming white blood cells, red blood cells, or platelets in the bone marrow and are reported to affect blood vessel formation), are increased in the bone marrow, blood, and lungs of patients with PAH. These findings suggest that the disease processes in the bone marrow and the lungs are related.

"This research pieces together a number of previous studies and observations suggesting a very close relationship between PAH and underlying bone marrow abnormalities," said Serpil Erzurum, MD, co-author of the study and Chair of the Department of Pathobiology at the Cleveland Clinic. "Our study honed in on the stem cells involved in blood vessel maintenance to identify factors that might be involved in bone marrow stem cell abnormalities as well as progressive arterial disease."

The researchers examined production of hypoxia-inducing factors (HIF, protein complexes that govern the body's response to low oxygen concentrations, which are activated to help heal damaged tissue) in patients with PAH. They found that levels of HIF and proteins whose production it regulates, erythropoietin (EPO) and hepatocyte growth factor (HGF), were all increased in PAH patients. Since individuals with this disease often require lung transplantation, the investigators were able to examine the lung tissue of the patients and found that blood vessel lining cells in the lung produced more HGF and stromal derived factor a, a protein which plays a crucial role in the formation of new blood vessels by recruiting progenitor cells from the circulation. Because HIF, EPO, and HGF can affect bone marrow progenitors, it appeared that there may be an abnormal feedback loop connecting blood and lung cell behavior. The presence of such an abnormal loop could provide a previously unrecognized opportunity for intervening in PAH, depending on the results of further investigation.

"Continued research will help us gain a better understanding of the level of cross-influence between these two conditions in order to improve treatment strategies and, ultimately, the quality of patient care," said Samar Farha, MD, co-author of the study and staff physician in the Respiratory Institute at the Cleveland Clinic.

Provided by American Society of Hematology