

Serum sodium predicts mortality 10 times higher in PAH patients

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Patients with pulmonary arterial hypertension (PAH)—chronically high blood pressure in the blood vessels of the lungs—whose serum sodium levels are low (called hyponatremia, or HN) have a very poor chance of survival and a high rate of right-heart failure (RHF), according to new research from the University of Pennsylvania.

Low blood sodium is already known to indicate advanced left heart failure but has never been demonstrated to be linked to right heart failure before, such as that seen in patients with PAH. The research appears in the second issue for June of the American Thoracic Society's *American Journal of Respiratory and Critical Care Medicine*.

"This is the first study to show the powerful prognostic significance of low blood sodium in these patients," said the study's lead author, Paul R. Forfia, M.D., a cardiologist in the Heart Failure/Transplant program and medical director of the Pulmonary Hypertension Program at the Hospital of the University of Pennsylvania.

Because serum sodium is measured on routine clinical labs, understanding the significance of HN in patient outcomes could make it a key clinical marker in patients with PAH

PAH is a syndrome marked by narrowing of the arteries in the lungs. Thus, the right ventricle of the heart has to work increasingly hard to pump blood into the lungs for reoxygenation. "The ability of the right ventricle to adapt to this increasing workload is the single most

important determinant of survival in these patients."

"Given the prevalence of RHF in these patients, we sought to determine whether HN is associated with more advanced RHF as well as worse prognosis in patients with PAH," wrote Dr. Forfia.

To do so, Dr. Forfia and Dr. Paul Hassoun from Johns Hopkins University, with associates from Emory and Vanderbilt Universities, analyzed the blood sodium levels in 40 patients with PAH. Thirteen had HN, or sodium less than 136 mEq/L.

Although there were no differences in age, sex, ethnicity or body mass index between the two groups, those with HN were in a lower functioning class (as measured by World Health Organization standards), had significantly poorer kidney function, and were three times as likely to have lower extremity edema, with evidence on echocardiography of significantly worse right heart function. During two years of follow up, HN patients were also twice as likely to be hospitalized, mostly for right heart failure.

But most remarkably, 11 of the 13, or 85 percent, of the HN group died during the follow-up period— compared to just 19 percent of the normonatremia group— with a median survival of eight and a half months. For patients with sodium concentration levels just slightly lower or higher than the 136mEq/L cut-off, the results were even more striking. "All ten patients with a serum sodium less than 135 mEq/L died, whereas all 16 subjects with sodium concentration of 140 mEq/L or greater survived," wrote Dr. Forfia.

"Thus," he continued, "serum sodium has important implications regarding right heart dysfunction, clinical right heart failure, and patient outcome and should not be overlooked in the clinical assessment of patients with PAH."

Source: American Thoracic Society

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