Medical Xpress

Hormone replacement therapy may improve pulmonary hypertension and right ventricular function

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The use of hormone replacement therapy (HRT) may be associated with improved pulmonary hypertension in women. Credit: ATS

The use of hormone replacement therapy (HRT) may be associated with

improved pulmonary hypertension in women, according to research presented at the ATS 2024 International Conference held May 17–22 in San Diego. Pulmonary hypertension (PH) is a type of pulmonary vascular disease—disease that affects blood vessels along the route between the heart and lungs.

Pulmonary hypertension is classified by the World Symposium on Pulmonary Hypertension (WSPH) into five groups (G1-5PH) based on its suspected cause. The heart's right ventricle accepts blood from the body's veins and propels it to the lungs, where it is oxygenated, and its carbon dioxide is eliminated.

Study participants had G1, G2, G3, G4 or G5 pulmonary hypertension. While some had mixed diseases (for example, both G2 and G3), they were categorized by the predominant subclass.

"Our study is unique in that it assessed over 700 women across multiple institutions nationally to help determine the impact of exogenous and endogenous hormone exposure on pulmonary hypertension," said corresponding author Audriana Hurbon, MD, assistant clinical professor, medicine, Dept. Of Medicine, The University of Arizona College of Medicine Tucson.

For this study's purposes, endogenous hormones were deemed to be those that women's bodies produce prior to menopause, while exogenous hormones were introduced through HRT.

Participants in the research were enrolled in the Pulmonary Vascular Disease Phenomics (PVDOMICS) study.

In WSPH Group 1 pulmonary hypertension (G1PH), being a woman has been associated with better preservation of right ventricular function than in men. However, scientists do not know if these observations, (1)

apply to both endogenous and exogenous female hormone exposure and (2) apply to types of pulmonary hypertension outside of G1PH.

This study explored the relationships between endogenous and exogenous hormone exposure to right ventricular function and pulmonary hypertension among women with G1-5PH.

"While it is accepted that in World Symposium Group 1 pulmonary hypertension female sex is associated with preservation of right ventricular function, the role of estrogen in pulmonary hypertension has been controversial," added Dr. Hurbon.

"Additionally, we know that women are affected by pulmonary hypertension more often than men, but when compared to each other, women seem to present less severely than men."

The study included 742 women from G1-5PH, comparators (those who have risk factors for pulmonary hypertension but do not have this disease), and healthy controls enrolled in the PVDOMICS study.

Pulmonary vascular disease related to pulmonary hypertension was defined by mean pulmonary artery pressure on right heart catheterization. Right ventricular function was characterized by right ventricular fractional shortening and right ventricular ejection fraction from echocardiography.

Endogenous hormone exposure was quantified by duration of self-reported lifetime duration of menses and exogenous exposure by ever having taken HRT. Two statistical analyses were done: One (all pulmonary hypertension groups) and two-way (by both pulmonary hypertension group and exposure) to examine differences in pulmonary vascular disease or right ventricular function.

The results: Across all pulmonary hypertension groups, average pulmonary arterial pressure decreased with greater lifetime duration of menses. Use of HRT was associated with lower mean pulmonary artery pressure and higher right ventricular fractional shortening and right ventricular ejection fraction.

G1PH had lower mean pulmonary artery pressure and pulmonary vascular resistance and higher right ventricular ejection fraction with hormone replacement therapy exposure. The team did not detect statistical differences within WSPH Groups 2-5.

While the team's initial analysis showed that higher duration of lifetime menses and HRT were associated with improved pulmonary vascular disease and right ventricular function related to pulmonary hypertension, further analysis has suggested that age in addition to use of HRT may have a synergistic effect on pulmonary vascular disease improvement.

"This could support a theory suggesting a threshold of estrogen exposure necessary for a protective effect," noted Dr. Hurbon.

"We hope this study will be a catalyst for further exploration of the mechanisms of female reproductive hormones to identify therapeutic targets for right ventricular preservation in pulmonary hypertension," the authors concluded.

More information: Session: A97 – It's (Not) a Small World: Molecular and Physiologic Epidemiology in PAH, The Impact of Reproductive History on Pulmonary Hypertension: Insights from the Pvdomics Study

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