Right Heart Failure Secondary to Pulmonary vs. Left Heart Disease

Jae-Hyeong Park, MD, PhD

Department of Internal Medicine, Chungnam National University Hospital, School of Medicine, Chungnam National University, Daejeon, Korea

Because right ventricle (RV) is a lower right chamber that receives deoxygenated blood from the right atrium and pumps it into pulmonary vascular beds, RV function is necessary to maintain normal pulmonary circulation. RV failure, a state of pumping insufficient blood to the lung, is commonly associated with left-sided heart failure (either systolic or diastolic heart failure, WHO group Ⅱ). Other causes of RV failure include pulmonary parenchymal diseases (WHO group Ⅲ), pulmonary vascular diseases (WHO group I and Ⅳ), coronary artery disease, valvular heart disease and pericardial diseases.

In patients with RV failure secondary to left-sided heart failure, left ventricle (LV) does not pump blood efficiently. This leads to increase of left atrium and pulmonary hypertension that can deteriorate RV function. It is not independently associated with the degree of LV systolic dysfunction, but is related to the degree of diastolic dysfunction and functional mitral regurgitation.

Pulmonary parenchymal diseases including chronic pulmonary obstructive disease (COPD) can cause increase of pulmonary arterial pressure that increases the workload of the RV, eventually causing the RV to fail (chronic cor pulmonale). RV failure secondary to pulmonary vascular obstruction include acute and chronic causes. Acute pulmonary arterial obstruction can be observed in the cases of acute pulmonary thromboembolism. Chronic pulmonary arterial obstruction can be associated with idiopathic pulmonary arterial hypertension (PAH), heritable, drug- or toxin-related and conditions of obstructing pulmonary arterial beds including connective tissue diseases, HIV infection, portal hypertension, congenital heart diseases, schistosomiasis and chronic hemolytic anemia.

Echocardiography is the most valuable tool to detect RV failure and differentiate their causes. In this session, I will focus on the causes of RV failure and the differenciating points of these with clinical and echocardiographic features.