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ReachMD

www.reachmd.com

info@reachmd.com

(866) 423-7849

The Echocardiogram Is of Central Importance to CTD-PAH Diagnosis and Referral

Announcer:

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Dr. Krasuski:

The echocardiogram is of central importance to connective tissue disease, pulmonary arterial hypertension, and for that all types of pH diagnosis and referral. The importance of structural changes of the right ventricle and pulmonary arterial hypertension. Right ventricular function is the single most important prognostic determine of survival in various forms of pulmonary hypertension. PH has been shown to result in right ventricular remodeling at different stages, organ level hemodynamics, to tissue stiffening, fiber reorientation, and altered myocyte contractility, and mitochondrial energetics. The right ventricle initially responds to increased pressures in pulmonary arterial hypertension by undergoing concentric hypertrophy. This helps to reduce right ventricular wall stress and results in increased organ level contractility. Increased wall thickness results in maintain cardiac output and an injection fraction. During the early stages of rye, ventricular remodeling with further progression of pulmonary hypertension, however right ventricular hypertrophy reaches a plateau while the PA pressures continue to rise. This is how this looks. Remember that pulmonary arterial hypertension is a process that is based on increased pulmonary vascular resistance. The right ventricle adapts in its early stages. But eventually this becomes maladaptive. The ventricle dilates, often the right ventricular ejection fraction goes down RVPA coupling become inefficient and the patient becomes progressively sicker. Ideally, we should be picking up patients in this asymptomatic or adaptive phases, but unfortunately, many patients are still picked up in the maladaptive phase.

Let's discuss the importance of echo in uncovering pH-related changes in heart structure. The most common opportunity to spot a new pH patient is either in the review of the echocardiographic images or in the echo report. Emphasis on the echocardiogram should be on structural changes associated with the heart and not just on the pressures. Remember that the pressures that are obtained are useful, but they're estimates only, and ideally pressure should be assessed with right heart catheterization. Some of the key structural features of the heart and pulmonary arterial hypertension, include the right ventricular size. If you're looking at the right ventricle to left ventricle basal diameter ratio, if it's greater than one, it should make you suspicious. The patient has pulmonary hypertension. If the right atrial size is increased if the right atrial area end diastolically is greater than 18 centimeter squared, that's very suspicious. If the intraventricular septum is flattened particularly during systole, that should make you very concerned that that patient has pulmonary hypertension. If it's flattened during diastole, it should make you think of volume loading issues. Inferior vena cava diameter fluctuates with the respiratory cycle. If you have a dilated IVC that's greater than 21 millimeters and it does not collapse at least 50% with inspiration, that should make you very suspicious for an increased right atrial pressure. And finally, the diameter of the pulmonary artery which can be pretty easily assessed with echo. If it's greater than 25 millimeters should make you concerned that pH is present.

So, echo is not all about the pressures. Structural changes are essential. Here on the left, you can see a patient with precapillary pulmonary hypertension. This patient has a dilated right ventricle, and their function is down. Remember the right ventricle contracts like a piston. You typically get up and down motion. And this particular patient, the tap seed tissue angular plain systolic excursion, appears to be reduced. There's also a pericardial fusion and there's a small left atrium with a septum that's been shifted from the RA over. So,

the interatrial septum pushes over into the LA. So, this is somebody who has classic precapillary pulmonary hypertension. Contrast this with the echo on the right. This is a patient with left heart disease and post-capillary pulmonary hypertension. This patient normally has pretty normal left ventricular function. They have left ventricular hypertrophy, often related to things such as hypertension, and they have normal-sized right chamber, right side of chambers. And they have left atrial enlargement. That can be pretty dramatic. Now I tend to use the, I call them Krasuski calipers. I put my fingers on the right ventricle for diameter. I compare it to the diameter of the right ventricle. If that right, ventricle is the same size, or larger than the LV, then I'm very concerned that a process involving the RV like pulmonary hypertension, is present.

Announcer:

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