

Pericardial disease

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The normal pericardium is a double-layered sac; the visceral pericardium is a serous membrane that is separated by a small quantity (15–50 mL) of serous fluid distributed mostly over the atrioventricular and interventricular grooves from the fibrous parietal pericardium.

Pericardial disease is an important cause of morbidity and mortality in patients with cardiovascular disease. Pericardial diseases involve inflammatory diseases of the pericardium ranging from acute pericarditis to chronic constrictive pericarditis, benign and malignant pericardial masses, pericardial cysts, and congenital absence of the pericardium. Recent advances in multimodality noninvasive cardiac imaging have solidified its role in the management of patients with suspected pericardial disease. The physiologic and structural information obtained from transthoracic echocardiography and the anatomic detail provided by cardiac computed tomography and magnetic resonance have led to growing interest in the complementary use of these techniques. Optimal management of the patient with suspected pericardial disease requires familiarity with the key imaging modalities and the ability to choose the appropriate imaging tests for each patient.

Echocardiography remains the primary and first-line imaging modality for diagnosing pericardial disease. It also provides critical physiologic data in patients with hemodynamic compromise. Cardiac CT has a relatively quick acquisition time and provides excellent morphological characterization of the pericardium. Cardiac MR provides superior soft tissue and pericardial anatomic characterization.

The presence of a pericardial effusion helps to confirm the diagnosis of acute pericarditis. On cardiac CT, pericardial thickening is suggestive of acute pericarditis. In the case of a pericardial effusion, attenuation measurements enable its initial characterization. Simple serous effusions (transudates) usually have the same attenuation as water but vary with cell and protein concentration (0 to 25 HU). Attenuation > 25 HU suggests a nonserous fluid composition (exudate) such as those seen in malignancy, hemopericardium, purulent exudates, or effusion-associated hypothyroidism. In cardiac MR, enhancement of the thickened pericardium after the administration of contrast material may aid in its visualization and usually suggests active inflammation characteristic of AP. On cardiac MR, transudative effusions show a low signal intensity on T1-weighted spin echo images, but exudative effusions have a high protein and cell content and therefore relatively higher T1-weighted signal intensity on spin echo images.

Transthoracic echocardiography should be the first modality to determine the hemodynamic significance of a pericardial effusion. Persistence of right atrial inversion in ventricular systole is usually an early sign of pericardial tamponade, followed by diastolic compression of the right ventricular outflow tract. The normal respirophasic flow patterns are more pronounced in

pericardial tamponade and can be documented by exaggerated respiratory Doppler echocardiographic variations in mitral and tricuspid inflow as well as pulmonary and systemic outflow. Septal bounce observed in constrictive pericarditis reflects exaggerated interventricular dependence combined with forceful early diastolic filling. Patients with constrictive pericarditis demonstrate an increase in early diastolic mitral inflow of $\geq 25\%$ during expiration as compared with inspiration.

References

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