of pulsus paradoxus. Despite the benefits of echocardiography in suspected pericardial tamponade, the diagnosis of tamponade remains a clinical diagnosis, and other important features, such as patient's blood pressure in the presence of pulsus paradoxus, needs to be taken into account when considering therapeutic options.

Chronic inflammation of the pericardium can lead to thickening and potentially calcification of the parietal pericardium, resulting in pericardial constriction in which diastolic filling can be severely impaired. In these cases, filling of the ventricles comes to an abrupt halt when the volume of ventricular filling is impaired by the constricting pericardium. Assessment of pericardial thickness in these patients is important, but it is just as important to note that approximately one in five patients with severe pericardial constriction have no significant pericardial thickening by imaging or at surgery. Thus, a lack of thickened pericardium does not rule out pericardial constriction, and patients' signs and symptomatology and physiologic evidence of constriction should be assessed independently. Pericardial constriction typically demonstrates marked respiratory changes in diastolic flow on Doppler echocardiography, in contrast to restrictive cardiomyopathy, but substantial overlap exists. CT and CMR offer tomographic, whole-heart assessment of pericardial thickening and other anatomy abnormalities in pericardial constriction (enlarged atria, vena cavas, pleural and pericardial effusions) **(Fig. 270e-31 and Video 270e-8)**. CMR offers the additional information of pericardial fibrosis and inflammation by LGE imaging, as well as evidence of constrictive physiology (e.g., regional relaxation concordance due to myocardial adhesions, paradoxical septal motion at rest or during Valsalva maneuver).

CARDIAC THROMBUS AND MASS

Echocardiography is usually the modality that first detects the presence of a cardiac mass. Differential diagnoses of an intracardiac mass most often include thrombus, tumor, or vegetation. Given their unrestricted tomographic views and multiplanar three-dimensional imaging, CMR and CT can complement echocardiography by further characterizing the physical features of the cardiac mass. Compared to CT, CMR has the advantage of higher tissue contrast differentiation, more robust cine imaging, and the use of multifaceted techniques within the same imaging session to determine the physiologic characteristics of the mass. Gadolinium contrast enhancement patterns of increased capillary perfusion can help to determine the presence and extent of vascularity within the mass, relevant for differentiating tumor from thrombus. Structures that are known to mimic a cardiac mass include (1) anatomic variants, such as the Eustachian valve, Chiari network, crista sagittalis or terminalis, and the right ventricular moderator band, and (2) "pseudotumors," such as interatrial septal aneurysm, coronary or aortic aneurysm, lipomatous hypertrophy of interatrial septum, hiatal hernia, or a catheter/pacemaker lead. A number of coexisting conditions should raise the likelihood of a cardiac thrombus **(Fig. 270e-32)**, including regional wall motion abnormality from infarction or ventricular aneurysm, atrial fibrillation leading to slow flow in the left atrial appendage, or presence of venous catheters or recent endovascular injury. CMR has the advantage of being able to assess regional wall motion and infarction or ventricular aneurysm in matching scan planes, adjacent to the cardiac thrombus, using cine and LGE imaging, respectively. For ventricular thrombus, gadolinium-enhanced LGE imaging can detect thrombus at a higher sensitivity than echocardiography by depicting high-contrast difference between the dark thrombus and its adjacent structures and by imaging in three dimensions. In addition, mural thrombus does not enhance on first-pass perfusion and often has a characteristic "etched" appearance (black border surrounding a bright center) on LGE imaging, thus providing higher diagnostic specificity than anatomic information alone **(Fig. 270e-33)**. Comparing the signal intensities of a mass before and after contrast injection may confirm the lack of tissue vascularity (i.e., thrombus)

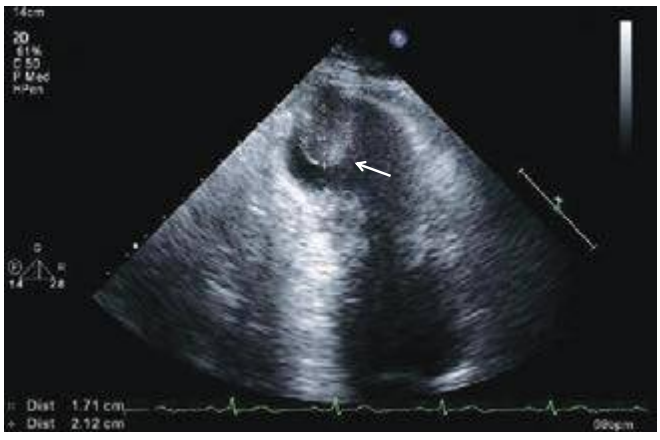

FIGURE 270e-32 Cardiac thrombus (*arrow*) in an apical aneurysmal region following acute myocardial infarction.

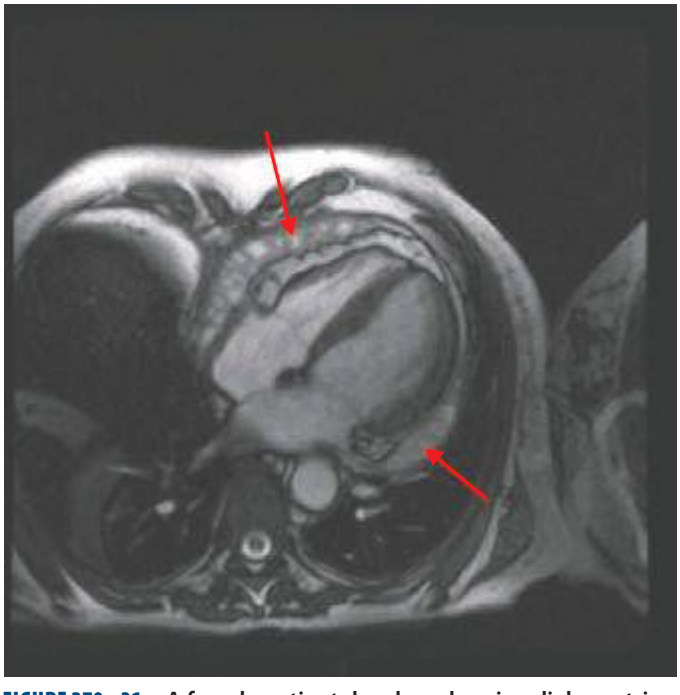

FIGURE 270e-31 A female patient developed pericardial constriction and right heart failure, secondary to radiation therapy for breast cancer. Note the multiple pericardial adhesions (*red arrows*).

FIGURE 270e-33 Late gadolinium enhancement image of a massive anterior infarction complicated by a dyskinetic left ventricular LV aneurysm and intracavitary thrombus (*red asterisk*).