

FIGURE 270e-21 The resultant flow curve generated from phase contrast imaging demonstrates a forward flow of 123 mL and a regurgitant volume of 67 mL, yielding a regurgitant fraction of 54% indicating severe aortic regurgitation.

flow across the aortic and pulmonic valves, assuming the pulmonic valve is competent.

CMR offers a number of advantages over echocardiography in the assessment of aortic regurgitation. CMR can be more accurate than echocardiography for assessing small changes in cardiac size or function that can occur over time in patients with aortic insufficiency. In addition, CMR techniques can very accurately quantify regurgitant volume in patients with aortic insufficiency, a known limitation of echocardiography. CMR can also capture three-dimensional imaging

of the aortic size that in some cases can be helpful in determining the etiology of the aortic regurgitation or in monitoring the patient (Fig. 270e-21 and Video 270e-6).

Assessment of Mitral Regurgitation The normal mitral valve consists of an anterior and posterior leaflet in a saddle shape configuration (Fig. 270e-22). The leaflets are attached to the papillary muscles via chordae tendineae that insert on the ventricular side of the leaflets. Mitral regurgitation can occur due to abnormalities of the leaflets, the chordal structures, or the ventricle, or any combination of these (Fig. 270e-23).

Mitral valve prolapse, in which one leaflet moves behind the plane of the other leaflet, can be due to myxomatous degeneration of the valves and leaflet redundancy, disruption of chordal structures secondary to degenerative disease, or papillary muscle rupture or dysfunction following myocardial infarction. Regurgitant jets can be visualized using color flow Doppler. The velocity of regurgitant jets is driven by the pressure gradient between the two chambers. This velocity tends to be quite high for left-sided regurgitant lesions, including mitral regurgitation and aortic regurgitation, resulting in turbulent jets on color flow Doppler (Fig. 270e-23). Visual estimation of color flow Doppler is generally sufficient for qualitative assessment of regurgitation severity but can dramatically under- or overestimate regurgitation severity, particularly when regurgitant jets are quite eccentric. For this reason, quantitative assessment is generally recommended, especially when making clinical decisions about surgical intervention. The PISA method is generally used for quantitative assessment of severity of mitral regurgitation. This method relies on estimation of the velocity of flow acceleration at a specific distance proximal to the valve with the assumption that the flow accelerates in concentric hemispheres.

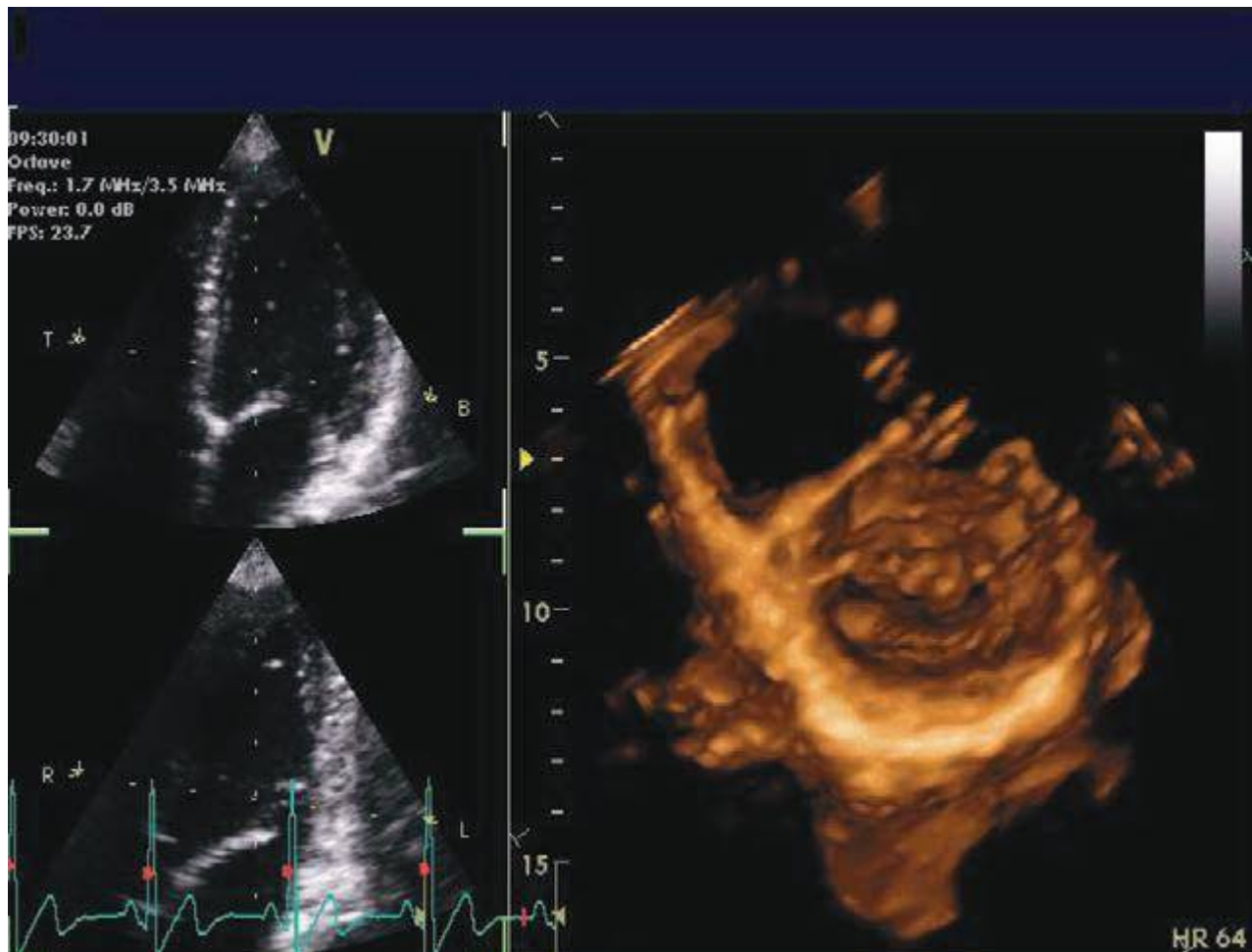


FIGURE 270e-22 Normal mitral valve in two-dimensional views (left) and with three-dimensional imaging (right).