



**FIGURE 284-4 Management of mitral regurgitation.** See legend for Fig. 283-2 for explanation of treatment recommendations (class I, IIa, IIb) and disease stages (B, C1, C2, D). Preoperative coronary angiography should be performed routinely as determined by age, symptoms, and coronary risk factors. Cardiac catheterization and angiography may also be helpful when there is a discrepancy between clinical and noninvasive findings. AF, atrial fibrillation; CAD, coronary artery disease; CRT, cardiac resynchronization therapy; ERO, effective regurgitant orifice; HF, heart failure; LV, left ventricular; LVEF, left ventricular ejection fraction; LVESD, left ventricular end-systolic dimension; MR, mitral regurgitation, MV, mitral valve; MVR, mitral valve replacement; NYHA, New York Heart Association; PASP, pulmonary artery systolic pressure; RF, regurgitant fraction; RVol, regurgitant volume; and Rx, therapy. \*Mitral valve repair preferred over MVR when possible. (Adapted from RA Nishimura et al: 2014 AHA/ACC Guideline for the Management of Patients with Valvular Heart Disease. *J Am Coll Cardiol* doi: 10.1016/j.jacc.2014.02.536, 2014, with permission.)

Surgery for chronic nonischemic severe MR is indicated once symptoms occur, especially if valve repair is feasible (Fig. 284-4). Other indications for early consideration of mitral valve repair include recent-onset AF and pulmonary hypertension defined as a systolic PA pressure  $\geq 50$  mmHg at rest or  $\geq 60$  mmHg with exercise. Surgical treatment of chronic nonischemic severe MR is indicated for asymptomatic patients when LV dysfunction is progressive with the LVEF falling below 60% and/or end-systolic dimension increasing beyond 40 mm. These aggressive recommendations for surgery are predicated on the outstanding results achieved with mitral valve repair particularly when applied to patients with myxomatous disease such as that associated with prolapse or flail leaflet. Indeed primary valvuloplasty repair of patients younger than 75 years with normal LV systolic function and no CAD can now be performed by experienced surgeons with  $< 1\%$  perioperative mortality risk. The risk of stroke, however, is also approximately 1%. Repair is feasible in up to 95% of patients with myxomatous disease operated on by a high-volume surgeon in a referral center of excellence. Long-term durability is excellent; the incidence of reoperative surgery for failed primary repair is  $\sim 1\%$  per year for the first 10 years after surgery. For patients with AF, left or biatrial maze surgery, or radiofrequency, isolation of the pulmonary veins is often performed to reduce the risk of recurrent postoperative AF.

The surgical management of patients with functional, ischemic MR is more complicated and most often involves simultaneous

coronary artery revascularization. Current surgical practice includes annuloplasty repair with an undersized, rigid ring or chord-sparing valve replacement for patients with moderate or greater degrees of MR. Valve repair for ischemic MR is associated with lower perioperative mortality rates but higher rates of recurrent MR over time. In patients with ischemic MR and significantly impaired LV systolic function (EF  $< 30\%$ ), the risk of surgery is higher, recovery of LV performance is incomplete, and long-term survival is reduced. Referral for surgery must be individualized and made only after aggressive attempts with guideline-directed medical therapy and CRT, when indicated. The routine performance of valve repair in patients with significant MR in the setting of severe, functional, nonischemic dilated cardiomyopathy has not been shown to improve long-term survival compared with optimal medical therapy. Patients with acute severe MR can often be stabilized temporarily with appropriate medical therapy, but surgical correction will be necessary emergently in the case of papillary muscle rupture and within days to weeks in most other settings.

When surgical treatment is contemplated, left and right heart catheterization and left ventriculography may be helpful in confirming the presence of severe MR in patients in whom there is a discrepancy between the clinical and TTE findings that cannot be resolved with TEE or CMR. Coronary angiography identifies patients who require concomitant coronary revascularization.