The Mitral Valve: Repair, Replace, or Leave it Alone

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The goal of this exercise is to provide a case based review of pertinent mitral valve sections of the newly revised ACC/AHA on the management of patients with valvular heart disease. We will apply the guidelines to specific TEE case studies and evaluate how they relate to decision making in the operating room. These new guidelines have been endorsed by the SCA and STS, and Dr Shanewise was a writing group member for this effort.

(text in italics are quoted exactly from ACC/AHA Practice Guideline: 2008 Focused Update Incorporated Into the ACC/AHA 2006 Guidelines for the Management of Patients With Valvular Heart Disease)

The committee recommends that institutions performing valve surgery establish consistent and credible intraoperative echocardiography programs with knowledgeable echocardiographers committed to and capable of providing accurate anatomic and functional information relevant to valve operations. Such services should be available during surgery to facilitate evaluation of unexpected difficulties.

A. Mitral valve prolapse and mitral valve repair

The likelihood of a successful MV repair is related to the extent of the MV dysfunction (with isolated posterior leaflet dysfunction being the most favorable condition); the presence and extent of calcification; the amount of pliable, noncalcified valve tissue; and surgeon experience. Recurrent MR after repair may occur with time, but in favorable situations, more than 90% of valves are still functioning well after 10 years ([529] and [530]).

Guideline 7.3.1.1. Myxomatous Mitral Valve

1 MV repair is recommended when anatomically possible for patients with severe degenerative MR who fulfill clinical indications, and patients should be referred to surgeons who are expert in repair. (Level of Evidence: B)

2 Patients who have undergone successful MV repair should continue to receive antibiotics as indicated for endocarditis prophylaxis. (Level of Evidence: C)
3 Patients who have undergone successful MV repair and have chronic or paroxysmal atrial fibrillation should continue to receive long-term anticoagulation with warfarin. (Level of Evidence: B)

4 Patients who have undergone successful MV repair should undergo 2D and Doppler echocardiography before discharge or at the first postoperative outpatient visit. (Level of Evidence: C)

5 Tricuspid valve repair is beneficial for severe TR in patients with MV disease that requires MV surgery. (Level of Evidence: B)

class iia

1 Oral anticoagulation is reasonable for the first 3 months after MV repair. (Level of Evidence: C)

2 Long-term treatment with low-dose aspirin (75 to 100 mg per day) is reasonable in patients who have undergone successful MV repair and remain in sinus rhythm. (Level of Evidence: C)

3 Tricuspid annuloplasty is reasonable for mild TR in patients undergoing MV repair when there is pulmonary hypertension or tricuspid annular dilatation. (Level of Evidence: C)

class iib

1. In patients with MR and a history of atrial fibrillation, a Maze procedure may be considered at the time of MV repair. (Level of Evidence: B)

Myxomatous MV disease produces MR based on rupture or elongation of chordae tendineae, valve leaflet instability, annulus dilatation, or multiple causes that result in excessive MV leaflet motion. In the majority of these conditions, experienced surgeons can repair the MV using strategies that involve removal of unsupported leaflet structures, transfer of chordae, or the use of artificial chordae to support unstable areas of the leaflet, the sliding of supported areas of the leaflet to cover the MV orifice, and stabilization of the size and shape of the MV annulus with an artificial ring. When possible, MV repair is the treatment of choice for degenerative valve disease, because patients in sinus rhythm do not need warfarin, the thromboembolism rate is low, valve efficiency and hemodynamics are good, there is little adverse effect on LV function, the risk of endocarditis is low, and the long-term survival rate is favorable compared with MV replacement.

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surgical experience. Recurrent MR after repair may occur with time, but in favorable situations, more than 90% of valves are still functioning well after 10 years.

CASES
Two cases will be presented and audience participation will be elicited to build a recommendation to the surgeon regarding an appropriate surgical plan for reparing each valve. The key elements of a perioperative Mitral Valve assessment will be reviewed including:

Assessment of regurgitation severity
Assessment of regurgitation mechanism(s)
Assessment of potential for post repair systolic anterior motion of the anterior leaflet
Assessment of the 3 dimensional relationship between the Circumflex coronary artery and the annulus of P1
Assessment of the appropriate size of the annular ring based on systolic TEE measurements
Assessment of Secondary Cord attachment sites and their significance to the contemplated repair.

B. Mitral Stenosis

MV replacement is an accepted surgical procedure for patients with severe MS who are not candidates for surgical commissurotomy or percutaneous mitral valvotomy. The perioperative mortality of MV replacement is dependent on multiple factors, including functional status, age, LV function, cardiac output, concomitant medical problems, and concomitant CAD. In the young, healthy person, MV replacement can be performed with a risk of less than 5%; however, in the older patient with concomitant medical problems or pulmonary hypertension at systemic levels, the perioperative mortality of MV replacement may be as high as 10% to 20%. MV replacement with preservation of subvalvular apparatus aids in maintaining LV function (466), but this can be particularly difficult in patients with rheumatic MS. Alternative approaches to ventricular preservation exist, such as artificial chordal reconstruction before MV replacement. Complications of MV replacement include valve thrombosis, valve dehiscence, valve infection, valve malfunction, and embolic events. These are discussed in Section 7.3. There is also the known risk of long-term anticoagulation in patients receiving mechanical prostheses

Guideline 3.4.9. Indications for Surgery for Mitral Stenosis
1 MV surgery (repair if possible) is indicated in patients with symptomatic (NYHA functional class III–IV) moderate or severe MS, when 1) percutaneous mitral balloon valvotomy is unavailable, 2) percutaneous mitral balloon valvotomy is contraindicated because of left atrial thrombus despite anticoagulation or because concomitant moderate to severe MR is present, or 3) the valve morphology is not favorable for percutaneous mitral balloon valvotomy in a patient with acceptable operative risk. (Level of Evidence: B)

2 Symptomatic patients with moderate to severe MS who also have moderate to severe MR should receive MV replacement, unless valve repair is possible at the time of surgery. (Level of Evidence: C)

class iia

1. MV replacement is reasonable for patients with severe MS and severe pulmonary hypertension (pulmonary artery systolic pressure greater than 60 mm Hg) with NYHA functional class I–II symptoms who are not considered candidates for percutaneous mitral balloon valvotomy or surgical MV repair. (Level of Evidence: C)

class iib

1. MV repair may be considered for asymptomatic patients with moderate or severe MS who have had recurrent embolic events while receiving adequate anticoagulation and who have valve morphology favorable for repair. (Level of Evidence: C)

class iii

1 MV repair for MS is not indicated for patients with mild MS. (Level of Evidence: C)

2 Closed commissurotomy should not be performed in patients undergoing MV repair; open commissurotomy is the preferred approach. (Level of Evidence: C)

A case will be presented which will include the pre and post CPB TEEs as well as surgical video of the commissurotomy. Elements of the TEE assessments will include a discussion of the use of PISA to quantitate orifice size before and after repair, and the potential for 3D TEE analysis to improve this technique.

C. Estimating the severity of MR in presence of Aortic Stenosis

Three cases will be presented:
1. mitral valve not approached, postop TEE showed no change or reduction in MR
2. mitral valve repaired along with AVR
3. mitral valve not approached but after AVR completed, MR was worse.

Discussion will center on approaches to assessing MR in the presence of aortic stenosis (and concomitant aortic insufficiency) Discussion will also cover the possibility predicting post AVR outcomes with regard to the effect on MR

D. Functional / ischemia MR: indications for replacement, repair, or no intervention.

TEEs will be shown of three cases of functional MR

1. Dilated cardiomyopathy
2. Coronary insufficiency with preserved global LV function
3. MR associated with LVOT obstruction from SAM

The mechanisms of these valve failure modes will be discussed and quantitative TEE analysis for each case will be presented.

Discussion of choice of therapy based on TEE findings will be presented.