Ischemic Mitral Regurgitation – when to repair and when to leave

Philip Greilich M.D., Alina Nicoara M.D.

Learning Objectives:
1. Review the echocardiographic diagnostic criteria for ischemic MR
2. Discuss management considerations for patients with ischemic MR
3. Discuss echocardiographic findings associated with failure of mitral valve repair

A 65-year-old obese male with known history of coronary artery disease, hypertension, dyslipidemia, obstructive sleep apnea and chronic renal insufficiency (baseline creatinine 1.8-2.1 mg/dL) presented to the emergency room with dyspnea and substernal chest pain relieved with nitroglycerin and with dynamic ST changes inferolaterally on his initial electrocardiogram.

Four years ago the patient underwent percutaneous coronary treatment of the right coronary artery (RCA) and an obtuse marginal branch with bare-metal stents. Physical examination revealed a blood pressure of 145/60 mmHg, bilateral crackles and a mitral regurgitation murmur. There is mild elevation of the serum troponin levels to 2 mg/dL.

Left heart catheterization showed 70% left main coronary artery stenosis as well as diffuse in-stent restenosis of the distal RCA. Left ventriculography was not performed due to elevated baseline creatinine. The patient's left ventricular end-diastolic pressure was 20 mmHg.

Transthoracic echocardiography showed dilated left ventricle (LV) (LV end-diastolic diameter 5.9 cm, LV end-systolic diameter 3.9 cm) with reduced systolic function and visually estimated ejection fraction 35-40%. There is hypokinesia of the basilar and mid inferior and inferolateral walls and mild hypokinesia of the anterior wall. There is moderate mitral regurgitation (MR), however because of poor window of imaging due to the patient’s body habitus, the mitral valve apparatus cannot be imaged very well but appears grossly normal. No myocardial viability studies were performed.
The patient is referred for surgical revascularization and possible mitral valve repair/replacement.

The induction of general anesthesia is uneventful. The surgical plan regarding the mitral valve will be altered depending on the transesophageal echocardiography examination findings.

1. How will you grade the severity of the MR?
   - Qualitative parameters
   - Quantitative parameters

2. How will the severity of MR change under general anesthesia?

You notice a centrally-directed regurgitant jet, with a calculated estimated regurgitant orifice area (EROA) of 0.25 cm², and a vena contracta (VC) of 4.5 mm. The mitral valve leaflets do not appear thickened or with excess tissue but the MV leaflet coaptation is limited and the posterior leaflet motion appears restricted.

3. What are the diagnostic criteria for ischemic MR?
4. How will your evaluation of the left ventricle influence your diagnosis of ischemic MR?
5. What other characteristics of the left ventricle will you examine besides systolic function?

Your examination reveals severe hypokinesia of the basilar, mid and apical inferior and inferolateral walls and mild hypokinesia of the mid and apical anterior walls. Visually estimated ejection fraction 30-35%.

6. How will you assess alteration in the geometry of the mitral valve apparatus?
7. What impact will the degree of alterations in mitral valve geometry have on the surgical plan?
8. How will you make the decision of surgical revascularization alone or revascularization with mitral valve repair or replacement?

The decision is to perform surgical revascularization and mitral valve repair.

9. What information from your TEE examination might help the surgeon in the performance of the repair?

10. What information from the TEE examination are you going to provide after separation from cardiopulmonary bypass (CPB)?

Following separation from CPB with moderate inotropic support, you report 2+ residual mitral regurgitation, which mandates the return to bypass in order to repair or replace the mitral valve.

11. What could be the etiology of the residual mitral regurgitation? What options for management do you have?

12. What is the place of mitral valve replacement in the surgical treatment of ischemic MR?

13. What are some of the echocardiographic predictors of successful intermediate and long-term mitral valve repair in ischemic MR?

References:

Impact of ischemic MR on freedom of symptoms and survival


Mechanism(s) of ischemic mitral regurgitation


Echocardiographic assessment of ischemic regurgitation


Surgical management of ischemic mitral regurgitation


Treatment of ischemic mitral regurgitation with CABG alone


Predictors of successful (and unsuccessful) treatment with CABG + mitral valve repair


