Should We Operate on Asymptomatic Patients With Severe Mitral Regurgitation?*

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The timing of surgery for chronic severe mitral regurgitation (MR) in asymptomatic patients with normal left ventricular (LV) function remains controversial. On the one hand, the natural history of chronic severe MR indicates a high likelihood of eventual progression to symptoms or LV dysfunction (1–3). In addition, hemodynamic compensation may allow LV size and ejection fraction to remain normal, even when myocardial dysfunction is already present (4,5). These factors, along with the physician’s ability to perform mitral valve repair with an operative mortality <1%, have led some to consider prophylactic mitral valve surgery to prevent the inevitable development of LV dysfunction before it becomes irreversible. On the other hand, it is impossible to make an asymptomatic patient feel better after heart surgery, and there is evidence that a strategy of “watchful waiting,” in which surgery is delayed until the first onset of either symptoms or LV dysfunction, is effective (6). The American College of Cardiology/American Heart Association Guidelines state that surgery for asymptomatic patients with chronic severe MR and normal LV size and function may be considered, provided that there is a 90% likelihood of successful valve repair (7). In this issue of JACC: Cardiovascular Imaging, a new study by Grigioni et al. (8) casts further light on this topic and raises some interesting and provocative questions.

Grigioni et al. (8) present a prospective, multicenter observational study of 394 patients, all of whom had flail leaflet by echocardiography. This population is a rather homogenous one because flail leaflet is a reliable marker of pure organic MR, is almost always accompanied by severe MR, and has been shown to be associated with an adverse prognosis, including sudden cardiac death. Most of the patients had degenerative, presumably myxomatous mitral valve disease, although in 9% the flail leaflet was caused by endocarditis. In most patients, only the posterior leaflet was flail (79%); the anterior leaflet alone was flail in 8% and both leaflets in 12%. Only 9% of patients had significant coronary artery disease. The decision to operate was left to the discretion of the attending physician. Surgery was performed in 315 (80%) with an excellent 30-day operative mortality (0.7%). Only 47 (15%) of these patients underwent prophylactic surgery; the majority had surgery for symptoms (68%), LV dilation (6%), endocarditis (5%), or other reasons not specified. Mitral valve repair was performed in 80% and replacement in 20%. By multivariate analysis, surgery reduced the risk of death and heart failure independently of age, functional class, and LV ejection fraction. Not surprisingly, this benefit was driven mainly by mitral valve repair. The 5-year survival was 92% with valve repair, 86% during nonsurgical management, and 80% after valve replacement.

In the subgroup of 102 patients who were asymptomatic with normal LV size and function, survival with nonsurgical management was excellent (97% 5-year survival), although atrial fibrillation (4%/year) or heart failure (5.7%/year) was common. Eventually, surgery was performed in 70 (69%) of these patients with no perioperative deaths. Mitral...
valve repair was performed in 82% and replacement in 18%. The data from this important subgroup are similar to those published by Rosenhek et al. (6), who showed a 96% 4-year survival in asymptomatic patients with normal LV size and function. In the Rosenhek et al. (6) study, a purposeful strategy of watchful waiting was used, such that surgery was only performed for onset of symptoms, echocardiographic LV dysfunction, atrial fibrillation, or pulmonary hypertension. Surgery was eventually performed in 35 patients, 83% of whom underwent valve repair, and 17% of whom underwent valve replacement. There were no perioperative deaths. Patients in the Rosenhek et al. (6) study were younger (55 vs. 64 years), more likely female (49% vs 33%), and less likely to have flail leaflet (44% vs 100%) compared with those in the present study by Grigioni et al. (8). These patient differences may explain the greater rate of surgery in the latter study, but overall, both studies show an excellent long-term survival in asymptomatic patients with normal LV size and function, even when surgery is delayed until clinical indications appear.

If in fact, we propose to operate early in the course of severe MR, before the onset of symptoms or LV dysfunction, several prerequisites must be met. First, it is imperative to be sure that MR is actually severe. Patients occasionally are referred for mitral valve surgery based on an echocardiogram that was incorrectly interpreted as “severe” MR, when no murmur is present, the mitral valve apparatus is structurally normal, and review of the data by an expert observer reveals only mild MR. Guidelines for assessing MR severity, including important quantitative parameters, have been published and should be applied (9). In the Grigioni et al. (8) study, this was not an issue because all of the patients had flail leaflet, and the authors are experts in echocardiographic assessment of MR. Second, it is necessary to be sure that the patient is truly asymptomatic. Exercise testing to establish functional class and/or stress echocardiography to evaluate LV end-systolic response to exercise may be helpful in this regard (10). Third, it is important to determine beforehand the likelihood of successful mitral valve repair, which should be performed in experienced centers by surgeons with established expertise in the various types of mitral valve repair (7). The American College of Cardiology/American Heart Association Guidelines state that mitral valve repair in asymptomatic patients is reasonable so long as the valve can be repaired with a 90% success rate (7). There are 2 aspects to that statement. One is the accurate predictive value of preoperative echocardiography in determining whether the valve can be repaired or not. In the Grigioni et al. (8) and Rosenhek et al. (6) studies, both done at expert centers, the rate of mitral valve repair was 80%, which is much lower than expected, considering that in both of these studies, all patients had either mitral valve prolapse or flail leaflets. These are all type II valves according to the Carpentier classification and should have a 90% success rate for mitral valve repair (11). In the Grigioni et al. (8) study, it is not clear how often the valves were thought to be repairable by preoperative echocardiography, and the surgical anatomy was found to be different, or how often repair was attempted but unsuccessful. Data from the Society of Thoracic Surgery Database show that, in 2006, there were 4,901 isolated (without concomitant bypass surgery) mitral valve repairs and 4,339 isolated mitral valve replacements, nearly a 1:1 ratio (12). This indicates that the best operation, mitral valve repair, has not penetrated well enough into general practice. Perhaps it is time to consider establishing centers of excellence for valve surgery, as has been done successfully with level III trauma centers.

A flail mitral valve leaflet is associated with a significant risk of developing heart failure, LV dysfunction, atrial fibrillation, pulmonary hypertension, and death (8,13–15). There is no question that flail leaflet is a surgical disease; there is no effective medical therapy for this condition. Although percutaneous techniques of mitral valve repair are forthcoming (16,17), surgical mitral valve repair remains the standard of care for flail leaflet and is clearly superior to valve replacement. However, the timing of valve repair is still a matter of debate. If the patient is truly asymptomatic with normal LV size and function, it is reasonable to use a strategy of watchful waiting. It is also reasonable to perform prophylactic surgery, but only if repair is feasible with a >90% likelihood in an expert center. Unfortunately, we might not be as good as we think we are in assessing feasibility of repair and carrying it out successfully.

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