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sc0030

106 Risk Stratification: Timing of Surgery for Aortic Regurgitation

Au8

Ricardo Benenstein, MD, Muhamed Saric, MD, PhD

s0075 INTRODUCTION

p0245 Aortic regurgitation (AR) may lead to serious morbidity and excess mortality. As noted in the preceding chapters, the diagnosis of AR should be based on the guidelines for native valvular regurgitation by the American Society of Echocardiography and other international organizations.¹

p0250 The role of medical, percutaneous, and surgical options for the treatment of AR is discussed in this chapter. The recommendations for AR treatment follow the latest joint American Heart Association (AHA) and American College of Cardiology (ACC) valvular heart disease guidelines.² Surgery remains the only definitive means of treating AR in appropriate patients.

s0080 MEDICAL THERAPY

p0255 No medical therapy has ever been shown to alter the natural progression or to improve survival in patients with AR. The role of medical therapy is primarily to alleviate the symptoms and to treat associated conditions such as systemic hypertension and heart failure.

s0085 Acute Aortic Regurgitation

p0260 Beta blockers are used in the treatment of AR associated with type A aortic dissection. When acute AR is associated with other causes, beta blockers should be used with caution, if at all, as their use prevents compensatory tachycardia and may lead to hypotension.

s0090 Chronic Aortic Regurgitation

p0265 Systolic hypertension (systolic blood pressure > 140 mm Hg) in patients with chronic AR should preferably be treated with vasodilators (dihydropyridine calcium channel blockers, angiotensin-converting enzyme [ACE] inhibitors, and/or angiotensin receptor blockers). If the left ventricular ejection fraction (LVEF) is diminished, the use of beta blockers, ACE inhibitors, and/or angiotensin receptor blockers is recommended.³ In contrast, vasodilator therapy has not been shown to be beneficial in asymptomatic patients with chronic AR and normal LVEF.⁴

PERCUTANEOUS INTERVENTIONAL THERAPY

s0095

Percutaneous Aortic Valves

s0100

p0270 In contrast to aortic stenosis, percutaneously implantable aortic prosthetic valves are not approved for the treatment of native AR at present.

Intra-aortic Balloon Pump

s0105

p0275 The use of intra-aortic pump is contraindicated in patients with AR.⁵

SURGICAL THERAPY

s0110

p0280 In appropriate patients, aortic valve surgery remains the only definitive treatment for AR. Aortic valve replacement is the primary form of surgical therapy for AR. Aortic valve repair (valve-sparing surgery) is feasible in some instances; however, such repair should preferably be done at centers with specialized expertise.

p0285 The timing of surgery for AR is dependent on the following five decision points: severity of AR, symptoms, left ventricular (LV) systolic function, LV size, and the need for other cardiac surgery.

Severity of Aortic Regurgitation

s0115

p0290 Surgery is performed typically only for severe AR; moderate AR is treated surgically only when a patient is already undergoing cardiac or aortic surgery for other indications.

Acute Versus Chronic Aortic Regurgitation

s0120

p0295 Severe acute AR is typically a medical emergency requiring prompt surgical intervention. The leading causes of severe acute AR include type A aortic regurgitation, infective endocarditis, blunt chest trauma, and iatrogenic complications of aortic catheterization. Surgery in acute AR is necessary both to reverse the hemodynamic instability (pulmonary edema, hypotension, low cardiac output) and to provide the definitive therapy for aortic valve pathology, especially in the cases of type A aortic dissection. A number of studies have demonstrated improved survival in patients with severe acute AR who were treated with prompt aortic valve surgery.⁶

p0300 The timing of surgical intervention for chronic AR is dependent on symptoms, LV systolic function, and LV size.

s0125 **Symptoms**

p0305 Clinical presentations of severe AR include angina (even in the presence of angiographically normal coronary arteries), exertional dyspnea, and other signs and symptoms of heart failure. If the nature of symptoms is unclear, exercise testing can be used to objectively assess exercise capacity and symptom status. Symptomatic severe chronic AR is an indication for surgery irrespective of LV size and LV systolic function.⁷

s0130 **LV Systolic Function**

p0310 Chronic AR leads to a progressive increase in LV size and a progressive decrease in LV systolic function. In asymptomatic patients with severe chronic AR, surgery is indicated when (1) LVEF is diminished (<50%),⁸ or (2) LVEF is normal (>50%) but there is LV dilation (LV end-systolic diameter >50 mm or LV end-diastolic diameter >65 mm). The evidence for the use of the end-systolic diameter cutoff value⁹ is stronger than that for the end-diastolic diameter. Symptomatic patients with severe chronic AR should be considered for aortic valve surgery irrespective of LVEF and LV size.

s0135 **Need for Other Cardiac Surgery**

p0315 If the patient is undergoing cardiac surgery for other indications, AV surgery should be considered in all patients with moderate or severe AR irrespective of symptoms, LVEF, or LV size.

s0140 **DECISION ALGORITHMS FOR SURGICAL TREATMENT OF AORTIC REGURGITATION**

s0145 **Level of Evidence**

p0320 In general, there is a relative paucity of studies evaluating the effectiveness of therapies for AR; therefore no AHA-ACC treatment recommendation has the level of evidence A, the highest level that is based on multiple randomized trials or meta-analyses. The recommendations for AR treatment are based on single randomized trials and nonrandomized studies (level of evidence B) or consensus opinions of experts (level of evidence C).

Strength of Recommendations

As with other treatment recommendations, class I indication implies that the treatment should be administered. Class IIa implies that it is reasonable to administer the treatment, whereas IIb implies that the treatment may be considered. Recommendations for AR fall into class I, IIa, and IIb. There are no class III recommendations for AR (treatments that have no proven benefits or are harmful).

SEVERE ACUTE AORTIC REGURGITATION

As previously noted, severe acute AR is a medical emergency requiring prompt aortic valve surgery. LVEF as well as LV end-systolic and end-diastolic cutoff values discussed earlier do not apply to severe acute AR, as LVEF and LV size are typically normal if the heart is otherwise healthy.

SEVERE CHRONIC AORTIC REGURGITATION

Class I Indications: AV Surgery Should Be Performed

- Severe chronic AR in symptomatic patients irrespective of LV size or systolic function [level of evidence B]^{10,11} u0010
- Severe chronic AR with LV systolic dysfunction (LVEF <50%) irrespective of symptoms [level of evidence B]^{12,13} u0015
- Severe chronic AR in patients undergoing cardiac surgery for other indications irrespective of symptoms and LV systolic function [level of evidence C] u0020

Class IIa Indications: AV Surgery Is a Reasonable Option

- Asymptomatic severe chronic AR with normal LVEF (>50%) but with severe LV dilatation as defined by LV end-systolic diameter greater than 50 mm [level of evidence B]^{14,15} u0025
- Moderate chronic AR in patients undergoing cardiac surgery for other indications irrespective of symptoms and LV systolic function [level of evidence C] u0030

Class IIb Indication: AV Surgery May Be Considered

- Asymptomatic severe chronic AR with normal LVEF (>50%) but with severe LV dilatation as defined by LV end-diastolic diameter greater than 65 mm, if surgical risk is low [level of evidence C] (Fig. 106-1) u0035

	AVR is primary surgical indication		Patient undergoing other cardiac surgery
	Low LVEF	Normal LVEF + Large LV size	
Asymptomatic	AVR is recommended if LVEF < 50% [class I, evidence B]	AVR is recommended if LVEF ≥ 50% and LVESD > 50 mm [class IIa, evidence B]	Irrespective of symptoms, AVR is recommended for: Severe chronic AR [class I, evidence C]
		AVR is recommended if LVEF ≥ 50% and LVEDD > 65 mm [class IIb, evidence C]	
Symptomatic	AVR is recommended irrespective of LVEF or LV size [class I, evidence B]		Moderate chronic AR [class IIa, evidence C]

f0075 **Figure 106-1.** Algorithm for surgical treatment of chronic aortic regurgitation (AR). AVR, Aortic valve replacement; LV, left ventricle; LVEF, left ventricular ejection fraction; LVEDD, left ventricular end-diastolic diameter; LVESD, left ventricular end-systolic diameter.

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