



Valvular Heart Disease

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INTRODUCTION

Although rheumatic fever remains a major cause of valvular heart disease in undeveloped countries, degenerative disease is the most common etiology in industrialized countries. As expected, the prevalence increases with age, to as high as 13.2% in those 75 years of age and older. The aortic and mitral valves are by far the most commonly affected valves.

There have been few randomized studies in valvular heart disease to guide management, and most of the joint guideline recommendations from the American College of Cardiology (ACC) and American Heart Association (AHA) are based on single-center studies or expert consensus (level C evidence).

AORTIC STENOSIS

Definition

When three normal aortic valve leaflets open fully in systole, they permit the left ventricular (LV) stroke volume to pass through the valve with little resistance to ejection. In aortic stenosis, leaflet excursion becomes progressively restricted over time. In advanced disease, the high resistance to ejection in systole invokes a cascade of physiologic sequelae that lead to the symptoms and physical examination findings of severe aortic stenosis.

Pathology

Aortic leaflet motion can become restricted for a variety of reasons. In westernized societies, the most common cause is senile degeneration. This term is a misnomer, in that this is not a degenerative disease but an active process involving the leaflet tissue that shares many characteristics with atherosclerosis. As plaques progress over time, calcified deposits accumulate on leaflets and increasingly restrict their motion.

A less common but important cause of aortic stenosis is congenitally abnormal leaflets. A two-leaflet, or bicuspid, aortic valve occurs in approximately 2% of the general population. Many patients with this condition develop premature thickening, fusion of the commissures, and calcification, resulting in abnormal flow characteristics and aortic stenosis at a relatively young age. Bicuspid aortic valves also put patients at increased risk for aortic enlargement and dissection and are associated with coarctation of the aorta.

Rheumatic fever is an uncommon cause of aortic stenosis in developed countries but is still seen in economically depressed regions. Rheumatic aortic stenosis is almost always associated

with concomitant involvement of the mitral valve. See [Table 7-1](#) for differential diagnosis of the valve lesions most commonly encountered clinically.

Clinical Presentation

Patients typically remain asymptomatic from aortic stenosis until the lesion reaches the severe range. Even after that point, most patients still experience an asymptomatic period of variable length. The onset of symptoms heralds an increase in mortality risk, as first described in 1968 by Ross and Braunwald, and guides management of this disorder. In order of increasing severity and decreasing survival, these symptoms are angina, syncope, and congestive heart failure ([Fig. 7-1](#)). Evaluation of patients with severe aortic stenosis must include careful screening for the development of these symptoms, and their detection can be especially challenging in sedentary individuals.

Diagnosis

The physical examination can be both sensitive and specific for the detection of aortic valve stenosis. The findings in severe stenosis either result from the outflow obstruction itself or are based on the direct physiologic sequelae of the obstruction.

The resistance to flow causes a pressure overload state of the left ventricle, resulting in concentric LV hypertrophy. This is

TABLE 7-1 MAJOR CAUSES OF VALVULAR HEART DISEASE IN ADULTS

AORTIC STENOSIS	MITRAL REGURGITATION
Bicuspid aortic valve	Chronic
Rheumatic fever	Mitral valve prolapse
Degenerative stenosis	Left ventricular dilation
AORTIC REGURGITATION	Posterior wall myocardial infarction
Bicuspid aortic valve	Rheumatic fever
Aortic dissection	Endocarditis
Endocarditis	Acute
Rheumatic fever	Posterior wall or papillary muscle ischemia
Aortic root dilation	Papillary muscle or chordal rupture
MITRAL STENOSIS	Endocarditis
Rheumatic fever	Prosthetic valve dysfunction
	Systolic anterior motion of mitral valve
	TRICUSPID REGURGITATION
	Functional (annular) dilation
	Tricuspid valve prolapse
	Endocarditis
	Carcinoid heart disease