Description: Narrowing or stricture of the aortic valve, causing resistance to blood flow in the left ventricle, decreased cardiac output, left ventricular hypertrophy, and pulmonary vascular congestion. The prominent anatomic consequence of AS is the hypertrophy of the left ventricular wall, which eventually leads to increased end-diastolic pressure, resulting in pulmonary venous and pulmonary arterial hypertension. Left ventricular hypertrophy also interferes with coronary artery perfusion and may result in myocardial infarction or scarring of the papillary muscles of the left ventricle, which causes mitral insufficiency. Valvular stenosis, the most common type, is usually caused by malformed cusps that result in a bicuspid rather than tricuspid valve or fusion of the cusps. Subvalvular stenosis is a stricture caused by a fibrous ring below a normal valve; supravalvular stenosis occurs infrequently. Valvular AS is a serious defect for the following reasons: (1) the obstruction tends to be progressive; (2) sudden episodes of myocardial ischemia, or low cardiac output, can result in sudden death; and (3) surgical repair rarely results in a normal valve. This is one of the rare instances in which strenuous physical activity may be curtailed because of the cardiac condition.

Pathophysiology: A stricture in the aortic outflow tract causes resistance to ejection of blood from the left ventricle. The extra workload on the left ventricle causes hypertrophy. If left ventricular failure develops, left atrial pressure will increase; this causes increased pressure in the pulmonary veins, which results in pulmonary vascular congestion (pulmonary edema).

Clinical manifestations: Newborns with critical AS demonstrate signs of decreased cardiac output with faint pulses, hypotension, tachycardia, and poor feeding. Children show signs of exercise intolerance, chest pain, and dizziness when standing for a long period. A systolic ejection murmur may or may not be present. Patients are at risk for BE, coronary insufficiency, and ventricular dysfunction.

Valvular Aortic Stenosis

Surgical treatment: Aortic valvotomy is performed under inflow