with a VSD. Although there is right atrial and ventricular enlargement, cardiac failure is unusual in an uncomplicated ASD. Pulmonary vascular changes usually occur only after several decades if the defect is left unrepaired.

Clinical manifestations: Patients may be asymptomatic. They may develop HF. There is a characteristic systolic murmur with a fixed split second heart sound. There may also be a diastolic murmur. Patients are at risk for atrial dysrhythmias (probably caused by atrial enlargement and stretching of conduction fibers) and pulmonary vascular obstructive disease and emboli formation later in life from chronically increased pulmonary blood flow.

Surgical treatment: Surgical patch closure (pericardial patch or Dacron patch) is done for moderate to large defects. Open repair with cardiopulmonary bypass is usually performed before school age. In addition, the sinus venosus defect requires patch placement, so the anomalous right pulmonary venous return is directed to the left atrium with a baffle. ASD 1 type may require mitral valve repair or, rarely, replacement of the mitral valve.

Nonsurgical treatment: ASD 2 closure with a device during cardiac catheterization is becoming commonplace and can be done as an outpatient procedure. The Amplatzer Septal Occluder is most commonly used. Smaller defects that have a rim around them for attachment of the device can be closed with a device; large, irregular defects without a rim require surgical closure. Successful closure in appropriately selected patients yields results similar to those from surgery but involves shorter hospital stays and fewer complications. Patients receive low-dose aspirin for 6 month (Park, 2014).

Prognosis: Operative mortality is very low (<0.5%).

Ventricular Septal Defect