



## Congestive Heart Failure

Several studies have shown that decompensated heart failure is associated with increased perioperative cardiac complications. In these patients, surgery should be postponed until appropriate treatment is instituted and symptoms have been stabilized. If planned surgery is associated with large blood loss or fluid shifts, a pulmonary artery catheter may be helpful.

During the postoperative period, congestive heart failure most commonly occurs in the first 24 to 48 hours, when fluid administered during surgery is mobilized from the extravascular space. However, heart failure may also result from myocardial ischemia and new arrhythmias. Initial management includes identification and treatment of the underlying cause. In addition, intravenous diuretics usually provide rapid relief of pulmonary congestion. If heart failure is complicated by hypotension or poor urine output, insertion of a pulmonary artery catheter may be helpful to guide additional therapy (see [Chapter 6](#)).

## Valvular Heart Disease

In regard to valvular heart disease the greatest risk for complications after noncardiac surgery is in those with aortic or mitral stenosis. Patients with symptomatic, severe aortic stenosis should have valve replacement before noncardiac surgery. In patients with mild to moderate mitral stenosis, careful attention to volume status and heart rate control are necessary to optimize left ventricular filling and avoid pulmonary congestion. Patients with severe mitral stenosis should be considered for percutaneous valvuloplasty or mitral valve replacement before high-risk surgery. In patients with valve disease or prosthetic heart valves, prophylactic antibiotics are recommended if appropriate.

## Arrhythmias and Conduction Defects

Patients with symptomatic, high-grade conduction disturbances, such as third-degree atrioventricular (AV) block, have an increased perioperative risk for cardiac complications and should have a temporary pacemaker inserted before surgery. Patients with first-degree AV block, Mobitz type I AV block, or bifascicular block (right bundle branch block and left anterior fascicular block) do not require prophylactic pacemaker insertion.

Atrial arrhythmias such as atrial fibrillation are common after surgery and usually are not associated with significant complications if the ventricular rate is well controlled. Ventricular premature beats and nonsustained ventricular tachycardia are also common after noncardiac surgery and do not require specific therapy unless they are associated with myocardial ischemia or heart failure. In most instances, treatment of the underlying cause (e.g., hypoxia, metabolic abnormalities, ischemia, volume overload) results in significant improvement or resolution of the rhythm disturbance without specific antiarrhythmic therapy.

## Cardiac Disease in Pregnancy

Pregnancy is associated with dramatic changes in the cardiovascular system that may result in significant hemodynamic stress to the patient with underlying heart disease. During a normal pregnancy, plasma volume increases an average of 50%, beginning in the first trimester and peaking between the 20th and 24th weeks

of gestation. This change is accompanied by increases in stroke volume, heart rate, and, accordingly, cardiac output. In addition, a concomitant fall in systemic vascular resistance and mean arterial pressure occurs because of the effects of gestational hormones on the vasculature and the creation of a low-resistance circulation in the pregnant uterus and placenta. During labor, uterine contractions result in a transient increase of up to 500 mL of blood in the central circulation, resulting in further increases in stroke volume and cardiac output. After delivery, intravascular volume and cardiac output increase further as compression of the inferior vena cava by the gravid uterus is relieved and extravascular fluid is mobilized. Symptoms and signs that may mimic cardiac disease often accompany these hemodynamic changes; they include fatigue, reduced exercise tolerance, lower-extremity edema, distention of the neck veins, S<sub>3</sub> gallop, and new systolic murmurs. Differentiating symptoms produced by cardiac disease from those attributable to a normal pregnancy can be difficult. Under such circumstances, echocardiography can be a safe and helpful noninvasive test to assess cardiac structure and function in the pregnant patient.

Many pregnant women with known cardiac disease can complete a normal pregnancy and delivery without significant harm to the mother or fetus. However, certain cardiac conditions, including irreversible pulmonary hypertension, cardiomyopathy associated with severe heart failure, and Marfan syndrome with a dilated aortic root, are associated with a high risk for cardiovascular complications and death. Under these circumstances, patients should be advised against having children. If pregnancy occurs, a first-trimester therapeutic abortion should be strongly recommended.

## SPECIFIC CARDIAC CONDITIONS

### Mitral Stenosis

Mitral stenosis secondary to rheumatic heart disease frequently occurs in young women of childbearing age. The physiologic increases in heart rate and cardiac output during pregnancy result in a significant increase in the gradient across the mitral valve and a rise in left atrial and pulmonary venous pressures. Congestive heart failure may develop as the pregnancy progresses through the second and third trimesters, or it may occur more acutely with the onset of atrial fibrillation.

The management of mitral stenosis depends on the patient's prepregnant functional capacity and the severity of the valve obstruction. In general, patients with severely symptomatic mitral valve stenosis should have percutaneous or surgical correction of the valve before conception. Women with minimal symptoms (New York Heart Association functional classes I to II) usually tolerate pregnancy and vaginal delivery well, even if moderate to severe stenosis is present. Management includes salt restriction, diuretic therapy, and aggressive treatment of pulmonary infections. Patients who develop atrial fibrillation with a rapid ventricular response should be treated with AV nodal blocking agents and cardioversion if possible. Patients who develop refractory heart failure during pregnancy should be considered for mitral balloon valvuloplasty because surgical commissurotomy or valve replacement may be associated with fetal demise.