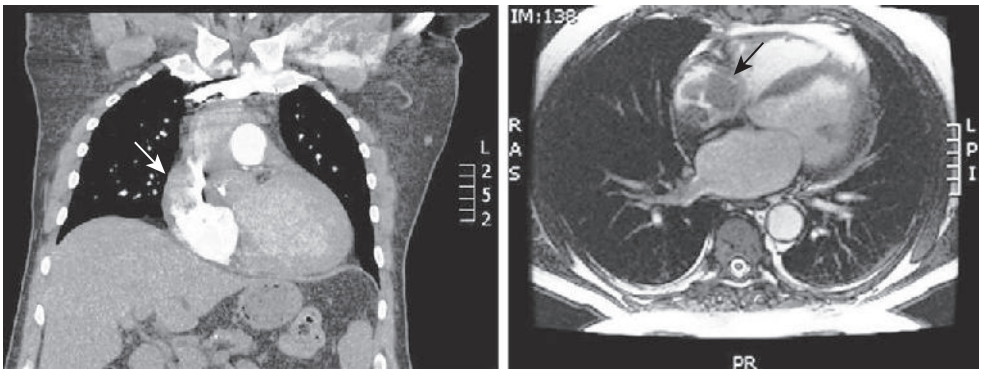

FIGURE 11-1 Cardiac magnetic resonance images of right atrial mass found to be primary cardiac lymphoma. The image on the *left* is a coronal cut, and the image on the *right* is an axial cut of the chest. *Arrows* point to the lobulated mass within the right atrium. (Courtesy Mohamed F. Algahim, MD, Division of Cardiothoracic Surgery, The Medical College of Wisconsin, Milwaukee, Wis.)

TABLE 11-2 CARDIAC LESIONS FROM NONPENETRATING TRAUMA

PERICARDIUM	VALVES
Hematoma Hemopericardium Rupture Pericarditis Constriction (late complication)	Rupture (e.g., leaflets, chordae, papillary muscle)
MYOCARDIUM	**CORONARY ARTERIES**
Contusion Intracavitary thrombus Aneurysms and pseudoaneurysms Rupture (e.g., free wall, septum) Acute rupture (e.g., atrium, ventricle, septa)	Laceration
	GREAT VESSELS
	Aortic rupture

Data from Schick EC: Nonpenetrating cardiac trauma, Cardiol Clin 13:241–247, 1995.

TRAUMATIC HEART DISEASE

Nonpenetrating Cardiac Injuries

Blunt cardiac trauma accounts for about 10% of all traumatic heart disease (Table 11-2). Motion-related injuries secondary to abrupt body deceleration (e.g., motor vehicle accidents) and chest wall compression (e.g., steering wheel impact, athletic blow, cardiac resuscitative maneuvers) are the most common causes of blunt injury to the heart. Changes in the myocardium range from small ecchymotic areas in the subepicardium to transmural injury with myocardial hemorrhage and necrosis. Pericarditis is present in most patients and may be complicated by a tear or rupture of the pericardium or cardiac tamponade. Less common complications include rupture of a papillary muscle or chordae tendineae and coronary artery laceration.

Patients most often experience precordial pain that is similar to that associated with myocardial infarction (MI). However, musculoskeletal pain secondary to chest wall injury may confuse the clinical presentation. Congestive heart failure is unusual unless myocardial injury has been extensive or valve dysfunction has occurred. Life-threatening ventricular arrhythmias may occur with severe trauma and are a frequent cause of death in such patients. The electrocardiogram (ECG) most often demonstrates nonspecific repolarization abnormalities or ST-segment and T-wave changes consistent with acute pericarditis. If myocardial injury is extensive, localized ST-segment elevation and pathologic Q waves may be present.

Elevation of the myocardial component of the creatine kinase muscle band (CK-MB) is supportive of a diagnosis of cardiac contusion but is of limited diagnostic use in patients with massive chest wall trauma because the CK-MB fraction may be elevated as a result of severe skeletal muscle injury. Newer markers of myocardial injury, such as troponins T and I, may be more specific for establishing a diagnosis of myocardial contusion. Echocardiography is a useful, noninvasive tool to assess for wall motion abnormalities, valve dysfunction, and the presence of hemodynamically significant pericardial effusion.

Treatment of cardiac contusion is similar to that of MI, with initial observation and monitoring, followed by a gradual increase in physical activity. Anticoagulants and thrombolytic agents are contraindicated given the risk for hemorrhage into the myocardium and pericardial sac. Most patients who survive the initial injury will have partial or complete recovery of myocardial function. However, patients should be monitored for late complications that include aneurysm formation, free-wall or papillary muscle rupture, and significant arrhythmias.

Great Vessel Injury

Rupture of the aorta is one of the most common cardiovascular injuries resulting from blunt chest wall trauma. In more than 90% of cases, rupture occurs in the descending thoracic aorta just distal to the origin of the subclavian artery. Most individuals die immediately of exsanguination. However, up to 20% of patients may survive the initial injury if the blood is confined within the aortic adventitia and surrounding mediastinal tissues (pseudoaneurysm). Characteristic symptoms and findings on presentation include chest and interscapular back pain, increased arterial pressure and pulse amplitude in the upper extremities, decreased pressure and pulse amplitude in the lower extremities, and mediastinal widening on the chest radiograph.

Previously, aortography was the standard for diagnosis of blunt aortic injury. However, aortography is a relatively invasive, time-consuming procedure with the potential for additional morbidity in this critically ill group of patients. Although conventional chest computed tomography (CT) cannot match the diagnostic accuracy of aortography, helical thin-cut CT angiography has emerged as a superior alternative to aortography for diagnosing blunt