



syndrome), or local issues such as chronic venous insufficiency or thrombophlebitis. Edema related to cardiac disease is caused by increased venous pressures that alter the balance between hydrostatic and oncotic forces. This leads to extravasation of fluid into the extravascular space. Peripheral edema is common with right-sided heart failure, whereas the same process in left-sided heart failure leads to pulmonary edema.

Edema due to a cardiac etiology is typically bilateral and begins distally with progression in a proximal fashion. The feet and ankles are affected first, followed by the lower legs, thighs, and, ultimately, the abdomen, sometimes accompanied by ascites. If edema is visible, it is usually preceded by a weight gain of at least 5 to 10 pounds. Edema with heart disease is typically pitting, leaving an indentation in the skin after pressure is applied to the area. The edema is usually worse in the evening, and patients often describe an inability to fit into their shoes. While these patients are lying prone, the edema can shift to the sacral region after several hours, only to accumulate again the next day when they are on their feet again (dependent edema).

Total body edema, or anasarca, may be caused by heart failure but is also seen in nephrotic syndrome and cirrhosis. Unilateral edema is more likely associated with a localized issue such as deep venous thrombosis or thrombophlebitis. Other parts of the history may shed light on the etiology of edema. Patients who report PND and orthopnea are likely have a cardiac etiology. If there is a history of alcohol abuse and jaundice is present, liver disease is a probable cause. Edema of the eyes and face in addition to lower-extremity edema is more likely related to nephrotic syndrome. Edema associated with discoloration or ulcers of the lower extremities is often seen with chronic venous insufficiency. In a patient with insidious onset of edema progressing to anasarca and ascites, one must consider constrictive pericarditis.

## Cyanosis

Cyanosis is defined as an abnormal bluish discoloration of the skin resulting from an increase in the level of reduced hemoglobin or abnormal hemoglobin in the blood. When present, it typically represents an oxygen saturation of less than 85% (normal, >90%). There are several types of cyanosis. Central cyanosis often manifests in discoloration of the lips or trunk and usually represents low oxygen saturations due to right-to-left shunting of blood. This can occur with structural cardiac abnormalities such as large atrial or ventricular septal defects, but it also happens with impaired pulmonary function, as in with severe chronic obstructive lung disease. Peripheral cyanosis is typically secondary to vasoconstriction in the setting of low cardiac output. This can also occur with exposure to cold and can represent local arterial or venous thrombosis. When localized to the hands, peripheral cyanosis suggests Raynaud's phenomenon. Cyanosis in childhood often indicates congenital heart disease with resultant right-to-left shunting of blood.

## Other

There are other, nonspecific symptoms that may indicate cardiovascular disease. Although fatigue is present with a myriad of medical conditions, it is very common in patients with cardiac disease when low cardiac output is present. It can be seen with hypotension due to aggressive medical treatment of hypertension

or with overdiuresis in patients with heart failure. Fatigue may also be a direct result of medical therapy for cardiac disease itself, such as with  $\beta$ -blocking agents. Although cough is commonly associated with pulmonary disease, it may also indicate high intracardiac pressures which can lead to pulmonary edema. Cough may be present in patients with heart failure or significant left-sided valve disease. A patient with congestive heart failure may describe a cough productive of frothy pink sputum, as opposed to frank bloody or blood-tinged sputum, which is seen more typically with primary lung pathology. Nausea and emesis can accompany acute myocardial infarction and may also be a reflection of heart failure leading to hepatic or intestinal congestion due to high right heart pressures. Anorexia, abdominal fullness, and cachexia may occur with end-stage heart failure. Nocturia is also a symptom described with heart failure; renal perfusion improves when the patient lies in a prone position, leading to an increase in urine output. Hoarseness of voice can occur due to compression of the recurrent laryngeal nerve. This may happen with enlarged pulmonary arteries, enlarged left atrium, or aortic aneurysm.

Despite the myriad symptoms of cardiovascular disease described here, many patients with significant cardiac disease are asymptomatic. Patients with CAD may have periods of asymptomatic ischemia that can be documented on ambulatory electrocardiographic monitoring. Up to one third of patients who have suffered a myocardial infarction are unaware that they had an event. This is more common in diabetics and in older patients. A patient may have severely depressed ventricular function for some time before presenting with symptoms. In addition, patients with atrial fibrillation can be entirely asymptomatic, with this rhythm discovered only after a physical examination is performed.

At times, patients do not report having symptoms related to usual activities of daily living, yet symptoms are present when functional testing is performed. Therefore, assessing functional capacity is a very important part of the history in a patient with known or suspected cardiovascular disease. The ability or inability to perform various activities plays a substantial role in determining the extent of disability and in assessing response to therapy and overall prognosis, and it can influence decisions regarding the timing and type of therapy or intervention. The New York Heart Association Functional Classification is a commonly used method to assess functional status based on "ordinary activity" (Table 3-3). Patients are classified in one of four functional classes. Functional class I includes patients with known cardiac disease who have no limitations with ordinary activity. Functional classes II and III describe patients who have symptoms with less and less activity, whereas patients in functional class IV have symptoms at rest. The Canadian Cardiovascular Society has provided a similar classification of functional status specifically for patients with angina pectoris. These tools are very useful in classifying a patient's symptoms at a given time, allowing comparison at a future point and determination as to whether the symptoms are stable or progressive.

## DIAGNOSIS AND PHYSICAL EXAMINATION

### General

Like the detailed history, the physical examination is also vital when assessing a patient with cardiovascular disease. This