

rest but may increase on lying down or on minimal exertion. Advanced HF may be associated with periodic breathing or Cheyne-Stokes respirations. The patient is usually unaware of the altered breathing pattern, but family members or friends may become alarmed or attribute this incorrectly to anxiety. Oxygen saturation is typically normal on room air unless there is acute pulmonary edema, underlying CHD with shunting, severe pulmonary arterial hypertension, or concomitant acute or chronic lung disease. A low-grade fever resulting from cytokine activation may occur in severe HF and subside when compensation is restored.

Jugular Venous Pulse Examination of the jugular veins provides an estimate of the right atrial pressure. Typically, the patient is examined at a 45° angle, and jugular venous pressure (JVP) is quantified in centimeters of water by estimating the height of the venous column of blood above the sternal angle in centimeters and then adding 5. In patients with mild right HF, JVP may be normal at rest (≤ 8 cmH₂O) but increase with compression of the right upper quadrant. *Hepatojugular reflux* is elicited by applying firm continuous pressure over the liver for 15–30 s while observing the neck veins. The patient must breathe normally and not strain during the maneuver. Higher levels of venous pressure approaching the angle of the jaw are common in chronic right HF. If significant tricuspid regurgitation is present, prominent V waves and Y descents may be noted. The *abdominojugular test*, defined as an increase in right atrial pressure during 10 s of firm midabdominal compression followed by an abrupt drop on pressure release, suggests elevated left-sided filling pressure. A rise in JVP with inspiration or Kussmaul's sign may be due to severe biventricular HF and is a marker of poor outcome.

Lung Examination Pulmonary rales result from transudation of fluid from the intravascular space into the alveoli and airways. In general, rales are heard at the lung bases, but in severe HF or acute pulmonary edema, they may be heard throughout the lung fields. Wheezing and rhonchi can occur with congestion of the bronchial mucosa and sometimes lead to a misdiagnosis (and inappropriate