Pulmonary Artery Pressure Monitoring

The pulmonary artery (PA) catheter is a flow-directed, balloon-tipped catheter first used in the early 1970s. The PA catheter is often called a Swan-Ganz catheter, after the physicians who developed it. The PA catheter is used to evaluate left ventricular and overall cardiac function. The PA catheter is inserted into a central vein, usually the internal jugular or subclavian vein, and threaded into the right atrium. A small balloon at the tip of the catheter allows the catheter to be drawn into the right ventricle and from there into the pulmonary artery. The inflated balloon carries the catheter forward until the balloon wedges in a small branch of pulmonary vasculature. Once in place, the balloon is deflated, and multiple lumens of the catheter allow measurement of pressures in the right atrium, pulmonary artery, and left ventricle. The normal PA pressure is around 25/10 mmHg; normal mean pulmonary artery pressure is about 15 mmHg. Pulmonary artery pressure is increased in left-sided heart failure.

Inflation of the balloon effectively blocks pressure from behind the balloon and allows measurement of pressures generated by the left ventricle. This is known as pulmonary artery wedge pressure (PAWP or PWP) and is used to assess left ventricular function. The normal pulmonary artery wedge pressure is 8 to 12 mmHg. PAWP is increased in left ventricular failure and pericardial tamponade, and decreased in hypovolemia.

Cardiac output also can be measured with the PA catheter using a technique called thermodilution. Cardiac output and the cardiac index are used to assess the heart’s ability to meet the body’s oxygen demands. Because body size affects overall cardiac output, the cardiac index is a more precise measure of heart function. The cardiac index is a calculation of cardiac output per square meter of body surface area. The normal cardiac index is 2.8 to 4.2 L/min/m².

Medications

Clients with heart failure often receive multiple medications to reduce cardiac work and improve cardiac function. The