nitrous oxide is used to cool a catheter to subfreezing temperatures, which then destroys the tissue of target by freezing.

Pulmonary Artery Hypertension

Pulmonary artery hypertension (PAH) is a disease of the entire pulmonary circulation. The pulmonary arteries are described as having vascular narrowing due to decreased vascular growth and surface area, as well as structure remodeling of the vessel wall (Abman and Ivy, 2011). This leads to an increase in pulmonary vascular resistance. These disorders are poorly understood, and until recently, there was no treatment beyond supportive care. PAH is a progressive, eventually fatal disease for which there is no known cure. It can be difficult to diagnose in the early stages. Often when patients become symptomatic and a diagnosis is made, their disease is rapidly progressing, treatment is unsuccessful, and death occurs within several years. There is also evidence of a genetic basis for some PAH (Newman, Phillips, and Loyd, 2008).

There are many possible causes of PAH. Cardiac causes occur primarily in patients with a large left-to-right shunt producing increased pulmonary blood flow. If these defects are not repaired early, the high pulmonary flow will cause changes in the pulmonary artery vessels, and the vessels will lose their elasticity. Other causes of PAH include hypoxic lung diseases, thromboembolic diseases causing pulmonary vascular obstruction, collagen vascular diseases, exposure to toxic substances, and congenital heart defects with a large left-to-right shunt, from increased pulmonary blood flow. Many of the patients have no identifiable cause for PAH and have primary or idiopathic PAH.

Clinical Manifestations

The clinical manifestations include dyspnea with exercise, chest pain, and syncope. Dyspnea is the most common symptom and is caused by impaired oxygen delivery. Chest pain is the result of coronary ischemia in the right ventricle from severe hypertrophy. Syncope reflects a limited cardiac output leading to decreased cerebral blood flow. Right-sided heart dysfunction is steadily progressive, and when symptoms of venous congestion and edema are present, the prognosis is poor.