Potts Shunt in Patients with Pulmonary Hypertension

To the editor: Pulmonary hypertension is a rare complication of transposition of the great arteries. As in other forms of primary pulmonary hypertension, the prognosis is poor, particularly in children who have symptoms. Converting normal cardiac physiological features to features typical of Eisenmenger’s syndrome by means of blade atrial septostomy has already been proposed for patients with this condition. But patients with severe right heart failure and markedly elevated pulmonary vascular resistance do not tolerate atrial septostomy, because massive right-to-left shunting may result in insufficient pulmonary blood flow and severe hypoxemia.

Therefore, in the cases of two boys who had suprasystemic pulmonary hypertension and right ventricular failure 4 years and 14 years after an arterial switch performed for transposition of the great arteries, we decided to create an anastomosis between the descending aorta and the left pulmonary artery (Potts shunt) (Fig. 1). The ratio of pulmonary blood flow to systemic blood flow was 1, as there was no intracardiac shunt in either boy. The aim of this intervention was to decrease right ventricular afterload so as to improve right ventricular function and potentially prevent syncope and sudden death. The procedures were uneventful.

The patients’ condition improved rapidly, and both are now in New York Heart Association functional class II. Right ventricular function was restored. Right-to-left shunting through the Potts shunt was responsible for cyanosis of the lower limbs, and consequently, polycythemia developed in both patients (the hematocrit values were 51 percent and 55 percent at the last follow-up). The patients did not have any further episodes of syncope after a follow-up of 18 and 6 months, respectively. Hemodynamic evaluation confirmed that the pulmonary-artery pressure and aortic pressure were equal. Left-heart output was preserved.

The advantages of the Potts procedure are the immediate decrease in the right ventricular afterload and the absence of cyanosis of the upper part of the body in the absence of intracardiac shunting. The chief concern remains the operative risk in patients with pulmonary hypertension. Without treatment, the mean survival of children is less than one year after diagnosis. For adults with pulmonary hypertension who are treated with prostacyclin analogues, the survival rate is estimated to be about 55 percent at five years, but comparable studies in children have not been conducted. Median survival in adults with Eisenmenger’s syndrome is 53 years. Therefore, the Potts procedure could be an alternative for the treatment of children with severe pulmonary hypertension and right ventricular failure.

Julie Blanc, M.D.
Pascal Vouhé, M.D.
Damien Bonnet, M.D., Ph.D.
Hôpital Necker–Enfants Malades
75015 Paris, France
damien.bonnet@nck.ap-hop-paris.fr