Repair of Partial Anomalous Pulmonary Venous Connection With a Minimal Atriotomy

We present an alternative surgical technique for the repair of a partial anomalous pulmonary venous connection to the higher segment of the superior vena cava. Although the atriotomy is limited in this technique, a sufficiently large systemic venous chamber overlapping to the outside of the superior vena cava can be created. (J JTCVS 2000; 48: 370–372)

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Masaaki Yamagishi, MD, Katsuji Fujiwara, MD, Hitoshi Yaku, MD, Yukio Wada, MD, and Nobuo Kitamura, MD.

Various surgical techniques for partial anomalous pulmonary venous connection (PAPVC) to the superior vena cava (SVC) have been reported. Essential factors in the surgical strategy for PAPVC are (1) creation of sufficient systemic and pulmonary venous channels, (2) preservation of the sinus node and its feeding artery, (3) avoidance of thrombus, late venous obstruction, and supraventricular arrhythmias, and (4) the growth potential of both venous channels especially in pediatric patients. We have developed an alternative technique for PAPVC to the higher segment of the SVC using autologous atrial septal and appendage flap with a minimal atriotomy.

Case

The patient was an 13-year-old girl, weighing 58 kg, in New York Heart Association functional class I. Angiography showed three right superior pulmonary veins drained directly into the SVC. Echocardiography showed sinus venosus type atrial septal defect.

Surgical technique. Surgical repair was performed through a median sternotomy. The SVC and the innominate vein were dissected free. The superior branches of the right pulmonary vein drained directly into the SVC. The highest pulmonary venous branch was connected to the high segment of the SVC just beneath the junction with the azygos vein. The right inferior pulmonary vein drained directly into the left atrium. A venous cannula toward the SVC was directly inserted via the innominate vein. Cardiopulmonary bypass was started with aortic and the inferior vena caval cannulation. The ridge line of the right atrium (RA) was incised from the summit of the right atrial appendage towards the junction between the SVC and the right atrium (SVC-RA junction). The atriotomy was stopped a few millimeters short of the SVC-RA junction. The atriotomy was extended caudally about 1 cm from the summit of the appendage (Fig. 1A). There was a sinus venosus atrial septal defect measuring 20 × 20 mm. The atrial septal flap for the pulmonary venous channel was created by incising the septum at about 20 mm from the left- and right-inferior edges of the defect along the septal attachment to the atrial wall. Care was taken to avoid the sinus nodal artery in the atrial wall running along the superior septal attachment. The septal flap was pulled up antero-superiorly and anastomosed around the anterior border of the SVC orifice into the RA. All sutures were located beneath the SVC orifice. An intraatrial pulmonary venous channel was completed using this maneuver. Just above the junction of the right superior PV, the anterior wall of the SVC was incised transversely. A T-shaped incision was added to the cephalic border of the SVC incision (Fig. 1A).
The caudal border of the SVC incision was pushed down and anastomosed to the posterior inner surface of the SVC (Fig. 1B). A pulmonary venous channel was then accomplished from the right superior pulmonary veins via the proximal SVC to the left atrium. The cephalic edge of the atrial appendage flap was anastomosed onto the anterior external wall of the SVC beyond the SVC-RA junction to avoid injury to the sinus nodal artery (Fig. 1B). The atrial appendage flap was anastomosed onto the anterior and both lateral walls of the SVC (Fig. 1C). Finally, the cephalic border of the SVC incision was covered with the atrial appendage flap (Fig. 1D). Magnetic resonance imaging at 2 months after the operation demonstrated that both venous channels were of sufficient patency without stenosis (Fig. 2). There was no evidence of supraventricular arrhythmias on 24-hour continuous Holter electrocardiographic monitoring.