Noninvasive Assessment of Pseudo-Pulmonary Artery Sling by Echocardiography and Computerized Tomography

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A 2-month-old infant with a double-outlet right ventricle, pulmonary stenosis, a subaortic ventricular septal defect, a hypoplastic mitral valve, a hypoplastic left ventricle, and a restrictive atrial septal defect was seen at an outside institution. The initial plan was to palliate the child with an atrial septectomy, have the pulmonary artery oversewn, and perform a modified Blalock-Taussig shunt. During surgery, an anomalous origin of the left lower pulmonary artery was noted originating from the right pulmonary artery. The possibility of a left lower pulmonary artery sling was suspected. The pulmonary artery was banded instead, and the patient was transferred to our institution. The noninvasive investigations at this institution, including echocardiography (Figure 1) and computerized tomography (CT) with 3D reconstruction (Figure 2), demonstrated the left lower branch pulmonary artery origin and its course. These findings were subsequently confirmed by angiography (Figure 3) and direct inspection during surgery. Partial anomalous left pulmonary artery is a rare vascular variant. If this vessel runs posterior to the trachea, it may cause compromise of the airway. Familiarity with and delineation of this lesion before surgery are important for successful intervention. Noninvasive imaging with echocardiography and/or color Doppler flow mapping can provide important clues to the diagnosis. CT scans, especially with 3D reconstruction, may confirm the diagnosis and may also provide information regarding the spatial relationship between the anomalous pulmonary artery branch and the trachea and bronchi.
Figure 1. Echocardiography with color Doppler flow mapping from suprasternal coronal view. A, Left (LUPA) and right pulmonary artery (RPA). B, Anomalous left lower pulmonary artery (LLPA) arising from the proximal right pulmonary artery coursing inferiorly and leftward. C, Color Doppler flow of the anomalous left lower pulmonary artery arising from the proximal right pulmonary artery coursing inferiorly and leftward.

Figure 2. CT scan of the chest with 3D reconstruction. A, The main pulmonary artery (MPA) gave rise to the left upper (LUPA) and right (RPA) pulmonary arteries. The trachea was located posterior to the main and branch pulmonary arteries. B, More caudal, the left lower pulmonary artery is seen arising from the right pulmonary artery and coursing posteriorly behind the left stem bronchus (LB).

Figure 3. Right ventriculogram (anteroposterior projection) showed the right ventricle, which gave rise to the aorta and pulmonary artery. The main pulmonary artery was banded, and the right and left upper pulmonary arteries (LUPA) were seen. The left lower pulmonary artery (LLPA) was shown to arise from the proximal right pulmonary artery with no narrowing.
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