Main pulmonary artery translocation for left pulmonary stenosis

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Supplemental material is available online.

Surgical arterioplasty for left pulmonary branch stenosis has often produced unsatisfactory results. We report a new operative technique involving the main pulmonary artery (MPA) translocation technique. This technique provided a wide patency without overstretching.

Technique

The operation is performed through a median sternotomy. In cases that require an additional aortopulmonary shunt, this procedure is performed through a standard left posterolateral thoracotomy. The left pulmonary artery and MPA are completely dissected to allow anastomosis without overstretching, and the stenotic portion is transected. Next, the MPA is transected and the distal stump is translocated to the distal left pulmonary artery. The anastomosis is completed with a running suture of 7-0 polypropylene. After this anastomosis, a modified

Blalock–Taussig (BT) shunt or a bidirectional Glenn (BDG) shunt is created.

Results

From November 2005 to April 2006, 2 patients underwent left pulmonary arterioplasty with this technique. The first case was an 11-month-old boy with single-ventricle and pulmonary atresia associated with nonconfluent right and left pulmonary arteries. A right-sided modified BT shunt had been performed at the age of 1 month. His left pulmonary arterial blood flow had been maintained from the arterial duct with continuous intravenous infusion of prostaglandin E1 (Figure 1). The operation was performed through a left posterolateral thoracotomy. The MPA translocation was completed, and a left modified BT shunt was created (Figure 2). The second case was a 10-year-old girl with single ventricular morphology with pulmonary atresia. Her left pulmonary artery had severe stenosis with a long segmental lesion caused by previous pulmonary arterioplasty. Pulmonary angiography showed that the main pulmonary trunk was long enough for this technique (Figure E1). Cardiopulmonary bypass was established through a median sternotomy. After the right-sided BDG shunt was completed, the left-sided BDG shunt was performed at the superior aspect of the anastomosis between the left pulmonary artery and the MPA (Figure E2). Postoperative 3-dimensional computed tomography showed a patency of the left pulmonary artery, which had a large enough diameter, in both patients (Figures E3 and E4).

Discussion

The relationship between stenosis of the left pulmonary artery and the arterial duct is well known and referred to as juxtaductal pulmonary artery coarctation or nonconfluent pulmonary arteries.¹ Although a pericardial patch enlargement of the left pulmonary arterial coarctation is easily accomplished, recurrent stenosis often develops because of the redundancy or shrinkage of the patch. If the stenosis is localized with biventricular morphology, we prefer the extended end-to-end anastomosis, or “the sliding technique,” to

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Figure 1. Preoperative pulmonary angiogram shows nonconfluent pulmonary arteries. Left pulmonary flow was maintained from the arterial duct. The MPA is large enough for translocation (Δ).

Figure 2. MPA translocation. MPA, main pulmonary artery.

give enough continuity of the pulmonary arterial tissue than a conventional patch enlargement.² However, if the stenotic portion is a long segment or completely separated, the sliding technique is not suitable because of overstretching.

We report a new operative technique involving the MPA translocation, providing a wide patency without tension. We believe this technique has the advantage of the continuity of autologous pulmonary arterial tissue. However, this procedure is recommended for patients with single ventricular morphology and a large enough MPA for translocation, because it might be difficult to reconstruct the right ventricular outflow tract for biventricular repair after this technique.

Conclusions

This technique is simple and applicable, providing excellent mid-term results because of the continuity of autologous pulmonary arterial tissue.

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Figure E1. Preoperative pulmonary angiogram shows severe left pulmonary stenosis with a long segmental lesion. The MPA is large enough for translocation (Δ). *MPA*, main pulmonary artery.

Figure E2. Left-sided BDG shunt was anastomosed at the superior aspect of MPA translocation. *BDG*, bidirectional Glenn; *MPA*, main pulmonary artery.

Figure E3. Postoperative 3-dimensional computed tomography of case 1 showed a widely patent left pulmonary artery. *mBT*, Modified Blalock-Taussig; *Ao*, aorta; *PA*, pulmonary artery.

Figure E4. Postoperative 3-dimensional computed tomography of case 2 also showed a widely patent left pulmonary artery (Δ).