



Heart Transplantation for Congenitally Corrected Transposition of the Great Arteries

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A 36-year-old male had congenitally corrected transposition of the great arteries (cc-TGA) with heart failure underwent heart transplantation. Due to the abnormal alignment of the great arteries in cc-TGA, the transplantation required technical modifications. When harvesting the donor heart, extra length of the pulmonary artery was preserved. The donor's pulmonary artery was cut at its bifurcation. Anastomosis of the pulmonary artery followed anastomosis of the left and right atrium. Last, aortic anastomosis was performed. Preservation of extraordinary pulmonary artery of the donor's heart may be necessary to achieve an acceptable anastomosis. Heart transplantation for cc-TGA is technically feasible.

Key words: Congenitally corrected transposition of the great arteries, heart transplantation, preserve pulmonary artery

INTRODUCTION

Heart transplantation for a patient with congenitally corrected transposition of the great arteries (cc-TGA) is rare.¹⁻³ As patients with cc-TGA have a high prevalence of severe myopathy of systemic morphologic right ventricle, heart transplantation is an accepted therapeutic method today. Operative procedures should be modified for anastomosis due to abnormal alignment of the great arteries.^{2,3} In the literature, many cases preserved an extra length of the aorta when harvesting the donor's heart, and cardiac allograft was implanted with rotation for anastomosis of the great vessels. In this case, an extra length of the pulmonary artery of the donor's heart was preserved. After the anastomosis of the aorta and pulmonary artery, the heart was in a natural position, and no hemodynamic compromise was noted.

CASE REPORT

A 36-year-old male was diagnosed with cc-TGA in his youth. He had undergone prosthetic valve replacement due to

severe systemic atrioventricular valve regurgitation when aged 16. After the surgery, he also had a history of conservative treatment for infective endocarditis. As dyspnea on exertion became exaggerated, he sought treatment at our medical center. A transthoracic echocardiogram demonstrated that the four chambers were dilated, and the ejection fraction of the morphologic right ventricle was estimated of 20%. Magnetic resonance imaging showed that the left atrium was connected to the morphologic right ventricle, from which aorta arises; the right atrium was connected to the morphologic left ventricle, from which the pulmonary trunk arises [Figure 1]. At catheterization, the cardiac index was 1.8 L/min/m², and pulmonary vascular resistance was 3.62 wood units. Despite maximal medical therapy, his condition deteriorated. Finally, he received heart transplantation in August 2012.

While harvesting the donor heart, extra length of the pulmonary artery was preserved. The donor's pulmonary artery was cut at its bifurcation. The recipient's aorta and both vena cava were cannulated for cardiopulmonary bypass. The recipient heart was excised as usual. The anastomosis of the left and right atrium was performed first, and the pulmonary artery was then anastomosed. Aortic anastomosis was performed last. After the anastomosis of the aorta and pulmonary artery, the heart was in its natural position, and no compromise in hemodynamic existed [Figure 2].

Postoperative course was smooth. He was discharged from the medical center at 21 days after surgery. Follow-up echocardiogram and chest X-ray were well. He was in good health at 17 months after heart transplantation.

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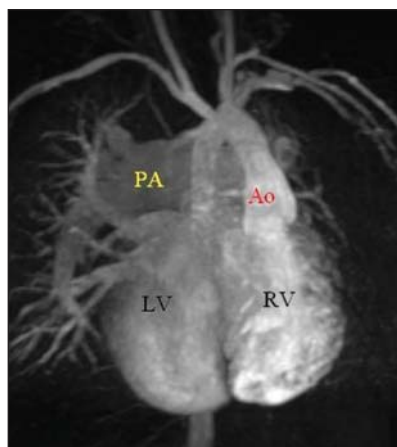


Figure 1. Magnetic resonance imaging showed that the morphologic right ventricle connected to aorta; the morphologic left ventricle connected to the pulmonary trunk arises. RV, right ventricle; Ao, aorta; LV, left ventricle; PA, pulmonary artery

DISCUSSION

The natural course of congenitally corrected transposition of the great arteries (cc-TGA) is eventual morphologic right ventricular failure, such that these patients will require heart transplantation, which as an initial therapy may be preferred.⁴ Reitz *et al.* first reported a successful heart transplantation for cc-TGA at Stanford University Medical Center in 1982.¹ They preserved the donor's aortic arch for acceptable anastomosis to the recipient's ascending aorta. Harjula *et al.* performed heart transplantation on a patient with cc-TGA in 1987.² The cardiac allograft included the ascending aorta and aortic arch, such that an extra length of the aorta could be crossed over the pulmonary artery for anastomosis. In 2008, Sue *et al.* presented a patient with cc-TGA who underwent heart transplantation.³ The aortic arch was preserved when donor's heart was harvested. The extra length of the aorta was acceptable for anastomosis, which could cross over the pulmonary artery. However, the heart was in a clockwise rotation after the pulmonary artery anastomosis was done. The authors concluded that the entire aortic arch should be excised with the donor's heart so that vascular prosthesis was not needed for anastomosis.

In our case, an extra length of the pulmonary artery of the donor's heart was preserved. The anastomosis of the pulmonary artery was made behind the aorta. A sufficient length of the pulmonary artery was used to avoid rotating the heart for anastomosis. We suppose that the redundant aorta after anastomosis may compress the pulmonary artery. Thus,

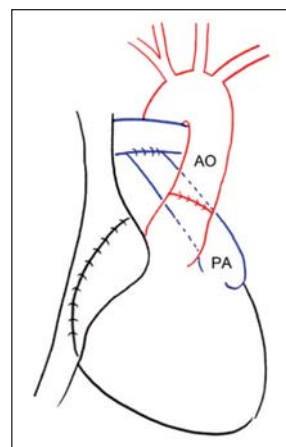


Figure 2. An extra length of the pulmonary artery of the donor heart was preserved. The anastomosis of the pulmonary artery was made behind the aorta. A sufficient length of the pulmonary artery was used to avoid rotating the heart for anastomosis. Ao, aorta; PA, pulmonary artery

adequate length of the aorta should be available before aortic anastomosis. Some procedures in this case were modified but with no heart rotation or hemodynamic compromise. We suggest that preserving an extra length of the pulmonary artery from a donor's heart may be necessary to achieve an acceptable anastomosis.

DISCLOSURE

The authors declared this study has no conflicts of interest.

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