

## IMAGES IN INTERVENTION

# Ascending Aorta to Main Pulmonary Artery Fistula Following Orthotopic Heart Transplantation

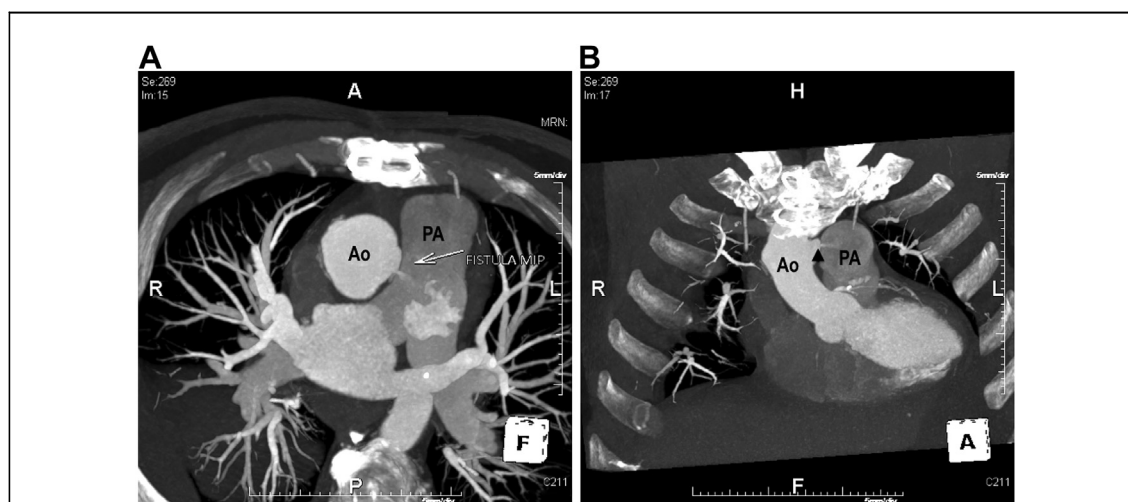
## Successful Percutaneous Closure Employing an Amplatzer Duct Occluder

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A 60-year-old man with end-stage heart failure underwent orthotopic heart transplantation. Before transplantation, he had elevated pulmonary artery (PA) pressures (60/17 mm Hg, mean PA 35 mm Hg) and pulmonary vascular resistance (PVR) (6.6 Wood units).

Following transplantation, he initially did well, with normalization of PA pressures (27/13 mm Hg, mean PA 20 mm Hg). Several months later, however, he developed overt right heart failure. Invasive hemodynamic evaluation demonstrated severe pulmonary hypertension (92/51 mm Hg, mean PA



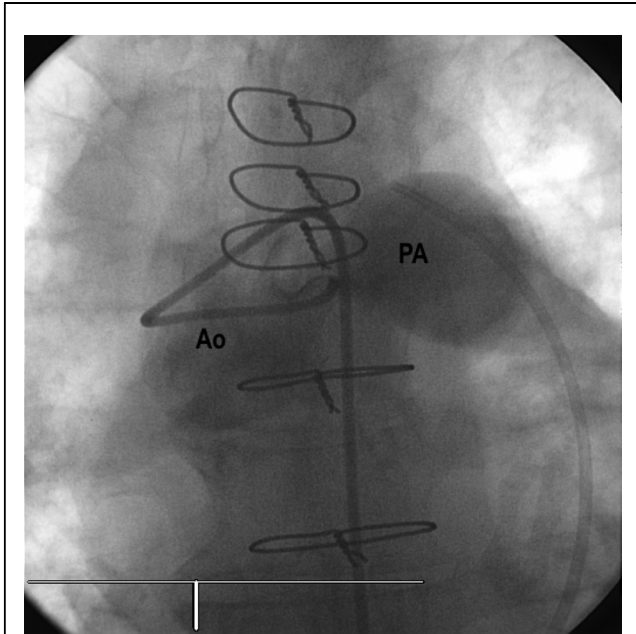
**Figure 1.** CTA Imaging of the Ao-to-PA Fistula

(A) Axial oblique computed tomographic angiography (CTA) image demonstrating contrast flow from the ascending aorta (Ao) into the distal main pulmonary artery (PA). (B) Coronal CTA image demonstrating contrast flow from the ascending Ao into the PA at a site of out-pouching along the inner curvature of the Ao (arrowhead). A = anterior; F = feet; H = head; L = left; MIP = maximum-intensity projection; P = posterior; R = right.

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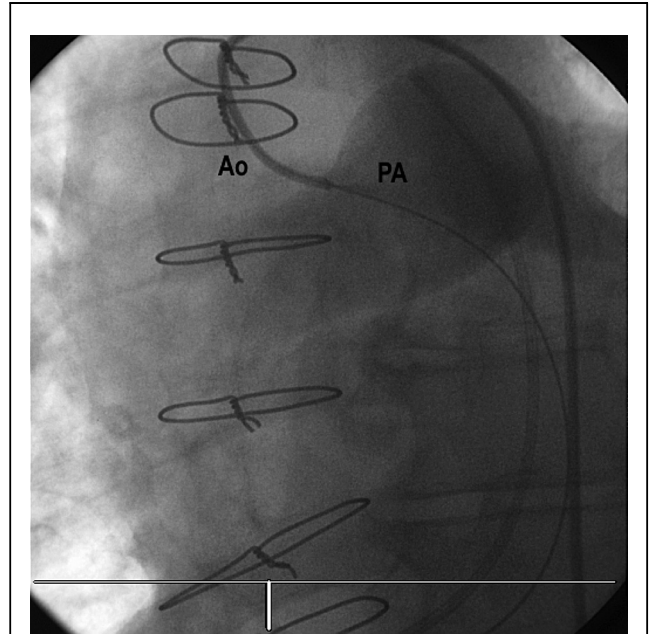
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66 mm Hg) with a PVR of 10 Wood units. There was no evidence of allograft rejection or pulmonary embolism. Transthoracic echocardiogram demonstrated right ventricular (RV) systolic dysfunction and enlargement. Color flow Doppler imaging demonstrated continuous flow from the ascending aorta into the main PA. The anatomy was



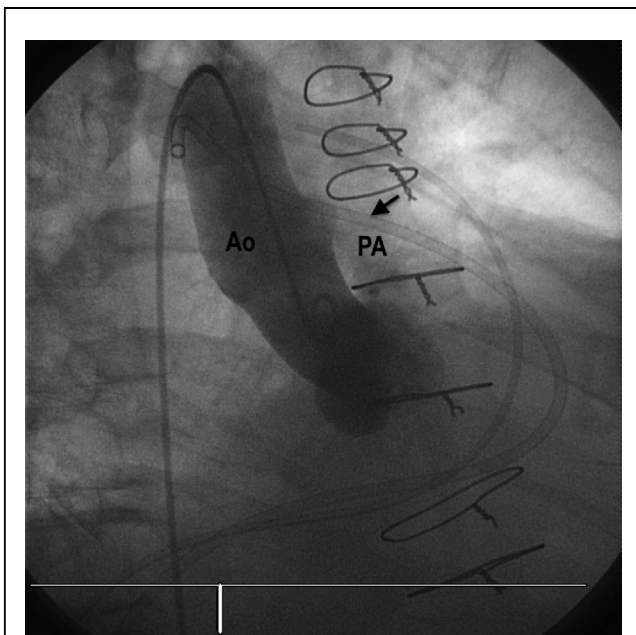
**Figure 2.** Still Cineangiographic Image in the Straight Anterior-Posterior Projection

Note the flow from the ascending Ao to the PA. Abbreviations as in Figure 1. ([Online Video 1](#))



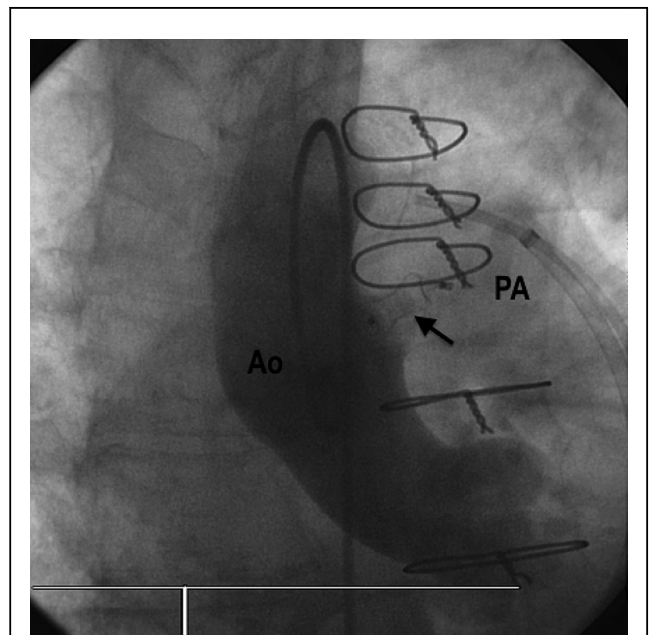
**Figure 3.** Still Cineangiographic Image in the 16° Left Anterior Oblique Projection

Note the Judkins Left 3.5 guide catheter entering the fistula from the ascending Ao and contrast opacifying the PA. Abbreviations as in Figure 1. ([Online Video 2](#))



**Figure 4.** Still Cineangiographic Image of the Ascending Ao Viewed From 32° Right Anterior Oblique

Note the course of the 9-F, 45° TorqVue delivery sheath (**arrow**) from the PA into the Ao. Abbreviations as in Figure 1.



**Figure 5.** Still Cineangiographic Image of the Ascending Ao (18° Right Anterior Oblique)

Note the stable position of the deployed 12/10 mm Amplatzer Duct Occluder device (**arrow**) and the absence of contrast flow from the Ao into the PA. Abbreviations as in Figure 1. ([Online Video 3](#))

confirmed by computed tomographic angiographic imaging (Fig. 1).

Oximetry measured a modest left-to-right shunt at the PA level and no right-to-left shunt ( $Q_p/Q_s$  shunt fraction = 1.2:1). Percutaneous closure of the aorta-to-PA fistula was recommended.

A 6-F Judkins Left 3.5 (Cordis Inc., Miami, Florida) guide catheter inserted via the right femoral artery engaged the fistula origin in the ascending aorta. Biplane angiography demonstrated the fistulous connection (Fig. 2 and Online Video 1, and Fig. 3 and Online Video 2).

A 0.035-inch Glidewire (Terumo Medical Corporation, Somerset, New Jersey) was advanced via the guide catheter through the fistulous connection into the PA and externalized out the right femoral vein using a 25-mm loop snare (ev3 Endovascular, Plymouth, Minnesota).

Based on computed tomographic and angiographic measurements (a sizing balloon would not cross the fistula), a 12/10 mm Amplatzer Duct Occluder was selected and deployed via a TorqVue delivery sheath (St. Jude Medical, St. Paul, Minnesota) (Fig. 4). Aortography confirmed stable and ideal positioning of the device within the fistula, with dramatic reduction of flow into the PA (Fig. 5, Online Video 3).

The patient did well post-procedure without complications. At follow-up evaluation 4 months after the procedure, the patient reported improvement in his dyspnea, increased energy, and diminished peripheral edema. In addition, TTE demonstrated decreased RV size and Doppler-derived RV systolic pressure with no residual shunt.

Review of the literature failed to reveal a report of the post-transplantation complication described in our patient: formation of a fistula between the aorta and PA after heart transplantation. The approach described for percutaneous closure represents a novel and less morbid solution compared with repeat open cardiac surgery.

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**Key Words:** Amplatzer Duct Occluder ■ cardiac transplantation ■ fistula ■ transthoracic echocardiogram.

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## APPENDIX

For accompanying videos, please see the online version of this paper.