

# AORTOPULMONARY WINDOW CLOSURE BY DUCT OCCLUDER: REPORT OF TWO CASES

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## Abstract

*Aortopulmonary window is usually treated surgically. However, small windows far from the coronary and pulmonary branch arteries can be occluded by transcatheter approach. The key step is the precise sizing of the defect. We report two successful transcatheter closures. We used CT angiography for precise measurement of the defect in the first patient, and balloon sizing in the other. We used duct occluders in both patients.*

## Key words:

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## Introduction

Aortopulmonary window (APW) is sub-classified into proximal, distal, confluent and intermediate types [1]. Surgery is the traditional treatment; however, those sufficiently far from coronary arteries and the origin of pulmonary arteries (at least 5 mm each) can be successfully occluded by transcatheter approach. Intermediate type is the least common but the best suited for device closure [2].

## Case 1

In an 11-month old 6.6 kg symptomatic infant, we found evidence of left to right shunt on echocardiography but we could not identify the precise location. Therefore, a computerized tomography (CT) angiography was done, revealing an intermediate type 6-mm APW (Fig. 1). Only thereafter we could confirm the diagnosis on echocardiogram using a modified subcostal view. In addition, mitral regurgitation of moderate

intensity was present. A decision of transcatheter closure was made.

After obtaining informed consent, the patient underwent catheterism. Pulmonary artery (PA) pressure was 45 mmHg, and shunt ratio 2/1. An ascending aortogram at 25° right anterior oblique view confirmed the presence of APW. Then the defect was crossed from aorta using a 5 Fr cut pigtail catheter and 0.035 inch Terumo guidewire (Terumo, Japan). The guidewire was snared in the main PA. After creating an arteriovenous loop, a 7 Fr TorqVue delivery system (St. Jude Medical, USA) was introduced from the venous side through the defect. An Amplatzer Duct Occluder (ADO; St. Jude Medical, USA) of 10/8 size was implanted in the defect and appropriate positioning was confirmed by angiography. A few minutes after device release, another ascending aortogram confirmed complete closure of the window and adequate distance between the device and coronary arteries. He was started

on aspirin for 6 months. Echocardiographies one day, one month, and four month after the procedure showed neither residual shunt nor stenosis in the great arteries. Intensity of mitral regurgitation was apparently decreased after one month.

## Case 2

We found a type II APW and a tiny patent ductus arteriosus (PDA) in a 10-month-old male infant weighing 7 kg. We again decided to occlude this APW by transcatheter method.

After obtaining informed consent, the patient underwent catheterism. Pulmonary artery (PA) pressure was 37 mmHg, and shunt ratio 3.5/1. An ascending aortogram at 38° right anterior oblique view confirmed the presence of APW (Fig. 1a). Then the defect was crossed and an arteriovenous loop was created in the same manner as in the first patient. At this step we sized the defect by a Tyshak II 8×20 balloon catheter (NuMed, Canada) (5.3 mm, Fig. 2b). A Cardi-O-Fix PDA occluder (Starway Medical Technology, China) of 10/8 size was implanted in the defect via a 7 Fr long sheath (Starway Medical Technology, China) (Fig. 2c). Ascending aortogram confirmed closure of the window with only mild residual flow. We decided to leave the PDA open as it was very small and insignificant. He was started on aspirin for 6 months. Echocardiographies with the same intervals as in the first patient

showed neither residual shunt nor stenosis in the great arteries.

## Discussion

Stamato et al first described APW device closure in 1995 [3]. In the total of 14 patients reported until 2008, 7 duct occluders were used for APW closure followed by two Amplatzer atrial septal occluders, one Amplatzer muscular VSD Occluder, one perimembranous VSD occluder, and three older devices (two umbrellas and one buttoned device) [2,4].

The rationale for using duct occluders over the other devices is minimal protrusion of this device into the ascending aorta and therefore minimal risk of supra-valvar aortic stenosis. However, these devices have the maximal protrusion into PA. Fortunately the capacious PA can accept it without significant stenosis. For the same reason we selected duct occluders for our patients, which yielded acceptable results.

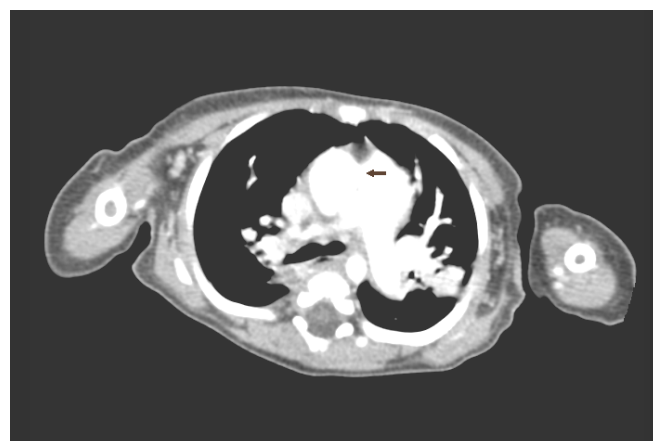


Fig. 1: Aortopulmonary window on CT angiography of the first patient (black arrow)

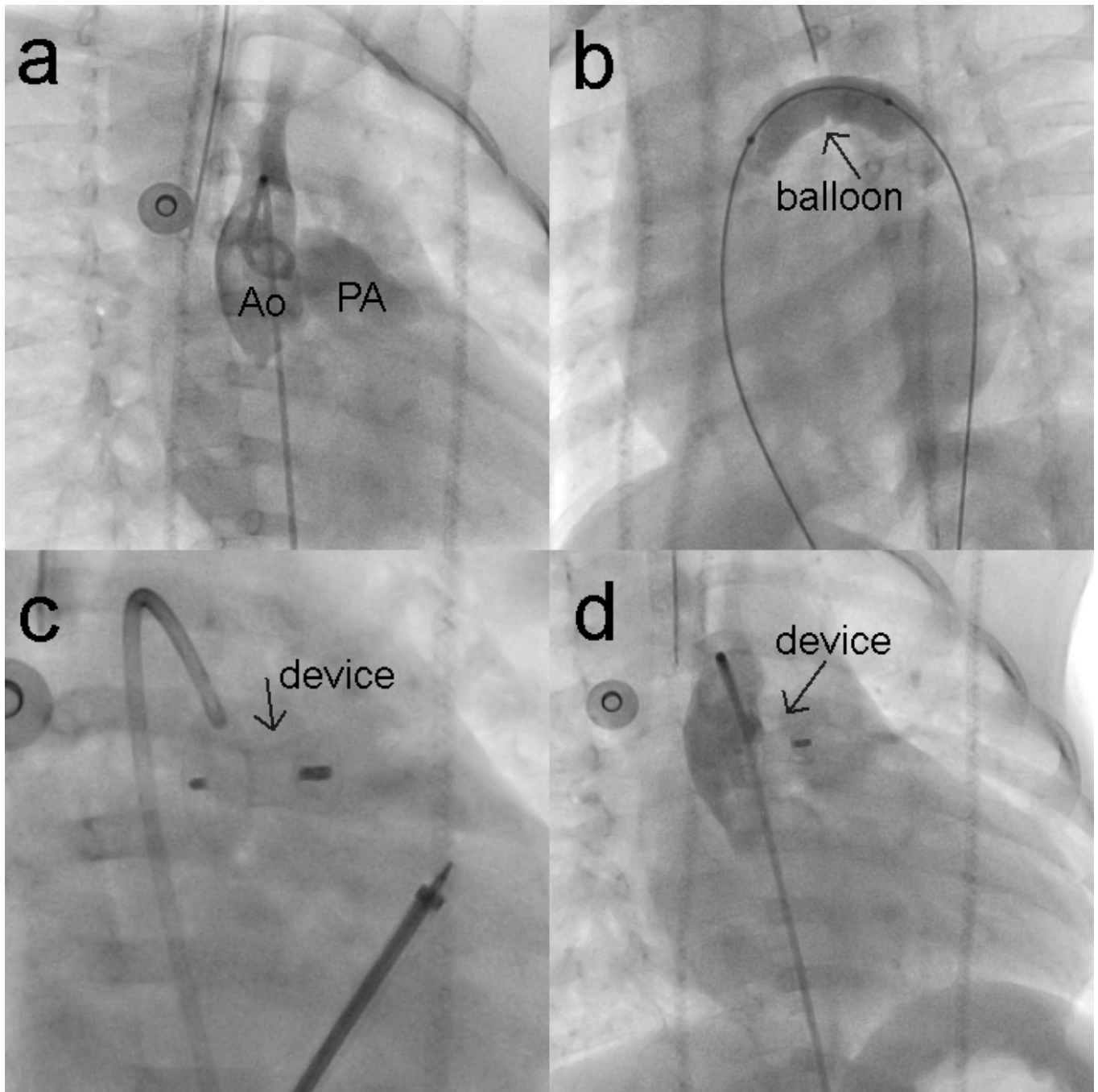


Fig. 2: Angiography of the second patient. a) Ascending aortogram (Ao) shows filling of pulmonary artery (PA) via an aortopulmonary window. b) Balloon sizing of the defect. Notice indentation in the balloon (arrow). c) The device just after release. d) Ascending aortogram after release shows only trivial residual shunt. The arrow points toward the device

### Resumo

Aorto-pulma fenestro ofte kuraciĝas kirurgie. Negrandaj fenestroj for de la koronariaj kaj pulm-branĉaj arterioj kuraceblas dum angiografio. La ŝlosila etapo estas akurata mezurado de la fenestra diametro. Ni raportas ĉi tie du sukcesajn tiajn procedurojn. Por preciza mezurado, ni uzis komputiligitan tomografian angiografion en la unua malsanulo kaj balon-mezuradon en la dua. Ni uzis dukt-fermilojn en ambaŭ malsanuloj.

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