

CASE REPORT

Transcatheter Closure of Nonrestrictive Aortopulmonary Window

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ABSTRACT :

Aortopulmonary window is an uncommon congenital heart defect. It is usually nonrestrictive and conventionally treated surgically at an early age to prevent the development of pulmonary vascular obstructive disease .

Only in 10% of the cases it is restrictive and case reports of it is transcatheter closure are mostly limited to these patients.

We report transcatheter closure of large non restrictive aortopulmonary window in a 2 years old , 8 kg child. Using Amplatzer duct occluder device.

KEY WORDS : aortopulmonary window, transcatheter closure

INTRODUCTION :

An aortopulmonary window (APW) is communication between pulmonary artery and the ascending aorta in the presence of two separate semilunar valves ⁽¹⁾. It is relatively rare cardiac malformation, found in 0.2% to 0.6% of patients with congenital heart disease ⁽²⁾.

Nearly half of the patients have associated lesions. The most common associations are aortic origin of the right pulmonary artery, type A interruption of the aortic arch, and Tetralogy of Fallote ^(2,3).

Mori et al ⁽⁴⁾ . classified APW as type 1 is the most common type , mid way between semilunar valves and pulmonary bifurcation.

Type 2 is a more distal defect , the distal border of which is formed by the pulmonary bifurcation.

Type 3 a large, confluent defect involving essentially the entire aortopulmonary septum, it is the most rare.

In most cases, surgical repair is undertaken during infancy using different techniques like ligation with out cardiopulmonary bypass, division and over-sewing between clamps on cardiopulmonary bypass, or transaortic patch closure ^(1,2).

The experience with transcatheter closure of APW is limited. We report a case of successful

closure of nonrestrictive APW using Amplatzer duct occluder device.

CASE REPORT :

A 2 years old male child weighing 8 kg presented with history of recurrent respiratory tract infection and congestive heart failure during infancy.

On examination , he had a bounding arterial pulse . The 2nd heart sound was prominent, and a long systolic murmur that was loudest at the upper left sternal border.

Echocardiography confirmed a large APW. There were no associated cardiac anomalies.

Catheterization and selective aortogram were performed.

Pulmonary artery pressure was 70/30, systemic pressure 90/60.

A selective ascending aortogram showed the presence of APW , measuring 8mm in diameter, away from the aortic valve and coronary arteries (figure 1).

The APW was crossed from the venous side via the right femoral vein , inferior vena cava , right atrium, right ventricle, and pulmonary artery with an end-hole catheter and a terumo wire. The catheter was then advanced over the wire and its tip positioned in the descending aorta .

A 7 f Mullins sheath was then taken over an extrastiff Amplatzer J-tipped 0.035 wire from the venous side through the defect to the descending aorta.

An Amplatzer duct occluder device of size 12/10 was deployed across the APW.

There was no residual shunt on subsequent aortic root angiography as well as on color Doppler echocardiographically, there was no gradient in the ascending aorta across the device both on Doppler echo and on withdrawal pressure tracing. The device was delivered and the sheath was withdrawn to inferior vena cava.

The follow up echocardiography done at 3 months showed good device position and no gradient in the pulmonary artery and ascending aorta.

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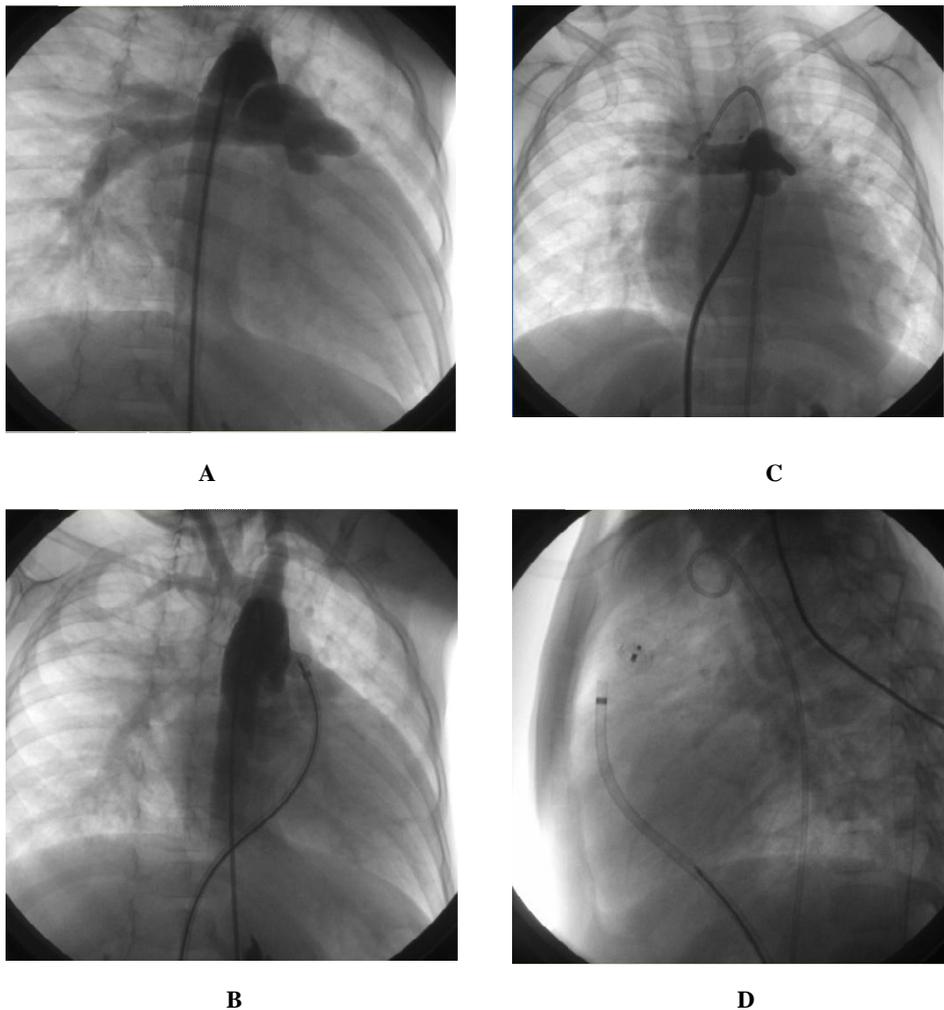


Figure 1: (A) right anterior oblique projection showing aortopulmonary window. (B) right anterior oblique projection showing complete closure of APW with Amplatzer duct occluder. (C) anteroposterior projection demonstrating pulmonary artery, Amplatzer duct occluder in APW , and pig tail catheter in ascending aorta. (D) left lateral projection after successful deployment of Amplatzer duct occluder.

DISCUSSION :

This case report demonstrated the feasibility of non –surgical closure of APW using Amplatzer duct occluder device in carefully selected cases. World literatures on transcatheter closure of APW is limited to closure of restrictive defects that too in adult or older children.⁵ There are a few cases report of device closure of nonrestrictive APW. Paucity of such reports may be due to relative rarity of the defects with good margins, associated congenital cardiac anomalies requiring cardiac surgery, and early development of Eisenmengers syndrome in this population. In our patient, the defect was amenable to closure , the defect was nonrestrictive situated well a way from coronary arteries and the branches of

pulmonary artery, and absence of associated anomalies.

Trehan V. et al ⁽⁵⁾. Sivakumar K. et al ⁽⁶⁾, were reported percutaneous closure of nonrestrictive APW.

Different operators have used different types of device . Initial report of transcatheter closure of APW describing the use of umbrella occluder system in a child result in residual shunt after such a closure⁽⁷⁾

Tulloh et al ⁽⁸⁾ , modified the Rashkind double umbrella after bending it arms medially so as achieve a relatively flatter profile of the device. There was no residual shunt after the device closure in their patient.

CLOSURE AORTOPULMONARY WINDOW

A buttoned device was used to close post-operative APW in an adult ⁽⁹⁾.

Richens et al ⁽¹⁰⁾ used custom made Amplatzer septal occluder and predicted that such device will be of no use in infancy in de novo lesions because of the relative bulk of the arterial position of the device.

Trehan et al ⁽⁵⁾ used muscular and perimembranous ventricular septal defect occluders.

All other operators have used duct occluder. We used Amplatzer duct occluder to close the defect. When both the aortic and the pulmonary ends were positioned in the respective great arteries across the APW.

Significantly less discomfort than surgical repair, avoidance cardiopulmonary bypass and surgical scar, and shorter duration of hospital stay make device closure the treatment of choice in selected cases of aortopulmonary window.

CONCLUSION:

It is feasible to transcatheter close nonrestrictive aortopulmonary window in selected cases.

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