

Successful Percutaneous Closure of Large Aorto-Pulmonary Window in a 3-Year-Old Girl Using Occluder A DO I 6/8: A Case Report

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Abstract

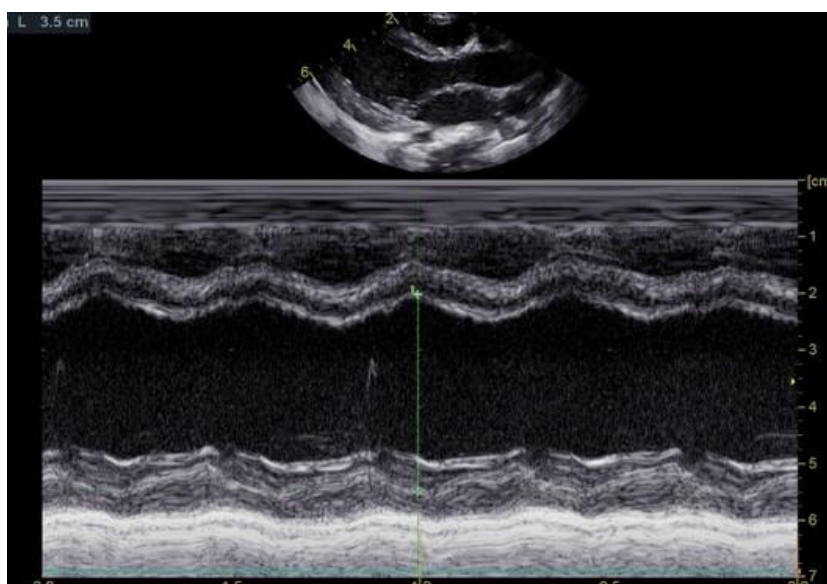
This case report details the diagnosis, management, and successful percutaneous closure of a large aorto-pulmonary window with associated pulmonary hypertension in a 3-year-old female patient. The intervention involved the use of an Occluder ADO I 6/8 device. The report provides a comprehensive overview of echocardiographic findings and aortoangiography results, culminating in the therapeutic strategy and outcome

Keywords: tricuspid insufficiency; echocardiography; mitral valve replacement; tricuspid plasty; mitral narrowing; operative mortality

Introduction

The aorto-pulmonary window is a rare congenital heart defect characterized by a communication between the ascending aorta and the pulmonary artery.

This condition can lead to significant hemodynamic consequences, including pulmonary hypertension. Percutaneous closure has emerged as a viable alternative to surgical repair, particularly in pediatric patients.



Transthoracic echocardiography showing in TM mode a Left ventriculare enlargement

Case Presentation:

The patient, a 3-year-old girl, presented with symptoms indicative of heart failure. Clinical examination and initial investigations suggested the presence of a large aorto-pulmonary window. Diagnostic Assessment: Echocardiography revealed :

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1. Identification and Characterization of the Aorto-Pulmonary Window:

A large aorto-pulmonary window was identified, measuring 5 mm in diameter.

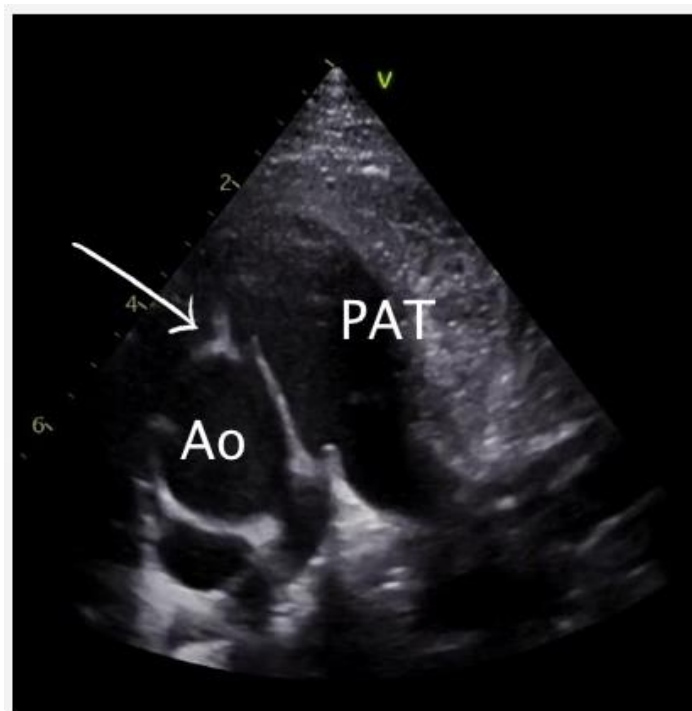
The window was located between the ascending aorta and the main pulmonary artery.

Notably, the defect was situated at a considerable distance from the coronary arteries, reducing the risk of compromising coronary blood flow during intervention.

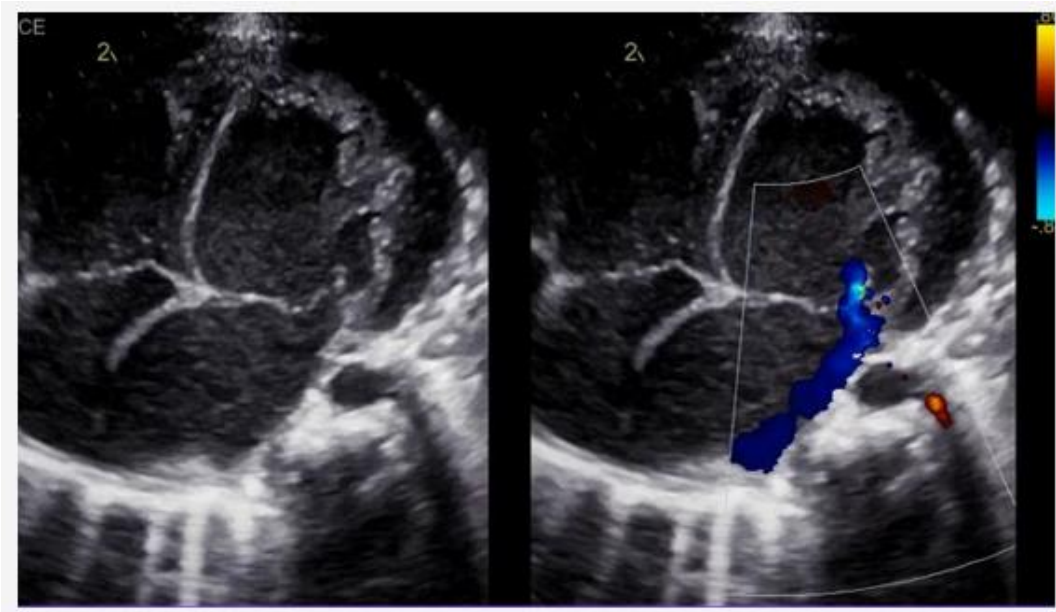
2. Assessment of Cardiac Chambers: Echocardiography showed signs of left ventricular overload. This was evidenced by:



Transthoracic echocardiography showing the left to right shunt of the aorto-pulmonary window



Transthoracic echocardiography showing the large aorto-pulmonary window Ao: Aorta, PAT: Pulmonary artery tru



Transthoracic echocardiography showing left ventriculs enlargement

Mild to moderate enlargement of the left ventricle. Increased left ventricular end-diastolic and end-systolic dimensions. The presence of volume overload could be inferred from these findings, consistent with a significant left-to-right shunt. The left atrium was also mildly dilated, a common finding in conditions with increased pulmonary blood flow.

3. Shunt Dynamics:

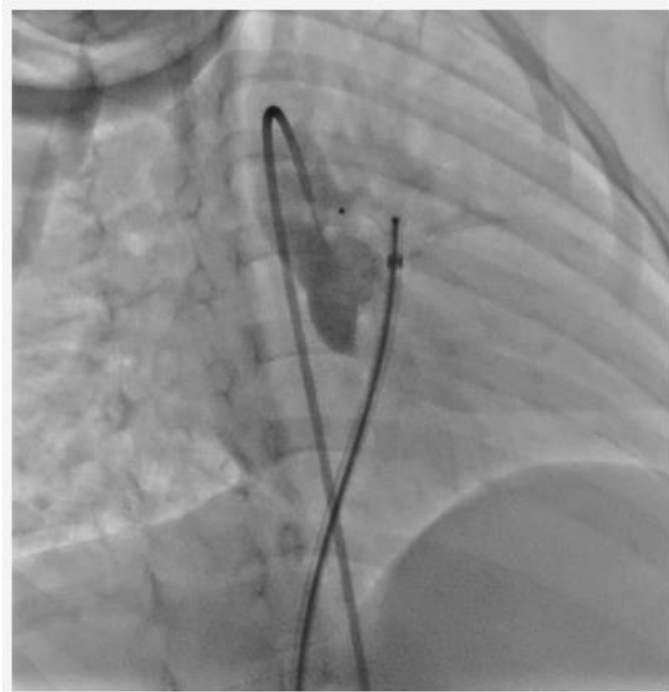
A substantial left-to-right shunt was observed at the level of the aorto-pulmonary window. The shunt's impact on cardiac hemodynamics was apparent, contributing to the observed left ventricular overload.

4. Pulmonary Artery Pressure and Pulmonary Hypertension:

Pulmonary artery pressures were estimated to be elevated, suggesting mild to moderate pulmonary hypertension. This was likely a result of increased pulmonary blood flow due to the left-to-right shunt (PSE).

5. Evaluation of Valves and Great Arteries:

The atrioventricular and semilunar valves appeared structurally normal with no functional abnormalities. The aorta and pulmonary artery were evaluated, particularly focusing on their size and relationship to the defect.



Procedure: a 6/8 PDA occluder was advanced abd deploide retrogadly from the pulmonary artery into the APW



Final angiography with complete occlusion of the APW

Discussion

1. Understanding Aorto-Pulmonary Window:

An aorto-pulmonary window is a rare congenital heart defect characterized by a communication between the aorta and the pulmonary artery. It can lead to significant shunting of blood, resulting in volume overload on the left side of the heart and pulmonary hypertension.

2. Traditional Surgical Closure:

Historically, open-heart surgery was the standard approach for closing an aorto-pulmonary window.

Surgical closure involves cardiopulmonary bypass and direct suturing or patching of the defect.

While effective, surgery carries inherent risks like infection, bleeding, and the need for a longer recovery period, which can be particularly challenging in young children.

3. Advancements in Percutaneous Techniques:

With advancements in interventional cardiology, percutaneous techniques have become a viable alternative.

These procedures involve the use of catheters and closure devices, like the Occluder ADO II 6/8, inserted through the blood vessels, eliminating the need for open surgery.

4. Why Choose Percutaneous Closure?

Minimally Invasive:

Percutaneous closure is less invasive than traditional surgery. It avoids the need for a thoracotomy and cardiopulmonary bypass, reducing the risk of complications related to these procedures.

Shorter Recovery Time: The recovery period is generally shorter, and the hospital stay is reduced, which is significant for pediatric patients.

Less Traumatic: For a young child, a less invasive procedure can be less traumatic physically and psychologically.

Preservation of Cardiac

Structure: This approach preserves the integrity of the heart and chest structures, which can be beneficial in a growing child.

Technological Advancements:

The availability of specialized devices like the Occluder ADO II 6/8, designed for closing such defects, has improved the success rates of percutaneous procedures.

5. Consideration of Patient-Specific Factors:

The decision also depends on

the size and location of the defect, the patient's cardiac anatomy, and the presence of any additional cardiac anomalies.

In this case, the defect being 6 mm and away from the coronary arteries made it amenable to percutaneous closure.

The presence of left ventricular overload and mild to moderate pulmonary hypertension also warranted timely intervention, favoring a less invasive approach.

6. Risks and Limitations of Percutaneous Closure:

While percutaneous closure has many benefits, it's not devoid of risks. These include the potential for device embolization, residual shunts, or damage to adjacent cardiac structures.

The expertise of the interventional team and the availability of appropriate device sizes are crucial factors.

7. Long-Term Outcomes and Follow-Up: Long-term outcomes of percutaneous closure of aorto-pulmonary windows are generally favorable, but regular follow-up is necessary to monitor for any complications or residual defects.

Conclusion

Highlights the successful outcome of the intervention, with resolution of the patient's symptoms and normalization of pulmonary pressures. This case contributes to the growing body of evidence supporting the efficacy and safety of percutaneous closure techniques in pediatric patients with aorto-pulmonary window.

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