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Surgery

Surgical Reconstruction of a Disconnected Left Pulmonary Artery Arising from the Left Subclavian Artery into Main Pulmonary Artery

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Abstract | **Case Report**

Background: Anomalous origin of the left pulmonary artery (LPA) from the left subclavian artery is an exceptionally rare congenital vascular anomaly. Systemic arterial perfusion of the affected lung exposes it to elevated pressures, predisposing to pulmonary overcirculation, pulmonary hypertension, and early pulmonary vascular disease. ***Case Description:*** We report a child with anomalous origin of the LPA from the left subclavian artery who underwent successful surgical reimplantation of the LPA to the main pulmonary artery (MPA). The diagnosis was established using transthoracic echocardiography and computed tomography angiography. Definitive repair was performed via median sternotomy under cardiopulmonary bypass, achieving tension-free reimplantation of the LPA into the MPA. ***Results:*** The postoperative course was uneventful. Follow-up echocardiography demonstrated a widely patent LPA–MPA anastomosis with laminar flow, preserved ventricular function, and no evidence of pulmonary hypertension. ***Conclusion:*** Early diagnosis and surgical reimplantation of an anomalous LPA arising from the left subclavian artery can be performed safely with excellent early outcomes. This case contributes to the limited literature on this rare anomaly and supports early surgical intervention to prevent long-term pulmonary vascular complications.

Keywords: Anomalous pulmonary artery; Left pulmonary artery; Left subclavian artery; Congenital heart surgery; Pulmonary artery reimplantation.

INTRODUCTION

Anomalous origin of a pulmonary artery from the systemic circulation is a rare congenital cardiovascular abnormality. While anomalous origin of the right pulmonary artery from the ascending aorta (hemitruncus arteriosus) is more frequently reported, anomalous origin of the left pulmonary artery from the left subclavian artery is exceptionally uncommon. Persistent exposure of the affected lung to systemic arterial pressures may result in early pulmonary vascular disease if left untreated. Surgical reimplantation of the anomalous pulmonary artery into the main pulmonary artery is the preferred definitive corrective strategy. We report a rare case of anomalous LPA arising from the left subclavian artery, successfully managed with surgical reconstruction.

CASE REPORT

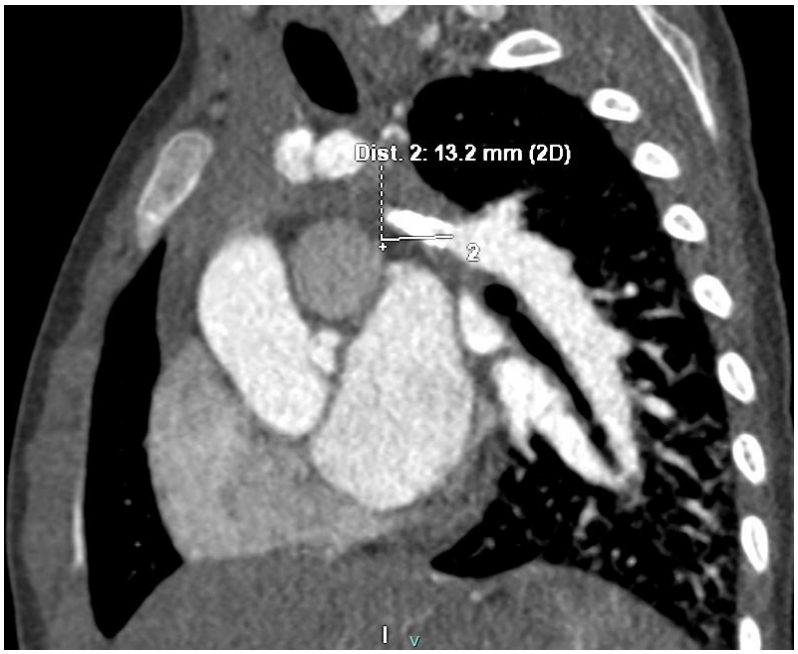
A 2-year-8-month-old boy was referred for definitive surgical management of a disconnected left pulmonary artery (LPA). He had a known diagnosis of anomalous origin of the LPA from the left subclavian artery, with the left lung supplied via a large patent ductus arteriosus (PDA). To maintain pulmonary blood flow, PDA stenting (Sierra 3.5 × 23 mm) was performed on May 2023, followed by balloon dilatation of the PDA stent on November 2024.

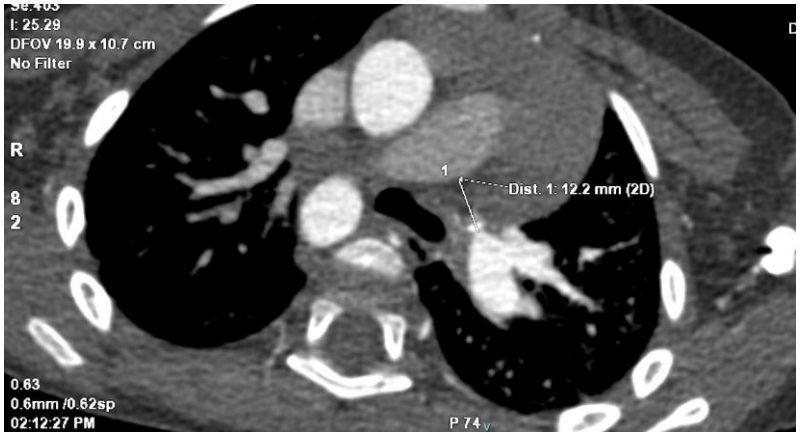
Preoperative transthoracic echocardiography demonstrated atrial situs solitus with levocardia, a single right superior vena cava, cardiomegaly, and a small patent foramen ovale. There was a dominant left ventricle and left atrium with no evidence of right or left ventricular outflow tract obstruction, muscular ventricular septal defect, or significant intracardiac shunt. Flow was visualized across the PDA stent, supplying the disconnected LPA, with preserved flow in the right pulmonary artery (RPA).

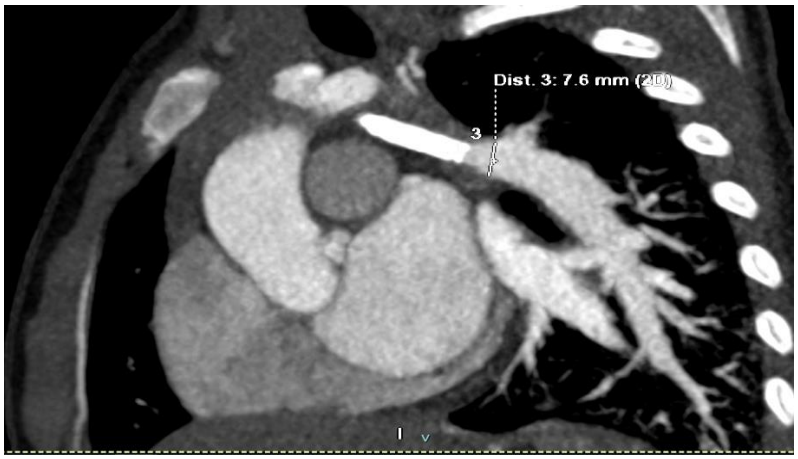
Multislice computed tomography angiography performed confirmed anomalous origin of the LPA from the left subclavian artery, with complete discontinuity between the LPA and the main pulmonary artery (MPA). The right pulmonary artery arose normally from the MPA. A right-sided aortic arch was present. The distance

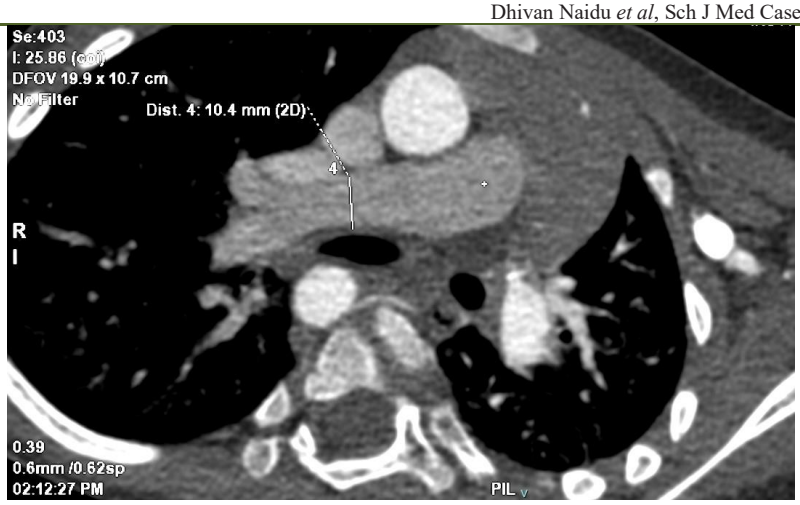
between the RPA and the LPA was approximately 15 mm, with no evidence of left ventricular outflow tract obstruction.

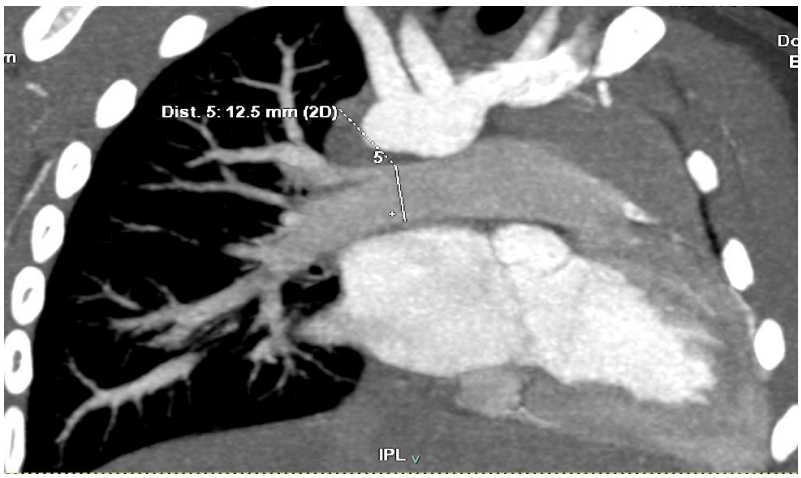
Imaging

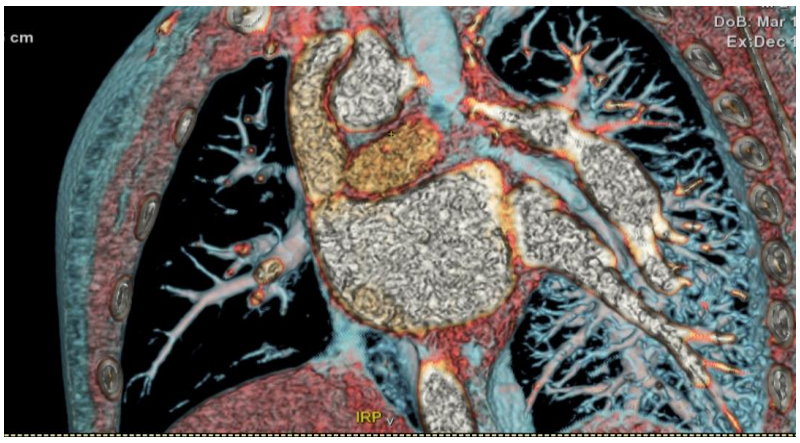












Surgical Technique

Definitive surgical repair was performed via median sternotomy by the senior author. Standard monitoring was established, including right radial arterial and right internal jugular venous access. After systemic heparinization, cardiopulmonary bypass was instituted via aortic, inferior vena caval, and right atrial cannulation. The patient was maintained normothermic, with the aorta left unclamped and ventricular fibrillation used instead of aortic cross-clamping. Total cardiopulmonary bypass time was 84 minutes, with no aortic cross-clamping.

Intraoperatively, the heart was moderately enlarged. The main pulmonary artery and right pulmonary artery were well developed. The left pulmonary artery was completely disconnected from the main pulmonary artery and was supplied by a large PDA arising from the left lateral wall of the distal transverse aorta. The previously implanted PDA stent was palpable.

The PDA was clipped and transected. The distal ductal tissue was dissected to expose the LPA within the left pulmonary hilum. Branches of the LPA were controlled, and the PDA stent was removed, leaving

healthy pulmonary arterial tissue. A segment of autologous pericardium, treated with 0.625% glutaraldehyde, was used to reconstruct the proximal LPA using continuous 7-0 polypropylene sutures.

A partial clamp was applied to the lateral wall of the main pulmonary artery, which was incised and anastomosed end-to-side to the reconstructed LPA using continuous 6-0 polypropylene sutures, ensuring a tension-free pulmonary artery confluence.

Hemostasis was secured, and mediastinal and left pleural drains were placed prior to routine sternal closure.

Postoperative Course and Follow-Up

The patient was transferred to the cardiothoracic intensive care unit in stable condition. The postoperative course was uneventful, with preservation of left ventricular function and no evidence of low cardiac output syndrome. Early postoperative echocardiography demonstrated a well-aligned pulmonary artery confluence with laminar flow across the reimplanted LPA and no residual ductal flow.

By postoperative day 4, the patient showed satisfactory clinical recovery with stable hemodynamics and adequate oxygenation. There was no evidence of pulmonary hypertensive crisis or anastomotic obstruction. The patient is expected to have excellent long-term outcomes based on optimal anatomical correction and preserved ventricular function.

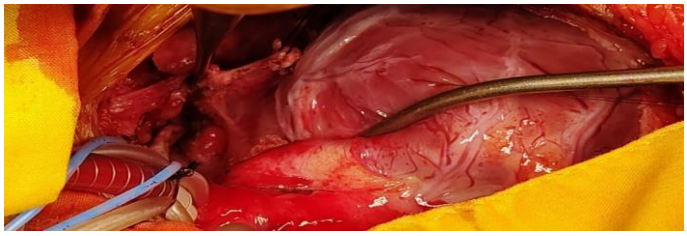


Figure 1. Intraoperative view following median sternotomy demonstrating a disconnected left pulmonary artery supplied by a large patent ductus arteriosus. The ductal tissue and indwelling PDA stent are visible prior to division

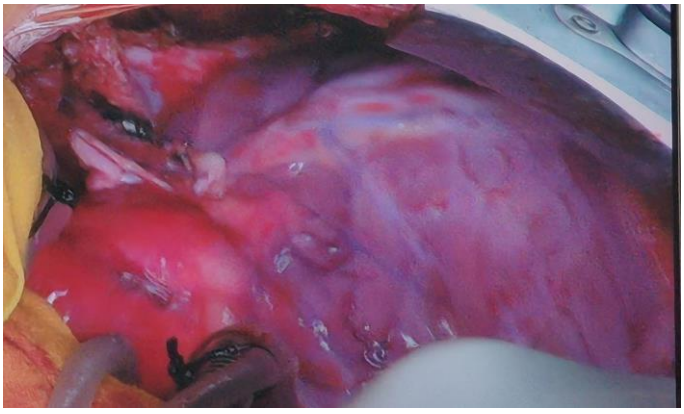


Figure 2. Exposure of the left pulmonary hilum following division of the patent ductus arteriosus. The left pulmonary artery is mobilized distally after removal of the ductal stent, leaving healthy pulmonary arterial tissue for reconstruction

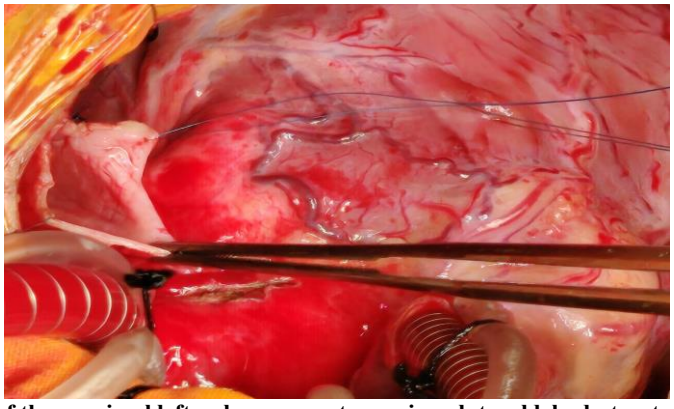


Figure 3. Reconstruction of the proximal left pulmonary artery using glutaraldehyde-treated autologous pericardium, fashioned to achieve adequate length and caliber for a tension-free anastomosis

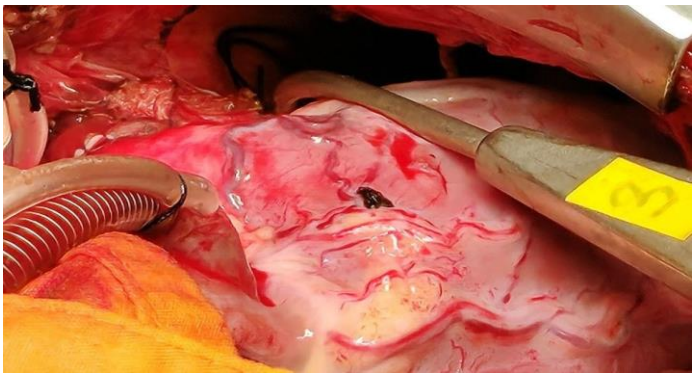


Figure 4. Reconstruction of the proximal left pulmonary artery using glutaraldehyde-treated autologous pericardium, fashioned to achieve adequate length and caliber for a tension-free anastomosis

DISCUSSION

Anomalous origin of the LPA from the left subclavian artery is among the rarest pulmonary artery anomalies reported. The embryologic basis is thought to involve abnormal persistence of systemic arterial connections with failure of normal pulmonary artery incorporation. As a result, the affected lung is exposed to systemic arterial pressures, predisposing patients to early pulmonary vascular remodeling.

Early surgical correction is recommended once the diagnosis is established. Reimplantation of the anomalous pulmonary artery to the main pulmonary artery restores normal pulmonary circulation and allows for symmetric pulmonary artery growth. Cross-sectional imaging is essential for defining anatomy and planning surgical strategy. Long-term surveillance is necessary to assess pulmonary artery growth and exclude anastomotic stenosis.

CONCLUSION

Anomalous origin of the left pulmonary artery from the left subclavian artery is a rare but correctable congenital vascular anomaly. Surgical reimplantation to the main pulmonary artery can be performed safely with excellent early outcomes. Early diagnosis and timely intervention are critical to preventing irreversible pulmonary vascular disease.

Declarations

Conflict of Interest: The authors declare no conflicts of interest.

Funding: None.

Ethical Approval: This study was reviewed by the National Heart Institute, Institut Jantung Negara Research Ethics Committee (IJNREC) and was waived from full ethical review.
Approval to proceed was granted.

Informed Consent: Written informed consent was obtained from the patient's parents or legal guardians for publication of this case report.

REFERENCES

1. Kutsche LM, Van Mierop LHS. Anomalous origin of a pulmonary artery from the aorta or its branches. Am J Cardiol. 1988;61(10):850–856.
2. Presbitero P, Bull C, Haworth SG, de Leval MR. Abnormal pulmonary arteries: origin, course and connections. Br Heart J. 1984;51(5):559–566.
3. Shakibi JG, Rastan H, Nazarian I, Paydar M, Aryanpour I. Isolated unilateral absence of the pulmonary artery: review of the world literature and guidelines for surgical repair. J Thorac Cardiovasc Surg. 1978;76(4):527–533.
4. Ten Harkel ADJ, Blom NA, Ottenkamp J. Isolated unilateral absence of a pulmonary artery: a clinical, radiologic, and echocardiographic study. Chest. 2002;122(4):1471–1477.
5. Bouros D, Pare P, Panagou P, Tsintiris K, Siafakas N. The varied manifestation of pulmonary artery agenesis in adulthood. Chest. 1995;108(3):670–676.
6. Lee ML, Lue HC, Chen CL, Wang JK. Anomalous origin of the left pulmonary artery from the left subclavian artery. Pediatr Cardiol. 1998;19(2):154–156.
7. Patra S, Srinivas SK, Agrawal N, et al. Anomalous origin of pulmonary artery from systemic circulation: a rare congenital anomaly. Ann Pediatr Cardiol. 2014;7(2):141–144.