

Dual-drainage pulmonary venous return of the left upper lobe

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ABSTRACT

Dual drainage of a pulmonary vein is an unusual anomaly of pulmonary venous drainage. While being evaluated for hypertension, a child was found with dual drainage of the upper left lobe through a vertical vein that connects to the normal pulmonary vein as well as the innominate vein with no symptoms from his effective left-to-right shunt.

Keywords: Cardiac catheterization, device closure, partial anomalous pulmonary venous return, shunt

CASE SUMMARY

A 7-year-old boy presented for the evaluation of chest pain and elevated blood pressure. The pain was described as “being punched” and was located in the lower portion of the sternum. His physical examination was unremarkable, as was his electrocardiogram. Echocardiography showed partial anomalous pulmonary venous return with the left upper pulmonary vein draining to the innominate vein. There was mild right-sided chamber enlargement and mild tricuspid valve regurgitation, which predicted an elevated right ventricular systolic pressure of 37 mmHg. He underwent cardiac catheterization, which revealed normal pulmonary artery pressure. The angiography of the vertical vein showed that this vein was connected to a left pulmonary vein, which drained both vertically and directly into the left atrium [Figures 1-3]. The pulmonary venous drainage flowed preferentially into the vertical vein due to lower resistance in the systemic venous circulation. Despite a normal Qp:Qs (due in part to elevated mixed venous saturations), the decision was made to embolize the vertical vein due to its growth potential. This was performed with a 12 mm Amplatzer vascular plug II [Figure 4]. The procedure was well tolerated, and he was discharged home the next day.

DISCUSSION

Patients with anomalous variants could be asymptomatic or sometimes present with nonspecific cardiorespiratory symptoms, including dyspnea, fatigue, palpitations, and exercise intolerance, especially in adult patients.^[1] In patients with left-to-right shunts, the increased pulmonary blood flow could result in pulmonary arterial hypertension and increased pulmonary vascular resistance.^[2] In our patient, the anomaly was found unexpectedly, and there were no symptoms referable to the effective left-to-right shunt.

Partial anomalous pulmonary venous return accounts for 0.4% to 0.7% of congenital heart defects. It occurs more frequently on the right side, the most common being the anomalous drainage of the right superior pulmonary vein into the superior vena cava.^[3] Most previous reports of left-sided partially anomalous pulmonary venous return were in the adult population, and 50% of the cases were incidentally detected during workup for other indications.^[2] Dual drainage of pulmonary venous blood is particularly unusual, and most patients are asymptomatic.^[1,4,5] In this case, the patient was found to have a rare form of drainage of the left upper lobe via a

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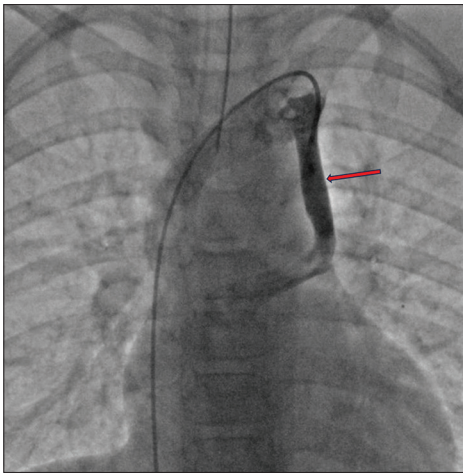


Figure 1: An angiogram showing the connection of the vertical vein to the pulmonary vein (red arrow)

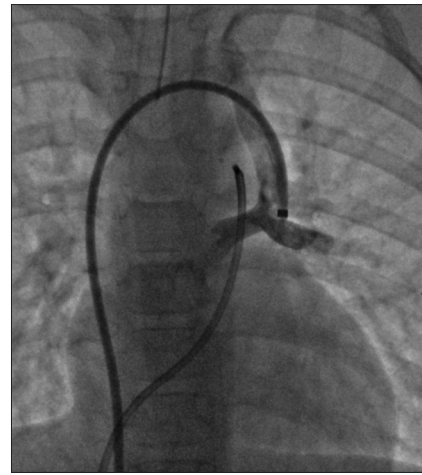


Figure 2: Angiogram through the device delivery sheath positioned in the distal aspect of the vertical vein where it connects to the pulmonary vein. Contrast can be seen coursing both to the left atrium and vertically to the innominate vein

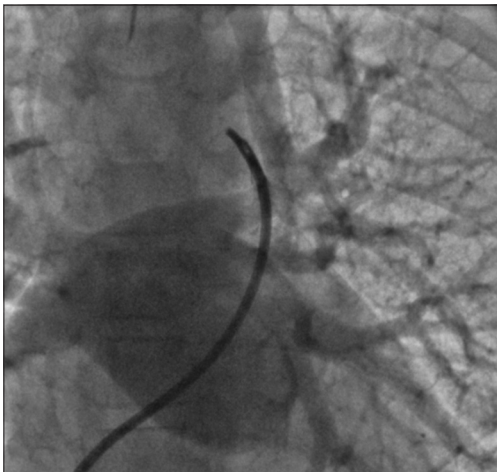


Figure 3: Still image during follow-through on a pulmonary artery angiogram demonstrates the left upper lobe pulmonary venous return to bifurcate into a vertical vein that connects to the innominate vein and a short segment that connects to the left atrium



Figure 4: Angiogram showing Amplatzer vascular plug II in position following embolization of the vertical vein

vertical vein, which connected to the normal pulmonary vein as well as the innominate vein [Figure 1].

Surgical intervention is indicated for symptomatic patients, but percutaneous catheterization, which provides a dual benefit of diagnosis and treatment, has been successfully used.^[4,5] Various devices have been used to close an abnormal pulmonary venous connection, and the device choice is operator-dependent or based on the anatomy of the abnormal connection.^[1,6] In this case, an Amplatzer vascular plug II provided effective and immediate embolization [Figure 4].

CONCLUSION

Partial anomalous pulmonary venous return of the left upper lobe is a rare anatomical anomaly. A high index of suspicion is required to make the diagnosis as clinical

presentation ranges from asymptomatic to significant cardiovascular presentation if diagnosed late. Cardiac catheterization can be diagnostic and therapeutic in selected cases.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Ari S, Ari H, Vatansever F, Melek M, Bozat T. Transcatheter treatment of partial anomalous pulmonary venous connection to left subclavian vein. *Turk Kardiyol Dern Ars* 2020;48:771-4.
2. Dutta A, Zuiderveld L. Incidental finding of anomalous pulmonary venous return of the left upper lobe, a rare anatomical variation. *J Patient Cent Res Rev* 2021;8:277-80.
3. Dillman JR, Yarram SG, Hernandez RJ. Imaging of pulmonary venous developmental anomalies. *AJR Am J Roentgenol* 2009;192:1272-85.
4. Aggarwal V, Mohamed AK, Said SM. Partial anomalous venous connection with intrapulmonary dual drainage: Transcatheter treatment of a rare entity. *Ann Pediatr Cardiol* 2023;16:229-30.
5. Luciano D, Laux D, Boudjemline Y, Hascoët S, Lusson JR, Sorensen C, *et al.* Transcatheter therapy in partially abnormal pulmonary venous return with additional drainage to the left atrium. *Int J Cardiol* 2013;170:221-6.
6. Gangadhara MB, Magee AG. Transcatheter occlusion of partial anomalous pulmonary venous connection with dual drainage to left atrium. *Ann Pediatr Cardiol* 2019;12:144-6.