

CASE REPORT

Supernumerary Pulmonary Vein: A Rare Anatomical Variation Observed During Cadaveric Dissection

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ABSTRACT

Introduction: Pulmonary veins are responsible for carrying oxygenated blood from the lungs to the left atrium of the heart. Unlike other veins, they supply oxygen rich blood to the left atrium of the heart. They have thin walls and are valveless. Normally, four pulmonary veins are present: Right Superior, Left Superior, Right Inferior, Left Inferior hence presence of a supernumerary pulmonary vein is considered a rare anatomical variation.

Case Report: After careful removal of heart from thoracic cavity, We observed the presence of two additional veins alongside of the four above mentioned pulmonary veins. Upon further investigation we noted that they emerged from the right lung draining independently into the left atrium. Supernumerary veins were identified along with the normal superior and inferior pulmonary veins.

Conclusion: This study strongly emphasizes the importance of keeping this anomaly in mind so that recognition by radiologists and surgeons can help prevent surgical complications and improve success of interventional procedures

KEYWORDS

• Pulmonary Vein • Supernumerary Pulmonary Vein • Left Atrium • Anatomical Variation • Cadaveric Study.

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INTRODUCTION

Pulmonary veins are unique vessels that carry oxygenated blood from the lungs to the left atrium. Normally, four pulmonary veins are present: right superior, right inferior, left superior, and left inferior pulmonary veins. In the root/hilum of lungs pulmonary veins are present in the anterior most part. Variations in pulmonary venous anatomy occur due to developmental alterations during embryogenesis.^{1,2,8,9}

Embryological Evidence: The pulmonary venous system develops from the common pulmonary vein arising from the primitive left atrium. Incomplete incorporation or abnormal branching during development may result in variations such as common trunks, accessory veins, or supernumerary pulmonary veins.^{2,5}

Supernumerary pulmonary veins are generally asymptomatic and are often detected incidentally during cadaveric dissection, radiological imaging, or cardiothoracic surgical procedures. Despite being clinically silent in many individuals, these variations hold considerable anatomical and clinical significance.^{3,4,5,6}

CASE REPORT

This study was conducted during routine cadaveric dissection of M.B.B.S 2025 batch at Uttar Pradesh University of Medical Sciences, Saifai

During thoracic cavity dissection, the heart and lungs were carefully exposed. On examination of the pulmonary venous drainage, two additional pulmonary veins were observed emerging from the right lung. Normally, two pulmonary veins emerge from each lung; however, in this cadaver, four pulmonary veins were identified on the right side.

Findings:

The right along with left pulmonary veins show normal course and drainage.

Two additional supernumerary pulmonary veins were observed emerging from the middle lobe of the right lung which then drained independently into the left atrium through a separate ostium.

This is an asymptomatic case since there is

no evidence of cardiac hypertrophy, congenital cardiac defect, or abnormality of the great vessels.



Figure 1: 1-4 Showing the right pulmonary veins and 5,6 showing left pulmonary veins

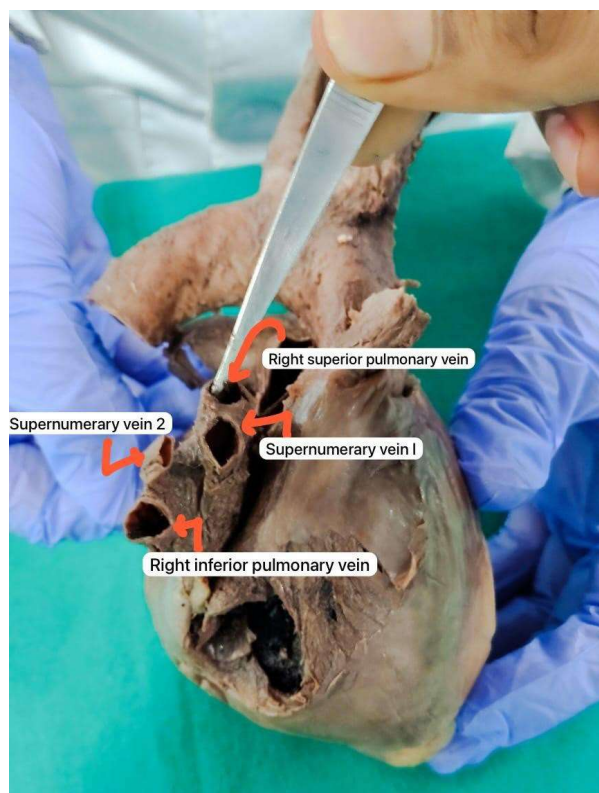


Figure 2: Close view of the labelled pulmonary veins

The supernumerary veins both 1 and 2 measured approximately 0.73 mm and 0.42 mm in diameter. Its course was anterior to the

right inferior pulmonary vein before entering left atrium.

DISCUSSION

The incidence and morphology of supernumerary pulmonary veins may vary among populations, with the right side being more commonly affected than the left. Detailed documentation of such variations contributes to anatomical literature and enhances understanding of clinically relevant vascular anomalies.^{3,5,10}

Embryologically, pulmonary veins develop as outgrowths from the primitive atrium that establish connections with the pulmonary venous plexus. Variations arise due to incomplete fusion or persistence of embryonic venous channels. Several radiological and cadaveric studies have documented pulmonary venous anomalies. The incidence of supernumerary right pulmonary veins has been reported to range from 20–35% in imaging studies.²⁻⁴ However, cadaveric identification remains comparatively rare.⁵

The clinical importance of this variation includes:

Cardiothoracic Surgery: During lung resections or mediastinal surgeries, unidentified accessory pulmonary veins may result in severe bleeding.^{6,8}

Radiological Interpretation: Knowledge of these variations helps radiologists avoid misdiagnosis during CT angiography and MRI evaluation.^{4,7}

Lung Transplantation: Precise venous anatomy is essential for successful vascular anastomosis.^{6,10}

CONCLUSION

The present case demonstrates accessory right pulmonary veins draining independently into the left atrium without associated cardiac malformations. The purpose of this study is to emphasize on awareness of pulmonary venous

variations is essential for thoracic surgeons, radiologists, and cardiologists, particularly during procedures such as pulmonary lobectomy, mediastinal surgeries and lung transplantation. Failure to identify these anomalous veins may lead to hemorrhage, incomplete ablation, or postoperative complications.^{3,6,10}

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