

The Fifth Pulmonary vein

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ABSTRACT

A cadaver in Myungsung Medical College (MMC) had a 3rd pulmonary vein originating from the middle lobe of the right lung. Such anatomical variations are very rare. People with this variation have a total of five pulmonary veins entering left atrium. It has clinical implications especially for thoracic surgeons and radiologists during radiofrequency ablations, lobectomies, valve replacements, pulmonary vein catheterizations, video-assisted thoracic surgery (VATS) and others.

Key Words: Anatomy, Variations, Pulmonary veins.

INTRODUCTION

Two pulmonary veins usually drain oxygenated blood from each lung to left atrium of the heart. The lobular tributaries lie mainly in the interlobular septa and two pulmonary veins from each lung enter left atrium through two separate pulmonary ostia on either side. On the right lung veins from the apical, anterior and posterior part of upper lobe unite with a middle lobar vein, which is formed by lateral and medial tributaries, and form the superior right pulmonary vein (Standring, 2008).

The inferior right pulmonary vein is formed by the hilar union of superior and common basal veins from the lower lobe. On the left lung, the superior pulmonary vein, which drains the

upper lobe, is formed by the union of apicoposterior, anterior and lingular veins. The inferior left pulmonary vein, which drains the lower lobe, is formed by the hilar union of two veins, superior and common basal veins. The right and left pulmonary veins perforate the fibrous pericardium and open separately in the posterosuperior aspect of the left atrium (Standring et al., 2008). This anatomy could show variations, with more veins draining separately into the left atrium (Kato et al., 2013). This reports are however scarce from African settings. In this report, we document a case of the fifth pulmonary vein in an Ethiopian Cadaver.

CASE REPORT

During routine cadaveric dissection of the thorax, at the MMC Addis Ababa, we observed fifth pulmonary vein from the right lung joined the left atrium of a black adult male cadaver. The cadaver was 1.60 m long. It has no other identified gross anomalies. Its heart was levocardia with no transposition of great vessels, patent ductus arteriosus (PDA) and

septal defects. Its lungs had 5 lobes, 2 on the left and 3 on the right lung. The cause of death was unknown. The fifth vein drained the right middle lobe to the left atrium independently and was located between the superior and inferior right pulmonary veins on the left atrium. Its diameter was 7.9 mm.

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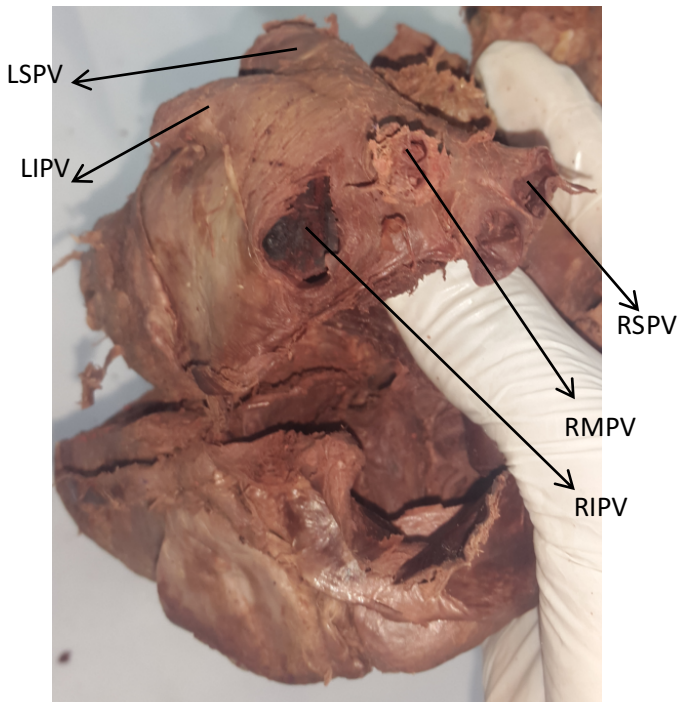


Fig. 1: Five pulmonary veins entering left atrium (LSPV=Left superior pulmonary vein, LIPV=Left inferior pulmonary vein, RSPV=Right superior pulmonary vein, RMPV=Right middle pulmonary vein, RIPV=Right inferior pulmonary vein).

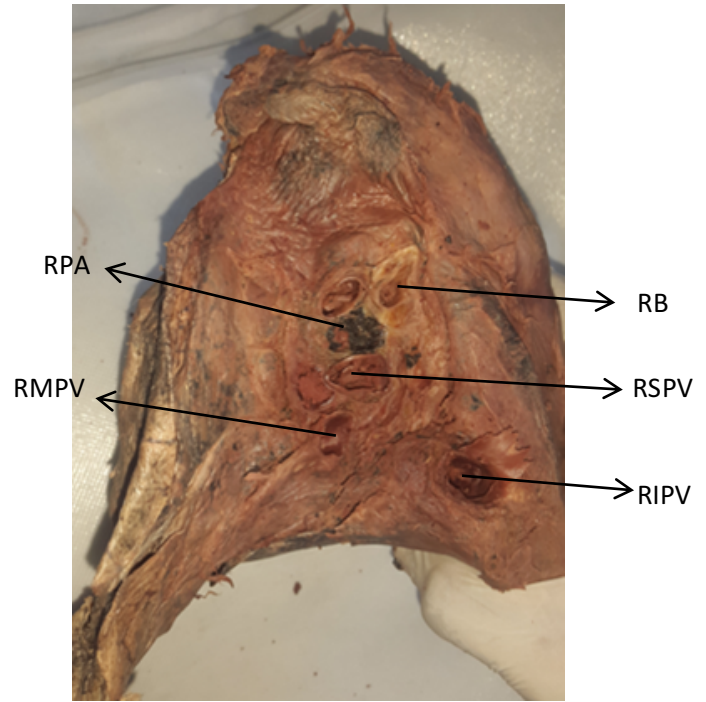


Fig. 2: Third pulmonary vein leaving the right lung (RB=Right Bronchus, RPA= Right Pulmonary Artery, RSPV=Right superior pulmonary vein, RMPV=Right middle pulmonary vein, RIPV=Right inferior pulmonary vein).

DISCUSSION

Several studies on cadaver, CT-Angiography and MRI results have shown that the right middle lobe vein could enter left atrium without joining the right superior pulmonary vein or it may join the right inferior pulmonary vein in rare cases (Shukla et al., 2012; Kato et al., 2013). In this study, we have noted a third right pulmonary vein that entered the left atrium. A study on 28 patients with atrial fibrillation (AF) who underwent ablation showed that the SI diameter of the right middle lobe vein variation (RMLV directly to left atrium) was 9.3 ± 1.8 mm (Kato et al., 2003).

Anomalous venous drainages are usually source of ectopic beats which is trigger factor of atrial fibrillation and it is eliminated by treatment with

radiofrequency ablation (Raviele et al., 2012). During lobectomies, thoracic surgeons should be aware of this variation to prevent complications. In modern surgical practice, knowledge about these and other possible vascular variations is important when performing video-assisted thoracic surgery (VATS) [Subotich et al., 2009; Shukla et al., 2012].

During embryologic period, there was a single pulmonary vein which developed from an outgrowth of the posterior left atrial wall just to the left of the septum primum around 5th week. Later this vein gains connection with veins of the developing lung buds and during further development, the pulmonary vein and its branches are incorporated into the left atrium on week 8 (Sadler, 2012). Usually four

pulmonary veins enter the left atrium. In conclusion, thoracic surgeons and interventional radiologists should be wary of the fifth

pulmonary vein, as it can be inadvertently injured during interventional procedures.

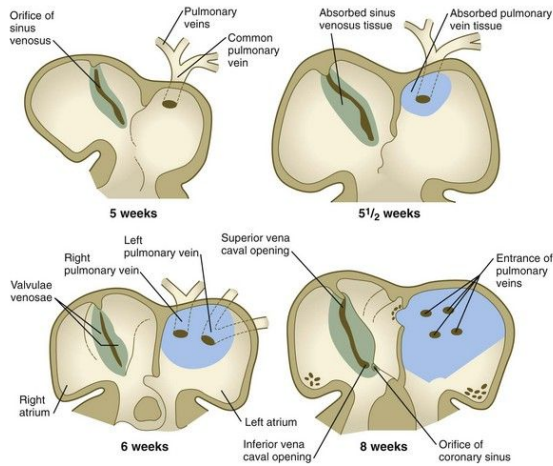


Fig. 3: Embryologic development of pulmonary vein. Adapted from Human embryology and developmental biology by B. M. Carlson 5th edition)

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