

Unusual Branching of Left Superior Pulmonary Vein: A Case Report

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Abstract :-

Human dissection is indispensable for a sound knowledge in anatomy which can ensure safe as well as efficient clinical practice and the human dissection lab could be the ideal place to cultivate humanistic qualities among the future physicians in the 21st century. Dissection of human cadaver has a long tradition. It paved the way for modern anatomical knowledge and plays a crucial role in the education of medical students. Though fundamental anatomy has mostly been established, cadaveric studies still yield valuable findings.

On each side of the base of the heart, the superior pulmonary veins carry oxygenated blood from lungs to left atrium of heart. The variation in number and branching pattern of pulmonary veins is frequent and this knowledge is valuable for various procedures involving pulmonary veins. This variation in pulmonary veins ranges from variation in number to drainage pattern in left atrium. [1]

In approximately 48 years old Indian male cadaver during routine dissection, we reported a variant of pulmonary vein branching pattern where the left superior pulmonary vein has 3 openings while remaining 3 veins i.e. left inferior pulmonary vein, right superior pulmonary vein and right inferior pulmonary veins have their normal one opening. The anatomical and morphological variations of the left superior pulmonary veins are significant for diagnostic, surgical procedures and vascular radiology in head and neck region.

It is of clinical importance to know origin and course of pulmonary veins in detail and being aware of possible variation.

Keywords: Pulmonary veins, left atrium, variations, left superior pulmonary vein, radiological procedures.

1. Introduction :-

A cadaver or corpse is a dead human body that is used by medical students, physicians and other scientists to study anatomy, identify disease sites, determine cause of death, and provide tissue to repair a defect in a living human being.

Human cadaveric dissection has been used as the core teaching tool in anatomy for centuries. [2] It is noteworthy that the innovative modes of learning anatomy such as the interactive multimedia resources have not replaced student's perception about the importance of cadaveric dissection. [3] For many centuries, physicians of ancient Greece gained considerable information about human body and health. [4]

For a cadaver to be viable and ideal for anatomical study and dissection the body must be refrigerated or the preservation process must begin within 24 hours of death. [4]

In anatomy, normality embraces a range of morphologies. It includes those are more common and others called variations which are less frequent but not considered abnormal. [5]

The primary pulmonary circulation comprising of pulmonary arterial tree, extensive capillary bed and

pulmonary venous tree, connected in series is a low pressure, high capacitance system which provides large surface area for gas exchange.

An understanding of variability of pulmonary vein remains most important in radiological procedures and cardiothoracic surgeries, where an incompatible knowledge of anatomy can lead to complications. The pulmonary veins drain oxygenated blood from both lungs to left atrium. The pulmonary veins course in the inter segmental septa and as such don't run with bronchi like pulmonary arteries do. The left superior pulmonary vein take an oblique infero medial course, whereas both right and left inferior pulmonary veins runs horizontally before taking a more vertical course. They pass through lung hilum antero inferior to pulmonary arteries, forming a short intra pericardial segment, to drain into left atrium of heart. [6,7]

The ostia of inferior pulmonary veins are more posteromedial and left inferior Pulmonary vein being more superior. [8]

The knowledge of these variations is valuable in cardiothoracic surgeries and radiological procedures such as radiofrequency ablations in atrial fibrillations, cardiac valve replacement, pulmonary lobectomy and others [9, 10].

2. Material and Method :-

During routine dissection of a 48 years old Indian male Cadaver in Dept. of Anatomy, CSMSS Ayurved Mahavidyalaya, Aurangabad, it was observed that the left superior pulmonary vein has unusual branches emerging from left atrium of heart, in addition to 3 openings present for right superior and inferior pulmonary veins and left inferior pulmonary vein.

3. Inclusion criteria :-

- a) All the limbs of the cadaver are intact.
- b) Death is natural.
- c) The age of cadaver is between 20 – 60 years.

4. Exclusion criteria :-

- a) Absence of one or more limbs.
- b) Death is due to poison or accident.
- c) Age of cadaver is less than 20 years or more than 60 years.

5. Case Report :-

During a routine dissection of thoracic and abdominal cavity, an atypical left superior pulmonary vein found, which has 3 branches in a 48 years old Indian male cadaver in the anatomy dissection hall at CSMSS Ayurved Mahavidyalaya, Aurangabad. After opening the thoracic cavity, the left superior pulmonary vein was seen having 3 branches. The remaining i.e. left inferior pulmonary vein, right superior and inferior pulmonary vein has normal one opening and one branch. No other congenital variations were found. The further course, branching and drainage pattern of these pulmonary veins were normal.

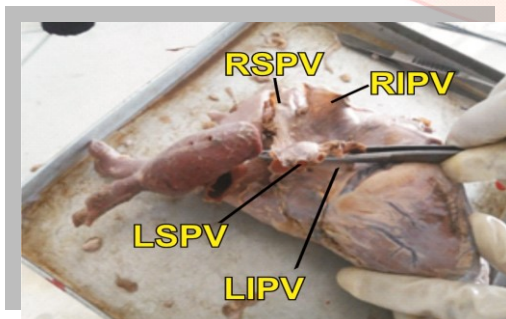


Fig. 1: Showing unusual branching of LSPV and normal branching of remaining 3 Pulmonary Veins. (LSPV-Left superior Pulmonary Vein, LIPV-Left Interior Pulmonary Vein, RSPV-Right Superior Pulmonary Vein, RIPV-Right Inferior Pulmonary Vein).

6. Discussion :-

Anatomical and morphological variations of pulmonary veins are of immense importance in cardiothoracic surgeries and radiological procedures. [7]. Researchers have documented that decreased use of dissection as teaching tool is one of the factor that can have a negative influence on anatomical knowledge of medical students. [18] Evidence suggests that learning anatomy by active exploration through cadaveric dissection actually contributes to improvement of anatomic knowledge. [19] Medical training essentially begins with cadaveric dissection and nearly all clinicians remember the details of their first interaction with the human cadaver. [20]

In our study, we found the unusual branching pattern of left superior pulmonary vein. Earlier it was considered that variations in number and course of pulmonary veins were rare and they are confined only few case reports. [8] Recently, however it has been found that variation in pulmonary venous anatomy were seen in 36% of patients. [9] and they were one of the etiologies for ectopic heart beats. [10] This greater than expected variability in pulmonary venous anatomy could substantially alter success rates of radiofrequency ablations, as ectopic foci could go untreated in variant veins. The successful treatment of atrial fibrillation by radiofrequency ablation of ectopic foci can be made possible only by having accurate knowledge of normal pulmonary venous anatomy and its measurement. [13]

The knowledge of these variations is valuable in cardiothoracic surgeries and radiological procedures [15] such as radiofrequency ablations in atrial fibrillation, cardiac valve replacement, pulmonary lobectomy and others. [14]

7. Conclusion :-

Human cadaveric dissection has survived the test of time and till time the student-cadaver encounter remains paramount in medical education. The rise of ancient Greek medicine paved the way for the inception of human cadaveric dissection as a tool for teaching anatomy in 3rd century B.C.

Typically there are four pulmonary veins with superior and inferior pulmonary veins on either side draining into the left atrium. [6]. There may be anomalous drainage in the left atrium or systemic veins. On left side, there may be convergence of the left pulmonary veins into a short or long common trunk that drains into left atrium. Anatomic variants on right side are less common and include accessory veins such as accessory right middle or upper pulmonary veins draining independently into left atrium. Partial Anomalous Pulmonary Venous Return (PAPVR) into a systemic vein produces a left to right shunt. In left sided PAPVR, left upper lobe pulmonary

veins form a vertical vein that joins the left brachiocephalic vein or coronary sinus. Anomalies in the branching pattern of pulmonary veins have been documented worldwide. We hope that our study has provided valuable data to clinicians and anatomists by enhancing their knowledge regarding the variation of the branching pattern of left superior pulmonary vein is important in cardiothoracic surgeries. The wide spectrum of variations in anatomical arrangement of human pulmonary veins and its branches offer valuable information to replace cardiac valve safely and performing pulmonary lobectomy. These anatomical and morphological variations in pulmonary vein are significant for diagnostic procedures and cardiothoracic surgeries.

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