

Pulmonary Vein Anatomy for Percutaneous Ablation in Atrial Fibrillation



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Percutaneous ablation of pulmonary veins (PVs) is one of the effective treatments for atrial fibrillation by isolating the source of ectopic electrical activity. Preoperative CT allows better delineation of PV anatomy and identification of variants, which increase the success rate and safety of the procedure. We aim to evaluate the various PV anatomy in local population with CT imaging.

Materials & Methods

Patients who underwent cardiac CT study from November 2018 to July 2019 were included. A total of 42 patients (25 males, 17 females) with mean age of 73 years (range, 51-90 years) were included. Cardiac CTs were performed using spiral mode ECG gated CT with dose modulation applied from 0 to 100% RR interval. The pulmonary venous drainage pattern was retrospectively reviewed by 2 radiologists using multiplanar reformation. Mean PV ostial diameters were measured in best systolic phase.

Results

Mean ostial diameter	mm \pm SD
Right superior PV (RS)	19.8 \pm 4.4
Right inferior PV (RI)	20.8 \pm 3.9
Left superior PV (LS)	23.9 \pm 4.4
Left inferior PV (LI)	17.5 \pm 2.7

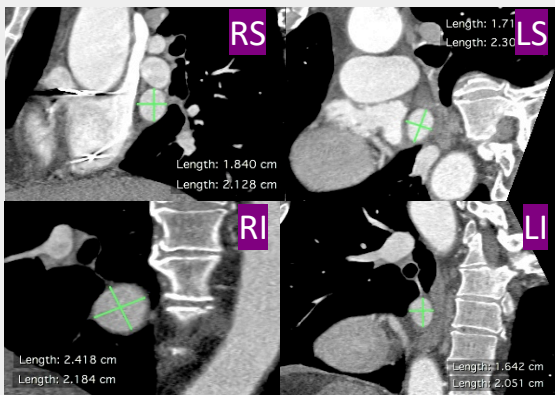


Fig. 1: Contrast cardiac CT images showing measurement of mean PV ostial diameters using multiplanar reformation.

Pulmonary venous drainage pattern	%
Usual anatomy *	57
Separate right middle lobe PV	38
Separate lingular PV	2
Separate PV for right lower lobe apical segment	2
Separate PV for right lower lobe basal segment	2
Right top PV	7
Single left PV	7

(* Four PVs with separate ostia, two superior and two inferior PVs)

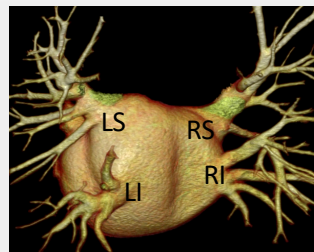


Fig.2: Volume rendered image showing usual PV anatomy

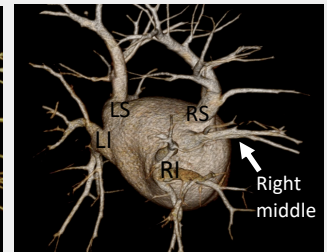


Fig.3: Volume rendered image showing separate right middle lobe PV

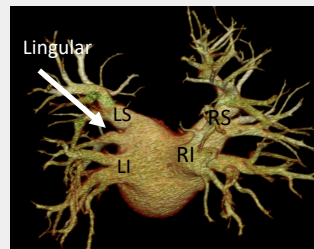


Fig.4: Volume rendered image showing separate lingular PV.

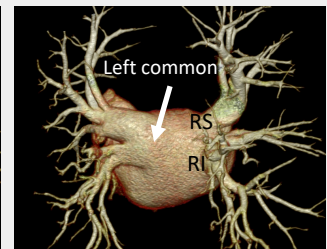


Fig.5: Volume rendered image showing single left PV.

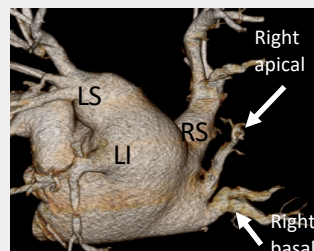


Fig.6: Volume rendered image showing separate PVs for right lower lobe apical and basal segments.

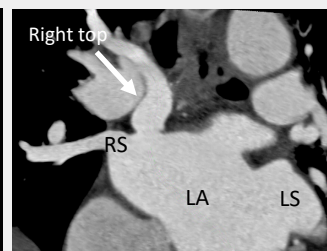


Fig.7: Coronal reformatted CT image showing extra right top PV, inserts medial and superior to RSPV.

Conclusion:

PV anatomical variants are common and PV ostial diameters are variable, therefore understanding the anatomy of PVs with preoperative CT is important for successful percutaneous ablation.