Anatomy of the pulmonary veins in patients with paroxysmal atrial fibrillation undergoing radiofrequency catheter ablation

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Introduction: The anatomy and morphology of pulmonary veins play a pivotal role in the pathophysiology of paroxysmal atrial fibrillation and also in the planning of ablation therapy. The aim of this study was to describe the characteristics of pulmonary vein (PV) anatomy and variants in patients with paroxysmal atrial fibrillation (AF) undergoing radiofrequency catheter ablation.

Methods: 45 patients with paroxysmal AF underwent ablation were selected in the period from October 2017 to August 2018 at Vietnam National Heart Institute. All patients underwent multislice contrast-enhanced thoracic computed tomography before their procedures. PVs’ characteristics were measured with digital calipers by two independent observers.

Result: Among 45 patients participating in this study, 33 were men (73.3%). Patients ≥60 years old accounted for the highest rate (51.1%). 35/45 patients had typical PV anatomy involves four PVs with separate ostia (77.8%). The rate of pulmonary veins variation was 22.2%, of which, there were 1 case of common left pulmonary vein (2.2%) and 9 case of right middle lobe pulmonary vein (20.0%). Mean left atrial end-diastole volume was 90.14 ± 24.27 (ml). Mean superior - inferior (SI) diameters for each pulmonary vein was significantly larger than mean anterior-posterior (AP) diameters. Mean SI and AP diameters for left superior pulmonary veins were significantly larger than left inferior pulmonary veins. Right-sided PV ostia were more round, and the right middle lobe pulmonary vein ostia were the roundest.

Conclusion: PV variations were common among paroxysmal atrial fibrillation patients. Comprehension of pulmonary vein diameter, shape and its anatomic variations was important in doing catheter ablation procedures.