Pulmonary vein anatomical variants and incidence of atrial fibrillation

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Introduction: Atrial fibrillation (AF) is the most common arrhythmia worldwide. The role of the pulmonary veins (PV) in its pathogenesis has been well described, as have the most frequently seen anatomical variants of these veins. Prior studies have shown conflicting evidence on the potential association of PV variants and incidence of AF. We sought to reassess this association.

Methods: We conducted a retrospective case-control study of patients with AF (cases) and without AF (control group) undergoing cardiac CT imaging. We documented patient characteristics and cardiac anatomical features including PV variants, LV ejection fraction (EF) and left atrial (LA) volume/diameter.

Results: 295 patients were included: 194 with AF and 101 without. 71% of AF cases were male. We showed a numerical difference for PV variants between the AF and control group that was not statistically significant (48.5% and 39.6%, p=0.15). The overall incidence of PV variants was higher than in previous studies. A significant association was identified between left atrial appendage (LAA) morphology and incidence of AF.

Conclusion: The suggested association between PV anatomical variants and the pathogenesis of AF may not be as clear-cut as previously thought. Our study is one of the largest of its kind and provides conflicting evidence with prior studies in this area. An improved understanding of the complex pathophysiology of AF and its relation to the pulmonary veins may help to guide future preventative and therapeutic strategies.