The aim of this study was to determine the mechanisms and effectiveness of pulmonary antral radial-linear (PAR) ablation in comparison with pulmonary vein isolation (PVI) in patients with paroxysmal atrial fibrillation (AF) after a long-term follow-up.

METHODS The enrollment occurred between March, 2011, and August, 2011, with the last follow-up in May, 2014.A total of 133 patients with documented paroxysmal AF were enrolled from 5 centers and randomized to PAR group or PVI group. Event ECG recorder and Holter monitoring were conducted during the follow-up for all patients.

RESULTS The average procedure time was 151 ± 23 min in PAR group and 113 min in PVI group (P < 0.001). The average fluence time was 21.7 ± 7 min in PAR group and 27.1 ± 11 min in PVI group (P = 0.002). AF triggering foci were eliminated in 59 patients (89.4%) in PVI group, whereas, only 4 patients (6.0%) in PVI group (P < 0.001). At mean 36 (37-35) months of follow-up after single ablation procedure, 43 of 67 patients in PAR group (65%) and 28 of 67 patients in PVI group (42%) had no recurrence of AF off anti-arrhythmic drug (AAD) (P = 0.007); and 47 of 66 patients in PVI group (71%) and 32 of 67 patients in PVI group (48%) had no recurrence of AF with AAD (P = 0.006). At the last follow-up, the burden of AF was significantly lower in PAR group than in PVI group (0.9% ± 2.3% vs 4.9% ± 9.9%; 90th percentile, 5.5% vs 19.6%; P < 0.008).

CONCLUSIONS PAR ablation is a simple, safe, and effective strategy for the treatment of paroxysmal AF with better long-term outcome than PVI. PAR ablation might exhibit the beneficial effect on AF management through multiple mechanisms.