

## Effects of pulse field and radiofrequency pulmonary vein isolation on parasympathetic cardiac innervation

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**Background:** Pulmonary vein isolation (PVI) is an established treatment modality for patients with atrial fibrillation (AF). PVI performed by radiofrequency (RF) energy results in parasympathetic denervation of the heart by collateral ganglionic plexi ablation. Pulse field (PF) is a novel nonthermal energy source for PVI that selectively ablates atrial myocardium while preserving cardiac autonomic nerves, which may affect the outcome after PVI.

**Purpose:** The study compared the effect of PVI between RF and PF ablation on cardiac autonomic function and a short-term AF recurrence rate. The resting heart rate (HR) was evaluated as a simple index of sinus nodal parasympathetic innervation.

**Methods:** We investigated 45 patients (aged  $64 \pm 7$  years, 4 women) who underwent PVI by novel three-dimensional electroanatomical mapping/ablation system (lattice electrode ablation system). PVI was performed by either high-energy RF ( $n = 21$ ) or PF ( $n = 24$ ) energy using the identical ablation catheter. Resting HR assessed by standard ECG was recorded the day before the procedure and at the 3-month visit. Arrhythmia recurrences were analysed by 24-Holter at the 3-month visit.

**Results:** All PVs were acutely isolated in all patients. The HR data are shown in the Table. The baseline HR did not differ between both groups. A significant increase in HR was observed only in the RF ablation subgroup. The between-group difference remained significant even after adjustment for age, gender, and baseline HR. There was no difference in arrhythmia recurrences at the 3-month visit between study groups.

**Conclusions:** Parasympathetic denervation effects on HR after the PF ablation are virtually absent. Comparable AF recurrence rate at 3-month visit after RF and PF ablation suggests that preservation of autonomic innervation has no impact on AF recurrence during short-term follow-up.

Table

	RF PVI (n = 21)	PF PVI (n = 24)	P
Baseline HR (bpm)	$60.0 \pm 7.1$	$63.8 \pm 9.4$	n.s.
HR change - 3-month visit (bpm)	$14.4 \pm 6.9$	$0.3 \pm 8.6$	$P < 0.001$
Arrhythmia recurrences	3/21 (14%)	2/24 (8%)	n.s.