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Is pulmonary vein isolation alone sufficient in persistent atrial fibrillation? One-year outcomes and the predictive role of NT-proBNP

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Introduction: Pulmonary vein isolation (PVI) is the cornerstone of catheter ablation for atrial fibrillation (AF), but in persistent AF, its efficacy may be limited by atrial remodelling beyond the pulmonary veins. Elevated natriuretic peptides, such as N-terminal pro-B-type natriuretic peptide (NT-proBNP), reflect this remodelling and have been associated with AF recurrence under a rhythm-control strategy[1,2]. Nevertheless, randomised trials have not shown a clear benefit of additional substrate ablation over PVI alone[3,4]. The aim of this study was to assess the one-year efficacy of a PVI-only strategy in patients with persistent AF and to evaluate whether preprocedural NT-proBNP and left atrial volume index (LAVI) can identify patients in whom PVI alone may be insufficient.

Patients and Methods: This single-centre, observational, registry-based study included 119 patients with persistent AF who underwent PVI only, without additional substrate ablation, between July 2022 and August 2025. PVI was performed using pulsed-field, radiofrequency, or cryoballoon ablation. All patients underwent transthoracic echocardiography and NT-proBNP measurement before the procedure. Patients were followed up at outpatient visits 3, 6, and 12 months after PVI, and AF recurrence was documented by electrocardiogram or 24-hour Holter monitoring. Preprocedural NT-proBNP levels were compared between patients with and without recurrence at each follow-up time point.

Results: The median participant age was 65 years (IQR 60–70), and 74% were male. The median baseline NT-proBNP level was 521 pg/mL (IQR 228–989). During the first year after PVI, AF recurrence was documented in 60 patients (50.4%). Recurrence within the first three months occurred in 22 patients (18.5%). Patients with early recurrence had a reported median NT-proBNP level of 499 pg/mL (IQR 178–940), with a statistically significant difference between patients with and without recurrence (p=0.001). No statistically significant differences in NT-proBNP levels were observed at six months (p=1.000) or twelve months (p=0.623). Baseline left atrial volume index (LAVI) measured 45.5ml/m^2 (IQR 39-56ml/m^2), and it was not associated with higher recurrence of AF (p=0.235), which could be explained with already increased values of LAVI in all patients.

Conclusion: A PVI-only strategy maintained freedom from AF in approximately half of patients with persistent AF at one year, consistent with the results of randomised trials[3,4]. Preprocedural NT-proBNP was associated with early but not late recurrence, and neither NT-proBNP nor LAVI reliably identified patients in whom PVI alone was insufficient. Further studies are needed to identify patients with persistent AF who may benefit from additional substrate-based ablation strategies.

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