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Incidence of LA fibrosis and substrate-based AF ablation success rates in HF patients

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Background: In heart failure (HF) patients, sinus rhythm maintenance after catheter ablation for atrial fibrillation (AF) is mandatory to achieve better long-term outcome. Presence of left atrial (LA) fibrosis significantly attenuates ablation success rates. Incidence of LA fibrosis and the effect of an individualized substrate-based ablation concept on rhythm outcome in HF patients with AF is unclear.

Methods: This study investigated 103 patients (64 years, 69% men) with persistent AF (79%) and left ventricular (LV) dysfunction (EF 33% IQR [25; 38]) undergoing first time AF ablation. Identification of LA fibrosis and selection of ablation strategy were based on sinus rhythm voltage mapping. All patients received pulmonary vein isolation (PVI). LA fibrosis ablation was individualized by (i) homogenization of small areas, (ii) linear lesions connecting fibrosis and anatomical obstacles and (iii) linear lesions isolating large fibrotic areas. Rhythm outcome was measured by continuous device monitoring (AF detection ≥ 6 min) or Holter-ECG. A total post-procedural AF burden < 0.1% was defined as successful rhythm control.

Results: LA fibrosis in the overall cohort, in paroxysmal and persistent AF patients was detected in 39/103 (38%), 6/22 (27%) and 33/81 (41%), respectively. After 11 ± 5 months and 1.2 procedures/patient, freedom from AF recurrence was similar between patients with and without LA fibrosis (33/39 (84%) vs. 54/64 (84%); p = 0.485). With continuous monitoring, 73/87 (84%) patients recorded a total AF burden < 0.1%. There was no significant difference in AF burden outcome between patients with and without LA fibrosis (3.1% SD ±17.4 vs. 2.2% SD ±8.1; p = 0.4). No correlation between presence or extent of LA fibrosis and AF burden was found; p = 0.299.

Conclusion: A substantial number of HF patients with AF have no evidence of LA fibrosis. Among HF patients with LA fibrosis, individualized substrate-based AF ablation beyond PVI was able to achieve similar ablation success.