Findings at repeat ablation after complex left atrial pulsed field ablation for longstanding persistent atrial fibrillation

M. Fiala1; F. Lehar1; M. Cernosek1; V. Bulkova1; M. Funasako1; J. Bahnik1; L. Rybka1; O. Toman1; P. Kala2

1Center of Cardiovascular Care Neuron Medical, Brno, Czechia
2Masaryk University, Faculty Hospital Brno, Department of Internal Cardiology Medicine, Brno, Czechia

Funding Acknowledgements: Type of funding sources: None.

Background: There is a limited knowledge on atrial arrhythmias recurring after complex left atrial (LA) pulsed field ablation (PFA) for longstanding persistent atrial fibrillation (LSPAF).

Purpose: To present recurrent atrial arrhythmias and their sources found at repeat ablation following PFA for LSPAF.

Methods and results: Of 214 patients with LSPAF (age 65±8, 53 females, continuous AF for 30±27 months) with complex LA PFA (Farapulse) in 10/2021-10/2023, 19 patients (64±8 years, 5 females) underwent repeat ablation for recurrent AF or aerial tachycardia (AT) in 20 procedures.

First PFA procedure included pulmonary vein isolation (PVI), roof/posterior wall, and mitral isthmus/coronary sinus/Ligament of Marshal region (LOM) ablation. At repeat ablation, 3D activation and entrainment mapping and ablation identified the AF/AT sources; ATs sources were classified as macroreentry (MRAT) (perimitral, roof-dependent, typical flutter) or localized (LOCAT) in case of smaller reentry or ectopic origin.

Results: The clinical recurrent arrhythmias included paroxysmal AF (n=1), persistent AF (n=2), paroxysmal AT (n=1) or persistent AT (n=16).
At the onset of repeat ablation, persistent AF/AT was present (n=15) or had to be induced (n=5). AF was finally present during the procedure in 8 patients, and was terminated by ablation directly into SR (n=3) or into intermediate AT (n=3) (conversion sites included LA ridge/LOM region 2x, RA septum 1x, RA low lateral 2x, CTI 1x), or required DCC (n=2). Primary recurrent or from AF converted AT was present in 15 patients; only MRAT in 6 patients, only LOCAT in 3 patients, and both AT types in 6 (patients). Of MRAT (N. ATs = 16), there were 12 perimitral ATs, 0 roof-dependent AT, and 2 typical flutters. Of LOCATs, sources were located at LA anterior wall 4x, LA septum 2x, LA roof 1x, LA ridge/LOM 1x, persistent left vena cava 1x, and RA – para SA node 1x. Recurrent AF/AT sources were targeted by radiofrequency or PFA in 16 and 4 cases, respectively, all spontaneous and induced AF/AT were finally terminated into SR in 16 cases, subsequent noninducibility by atrial pacing up to 300 bpn was achieved in 13 cases, and recurrent AF/AT occurred in 3 patients.

Conclusion: At repeat ablation PFA (Farapulse) for LSPAF, recurrent AT dominated over AF, MRAT slightly prevailed over LOCAT, mostly constituted by perimitral AT, while roof-dependent AT recurrence was reduced to zero. A majority of AF/AT sources were located outside prior PFA lesions at the LA anterior wall, septum and the right atrium.