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CASE REPORT

Pulsed-field ablation of pulmonary vein and left atrial posterior wall combined with left atrial appendage occlusion as single procedure

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Abstract

Pulmonary vein isolation and left atrial posterior wall ablation using the Farapulse system, followed by left atrial appendage occlusion, have been achieved as single combined procedure to treat long-standing persistent atrial fibrillation in a patient at high hemorrhagic risk.

KEYWORDS
atrial fibrillation, left atrial appendage occlusion, pulsed field ablation

1 | INTRODUCTION

Pulsed field ablation (PFA) is a novel ablation technology for atrial fibrillation (AF), which allows rapid and durable pulmonary vein (PV) isolation with an excellent safety profile.[1] The first device approved in Europe is the Farapulse PFA ablation system (Farapulse, Boston Scientific, USA), that comprises the over-the wire penta-spline ablation catheter (Farawave, Farapulse, Boston Scientific, USA) and the 14F steerable sheath (Faradrive, Farapulse, Boston Scientific, USA). Beyond PV isolation (PVI), this technology has also proven to be effective and safe in providing durable ablation of left atrial posterior wall (LAPW), feature that extends the role of PFA to persistent forms of AF.[2] Combining AF ablation with percutaneous closure of left atrial appendage (LAA), as a single procedure, has already shown to be safe and effective with non-PFA ablation technologies.[3,4]

We present a case of PV and LAPW PFA combined with LAA occlusion as single procedure.

2 | CASE PRESENTATION

A 69-year-old male patient affected by long-standing persistent, symptomatic, drug-refractory AF, previously treated with two consecutive procedures of radiofrequency transcatheter PVI, was referred to our center for a third procedure of AF ablation.

Patient was also deemed to be at high hemorrhagic risk (HASBLED score 5), so we decided to perform simultaneously LAA occlusion as a combined procedure.

After general anesthesia induction, single transseptal puncture was performed.

The penta-spline ablation catheter, through the 14F steerable sheath, was advanced in the left atrium. Preablation electrical mapping, using the electrograms recorded from the ablation catheter, showed

Abbreviations: AF, atrial fibrillation; LAA, left atrial appendage; LAPW, left atrial posterior wall; NOAC, non-vitamin K antagonist oral anticoagulant; PFA, pulsed field ablation; PV, pulmonary vein; PVI, pulmonary vein isolation.

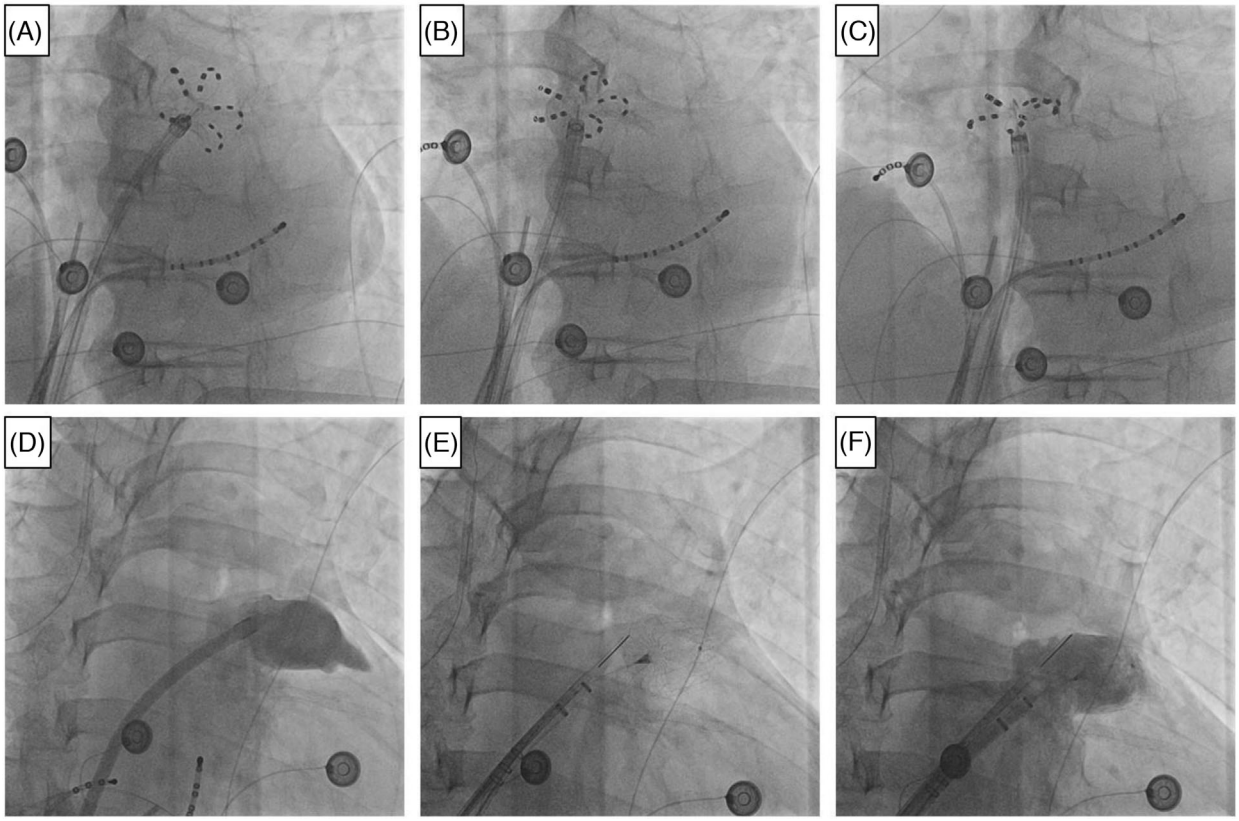

FIGURE 1 Panels (A)–(C) show, in LAO view, the position of the penta-spline ablation catheter, in flower-like configuration, during ablation of the superior part of left atrium posterior wall. Panels (D)–(F) shows in RAO view, respectively, LAA selective angiography, Watchman device placement and repeated angiography to verify occlusivity. LAA, left atrial appendage.

complete PV reconnection. PV re-isolation was then achieved using the standard workflow (4 basket-like and 4 flower-like applications for each PV).

Subsequently, after retracting the guidewire, in the flower-like configuration, under the guidance of voltage map and fluoroscopy, 12 consecutive applications were deployed, targeting the whole area of the LAPW (Figure. 1, panels A–C).

Of note, during LAPW ablation, sinus rhythm was spontaneously restored. Complete LAPW ablation was completed in 10 min.

Afterwards, left atrium high density voltage map, using Orion Intellamap catheter (Rhythmia, Boston Scientific, USA) was performed, and PVI, as well as LAPW ablation, were validated (Figure. 2).

Finally, the 14F deflectable sheath was replaced by the 14F dedicated sheath for Watchman Flex deployment.

Under intracardiac echocardiography and selective angiography guide to determine device size, successful LAA closure was performed (Boston Watchman Flx 31 mm; Figure 1, panel D–F) with no final residual flow.

No major procedural complications were detected. Mild pericardial effusion was noticed at echocardiography check 48 h after procedure and was stable after further 24 h of observations. Short repetitive atrial premature beats episodes were observed the day after the procedure, with subsequent stabilization of sinus rhythm after amiodarone infusion. Antithrombotic therapy at discharge consisted of non-vitamin K antagonist oral anticoagulant (NOAC) plus aspirin. After 3-month follow up, patient reported symptoms improvement, with sporadic episodes of palpitations. 24-h ECG Holter showed one brief paroxysmal episode of AF. The patient underwent also a transesophageal echocardiography investigation that confirmed proper LAA device position, with no evidence of peridevice leakage. No pericardial effusion was noticed. NOAC therapy was then discontinued.

3 | DISCUSSION

long standing persistent AF ablation represents an unsolved issue, as a PVI-only strategy has showed high recurrence rate in this clinical setting.[5] What to do beyond PVI ablation remains matter of research, and various ablation strategies have been attempted.[6] One of these is LAPW ablation, whose efficacy over a PVI-only strategy has shown conflicting results in randomized control trials.[7] In our case report, the penta-spline ablation catheter in the flower-like configuration allowed us to reach quickly an acutely effective LAPW ablation.

AF ablation and LAA closure is furthermore emerging as a combined procedure. Previous studies, using non-PFA ablation technologies, showed that a combined approach is feasible and safe, preventing stroke and reducing the risk of bleeding in patients with non-valvular AF compared with oral anticoagulants (OAC).[4,8] The combined procedure offers the advantages of performing a single vascular access and transseptal puncture. PFA, with its unique features, can bring even

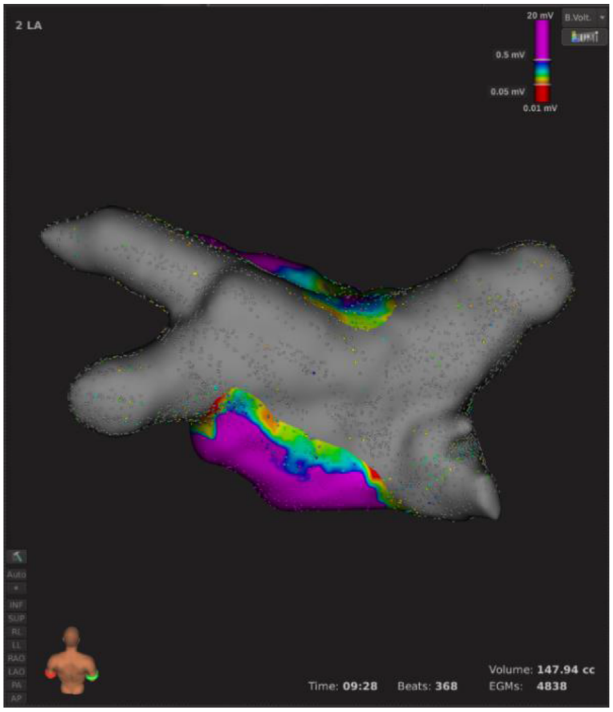

FIGURE 2 Electro-anatomical voltage map of left atrium in posteroanterior projection. Successful PV and posterior wall ablation are confirmed. PV, pulmonary vein. [Color figure can be viewed at wileyonlinelibrary.com]

more benefit than thermal ablation technologies in the context of combined procedure. First, it is a single-shot device that allows fast PVI, hence reducing total procedure time, feature even more important since treated patients are usually frail and older. Second, catheter-tissue contact is not as important as it is with thermal technologies for lesion creation, thus the single transseptal puncture can be performed in a more suitable position for LAA access. Third, inducing a non-thermal cell death, PFA could create less edema of the left superior PV ridge, reducing the risk for peri-device leak.

To our knowledge, this is the first reported case of PV and LAPW PFA and LAA occlusion as single combined procedure.

4 | CONCLUSIONS

PFA is a novel and promising AF ablation technology. Effectiveness and safety of combined AF ablation and LAA occlusion procedures, using non-PFA ablation modalities, has already been reported. The present report describes the efficacy and safety of PV and LAPW PFA combined with LAA occlusion, opening this approach to future large-scale evaluation.

AUTHOR CONTRIBUTIONS

Lorenzo Bianchini: drafted the manuscript. All other authors contributed to the critical review of the manuscript.

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CONFLICT OF INTEREST STATEMENT

All authors have no disclosure or conflict of interest regarding the manuscript.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

INFORMED CONSENT

Patient provided firmed informed consent.

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