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Combination of the pulsed field ablation with EnSite precision cardiac mapping system in the treatment of atrial fibrillation

Short title: PFA and mapping system combination to facilitate PVI

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Atrial fibrillation (AF) is one of the most commonly encountered heart condition. The prevalence of AF is expected to double in the next few decades [1]. Catheter ablation is beneficial in symptomatic patients with recurrent paroxysmal or persistent AF [2]. Due to growing demand and techniques development growing number of procedures is being performed. One of the newest recently introduced catheter ablation method is pulsed field ablation (PFA), which despite many advantages, also has drawbacks in the means of higher X-Ray exposure.

A 63-year old female with a history of paroxysmal AF underwent pulmonary vein isolation using both FARAPULSE™ PFA System and EnSite Precision™ under deep sedation. During the procedure single transseptal puncture was performed with subsequent rotational angiography. The map was obtained while maneuvering the FARAPULSE catheter integrated into EnSite system. Four applications were delivered to each pulmonary vein with the basket-shaped catheter and another four with the flower-shaped catheter. Additional lesions were made between the veins. After isolating all of the veins remap was performed to confirm entrance

block (Figure 1). Exit block was confirmed with pacing. The procedure was free of complication and patient was discharged home on the following day.

The described case the first case in Poland with the use of the specific additional Ensite software dedicated to the FARAPULSE system. This novel approach enabled noting the exact places of ablation, better entrance block confirmation due to performed electroanatomical map after ablation. Moreover, it fits into concept of using X-Ray as low as reasonably achievable. In this case the idea behind using a combination of two systems was to implement it into clinical practice in order to be ready to use it in other clinical scenarios with definite indication for mapping and PFA ablation.

Unlike the earlier techniques of cryoablation or radiofrequency ablation, this case utilized a newer form of energy delivery — PFA, which is thought to be a non-thermal ablation that applies short-duration high-voltage electrical fields to ablate myocardial tissue with high selectivity and durability [3]. Success during PFA procedure depends upon the proximity of the electrode to the target tissue, but not necessarily upon contact. A unique feature of PFA is tissue specificity. Myocardium is very susceptible to irreversible injury whereas the collateral organs are relatively resistant to injury. So far, the times of PFA based procedures proved to be shorter when compared with radiofrequency and cryoablations [4]. The integration with the EnSite Precision™ 3D heart mapping system allows for the creation of 3D maps of the atrium with pulmonary veins based on the individual anatomy of the patient's heart. The use of the EnSite Precision™ mapping system was associated with improved periprocedural variables [5].

Currently, research is being conducted on the clinical effectiveness of integration of the PFA system with electroanatomic systems. Due to the innovative nature of this combination, there are currently few publications on the topic. Considering the numerous benefits, such as reduced fluoroscopy and precise localization of the application site, this integration seems to be beneficial for the patients and should be explored more in the future.

Article information

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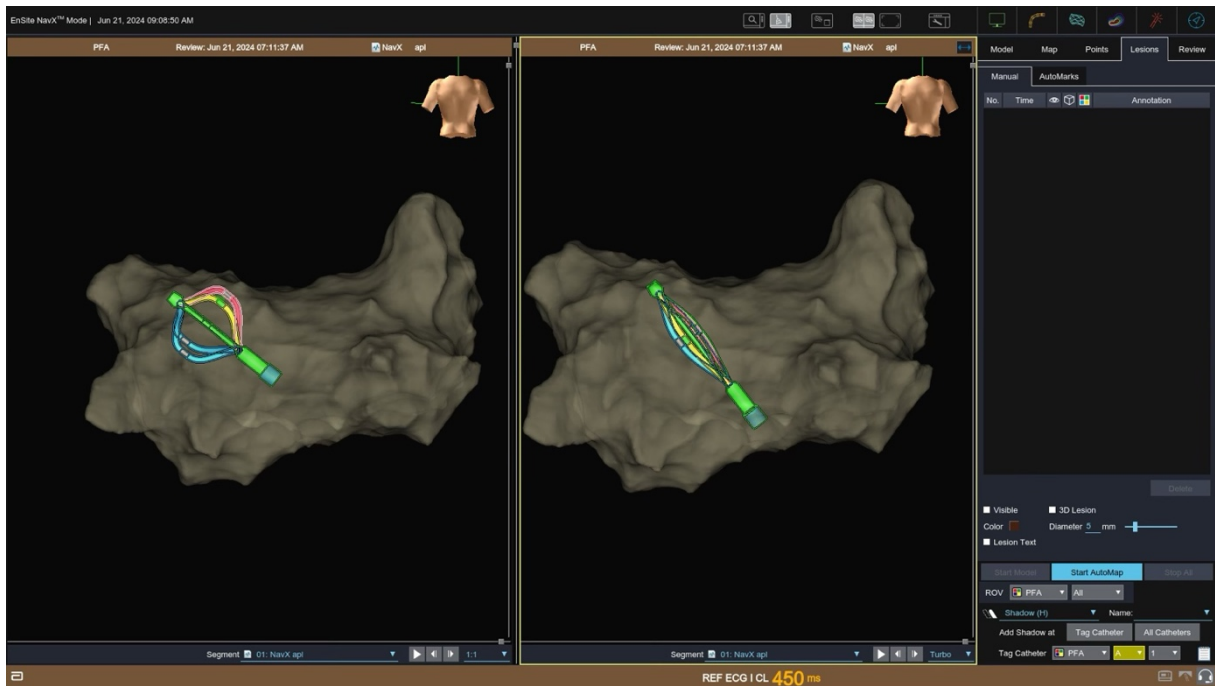


Figure 1. A. Electroanatomical map presenting catheter position in real time



Figure 1. B. Periprocedural electroanatomical maps showing the places and shapes of application in the atrium

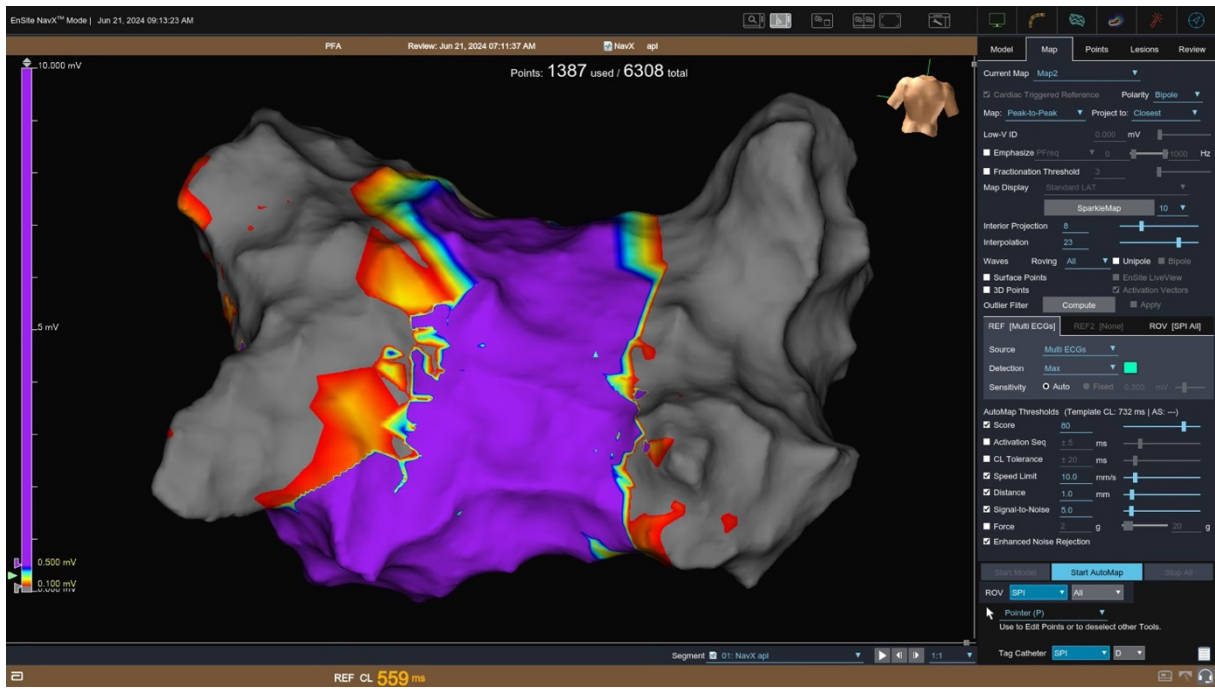


Figure 1. C. Posteroanterior view of the electroanatomical map performed after the ablation