Pulmonary vein isolation (PVI) is the cornerstone of most atrial fibrillation (AF) ablation procedures. Recent studies demonstrate that in AF, rapidly activating spiral-circuits called ‘rotors’ can be localized with computational-mapping during an electrophysiological study. Radiofrequency ablation at the rotor may result in AF termination. Remote robotic-navigation (RN) is designed to improve catheter stability and decrease radiation exposure.

We report the first in-human rotor-mapping with a novel 64-electrode basket catheter (FIRMap®, Topera) (Panel A) and mapping system (RhythmView®, Topera) combined with a RN system (SenselTM, Hansen Medical), and assessed its feasibility for rotor-modulation and PVI.

A 73-year-old male with paroxysmal AF and no structural heart disease was referred for ablation. Two long sheaths were advanced into the left atrium (LA). Atrial fibrillation was induced with burst pacing from the septal PVs, and sustained for >5 min before a 60 mm FIRMap® basket catheter (Panel B) was used to map for rotors in both atria.

No rotors were identified in the right atrium. A rotor was identified at the LA mid-posterior wall near the right PV antrum before circumferential PVI (Panels C and D, Supplementary material online, Video). Radiofrequency current (30 W) was applied for 300 s using the RN Artisan® Extend catheter (Hansen Medical) and resulted in coronary sinus cycle-length prolongation (150 to 170 ms). Atrial fibrillation termination occurred 72 s after rotor ablation (Panel E). Repeat rotor-mapping confirmed no further rotors. Ipsilateral PVI was then performed, and AF was no longer inducible.

Fluoroscopy time was 22 min, and fluoroscopy dose was 3125 cGycm². Oesophageal temperature-monitoring during ablation and gastroscopy post-procedure showed no oesophageal thermal lesions, and echocardiography found no pericardial effusion.

The combination of RN and rotor ablation using the novel FIRMap® catheter is feasible.

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