Nature Reviews Cardiology **9**, 491 (2012); published online 7 August 2012; doi:10.1038/nrcardio.2012.116

ATRIAL FIBRILLATION

Electrophysiologists eagerly await independent CONFIRMation of improved method for ablation

The CONFIRM trial investigators have published their findings on a new, patient-specific strategy for ablation of atrial fibrillation (AF). The results of their trial have been received with excitement among electrophysiologists. In an editorial that accompanied the CONFIRM study report in the *Journal of the American College of Cardiology*, Dr Karl-Heinz Kuck and Dr Erik Wissner state that the investigators "should be praised for providing the electrophysiology community with a potentially ground-breaking new method for AF ablation". They point out that, if confirmed by other investigators, "for the first time, ablation could target the underlying pathophysiologic mechanisms and not merely the AF trigger". Similarly, in his blog on www.theheart.org, Dr John Mandrola says that "this might be a turning point in the treatment of AF ablation" and describes the new method as "so much smarter and more elegant a strategy" compared with the traditional approach. All are eagerly awaiting reproduction and published confirmation of the success of this strategy by other teams of investigators.

Although found to be more effective than pharmacotherapy in many patients with AF, catheter ablation is considered to be 'suboptimal' in this setting. In a large proportion of patients, medications are still needed after one or more of these procedures. The traditional strategy for AF ablation is based on the idea that AF is triggered by ectopic beats from the pulmonary veins and, therefore, involves isolation of these veins. In contrast to the traditional ablation strategy in the setting of AF, for all other arrhythmias, it is the perpetuating mechanism, and not just the trigger, that is the primary target for ablation. Unfortunately, although hypotheses about the mechanisms that sustain AF after it has been initiated have been tendered by various investigators, none have previously been confirmed in humans.

Dr Sanjiv Narayan and colleagues, therefore, set out to test the hypothesis that human AF is sustained by localized sources and that targeted elimination of these sources during AF ablation—termed focal impulse and rotor modulation (FIRM)—would improve outcome. To detect the localized sources, they used a novel computational mapping system, called RhythmView® (Topera Inc., Scottsdale, AZ, USA), that depicts propagation of electrical activity in each atrium. Electrical rotors were defined as "sequential clockwise or counterclockwise activation contours around a center of rotation emanating outward". Focal impulses were defined as "centrifugal activation contours from an origin". Only electrical rotors and focal impulses that were found consistently in multiple recordings over a period of >10 min were considered to be AF sources.

Of the 101 cases of sustained AF, 97% were associated with the presence of electrical rotors and/or focal impulses. The AF sources were found in various, widespread locations throughout the left (76%) and right (24%) atria. When present, the number of sources was slightly higher for persistent AF than for paroxysmal AF (median of 2 per case vs 1 per case, respectively) and higher for spontaneous compared with induced AF (median of 2 per case vs 1 per case, respectively). The number of AF sources was found to be unrelated to age, historical duration of AF, and prior catheter ablation.

In total, 65 cases of sustained AF were assigned to the traditional catheter ablation strategy (wide area circumferential ablation isolating the left and right pulmonary veins in pairs) only and 36 cases were assigned to FIRM-guided ablation followed by traditional ablation. Total procedural ablation time did not differ between the two groups.

After FIRM-guided ablation alone, AF termination or ≥10% slowing of AF—the acute primary efficacy end point of the study—occurred in 86% of the cases assigned to receive both FIRM-guided and traditional ablation (termination in 56%). By contrast, the acute primary efficacy end point occurred in 20% of cases that were treated via the traditional ablation strategy only (AF termination in 9% of cases). Freedom from AF for up to 2 years (median 273 days) after a single procedure—the long-term primary efficacy end point—was higher for cases assigned to receive FIRM-guided ablation than for those not assigned to the patient-specific strategy (82.4% vs 44.9%; $P<0.001$). The incidence and type of adverse events did not differ between the two groups.

The CONFIRM investigators conclude that human AF might be sustained by localized sources and that patient-specific ablation of these sources is more-effective than the traditional ablation strategy for AF. The FIRM-guided ablation strategy is currently being validated in a randomized study involving a larger patient population and more investigators.

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Original article Narayan, S. M. *et al.* Treatment of atrial fibrillation by the ablation of localized sources: CONFIRM (conventional ablation for atrial fibrillation with or without focal impulse and rotor modulation) trial. *J. Am. Coll. Cardiol.* doi:10.1016/j.jacc.2012.05.022