Response to Letter by Jalife et al Regarding Article, “Quantitative Analysis of Localized Sources Identified by Focal Impulse and Rotor Mapping in Atrial Fibrillation”

You must be sincerely committed to what’s right and not who’s right.

—John R. Wooden (1920–2010)

UCLA Basketball Coach and Presidential Medal of Freedom Recipient

From Wooden on Leadership, 2005

We reviewed the letter by Jalife et al1 regarding our recent article2 and are delighted to provide a response to the comments relevant to our article.

We agree with their assessment that skepticism regarding the Focal Impulse and Rotor Modulation (FIRM) rotor mapping system derives in part from the low signal quality often obtained with the basket catheter and the possibility that the proprietary phase interpolation algorithm is inherently biased toward detection of rotors. Indeed, this was a key motivation for conducting our study. We expected to alleviate this skepticism by demonstrating, with independent analytical methods, that FIRM-identified rotor sites showed unique quantitative characteristics, and thus were less likely to be the result of algorithmic bias. We did not find such differences nor did the studies cited by Jalife et al1 (references 13 and 18), which did not analyze atrial electrograms.

Of greatest concern to Jalife et al1 was the poor signal quality and coverage of the left atrial surface we achieved with the basket catheter. We share their concern, and in fact these were among the central findings of our study. Figure 1 was included to demonstrate problems frequently seen when positioning this catheter. Despite repeated attempts by multiple operators to optimize basket catheter position and signal quality, high-quality electrograms could not be obtained from most of the atrium in the majority of cases. Others have had a similar experience with the basket catheter, reporting that only 43±16% of left atrial surface area could be covered.3 Still, after processing this low-quality data, the Rhythm View mapping system consistently identified rotors in every single patient that we analyzed. The algorithm never failed to display rotational activity, and those areas were targeted for ablation, with poor acute results. If the information gathered from the basket catheter was inadequate to generate a valid solution, we would have expected some indication of this from the FIRM mapping system, and we would not have applied radiofrequency energy at those sites in our patients. Recent data from multiple centers have shown similarly low rates of organization or termination of AF with FIRM-guided ablation, ranging from 0% to 11%.4,5

Some of the other points made by Jalife et al1 also deserve response. The animal studies and isolated tissue preparations that they cited are not directly related to our analysis of clinical ablation strategies that FIRM-identified rotors, and the effectiveness of FIRM-only ablation in treating AF. We stand by our data and concur with the editorial comments that FIRM-identified rotors have no role in driving atrial fibrillation. Our study examined only one institution’s results with a single proprietary rotor mapping system. The rationale for ablation of rotors itself is questionable, as studies suggest that ablating the core of a rotor would be expected to convert functional to anatomic reentry rather than terminate fibrillation.6,7 However, we look forward to other studies that may independently verify the presence, location, and stability of FIRM-identified rotors, and the effectiveness of FIRM-only ablation in treating AF. We stand by our data and concur with the editorial comments describing the ongoing uncertainty of rotors as a mechanism of AF in humans,8 and their suitability as ablation targets. Anatomic approaches will continue to play a major role in AF ablation until mechanisms are identified which lead to effective ablation strategies for AF.9

Disclosures

None.

References


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