Introductions

The tissue specificity of pulsed field ablation (PFA) makes it an attractive energy for pulmonary vein isolation (PVI). Indeed, recent data indicates that PFA results in durable PVI.¹,² However, beyond each PFA lesion’s zone of irreversible electroporation and cell death, there may be a surrounding zone of reversible electroporation and cell injury that normalizes with time.

Purpose

The aim of this study was to assess whether the level of electrical PVI that is observed acutely after PFA regresses over time.

Methods

In a clinical trial (PEFCAT; NCT 03714178), PAF patients underwent PVI using biphasic PFA waveforms with a basket/flower PFA catheter (Farawave, Farapulse Inc).

Detailed voltage maps were created using a multispline catheter (Pentaray; Biosense Webster Inc) immediately after PFA and again after 3 mo in a protocol-specified reassessment procedure. For our analysis, we chose 14 PFA pts with both durable PVI and available maps from both the baseline and reassessment timepoints.

We quantified the level of isolation by measuring:
1) the area of left- and right-sided PV antral isolation,
2) the nonablated posterior wall area, and
3) the distances between left and right low voltage borders.

Consistent with the workflow for each procedure, voltage data was registered to CT-based 3D models to improve accuracy.

Results

The cohort was relatively young (age 57.5 ± 11.3 years), and male predominant (64%). The left ventricular function was largely preserved (63.7 ± 9.0%), and the LA dimension was 42.1 ± 5.8mm.

A comparison of voltage maps after index ablation and at reassessment (median 69 days; range 69 - 83) revealed that there was no significant difference between the left- and right-sided PV antral isolation areas and nonablated posterior wall areas (Figure).

The distances between low voltage borders on the posterior wall were also not significantly different between the 2 timepoints.

Patient Characteristics (N=14)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Acute N=14</th>
<th>Chronic N=14</th>
<th>P value</th>
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</thead>
<tbody>
<tr>
<td>LV total (cm²)</td>
<td>6.75 ± 1.53</td>
<td>6.24 ± 2.68</td>
<td>0.319</td>
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<tr>
<td>RPV total (cm²)</td>
<td>5.38 ± 2.39</td>
<td>5.14 ± 1.50</td>
<td>0.587</td>
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<td>Superior line (mm)</td>
<td>23.67 ± 6.88</td>
<td>23.86 ± 7.71</td>
<td>0.887</td>
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<tr>
<td>Middle line (mm)</td>
<td>24.55 ± 8.75</td>
<td>24.51 ± 7.56</td>
<td>0.894</td>
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<tr>
<td>Inferior line (mm)</td>
<td>27.97 ± 8.70</td>
<td>30.20 ± 9.16</td>
<td>0.115</td>
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<tr>
<td>Non-ablated area (cm²)</td>
<td>10.36 ± 3.93</td>
<td>10.27 ± 3.75</td>
<td>0.143</td>
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<tr>
<td>Points (n)</td>
<td>694 ± 193</td>
<td>1029 ± 860</td>
<td>0.177</td>
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</table>

Values are mean ± SD, n (%)

Conclusion

This study demonstrates that the level of PV antral isolation after PFA with the basket/flower PFA catheter persists without regression.

References


Disclosures

The trials were supported by the manufacturer of the pulse field ablation system, Farapulse Inc. Dr. Reddy owns stock in Farapulse; and has served as a consultant for Farapulse, Biosense Webster, and Boston Scientific. Dr. Neuzil has received grant support from Farapulse. Dr. Dukkipati has received grant support from and served as a consultant for Farapulse. Drs. Reddy and Koruth also have conflicts with other medical companies not related to this paper.