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Incidence and location of residual gaps identified by a high-density grid-style mapping catheter after PVI is confirmed by pacing the ablation lines

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Background: Durable pulmonary vein isolation (PVI) is critical to the clinical success of ablation for treatment of atrial fibrillation (AF). Pacing along the ablation line (often using the ablation catheter), is one technique that is commonly used for confirmation of PVI. While this technique is common in practice, it has not been systematically evaluated against other methods for confirming PVI. A high-density grid-style mapping catheter (HD Grid) enabling simultaneous recording of adjacent bipolar EGMs in two directions (HD Wave) is now available in multiple geographies. The sensitivity of this technology for periprocedural identification of gaps in PVI lines has not previously been compared to the technique of pacing the ablation lines.

Purpose: To assess the utility of a high-density grid-style catheter for confirming PVI, and to evaluate sensitivity for identification of gaps relative to a technique of pacing the ablation lines.

Methods: Self-reported procedural data was prospectively collected in atrial fibrillation ablation procedures. Cases in which pulmonary vein isolation was confirmed by pacing the ablation line and subsequently assessed with HD Grid were selected for analysis. Techniques for PVI confirmation were analyzed and the incidence and location of residual gaps following PVI confirmation via pacing was quantified.

Results: A total of 22 AF ablation procedures (age 60.1 ± 9.0 years, LVEF $59.3 \pm 5.7\%$, CHADS 1.5 ± 1.4 , hypertension 45.5%) across 5 centers in Italy and the United States were analyzed. De novo and repeat ablations represented 72.7% and 22.7% of cases, respectively (4.5% not reported). PVI was confirmed by pacing along the ablation line with an average output of 8.8 ± 1.9 mV and pulse width of 2.2 ± 0.7 ms (10mv at 2ms utilized in 59.1%). Subsequent PVI assessment was performed with HD Grid using the HD Wave configuration in all cases. PVI confirmation techniques included exit block confirmation (90.9%), voltage mapping (59.1%), loss of pace capture along ablation lines (40.9%), entrance block confirmation (18.2%), and activation mapping (4.5%); note: total exceeds 100% as more than one technique may be employed in a single case. The HD Grid identified a total of 30 gaps in 15 (68.2%) patients, which were initially missed by pacing along the ablation lines. No adenosine or isoproterenol use was documented in any case.

Conclusion(s): Use of the HD Grid appears to increase substantially, the sensitivity for identifying gaps in PVI lesion sets relative to a technique of pacing the ablation line. Limitations of this analysis include small sample size and workflows which consistently assessed PVI with the HD grid following confirmation of isolation by pacing the ablation lines. Despite these limitations, the high prevalence of residual gaps is quite provocative and may warrant additional study.

Abstract Figure.

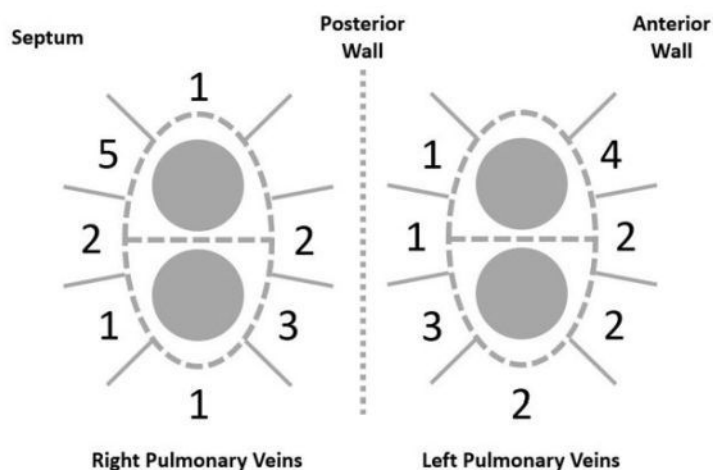


Figure 1. Incidence and location of residual gaps (across all patients in which gaps were recorded) identified by Advisor HD Grid, which were not identified by pacing the ablation line.