

Optimal Interlesion Distance To Prevent Gap Formation After Catheter Ablation

A Study using Animal Models

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The Magic Number To **Prevent Gap** Formation after Catheter Ablation in Animal **Ventricles**:

Less than 10 mm

BACKGROUND

Arrhythmia recurrences after cardiac ablation can be explained by the presence of gap between lesions. Most studies regarding radiofrequency (RF) ablation focus on ablation parameters. Studies on the optimal interlesion distance to avoid gap formation are lacking, especially in the ventricles.

The purpose of this study is to compare interlesion distance in connected and unconnected lesions.

METHODS

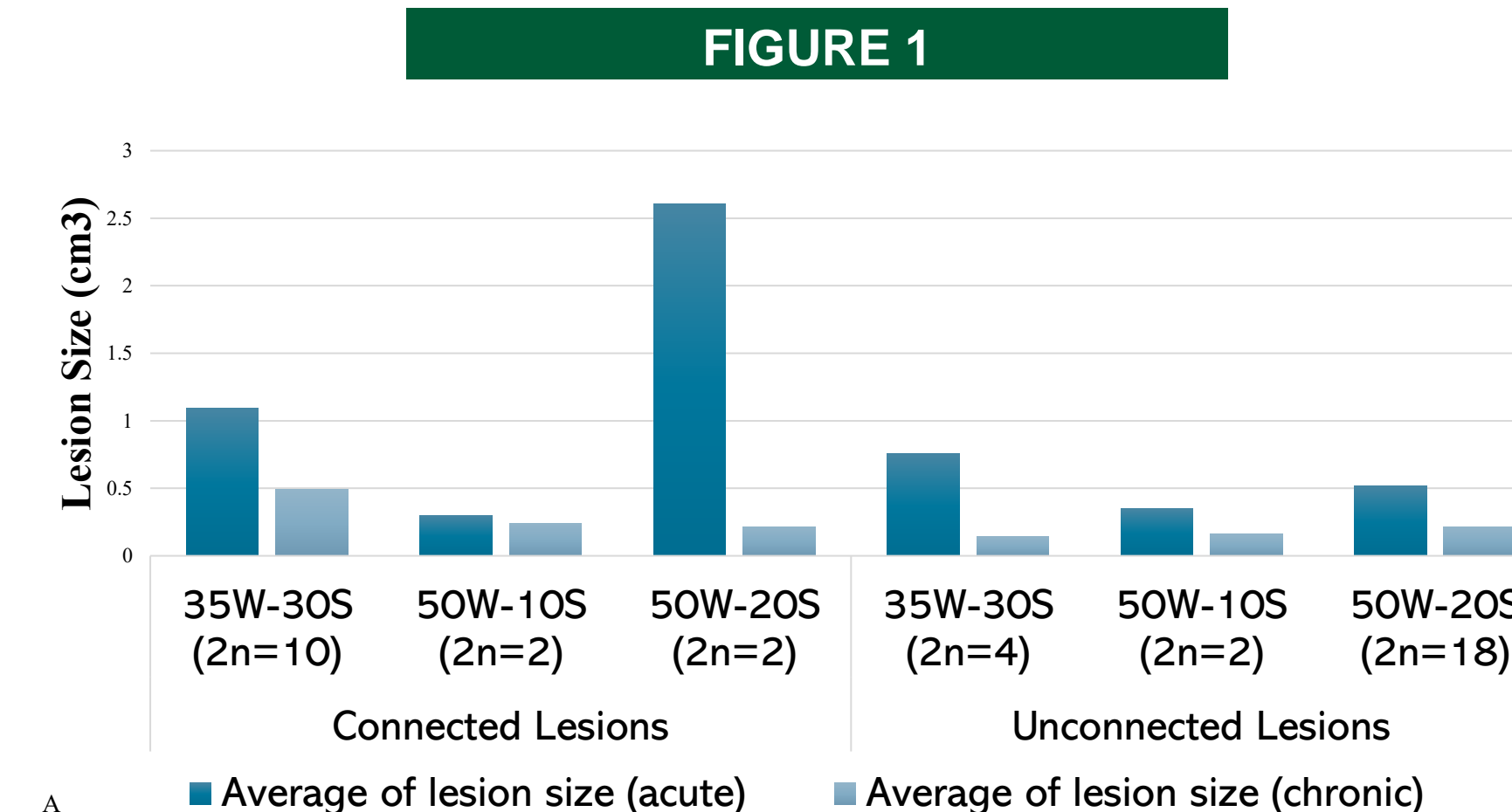
Ablation procedures were performed on 7 canine models followed immediately by a late gadolinium enhancement MRI (LGE-MRI) of these acute lesions. After 7-12 weeks, additional ablation procedures were carried out, immediately followed by LGE-MRI, euthanasia and heart excision. Lesions within each pair were spaced 7-21 mm apart as measured by Electroanatomic mapping (EAM), with different operating parameters (power 35 or 50W, duration of energy delivery 10, 20 or 30s and contact force of 10g or above).

RESULTS

Thirty-eight lesions were created: fourteen connected lesions and twenty-four unconnected lesions. EAM distance was significantly larger in unconnected lesions than connected lesions (16.17 +/-0.92 mm vs. 11.51 +/-0.68 mm respectively, p<0.05). We concluded that a minimal interlesion distance of 10 mm is required to prevent gap formation. Average volumes in unconnected lesions (n=14) at the acute and chronic stages were 0.55 ± 0.11 cm³ and 0.20 ± 0.02 cm³, respectively. On average, lesion volumes were 64% (p<0.05) smaller at the chronic stage compared to the acute stage. Among connected lesions (n=10), we observed a volume of 1.19 ± 0.8 cm³ and 0.39 ± 0.15 cm³ at the acute and chronic stages, respectively. These connected lesions reduced in volume by 48% on average.

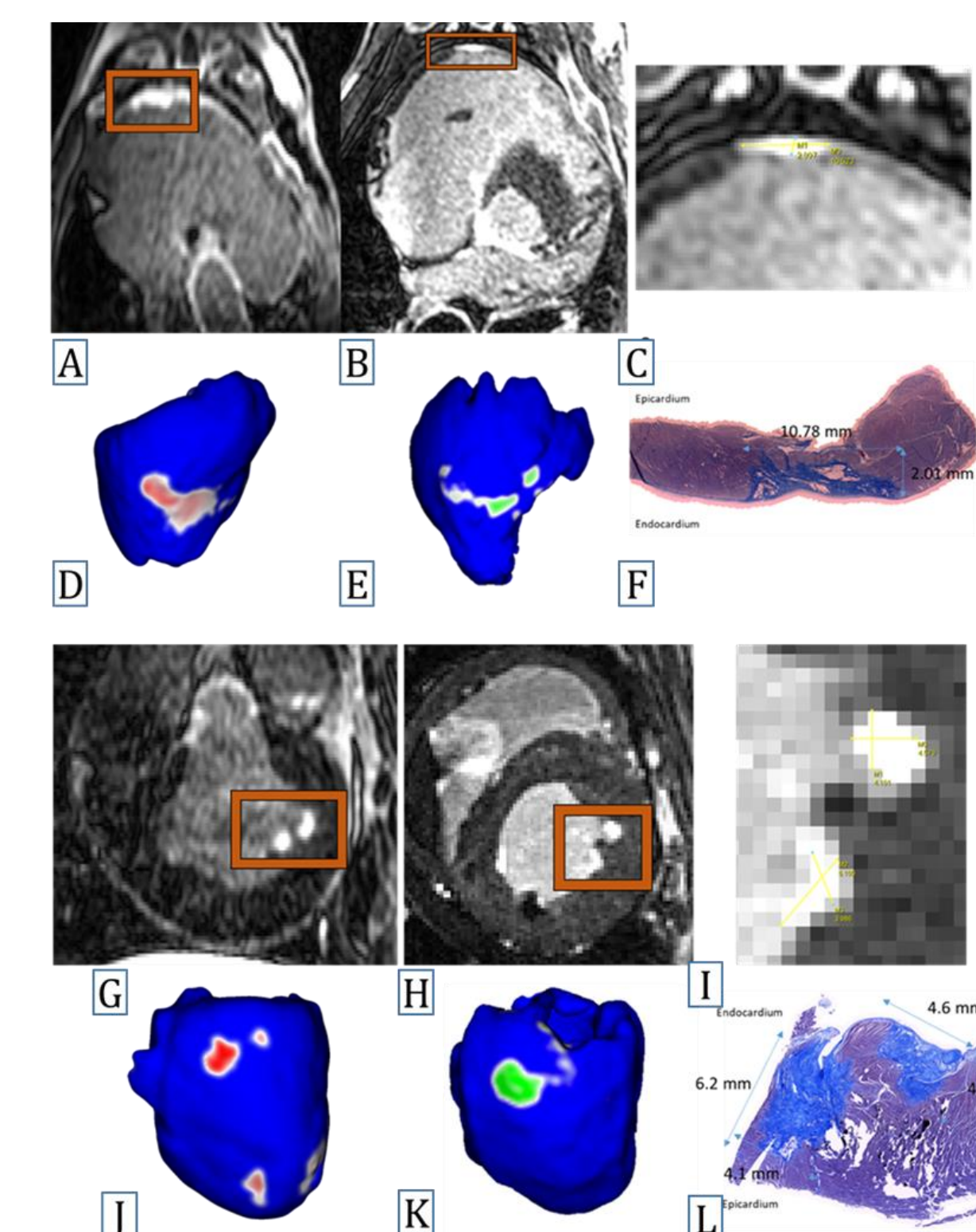
CONCLUSION

Minimizing distance across endocardial surface to less than 10 mm between paired lesions created in the ventricles can prevent gap formation.

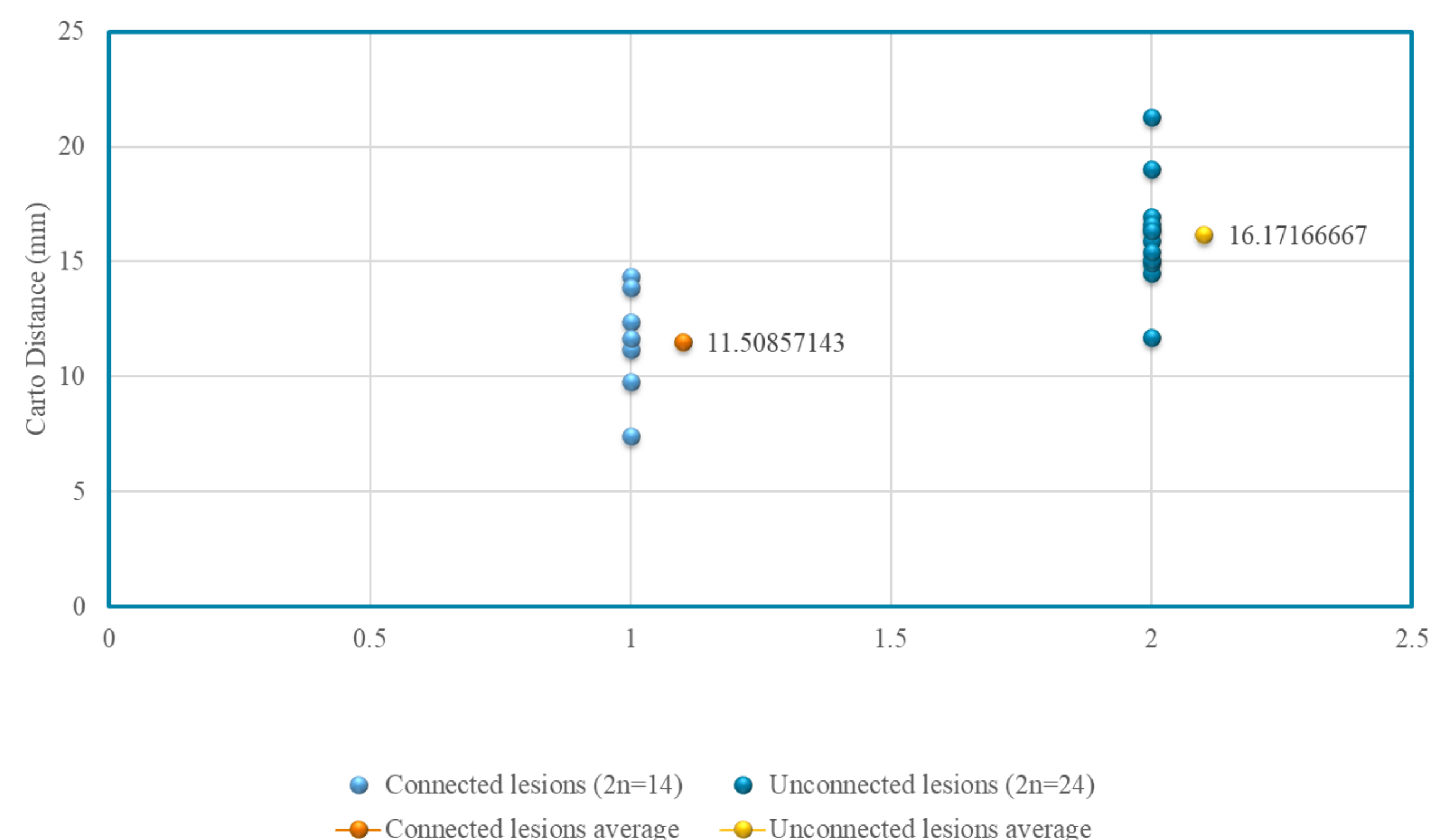


Average volumes of ventricular lesions at the acute and chronic stages with varying ablation parameters

FIGURE 2



Images of two connected lesions (14.36 mm apart) in the RV free wall shown on LGE-MRI in the acute phase (A and B) and the chronic phase (C, D and E). Images of two unconnected lesions (14.5 mm apart) in the LV free wall shown on LGE-MRI in the acute phase (G and H) and the chronic phase (I, J and K). Respective histology are shown (F and L)



Distances across endocardial surface between various paired lesions as measured by Electroanatomical Mapping.



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DISCLOSURE INFORMATION

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