Cleveland Clinic Innovations

Ultrasound Spectral Monitoring of Atrial Ablation

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PRODUCT
Ultrasound monitoring of atrial fibrillation ablation procedure

INDICATION
Imaging, Cardiology, Atrial Fibrillation, Ablation, Electrophysiology, Ultrasound

VALUE PROPOSITION
- Atrial Fibrillation patient population and ablation procedures are growing rapidly.
- Easily integrated software module into ICE system consoles.
- Durable clinical outcomes.

DEVELOPMENT STAGE
- Demonstration model
- Technology refinement

INTELLECTUAL PROPERTY
Patent application pending

RELATED PUBLICATION
Ultrasonic Imaging, 2021 Nov; 43(6):299-307

PARTNERING OPPORTUNITY
Development and commercialization partnership

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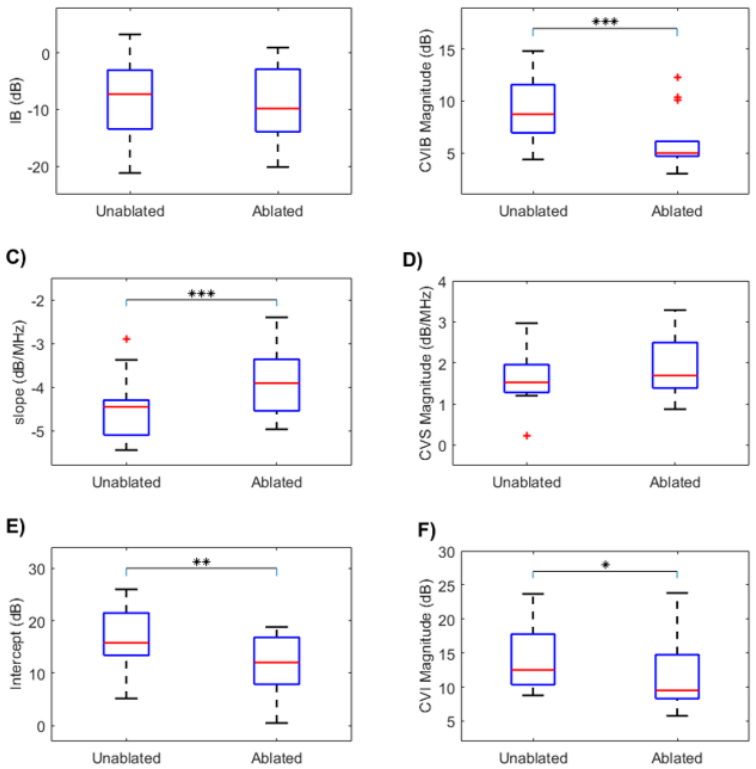
UNMET NEED
Current treatment of atrial fibrillation (AF) includes ablation of atrial myocardium to disrupt electrical pathways involved in AF. Over ablation of atrial tissue is intentionally minimized to ensure the integrity of the atrial wall and avoid adjacent tissue damage but there is currently no robust measure to know when atrial tissue is fully ablated. Thus, undertreatment does occur in 1/3 of these procedures leading to the need for a repeat ablation procedure. There is a clinical need to improve outcomes from these ablation procedures and reduce AF recurrence.

SOLUTION
Disruption of electrical activity over the heart cycle is currently used to monitor ablated regions. In cases where the tissue is under-ablated or has edema, the electrical signal may have disappeared, but the tissue can heal and recover leading to recurrence of AF. This invention uses spectral analysis of ultrasonic backscatter collected from an intracardiac echocardiography (ICE) catheter to determine the degree of ablation. In a study comparing ablated and unablated atrial tissue (n=14), the magnitude of cyclic variation of spectral parameters and their value at end diastole were obtained for integrated backscatter (IB), slope, and intercept. Four of the parameters demonstrated a significant difference: CVIB, slope, intercept, and cyclic variation of the intercept (CVI).



** = p < 0.05, ** = p < 0.01, *** = p < 0.001*