Non-Pulmonary Vein Triggers and Associated Pathological Substrate: Inroads into the Less Understood Science of Non-Paroxysmal Atrial Fibrillation Therapeutic Targets with a Novel Non-Contact Mapping System

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BACKGROUND
The treatment of triggers has been shown to improve freedom from arrhythmias compared to leaving PACs untreated. Despite technological advancements, AF ablation success rates remain suboptimal between 38% - 64% at 12 months. The mechanisms behind AF arrhythmogenesis are theorized to involve an interplay between AF triggers and abnormal substrate.

METHODS
- **This is a prospective registry (DISCOVER-US) of AF patients undergoing trigger mapping using the AcQMap® 3D Imaging and Mapping Catheter**
- After Pulmonary Vein Isolation (PVI), an inotropic infusion was initiated (for 10 minutes at 20μg/ml), and Premature Atrial Contractions (PACs) occurring at a rate of ≥5 per minute were targeted for ablation
- The impact of targeting these sites on acute, short-term and long-term outcomes were assessed.

RESULTS
- Of the 54 study patients, non-PV triggers were identified in 48 and ablated in 45 post PVI+, 27 were de novo and 21 were redo procedures
- Trigger sites were localized onto a 3D model and conduction velocity (CV) at the trigger site was compared to the rest of the atrial body
- Of the 45 patients with triggers ablated, the cumulative distribution function (CDF) of trigger density across the bi-atrial anatomy showed a median density of 1 Tr./cm with <1% of the anatomy at the highest density (>10 Tr./cm) and only 37% of the anatomy without triggers
- Further analysis was performed on 36 patients who had both sinus and trigger LA maps. Trigger sites were found to be significantly slower (26%) than the rest of the atrial tissue (0.49 m/s vs 0.66 m/s). The region of interest (ROI) was defined as 1 cm from the trigger's center.

CONCLUSION
Patient-specific ablation for non-PV triggers is crucial due to the strong physiological coupling and diverse localization of trigger-substrate events. Targeting these sites can improve our understanding of AF pathophysiology and enhance therapeutic targeting for arrhythmia.

DISCLOSURES
DJ Lakkireddy, George Thomas, David N. Pederson, and Andrea Natale are consultants to Acutus Medical.