Cleveland Clinic Innovations

Radiofrequency-assisted atrial wall perforating microcatheter

Pasquale Santangeli, MD, PhD

PRODUCT
RF-assisted microcatheter system

INDICATION
Pericardial access-based procedures such as epicardial ablation, lead placement/ removal, left atrial appendage ligation, pericardiocentesis, and drug delivery.

VALUE PROPOSITION
- Minimally Invasive
- Dedicated tool to aid access to pericardial cavity
- Enables safer sub-xiphoid approach
- Reduces Fluoroscopy Time/radiation

DEVELOPMENT STAGE
- Prototype

PUBLICATIONS
P. Santangeli et. al. JACC: Clinical Electrophysiology, 2025 (https://doi.org/10.1016/j.jacep.2025.01.020)
I. Liuba et. al. Heart Rhythm, 2025. (https://doi.org/10.1016/j.hrthm.2025.03.1977)

INTELLECTUAL PROPERTY
Patent pending

CONTACT INFORMATION
Partha Paul
Director, Business Development and Licensing
(216) 672– 1664
paulp2@ccf.org

IDF 2023-015

UNMET NEED
Minimally invasive epicardial mapping and ablation using a percutaneous subxiphoid approach to access the pericardial cavity is not a widespread technique due to significant complications associated with subxiphoid puncture. Subxiphoid puncture is a blind puncture, due to the pericardial cavity not easily distinguishable in x-ray, leading to high complication rates (6% to 25%, including pericardial bleeding, inadvertent RV puncture, tamponade, injury to tissues (liver, lungs, etc.)/epicardial vessels/phrenic nerve, etc., and excessive fluoroscopy time. There is a lack of dedicated technology for safe and reliable access to pericardial cavity and intrapericardial navigation around the beating heart.

SOLUTION
Radiofrequency (RF) micro-catheter system designed to facilitate perforation of the atrial wall to safely access the pericardial cavity to augment separation between parietal and visceral pericardial layers via CO_2 insufflation and thereby facilitate subxiphoid percutaneous epicardial access and subsequent mapping/ablation procedure using standard approach. The RF micro-catheter perforation and CO_2 insufflation system used in conjunction with fluoroscopy provides a standardized, time-efficient way to reliably, safely and precisely access the pericardial cavity by a sub-xiphoid approach, thus enabling physicians to work on the outside surface of the heart muscle and drive the market for pericardial access-based procedures such as epicardial ablation, lead placement and removal, left atrial appendage ligation, pericardiocentesis, and drug delivery.