

# **Cerebral Microembolic Signal Burden During Pulsed Field Ablation: Preliminary Results from Robotically Assisted Transcranial Doppler**

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**Background:** Transcranial Doppler (TCD) has been used to monitor the burden of cerebral microembolic signals (MESs) during atrial fibrillation (AF) ablation. MES burden is considered a surrogate marker for stroke risk and has never been reported during AF ablation with the novel pulsed field ablation (PFA) system.

**Objective:** To report the MES burden during AF ablation with the novel PFA system.

**Methods:** Six paroxysmal AF patients (age:  $63 \pm 9$ y; 83.3% M) underwent AF catheter ablation with the PFA system under uninterrupted oral anticoagulation and a periprocedural ACT  $\geq 350$ s. Four pulse trains (1500V, dual field mode) were delivered at each position for a minimum of 4 positions per pulmonary vein. Peri-procedural TCD was performed via a robotically-assisted ultrasound system (NovaGuide<sup>TM</sup>). The FDA-cleared NovaGuide<sup>TM</sup> Intelligent Ultrasound (NovaSignal Corp., Los Angeles, CA) includes an Artificial Intelligence-powered robotic headset designed to automate signal acquisition and reduce interoperator variability of TCD findings.

**Results:** A typical trend of MESs was observed during each pulse train, characterized by a shower-like pattern generally after the 3<sup>rd</sup> pulse and lasting approximately 2-3sec. The median MES count automatically generated by the system was 3900 (range: 1699-4786). The composition of MESs and their exact mechanism of formation during PFA are unknown and will be addressed in future studies.

**Conclusion:** PFA generated a relevant number of MESs frequently clustered in short-lasting shower-like patterns. Their nature and impact on neurological outcomes need to be further evaluated.

**Figure.** Typical pattern of MESs on TCD during a train of four pulses. LMCA: left middle cerebral artery; RMCA: right middle cerebral artery.

