Hyperspectral Imaging of Atrial Ablation Lesions

Atrial fibrillation (AF) is the most common sustained arrhythmia estimated to affect over 10 million people in the United States by the year 2050. AF accounts for one third of all hospital admissions for cardiac rhythm disturbances and increases stroke probability by fivefold. Annual costs related to the management of AF in the United States alone are approximately $7 billion.

The most common treatment for AF is ablation. This technique directs energy to destroy or isolate the triggers of the heart’s conduction system responsible of AF. However, there is a 50% chance for recurrence after this procedure due to gaps caused by ineffective or incomplete lesions that may heal over time.

GW researchers created a method to visualize lesions and gaps between them in real-time in-surgery. This method collects individual images across several spectral bands (hyperspectral imaging) which are then matched to existing spectral libraries to mark the potential targets for ablation (Fig. 1).

Additional development is underway to incorporate this method into a visualization catheter so it can be used during percutaneous ablation procedures.

Applications:

- Atrial ablation surgeries.

Advantages:

- High resolution real-time visualization
- Reduces frequency of follow up ablation surgeries
- Effective even for surfaces presenting a high amount of collagen
- Compatible with various ablation modalities (radiofrequency, cryothermic)

Inventors

Narine Sarvazyan