SPECTRAL CHANGES CAUSED BY RADIOFREQUENCY ABLATION OF CARDIAC TISSUE
Mohammed Aljishi, Huda Asfour, Luther Swift, Narine Muselimyan, Marco Mercader, Narine Sarvazyan
Pharmacology and Physiology, The George Washington University, Washington, DC, USA

OBJECTIVE: To improve existing tools for surgical treatment of cardiac arrhythmias. We aim to develop new generation of diagnostic/treatment catheters that deliver and acquire light through fiberoptic bundle within body of ablation catheter. This information can be then used for a real-time feedback guidance.

SPECIFIC AIM: To determine the most sensitive optical ranges for characterizing thermal injury by comparing spectral information from different areas of the heart before and after radiofrequency (RF) ablation.

METHODS: Light was delivered and acquired through a fiber optic bundle pressed against excised pieces of porcine heart using FluoroMax 3 spectrophotometer. Excitation emission matrices (EEMs) from ventricular muscle, endocardial surface of left atria, and aorta were acquired from 300-600 nm range. Values from different pieces of porcine tissue were averaged to reveal the differences with p<0.05 considered significant.

Analysis of Excitation-Emission Matrices analysis for three types of cardiac tissue

Effect of RFA ablation on three tissue types

Each type of tissue exhibited distinct EEMs with reproducible changes in fluorescence and diffuse reflectance as shown in the graphs and corresponding figures (n=7).

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