**INAPPROPRIATE SHOCKS DUE TO CHATTERING OF THE LEADS FROM AN INVESTIGATIONAL DEVICE FOR CARDIAC CONTRACTILITY MODULATION AND A DEFIBRILLATION LEAD**

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*Objectives*: Cardiac contractility modulation (CCM) is an investigational adjunctive treatment to enhance ventricular contractile strength of the systolic heart failure patients. This is a case of inappropriate shock due to lead chatter between the Optimizer leads and implantable cardioverter defibrillator (ICD) defibrillation lead.

Background: Optimizer is an investigational CCM device. It sends sub-threshold electrical signals during the absolute refractory period. These non-excitatory electric signals increase the influx of calcium ions into the cardiomyocytes resulting in enhanced cardiac contractility. The manufacturer declared that CCM devices can work with any ICD system without any interaction.

*Method*: 72-year-old male with ischemic cardiomyopathy status-post ICD and Optimizer device underwent extraction of defibrillator lead in right ventricle. His right ventricular defibrillation lead showed high impedance and alert warning. The ICD lead was exchanged successfully. All the device parameters were within normal limit before discharge. Shortly after discharge, patient had multiple ICD shocks. Interrogation of the ICD revealed intermittent, repetitive noise which was sensed as ventricular fibrillation. The noise signals were distinct from high frequency repetitive signals as observed in electromagnetic interference. Lead fracture was unlikely as all parameters including lead impedance of the new ICD lead were normal.

*Result*: Under fluoroscopy, it was documented that pace sense leads were in close proximity to the ICD leads leading to intermittent chattering inside the right ventricle. The Optimizer system including all the leads was removed. There was no more noise signal detected and no more inappropriate defibrillation occurred since then.

*Conclusion*: The most common causes of abnormal sensing are external electromagnetic interference and lead fracture. However, we should be aware that mechanical interactions including intra-cardiac lead chattering can cause considerable interference leading to inappropriate therapies in an ICD patient, or it may potentially cause ventricular asystole in a pacemaker dependent patient.