Simulating Defibrillation with Industry Collaborators
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Academic Collaboration

Our image based modeling workflow to predict the electric field of defibrillation is well developed with many applications [1-3].

Published applications of the defibrillation pipeline include predicting effective Subcutaneous ICD placement [4] (left) and predicting the effect of stray metal in the torso during defibrillation [5] (right).

Cardiothrive

Sandbox Geometry used to test the effect of pad texture on defibrillation. Various pad textures were tested, e.g., sine or saw texture and 1D or 2D variations. Texture also varied in amplitude and frequency.

Pipeline to sandbox modeling using SCIRun and Cleaver. SCIRun is used to define the geometry as indicator functions, which are used by Cleaver to create computational mesh. The defibrillation simulation is performed in SCIRun.

Physio Control

We are testing pad size, shape, and location on various torso scans obtained from previous studies to determine the best placement for the application. We tested standard pad geometries (shown here) against novel pad designs.

Predicted current density distribution with varied pad texture. Increasing pad texture decreases peak current density while total current delivered increases, reducing tissue damage to the patient while maintaining effective defibrillation.

Citations


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