Office for Technology Commercialization

Method and Apparatus for Imaging of Cardiac Electrical Activation and Repolarization

Sudden cardiac arrest is the number one killer in the U.S. Over 200,000 cardiac ablations are predicted to be performed in the U.S. by 2010 in order to manage arrhythmia. Currently, cardiac ablation procedures are not widely used because they are not site specific, they cannot locate the specific area of the heart that is causing the electrical disturbances.

This University of Minnesota invention describes a cardiac electrophysiological 3-D imaging algorithm that provides a true 3-D image of the entire myocardium (both internal and external surfaces of the muscular tissue of the heart) to improve identification of electrophysiological disturbance locations. Better localization can improve site specific ablation procedures in smaller areas providing improved outcomes from these procedures.

Both non-invasive and catheter based approaches to measure cardiac activation are disclosed. These methods image the 3D cardiac electrical activity, including the source distribution within the 3D heart, activation sequence with the 3D heart, and other physiological properties of the heart in 3D, using either a heart-physiological-model based approach or a physical equivalent source based approach.

Features & Benefits

- 3-dimensional mapping of cardiac electrical activity for pre-surgical and surgical planning
- Alternative for imaging the origin of a cardiac arrhythmia
- Reduction in surgery time and related expenses
- Pinpoints the origin of cardiac arrhythmia allowing for more accurate treatment
- Can be used to guide implantable electrical stimulations to treat the disorders

Technology Status

Human testing of the cardiac activation imaging algorithm has been performed.

IP Status

Patent Pending (International Application Number PCT/US2007/068702 and US Serial Number 11/747,161)

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