Oxford Cardiomox - a New Generation of Magnetocardiography (NG-MCG)

New generation magnetocardiography uses a fully non-invasive medical device which can detect local current signals emitted by heart muscle cells. The 3-D current density vectors images generated by this method can indicate the electrophysiological condition of the heart, and support the diagnosis of early-stage heart diseases.

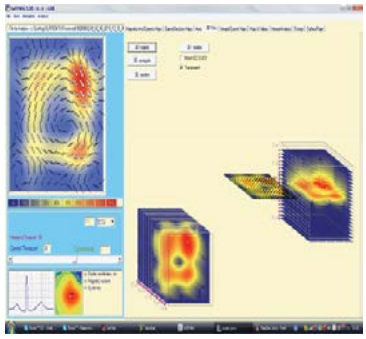
NG-MCG focuses on non-invasive mapping of weak biomagnetic signals around the thorax of the heart, and it works in an unshielded environment. It can investigate the factors determining whether there is sufficient signal-to-noise ratio and spatio-temporal signal resolution for practical clinical applications.

We have been exploring, developing and implementing innovative physical and mathematical formulations and algorithms for analysis of clinical magnetocardiogram data.

With the high sensitivity and specificity of MCG, the result will be analyzed based on patient data recorded both at rest and under conditions of controlled cardiac stress. Validation will be by comparison with a technique such as coronary angiography, the current gold standard for cardiac pathology.

The advantages of using MCG advanced imaging and quantitative analysis techniques to detect abnormal electrophysiological cardiac phenomena include:

- non-invasive and risk-free surface mapping of the magnetic fields generated by the electrical activity of the heart
- the MCG system's Superconducting Quantum Interference Device (SQUID)-based magnetometer can be used in hospital environments without expensive shielded rooms, increasing potential usage in health care settings.



MCG is superior to ECG because:

- its ultra-sensitive SQUID detector has increased sensitivity to local myocardial currents
- it is sensitive to vortex currents undetectable by ECG
- Unlike ECG, the MCG signal is not perturbed by electrical signals from tissues near the heart.

In comparison to expensive and invasive clinical practice techniques such as Single Photon Emission Computed Tomography (SPECT), coronary angiography, magnetic resonance imaging (MRI), etc., MCG allows for:

- the detection of ischemic changes in viable myocardium
- an evaluation of patients with cardiac conduction disease
- assessment of the risk for developing arrhythmias, and localizing the arrhythmigenic substrate;
- evaluating pro-arrhythmigenic drug properties.

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