Docket #: S10-141

Multi-dimensional Cardiac Imaging

Stanford researchers have developed a fast, multi-dimensional MRI procedure which records and correlates at least five dimensions of anatomic, physiologic, and functional information applicable for cardiac imaging. Fast MRI techniques have enabled the acquisition of volumetric datasets within a patient-tolerable examination time. However, many patient datasets are "corrupted" by dynamic physiologic motion. Much of the research in volumetric data acquisition has been aimed at removing these dynamic effects. This invention proposes to acquire and display the effect of these dynamic physiologic changes (either spontaneous or induced) on cardiac function to elucidate their effects on diastolic myocardial function.

Applications

- **Cardiac imaging:**
  - Characterize 3D cardiac wall motion in its natural physiologic state with respect to cardiac and/or respiratory motion
  - Characterize 3D volumes and its variations with respect to cardiac and/or respiratory motion
  - Characterize functional information, such as flow and perfusion, and correlate the results with the underlying 3D morphology and physiologic motion
  - Observe changes in the state of the heart over time or when under different conditions

Advantages

- Rapid acquisition of multiple-dimensions of information effectively resolves the sources of physiologic motion and avoids artifacts arising from such motion.
- Anatomic and physiologic information are registered.
- The heart can be observed in its natural physiologic state.

- Ease of use. No respiratory cooperation is expected from the patient.
- Ease of prescription. Can prescribe coverage over whole heart with isotropic resolution.
- The comprehensive multi-dimensional acquisition allows for flexible repeated inspection of a plurality of information retrospectively.

Publications

- U.S. Application No. 13/374,045
- Holden Wu, Magnetic Resonance Imaging Using a Concentric Rings K-space Trajectory 2009.

Patents

- Published Application: 20120146641

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