Three-Dimensional Phase Contrast Imaging Using Interleaved Projection Data

INVENTORS • Charles Mistretta

WARF: P02031US

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a technique that allows capture of three-dimensional PC images in the same amount of time as TOF techniques.

OVERVIEW

Magnetic resonance angiography (MRA) uses the magnetic resonance phenomenon to produce images of blood vessels. There are two basic classes of non-contrast-enhanced MRA techniques: 1) time-of-flight (TOF) methods, which exploit the difference in MR signal saturation between flowing blood and stationary tissues; and 2) phase contrast (PC) methods, which encode the motion of flowing blood into the phase of the acquired signal.

Although PC methods provide valuable quantitative information on blood flow, they are less popular because they take four to six times longer than TOF methods to acquire image data. Two additional drawbacks to PC techniques are that the velocity encoding (VENC) value must be optimized separately for each vessel in an image, and the acquisition of quantitative data usually requires careful selection of an imaging plane perpendicular to blood flow.

THE INVENTION

A UW-Madison researcher has developed a technique, called SUPERVENC for Spectral imaging with Undersampled Projections and interleaved Velocity ENCoding, that allows capture of three-dimensional PC images in the same amount of time as TOF techniques. It also greatly simplifies VENC selection and provides isotropic resolution, advances that could make quantitative PC imaging superior to TOF methods for MR angiography applications.

APPLICATIONS

• MRA imaging of blood vessels
KEY BENEFITS

- Allows capture of three-dimensional PC images in the same amount of time as TOF techniques.
- Unlike TOF methods, PC techniques provide quantitative information on blood flow velocity during MR angiography.
- Non-invasive -- does not require use of a contrast agent.
- Isotropic resolution provided by SUPERVENC eliminates the need to select planes perpendicular to the vessels of interest, reducing set up and total scan time.
- Greatly simplifies VENC selection relative to standard PC techniques.
- Allows examination of all vessels in an image volume retrospectively.

ADDITIONAL INFORMATION

Related Technologies
For information on 2-D phase contrast imaging in MRA, see WARF reference number P99144US.

Tech Fields
Medical Imaging - MRI

CONTACT INFORMATION

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846.