An Accelerated Phase-Contrast MRI Technique

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SUMMARY

UCLA researchers in the Department Radiological Sciences have developed a technique for accelerated phase-contrast MRI, reducing total image acquisition time in the collection of high-resolution data.

BACKGROUND

Phase-contrast Magnetic Resonance Imaging (PC-MRI) is an imaging technique frequently used to visualize patient anatomy for health and disease by using a strong magnetic field to visualize the spin of nuclei. PC-MRI has also been used to quantify blood flow and velocity, which is important for diagnosing and monitoring disease progression. Currently, the conventional technique allows for large data collection however, this results in reduced temporal resolution. As a result, this can affect measurement accuracy, which is essential for diagnosis.

INNOVATION

UCLA researchers in the Department Radiological Sciences have developed a flow PC-MRI strategy for collection of high-resolution data with minimal measurements by balancing temporal resolution and image acquisition time. This method saves 50% of data acquisition time and has been shown to provide high-resolution temporal data on 4D blood flow and velocity.

APPLICATIONS

- Observation of 4D blood flow using PC-MRI
- Retrograde flow
- Blood vessel translocation
- Expansion in systolic phases
- Spinal visualization of Cerebral Spinal Fluid, MR-gated intracranial CSF (liquor) dynamics

ADVANTAGES

- Improve temporal resolution for PC-MRI
- Can be combined with existing MRI techniques such as parallel imaging, compressed sensing, and non-Cartesian acquisition trajectory to further accelerate 4D flow PC-MRI

STATE OF DEVELOPMENT

Successful demonstration in image acquisition from a cohort of healthy volunteers.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,813,048	11/14/2023	2016-177
United States Of America	Issued Patent	10,973,434	04/13/2021	2016-177

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OTHER INFORMATION

KEYWORDS

Phase Contrast MRI, Magnetic Resonance Imaging, MRI, Blood Flow, Blood Velocity, Two-Sided Flow Encode, Fourier Velocity Spectrum, Cardiovascular Disease, Flow Encoding, Temporal Resolution

CATEGORIZED AS

- Imaging
- Medical
- **Medical**
  - Diagnostics
  - Imaging

RELATED CASES

2016-177-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- An Improved Phase-Contrast MRI Technique
- High Spatial and Temporal Resolution Dynamic Contrast-Enhanced Magnetic Resonance Imaging
- A Novel MR Angiography Technique
- Improved Cardiac Late Gadolinium Enhancement MRI for Patients with Cardiac Devices

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