Efficient Method to Improve the Temporal Signal-to-Noise of Arterial Spin Labeling for MRI

Tech ID: 25762 / UC Case 2015-287-0

BACKGROUND

In conventional vessel encoded pseudo-continuous arterial spin labeling (PASL), the temporal signal to noise (tSNR) is improved by repeatedly applying pulsed labeling pulses in between Look-Locker readouts. This works optimally when the temporal width of the tagged boluses matches the inter-pulse spacing. However, because the feeding arteries generally have different velocities and geometries, the conventional labeling slab fails to achieve desirable tSNR.

TECHNOLOGY DESCRIPTION

UCSD researchers have developed a novel labeling method that creates a wedge-shaped (WS) inversion slab, with the thickness at different arteries matching their velocities, aiming for an equal temporal bolus width that matches the inter-pulse spacing in different feeding arteries, therefore optimized tSNR. The WS inversion pulse uses a combination of conventional slice-selective adiabatic fast passage (SS-AFP) and additional in-plane gradient pulses.

APPLICATIONS

Functional MRI(fRMI)studiesandtissueperfusionwithMRI including:

·Diagnostic imaging in stroke.

·Image based guidance for intra-arterial treatment of stroke.

·Risk Assessment for stroke.

·Evaluation of blood supply to tumors.

·Evaluation of blood supply to organ transplants such as kidneys.

·Evaluation of collateral blood supply in carotid or other cerebrovascular disease.

ADVANTAGES

UCSD method, when compared to other conventional methods, requires shorter pulse duration, lower RF power, achieves better temporal resolution and tSNR;

STATE OF DEVELOPMENT

A working software on GE MRI scanner has been developed. This method has been simulated in Matlab and implemented on a human MRI scanner. Experimental data has been collected on phantoms to demonstrate its capability of generating different designated inversion thickness at up to three in-plane locations and generating uniform bolus temporal width in vessel phantoms with different flow velocities.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,502,803	12/10/2019	2015-287

CONTACT
University of California, San Diego
Office of Innovation and Commercialization
innovation@ucsd.edu
tel: 858.534.5815.

OTHER INFORMATION

KEYWORDS
Velocity Selective Arterial (ASL), pseudo-continuous arterial spin labeling (PASL), MRI, imaging, stroke, blood supply

CATEGORIZED AS
- **Imaging**
  - Medical
- **Medical**
  - Devices
  - Diagnostics
  - Imaging

RELATED CASES
2015-287-0

University of California, San Diego
Office of Innovation and Commercialization
9500 Gilman Drive, MC 0910, ,
La Jolla,CA 92093-0910

Tel: 858.534.5815
innovation@ucsd.edu
https://innovation.ucsd.edu
Fax: 858.534.7345