Non-Invasive Mapping of Perfusion Territories Using MRI

Tech ID: 19805 / UC Case 2007-238-0

TECHNOLOGY DESCRIPTION

MR perfusion imaging based on arterial spin labeling (ASL) uses arterial blood water as the endogenous contrast agent, making possible for this non-invasive procedure to be widely available at relatively low cost. To date, most perfusion studies carried out by MRI have obtained perfusion maps that include contributions from all the arteries feeding the brain. In perfusion territory imaging, blood in individual or groups of feeding arteries are tagged separately and the images acquired map the vascular distribution of those feeding arteries.

A researcher at UC San Diego has developed a non-invasive mapping approach of perfusion territories using MRI. It allows one to place a person in an MRI scanner, without the use of any exogenous agents, and map the tissue regions that are supplied with blood from different feeding arteries in a time-efficient manner practical for clinical applications. Compared to the pulsed methods developed for this use by others, the UC San Diego's pseudo-continuous tagging approach is superior in four ways:

- Higher SNR
- Better vessel selectivity
- Flexibility in tagging geometry
- Potential for separation of vascular territories above the Circle of Willis in the brain

The relative tagging efficiency for each vessel is measured directly from the ASL data and is used in the decoding process to improve the separation of vascular territories. High SNR maps of left carotid, right carotid, and basilar territories are generated in six minutes of scan time. Software has been developed on a GE MRI scanner and can be adapted to other MRI scanners.

SUGGESTED USES

- Diagnostic imaging in stroke, carotid occlusion, and cerebral ischemia
- 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

RELATED MATERIALS

- Wong EC. Vessel-Encoded Arterial Spin Labeling Using Pseudocontinuous Tagging. Magn Reson Med. 2007 Dec;58(6):1086-91.
- Patent application titled "Mapping of Vascular Perfusion Territories"

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	8,195,274	06/05/2012	2007-238

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OTHER INFORMATION

CATEGORIZED AS

- **Medical**
  - Devices
  - Diagnostics

RELATED CASES

2007-238-0

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