Enhanced Method for Vessel Segmentation to Improve Magnetic Resonance Angiography Images

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method that utilizes automated vessel segmentation for improved magnetic resonance angiography.

OVERVIEW

Magnetic resonance angiography (MRA) uses the nuclear magnetic resonance (NMR) phenomenon to produce images of arteries. To enhance the diagnostic capability of MRA, a contrast agent can be injected into the patient prior to the MRA scan; however, the success of this exam depends on acquiring images during peak arterial enhancement as the contrast agent is flowing through the vasculature of interest. If the image is not acquired at the correct time, the enhancement of veins can obscure the arterial images. Image acquisition sequences of either low spatial resolution or very short repetition times are required to obtain the correct images, presenting temporal-spatial limitations.

Venous removal techniques, i.e., vessel segmentation, have been attempted to try to improve MRA; however, current methods have proven to be of limited usefulness due to the difficulty in determining which voxels are artery-based and which are vein-based. An improved MRA method is needed.

THE INVENTION

UW–Madison researchers have developed an improved MRA method that uses automated vessel segmentation. The method involves injecting the patient with a contrast agent and rapidly acquiring a series of NMR images during a time-resolved phase. Arterial and venous voxels then are automatically identified in the images from which the contrast enhancement reference curves are calculated. Finally, voxels are segmented using the calculated contrast enhancement reference curves.

APPLICATIONS

- Contrast enhanced magnetic resonance angiography
KEY BENEFITS

- Improved vessel segmentation for better image quality in MRA
- Arterial and venous voxels and contrast enhancement reference curves are produced automatically instead of manually
- More accurate segmentation of arteries, veins and background tissues for each region in the field of view

ADDITIONAL INFORMATION

Tech Fields
Medical Imaging - MRI

CONTACT INFORMATION

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