Automatic Determination of the Arterial Input Function in Dynamic Contrast-Enhanced MRI

INVENTORS • Timothy Carroll

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing an improved method for automatically determining AIF from MRI images, so it can be used for measuring physiologic quantities such as cerebral blood flow (CBF), which is used in turn to diagnose stroke and other cerebrovascular diseases.

OVERVIEW

Ischemic stroke is a leading cause of death and disability in industrial nations, accounting for over $30 billion per year in the United States alone. The arterial input function (AIF) is instrumental in calculating physiologic quantities, such as cerebral blood flow (CBF), which in turn are used to diagnose stroke and other cerebrovascular diseases. In treating acute stroke, knowledge of CBF is critical for determining whether to administer thrombolytic agents, which have been shown to improve neurological outcome.

However, these “clot busting” drugs must be administered within three to six hours of the onset of symptoms and incur the risk of fatal cerebral hemorrhage. This makes rapid and reliable diagnosis of salvageable, or “at-risk,” brain tissue critical for determining whether aggressive drug therapy is warranted.

Magnetic resonance imaging (MRI) allows the physician to distinguish between dead and salvageable brain tissue based on CBF. Current methods of measuring CBF using MRI define an AIF chosen from inspection of the MRI images by a trained operator using an iterative “trial and error” approach. Although this approach for defining salvageable tissue is widely used, it requires a dedicated offline workstation and is subject to human error. This may result in a lengthy delay in calculating CBF, which, in turn, may significantly impair, or possibly prevent, the determination of “at-risk” tissue.

THE INVENTION

A UW-Madison researcher has developed a method of automatically determining the AIF from MRI images that eliminates reliance on offline workstations, trained personnel and the lengthy delay normally associated with MRI CBF measurements.
APPLICATIONS

• Diagnosis and treatment planning for stroke and other cerebrovascular diseases

KEY BENEFITS

• Allows for rapid triage of acute and hyperacute stroke patients
• Eliminates the need for trained personnel, dedicated offline workstations, and additional time required to determine cerebral blood (CBF) flow from MRI images
• Produces an optimal arterial input function (AIF) for calculation of CBF, mean transit time and cerebral blood volume
• Provides an exceedingly fast and robust method of calculating CBF

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.