More Accurate Methods for Detecting and Quantifying Fat from Magnetic Resonance Images

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Technology description

Quantifying the amount of fat in the liver is crucial for the detection of non-alcoholic fatty liver diseases including steatosis, fibrosis, cirrhosis and liver failure. Accurate fat measurements can lead to early treatment and prevention of liver diseases. Currently, the best method for the measurement of liver fat is a biopsy, in which bits of the liver are surgically removed and analyzed.

MRI techniques have been developed to image fat, but currently are only useful for fat detection. Because these techniques produce large amounts of noise, the quantification of fat cannot be accomplished reliably. An accurate, non-invasive fat quantification method would be desirable. UW-Madison researchers have developed two methods for improving the accuracy of fat measurements from MR images. These methods remove the effects of noise during the quantification process. Large amounts of noise leads to an over- or underestimate of the amount of fat. The removal of this noise results in a more accurate fat image.

The two methods are known as the phase constrained and signal normalization methods. The phase constrained method assumes water and fat to have a common, equal phase. This method calculates the fat fraction directly from real water and fat components, as opposed to complex signal components, to remove noise bias. The signal normalization method takes an image signal when the water and fat are in phase. Two or more other image signals are obtained and normalized using the previous in phase image signal to remove any noise bias.

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing methods for improving the accuracy of fat measurements from MR images by removing the effects of noise during the quantification process.

Application area

Measuring and quantifying fat from MR images
Detecting fat in the liver, skeletal muscles, adrenal glands and other tissues or organs

Advantages

Improves the accuracy of quantifying fat from MR images

Institution

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