

AbstractID: 6551 Title: Automatic Quantitative MRI Technique as a Biomarker for AD tracking

Purpose:

A newly automatic segmentation technique was developed to measure the percent brain parenchyma (PBP) with a high degree of precision. The purpose was to provide a simple yet a robust biomarker to track automatically and accurately over time the progression of early stages of Alzheimer Disease (AD).

Method and Materials:

The PBP was calculated as the percent difference between the brain intra-dural volume (IDV) and the cerebral spinal fluid (CSF) volume over the IDV. The developed automatic segmentation technique is composed of two main stages of image processing methods. The first stage uses multi-spectral analysis where the brain and CSF clusters are delineated automatically and accurately based on known information of tissue relaxations, optimal MR parameters, as well as T2 median filter. The T2 Median filter is used to reduce the spread of the clusters thus improves the reproducibility of the segmentation technique. The second stage is composed of a special region growing technique in combination with logical image processing operators. The technique requires dual spin echo MR T2 weighted images of the whole brain. To test the precision of the technique, two normal subjects were scanned on a GE 1.5 Tesla MR Scanner seven times over a month period with the same MR spin echo pulse sequence. The pulse sequence generated a voxel size of 0.859x1.719x2 mm³.

Results:

The percent brain parenchyma was calculated for these two subjects. The percent change in PBP was less than 0.3%. The technique ran automatically without any user interaction under a minute using a standard personal computer.

Conclusion:

This research provides a newly fast technique that can be used as to track automatically and accurately the progression of early stages of AD patients.

Conflict of Interest (only if applicable):

“Research sponsored by General Electric Corporation”