Differential Diagnosis of Normal Pressure Hydrocephalus by MRI Mean Diffusivity Histogram Analysis

Published date: Feb. 13, 2014

Technology description

This invention provides a method to differentiate normal pressure hydrocephalus (NPH) from related conditions using post-processing software to analyze images acquired using diffusion tensor imaging, a form of MRI.

NPH is a treatable cause of dementia, incontinence and gait disturbance that primarily occurs in the elderly, in which there is a buildup of cerebrospinal fluid (CSF) in the brain. Accurate diagnosis of NPH is challenging because the clinical symptoms and radiographic appearance of NPH often overlap those of other conditions, such as Alzheimer's disease (AD) and Parkinson's disease (PD). It has been estimated that only 10-20% of patients with NPH get the appropriate treatment.

One of the challenges in using medical imaging to diagnose NPH, is that the resolution of MRI is too low to accurately quantify CSF; many voxels end up being mixtures of brain tissue and CSF. Cornell inventors developed a method to better estimate the amount of CSF in mixed voxels by generating a histogram of the mean diffusivity of each voxel, and then iteratively fitting multiple functions to model the histogram curve.

They applied this method to diffusion tensor images from patients with probable NPH and controls with AD, PD or dementia with Lewy bodies, and identified parameters from the functions that best separated the groups. They were able to distinguish NPH from 3 other disorders with 86% sensitivity and 96% specificity.

This objective method does not rely on operator-dependent region-of-interest analyses, nor does it require registration of the subject image onto a standardized normal image.

Application area

Clinical diagnosis of NPH
Monitoring treatment response in NPH patients

Institution

Cornell University

Inventors

[Jonathan Dyke](#)

[Henning Voss](#)

[Norman Relkin](#)

[Milos Ivkovic](#)

联系我们

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com