

Abstract

Automated Brain Volumetry – Software comparison and its Evaluation in the clinical practice

Introduction: The automated brain volumetry from MRI images is a modern tool tool in the understanding the nature and evolution of atrophy related diseases

Purpose: This study investigates:

1. The reliability, quantitatively and qualitatively, of automated volumetry software.
2. The evaluation of these software in clinical practice for patients with dementia, MS and epilepsy
3. The development of a personal mathematical model for the prognosis of MS patients

Methods and materials:

1. 3D T1 and T2 FLAIR images from GE Discovery 3.0 T MRI scanner.
2. For the reliability of the method we compare measurements from about 50 patients with software: NeuroQuant, volBrain and JIM8.
3. To investigate statistical differences between software measurements, the two-tailed unpaired t-test method from GraphPad site was used.
4. For investigation of any linear relation of data Open Office Calc used.
5. For atrophy evaluation volBrain software used.
6. For epilepsy evaluation volBrain & Hippo software used.
7. For MS evaluation lesionBrain software used.

Results:

1. Important differences between NeuroQuant and volBrain brain segments' volume measurements were found.
2. Strong linear relation found between NeuroQuant and volBrain brain segments' volume measurements.
3. Errors on lesion burden measurements related with FLAIR seq parameters.
4. The personalized math model show that prognosis and relation of lesion burden with patients' condition might exist.
5. Possible relation of measured atrophy with dementia patients' condition
6. Possible relation of measurement hippocampus asymmetry with epilepsy patients' condition.

Conclusions:

1. (a) Brain volumetry software are not a reliable quantitatively tool for measurement of brain segments' volume

(b) Brain volumetry software are a reliable qualitative tool for measurement of brain segments' volume.

2. The personalized math model for prognosis and relation of lesion burden with patients' condition worked for small sample.

3. Atrophy measurement might reflect on dementia patient condition

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