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Poster Presentation

Automatic Detection of Glioblastoma Multiforme Tumors Using Magnetic Resonance Spectroscopy Data Based on Neural Network

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Abstract

Inflammation has been closely related to various forms of brain tumors. However, there is little knowledge about the role of inflammation in glioma. Grade IV glioma is formerly termed glioblastoma multiform (GBM). GBM is responsible for over 13,000 deaths per year in the America. Magnetic resonance imaging (MRI) is the most commonly used diagnostic method for GBM tumors. Recently, use of the MR spectroscopy (MRS) technique has been widely considered. The advantage of using MRS with MRI is that MRS can show biochemical biomarkers non-invasively. In the analysis of MRS data, the segmentation of GBM and normal regions is very important (especially in the borders) and requires very careful operation. The purpose of this study is to distinguish between GBM and normal regions using a neural network to improve the diagnosis of neuroscientists, neurologists, radiologists and neurosurgeons. Four patients, including 2 men and 2 women with GBM tumors, were studied according to the radiologist's comments .Applying a 1.5Tesla Siemens scanner, MRS data were acquired. Choline and n-acetyl aspartate metabolites were identified. In order to measure the concentration of metabolites, MRS data were first analyzed using TARQUIN software. Then, using MATLAB software, the calculated concentrations were classified into normal and GBM groups using a neural network. The results showed that sensitivity and specificity of classification are 78% and 87% respectively. By categorizing the data obtained from TARQUIN software and using neural networks, it is possible to determine the GBM and normal regions automatically in order to investigating the role of neuro inflammation in GBM tumor metabolites.

Keywords: Glioblastoma Multiforme Tumors, Magnetic Resonance Spectroscopy, Neural Network

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