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▶ Evaluation of multimodal MR imaging for ...

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Evaluation of multimodal MR imaging for differentiating infiltrative versus reactive edema in brain gliomas

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Abstract

Objective

To determine the border of glial tumors by diffusion weighted imaging (DWI), apparent diffusion co-efficient (ADC), magnetic resonance spectroscopy (MRS) and perfusion brain MRI.

Patients and methods

Ten patients with brain gliomas were enrolled [mean age: 35.3 ± 13.2 , range: 20–62]. Conventional MRI was performed for all patients. Besides, tumor mapping based on Choline (Cho)/Creatine (Cr) color map in MRS, perfusion and diffusion color maps, were gathered. Different tumoral and peritumoral regions [normal tissue, reactive edema, infiltrative edema, and tumor core] were defined. MRI criteria were evaluated in areas targeted for biopsy and histopathologic evaluation was determined.

Results

Tumor cell positive samples [one necrosis, 26 infiltrative and nine tumor cores] composed 36 (75%) of the 48 samples. Seven (19.4%) of the positive samples were interpreted as not tumor on MRI. Five were identified as reactive edema and two as normal tissue [kappa: .67, p -value < .001]. Mean of ADC, median of N-acetylaspartate (NAA) and NAA/Cho were statistically different between positive and negative samples ($p = .02$ and $p < .001$, respectively). Mean ADC and median Cho/NAA were statistically different in missed tumor containing tissue presented as reactive edema compared to normal and correctly diagnosed reactive edema samples together (p -values < .05).

Conclusions

Multimodal MRI could define infiltrated borders of brain gliomas.

Q Keywords: Brain gliomas quantitative MRS diffusion perfusion tumoral margin

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