Magnetic Resonance Spectroscopy for Differentiating Pseudo-Progression from True Progression in GBM on Concurrent Chemoradiotherapy.

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Abstract

Neoadjuvant chemo-radiation therapy including temozolomide is commonly used for the treatment of gliomas. However, increased lesion size and contrast enhancement are frequently observed following this therapy and this appearance is termed as 'pseudo-progression'. Since conventional imaging is unable to differentiate pseudo-progression from tumour recurrence, we evaluated the utility of MR spectroscopy (MRS) to differentiate these two pathological entities. Longitudinal MRI and MRS studies prior to and within four months post chemo-radiation therapy including diffusion-weighted imaging and single voxel spectroscopy (short and intermediate echo) were performed in 62 glioblastoma (GBM) patients undergoing chemo-radiation therapy. Clinical follow-up demonstrated four cases of pseudo-progression. In this study, results from these four cases and a known case of tumour recurrence are reported. Metabolite ratios and presence or absence of lipids at 1.3 ppm were used to differentiate between pseudo-progression and tumour recurrence. All four cases of pseudo-progression demonstrated elevated lipid signals on MRS. Additionally, an absence of choline or a low choline/NAA ratio was also observed. In comparison, the patient with tumour recurrence showed lower lipid signals and a high choline/NAA ratio. The presence of elevated lipid signals along with low choline/NAA ratios can aid in differentiation of pseudo-progression from tumour recurrence.

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