Relative value of magnetic resonance spectroscopy, magnetic resonance perfusion, and 2-((18)F) fluoro-2-deoxy-D-glucose positron emission tomography for detection of recurrence or grade increase in gliomas.

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In a consecutive series of 26 previously operated patients diagnosed with cerebral glioma, magnetic resonance spectroscopy (MRS), 2-((18)F) fluoro-2-deoxy-D-glucose positron emission tomography (FDG-PET), and perfusion MRI (MRP), were performed at follow-up to distinguish recurrence from radiation necrosis, and to identify tumour upgrading. Discrepancy between techniques was observed in 9 cases. The positive predictive value (PPV) and the negative predictive value (NPV) of each technique to detect the presence of high grade glioma was: MRI, PPV=50%; MRS, PPV=91.6%, NPV=100%; FDG-PET, PPV=75%, NPV=61.1%; MRP, PPV=100%, NPV=100%. In the selected group of nine cases studied to differentiate viable tumour from radiation necrosis, MRS and MRP reached a PPV and a NPV of 100%, whereas for FDG-PET, PPV and NPV were 66.6% and 60%, respectively. To distinguish between viable high-grade glioma and radiation necrosis, gadolinium-enhanced MRI gives a high false-positive rate, while MRS and MRP are superior to FDG-PET in discriminating tumour recurrence, grade increase and radiation necrosis.

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