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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.

Prat R, Galeano I, Lucas A, Martínez JC, Martín M, Amador R, Reynés G.

Department of Neurosurgery, Hospital Universitario La Fe Avda, Campanar 21, Valencia 46009, Spain.

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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