OBJECTIVE: The treatment regimen for cerebral gliomas is different, depending on the histological grade of the lesion. The therapeutic strategy for anaplastic gliomas and glioblastomas is more aggressive, including microsurgical removal, radiation and chemotherapy. The management for low-grade gliomas is still under discussion, operation or “wait and see” tactics are possible options. Therefore the diagnostic imaging procedures are crucial for further treatment planning. Although most of the low-grade gliomas appear as hypointense lesions without contrast medium (CM) enhancement on magnetic resonance images, in some cases lesions without CM enhancement can be anaplastic tumours as well. 11C-Methionine positron emission tomography (MET-PET) was performed for preoperative evaluation of non or low CM enhancing intracerebral lesions, so-called suggestive low-grade gliomas. METHOD: 20 patients harbouring suggestive low-grade gliomas were included. Seventeen patients were found to be candidates for open surgery and 3 patients were planned for stereotactic biopsy due to the localisation of the lesions. MET-PET studies were performed a few days prior to surgery. On the day of surgery MRI sequences for neuronavigation planning were carried out (MPRAGE and FLAIR sequences). All image data were fused for...
operation with neuronavigation-guided microsurgery or stereotactic biopsy (BrainLAB Neuronavigation system, VectorVision 6.1). Biopsies were taken from the MET uptake areas as well as from areas without MET uptake. RESULTS: 2/20 patients showed sparse CM enhancement on MRI T (1) images, 18/20 patients had lesions without CM enhancement. MET uptake was found in 16/20 cases (T/N ratio 1.5 or more) and no MET uptake was documented in 4/20 cases (T/N ratio<1.5). Histologically the 2 patients with sparse CM enhancement and MET uptake were glioblastoma multiforme, 10/14 patients with MET uptake and without CM enhancement had an anaplastic astrocytoma WHO III, 3/14 with MET uptake and no CM enhancement had an anaplastic oligoastrocytoma WHO III, and 1/14 had an oligoastrocytoma grade II. The lesions of the 4 patients without MET uptake and without CM enhancement were classified as astrocytoma grade II in 2 cases, as astrocytoma grade I in 1 case and as astrocytoma III in one case. CONCLUSION: According to the results of this study, we find MET-PET to be a helpful tool for pretreatment evaluation of non-CM enhancing, suggestive low-grade intracerebral lesions. MET-PET adds valuable information for the decision-making for surgery or stereotactic biopsy.