O8.05. STRUCTURAL CHARACTERIZATION OF LOW GRADE GLIOMAS BY INTEGRATION OF MR, ULTRASOUND AND PET IMAGING

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Structural characterization of Low-Grade Gliomas (LGGs) is depicted by MR or metabolic imaging, which when transferred into the neuronavigation system are used for guidance and tissue sampling. The combined use of intraoperative Ultrasound (US), corrects for brain shift. We present our experience on the use of MR and MET-PET-TC for structural characterization of LGGs for surgical resection. Patients with presumptive MR diagnosis of LGGs were submitted to standard, advanced MR (diffusion-tensor-structural-characterization-imaging), MET-PET-TC, images were transferred to neuronavigation system and available for guidance and tissue sampling. Intraoperative Aloka-US delineated tumor mass, corrected for brain shift, being a further source for structural characterization. The correspondence between information obtained by MR and MET-PET-TC was evaluated preoperatively. Intraoperatively sampling was performed according to MR and MET-PET information. Histological-molecular analysis (MGMT status, codeletion, IDH1) of various samples was performed. 139 patients were studied. Two groups were depicted by advanced-MR: 49 tumors (small medium volume) with one-two areas of high-tissue-density (q areas); 90 tumors (medium-large volume), with several q areas. MET-PET-TC depicted areas of high-uptake in 39, a low activity in 72 and no activity in the remaining. The areas of high MET-uptake were located in the q areas. Multiple spots were present in larger tumors. At surgery, neuronavigation integrated with US was used to perform samples of various MR and/or PET areas. Areas of higher MET-uptake corresponded to anaplastic foci (35%) or higher tissue density areas (55%) with higher proliferative rate, or oligodendrogial tumors (34%). Samples taken from various MR or PET areas of the same tumor showed a differential molecular signature (IDH1, MGMT status). The integrated use of advanced-MR-imaging, MET-PET-TC, US better delineate structural characterization of LGGs, allowing a more precise histological-molecular profiling of the tumor.