

P16.07 INDIVIDUAL TASK SPECIFIC TESTING ASSOCIATED WITH INTRA-OPERATIVE MRI DURING AWAKE CRANIOTOMY SURGERY FOR LOW GRADE GLIOMAS TO IMPROVE EXTENT OF RESECTION AND MINIMIZE MORBIDITY

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Brain low grade lesions of glial origin (LGG) especially those located in or near eloquent areas pose a challenging task for neurosurgeons operating such tumors. Even after the new classification of LGG, age, IDH status and extent of resection (EOR) seem to represent the main points that stratify patients in low or high risk. Often, surgery is the first step in the treatment and may positively impact the overall survival if extensive resection can be achieved with lowest morbidity. Therefore, neurophysiologic monitoring and intra operative MRI can be considered valuable tools in aiding maximal safe resection. Awake surgery has an important role when left side low frontal or posterior temporoparietal gliomas are to be operated on and individualized testing may influence, to our knowledge, on the extent and quality of resection, since anatomic variability may be encountered on different individuals during awake mapping. MATERIALS AND METHODS: a total of 16 LGG (10 astrocytomas, 4 oligoastrocytomas and 2 oligodendroglioma) were submitted to surgery, using awake craniotomy, neurophysiologic monitoring and intra operative MRI. Depending on each patient personal background, when appropriate and with personal consent prior to surgery, individualized testing based on mainly labor activities and hobbies such as playing the guitar and singing, praying, and oral math calculations were conducted and evaluated by a neurophysiologist, in conjunction with brain intra operative cortical and subcortical mapping. 9 patients were male and 7 were female. Median age was 38, maximal age was 54 and the minimal age was 28. All patients had lesions located in or near eloquent speech and/or motor areas. All patients were submitted to immediate post operative CT scan prior to UCI care and all were submitted to control MRI scan to estimate the EOR. 70% patients presented with headache, 62, 5% with seizure, only 1 patient presented as an incidental finding. Post operatively, 10 patients were neurologically intact, 5 had transient worsening of the previous neurological deficit and only one did not totally recover after 3 months post operation. The use of iMRI was helpful to improve EOR in 37,5% cases and positive mapping using individual speech testing that limited resection occurred in 56,25% cases. Gross total resection was achieved in 10 patients. CONCLUSION: brain mapping is an essential tool when performing awake surgery and may be even more specific when combined to individualized intra operative testing. Intra operative MRI, in our cases, combined to neuromonitoring, was a valuable tool when seeking maximal safe LGG resection.

P16.08 RESECTION OF PRIMARY MOTOR CORTEX TUMORS: FEASIBILITY AND SURGICAL OUTCOMES

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BACKGROUND: Brain tumors involving the primary motor cortex are often deemed unresectable due to the potential neurological consequences that result from injury to this region. Nevertheless, we have challenged this dogma for many years, and used asleep, as well as awake, intraoperative stimulation mapping to maximize extent of resection. It remains unclear whether these tumors can be resected with acceptable morbidity, whether performing the surgery awake or asleep impacts extent of resection, and how stimulation mapping influences outcomes. METHODS: A retrospective chart review from 1998-2016 was performed on the senior author's cohort to identify patients who underwent surgical resection of tumors that were located within the primary motor cortex. Clinical notes, operative reports and radiographic images were reviewed to identify intraoperative stimulation mapping findings and functional outcomes following tumor resection. Extent of resection was quantified volumetrically. Characteristics of patients were analyzed to identify factors associated with post-operative motor deficits. RESULTS: Forty-nine patients underwent 53 surgical resections of tumors located primarily within the motor cortex. Stimulation mapping was performed in all cases. Positive cortical sites for motor response were identified in 91% of cases, and sub-cortical sites in 74%. Awake craniotomy was performed in 65% of cases, while 35% were done under general anesthesia. The mean extent of resection was 91%. There was no difference in extent of resection in cases done awake compared to general anesthesia. New or worsened post-operative motor deficits occurred in 32 (60%) patients, and 20 (37%) patients had a permanent deficit. Of the permanent deficits, 14 were mild, 4 were moderate, and 2 were severe (3.7% of cases). Decreased intraoperative motor response and diffusion restriction on post-operative magnetic resonance imaging (MRI) findings were associated with permanent deficit. Awake motor mapping surgery was associated with increased diffusion signal on post-operative MRI. CONCLUSIONS: Resection of tumors from the primary motor cortex is associated with an

increased risk of motor deficit, but most of these deficits are transient or mild and have little functional impact. Excellent extent of resection can be achieved with intraoperative stimulation mapping, suggesting that these tumors are indeed amenable to surgical resection and should not be labeled unresectable. Injury to small perforating or en passage blood vessels was the most common cause of infarction that caused moderate or severe deficits. Awake motor mapping was not superior to mapping done under general anesthesia with regards to long-term functional outcome.

P16.09 PILOCYTIC ASTROCYTOMAS: COMPREHENSIVE TREATMENT APPROACH

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INTRODUCTION: Pilocytic astrocytomas (PAs) are WHO grade I neoplasms accounting for 5 to 6% of all gliomas, primarily affecting children and young adults with no gender predilection. Neoplasms such as pilocytic astrocytoma have excellent prognoses, even if resection has to be incomplete due to anatomic and other factors. Even though at least half of patients after subtotal (STR) or partial resection (PTR) will progress within 5 years, overall survival rates exceed 90%. PAs may remain quiescent after an incomplete resection suggests that tumors can exhibit decelerated growth kinetics over time and tumor cells may undergo senescence after an initial period of growth. Decisions regarding adjuvant radiation therapy are controversial after a STR or PTR. MATERIAL AND METHODS: A retrospective analysis of 10 consecutive surgical interventions on PAs that were treated at the Uzhhorod Regional Clinical Center of Neurosurgery and Neurology during the last 2.5 years (August 2014 to December 2016). The male-to-female ratio was 1:1. The mean age was 8 (from 3 to 17 years old). Localisation of tumors was as follows: brainstem - 3, optic pathways - 3, thalamus/hypothalamus - 2, cerebellum - 1, spinal cord - 1. In all patients the tumor cells show expression of GFAP and focal coexpression of Map2, all cases were without IDH1 mutation (variant R32H) and with preserved ATRX-expression. The mean Ki-67-labeling index for all the patients was 3% RESULTS: According to the data, among the pilocytic astrocytoma prevail the tumors of the functionally eloquent areas (60%), with low mean proliferative index (3%). The degree of tumor removal: total/subtotal - 6 (60%), partial - 4 (40%) patients. There was no postoperative mortality. 3 (30%) received chemotherapy postoperatively and 7 had no adjuvant treatment. The results of treatment were assessed (median follow-up time - 10 month) according to Karnofsky scale: more than 60 points - 10 (100%) patients. CONCLUSIONS: In treating indolent tumors, the primary predictor of favourable oncological outcome is achieving maximum safe extent of the resection of the tumor. Significant long-term side effects make radiation difficult to justify as an adjuvant therapy in a patient population with excellent long-term survival. More prospective studies are needed to address the impact of modern radiation therapy technologies on patients outcome.

P16.10 AN UNUSUAL CYST WALL ENHANCEMENT IN A PATIENT WITH CEREBELLAR HEMANGIOBLASTOMA

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OBJECT: Hemangioblastomas (HGBLs) are the most common primary brain tumors of adult posterior fossa. Solid mural nodule associated with peritumoral cyst is the common radiological finding in HGBLs of cerebellar hemisphere. The cyst wall usually reveals no enhancement with paramagnetic contrast media and regarded as reactive gliosis devoid of tumor cells. Surgical excision of nodule and drainage of cyst could achieve good long-term outcome. A nodule with enhanced peritumoral cyst wall after contrast injection is extremely rare and can be source of misdiagnosis and recurrence. METHODS: The authors present an unusual case of hemangioblastoma showing radiographic cyst wall enhancement in cerebellar hemisphere. A 25-year-old man without evidence of von Hippel-Lindau disease presented with a cerebellar hemispheric lesion. Neurological examination showed mild headache and dizziness. Magnetic resonance (MR) imaging showed a large cystic lesion with an enhancing mural nodule and atypical strong linear enhancement throughout the whole cyst wall. RESULTS: At surgery, vascular reddish tumor nodule was found at inferolateral corner of the cyst. The entire peritumoral cyst wall was thickened by highly vascular, friable red tissue showing copious bleeding. A tiny portion of cyst wall remained on postoperative MR imaging. Gamma-Knife radiosurgery was performed for small remnant, 6 months after surgery. Regular MR imaging follow-up revealed tumor regrowth at 5 years after radiosurgery. CONCLUSIONS: HGBLs with peritumoral enhanced cyst wall is exceedingly rare and could be considered as tumor cells within the cyst wall. Additionally, enhanced thick cyst wall causes not only surgical difficulty with abundant bleeding, but also tumor recurrences by preventing complete excision of cyst wall.