the outcome and the device of 3D simulation image at our single institute. **Material and Method:** From April 2019 to July 2021, 56 cases of HGG (grade III: 18 cases, grade IV: 38 cases, initial cases: 49 cases, recurrent cases: 7) were included retrospectively. Zedview, Horos, and Freeform were used to create 3D simulation image from conventional clinical images as CT, MRI, and angiography. The evaluations of anatomical structures were 9 items: cerebral arteries (A), cerebral veins (V), perforators (Per), passing arteries (Pass), feeders (F), drainers (D), sylvian fissure vessels (SV), brain structures (B), and ventricles (Vent). After determining the necessity of 3D visualization for operative planning and evaluating whether it was possible to create the 3D image, the consistency with the anatomical structure and the usefulness for surgery were scored (Excellent 3 points / Good 2 points / Poor 1 point) respectively. **Result:** A: 56 out of 56 cases (100%) was judged as necessary, and the average score was 2.73 points. V: 56/56 cases (100%), 2.70 points. Per: 7/7 cases (100%), 1.80 points. Pass: 7/7 cases (100%), 2.86 points. F: 34/36 cases (94.5%), 2.56 points. D: 22/22 cases (100%), 2.36 points. SA: 7/7 cases (100%), 2.43 points. B: 53/54 (98.1%), 2.70 points. Vent: 27/28 cases (96.5%), 2.50 points. The average score of all structures was 2.59 points. **Discussion and Conclusion:** 3D imaging of the required anatomical structures was possible in almost all cases, and consistency and usefulness in most items were highly scored. Although the evaluation of the perforators was low, the 3D simulation image seemed to be useful for surgical planning.

Key words: HGG | Operation | 3D simulation

STMO-17

TREATMENT OUTCOME OF PHOTODYNAMIC THERAPY USING TALAPORFIN SODIUM FOR RECURRENT HIGH-GRADE GLIOMA

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Objective: Photodynamic therapy (PDT) using Talaporfin Sodium (TS) is a novel therapeutic strategy to improve local tumor control in high-grade glioma. TS is a photosensitizer that accumulates in tumor cells and produces highly toxic free radicals by intraoperative irradiation of laser with a 664nm wavelength. However, little is known about the treatment outcomes of PDT in recurrent high-grade gliomas (rHGG). In this study, we investigated the treatment outcome of PDT in rHGG and evaluated the correlation between intratumoral TS accumulation and outcomes. Methods: We included 21 patients with rHGG and 22 tumors, who were treated by PDT between June 2016 and March 2021. TS was transvenously administered 22–26 hours before PDT. Intratumoral TS concentrations were measured by liquid chromatography using frozen tissue. Results: The rHGGs included 10 glioblastoma, IDH1/2-wildtype (GBM, IDH1/2-WT: 45.5%), 3 GBM, IDH1/2-mutant (GBM, IDH1/2-Mut: 13.6%), 7 anaplastic oligodendroglioma, IDH1/2-Mut/codel (AO, IDH1/2-Mut/codel: 31.8%), 1 anaplastic astrocytoma, IDH1/2-WT (AA, IDH1/2-WT: 4.5%), 1 high-grade astrocytoma, IDH1/2-WT (4.5%). The median local progression free survival (PFS) time after PDT was 3.6 months and the median survival time from PDT was 19.4 months. The intratumoral TS concentrations of 7 tumors (TS(-): 31.8%) were below the limit of quantification, and the intratumoral TS concentrations of the remaining 15 tumors (TS(+)) were 43.5 ng/mg-protein (14.7–132 ng/mg-protein). The intratumoral TS concentrations were not significantly associated with IDH1/2 mutation status, cellularity, tumor grade, and pattern of enhancement. The median PFS from PDT tended to be longer in TS(+) than in TS(-) (TS(+): 6.3 vs TS(-): 1.4 months, p = 0.054). Conclusions: We found that the intratumoral TS concentrations were heterogeneous and 31.8% were below the limit of quantification. TS(+) tended to have better local tumor control than TS(-), suggesting the intratumoral TS accumulation have an impact of treatment outcomes of PDT.

Key words: Photodynamic therapy | Talaporfin sodium | Recurrent glioma

STMO-19

IMPACT OF AGGRESSIVE RESECTION FOR GLIOBLASTOMA OF THE THALAMUS WITH HISTONE H3-K27M MUTATION

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Glioblastoma of the thalamus occurs predominantly in childhood and young adulthood, and cases with histone mutations are thought to have a particularly poor prognosis. We studied tumor resection rate, age, type of adjuvant therapy, and histone gene mutations on progression-free survival (PFS) and overall survival (OS) in patients who underwent aggressive removal. Eight cases of thalamic glioblastoma were included in the study. The mean age at surgery was 36.1 years (10–74 years, 3 cases under 18 years). Tumor removal was performed from the parieto-occipital lobe to the thalamus via the lateral ventricles in all cases. In all cases, more than 90% of the contrast-enhancing lesions were removed. Postoperatively, one patient had sensory disturbance of the left upper limb, and the other had incomplete paralysis of the left upper and lower limbs, but both were able to walk with a cane. In the case of the patient with postoperative complications, the tumor was located in the vicinity of the internal capsule. All patients were treated with radiation therapy and temozolomide, and bevacizumab and Novo-TTF were used in cases after approval. All patients were able to return home and return to school or work after initial treatment. The mean progression-free survival (PFS) was 0.87 years, and overall survival (OS) was 1.95 years. Five patients had histone H3-K27M mutations, and three patients had no mutations. PFS and OS were 1.02 years and 0.62 years, respectively, and 2.53 years and 1.20 years, respectively, both of which were longer in patients with mutations (PFS; p=0.16, OS; p=0.23).Aggressive removal of glioblastoma of the thalamus may improve prognosis, especially in patients with histone H3-K27M mutations. In patients with tumors extending to the vicinity of the internal capsule, total removal may cause paralysis and sensory disturbance.

Key words: glioblastoma | thalamus | histone mutation

STMO-21

THE OUTCOME OF TUMOR RESECTION FOLLOWED BY PHOTODYNAMIC THERAPY FOR RECURRENT GLIOBLASTOMA

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Recurrent glioblastoma remains a clinical problem with no standard treatment and quite a few effective treatment options. We evaluated the efficacy of photodynamic therapy (PDT) using talaporfin sodium (TS) as a treatment for recurrent glioblastoma in a retrospective analysis of 70 patients who underwent PDT with surgery (PDT group) between 2014 and 2018, and 38 patients who underwent surgery alone (control group) during the same period. The median overall survival (OS) of the PDT and control groups were 16.03 and 12.75 months, respectively (P=0.0311). The median progression-free survival (PFS) of these two groups were 5.67 and 2.2 months, respectively (P=0.00428). Univariate and multivariate analyses showed PDT with surgery and preoperative Karnofsky Performance Scale as significant independent prognostic factors for both PFS and OS.On the other hand, IDH mutation and previous pathology before recurrence were not significant prognostic factors in this study. In the PDT group, there was no significant difference in PFS and OS between patients with GBM from the previous pathology before recurrence and those with malignant transformation to GBM from lower-grade glioma. Furthermore, there was also no significant difference in TS accumulation in the tumor between these two groups. These results suggest that additional PDT treatment for recurrent glioblastoma can have potential survival benefits and that its efficacy is independent of the pathology before recurrence or IDH status.

Key words: recurrent glioblastoma | photodynamic therapy | talaporfin sodium

RADIATION THERAPY (RT)

RT-1

TREATMENT RESULTS OF SALVAGE GAMMA KNIFE STEREOTACTIC RADIOSURGERY AND BEVACIZUMAB (AVAGAMMA THERAPY) FOR RECURRENT MALIGNANT GLIOMA

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Purpose: We report the treatment results of AVAgamma therapy combining gamma knife (GK) and bevacizumab for recurrent malignant glioma. Subjects: From August 2013 to January 2021, 71 patients (Grade 2:8 pa-