

cases in the A group, 0 (0%) case in the O group and 9 (26%) cases in the W group, and the positive rate was significantly higher in the A group ($p=0.013$).

CONCLUSIONS: “T2/FLAIR mismatch” sign was a specific finding for astrocytic tumor, and the cases with positive “T2/FLAIR mismatch” sign had significantly lower MET-PET uptake than that with negative cases.

NI-11

CLINICAL SIGNIFICANCE OF INTRACYSTIC DIFFUSION HYPERINTENSITY LESIONS REMAINING AFTER TREATMENT OF INTRACRANIAL GERM CELL TUMOR

Motoki Takano¹, Takeshi Takayasu¹, Ushio Yonezawa¹, Akira Taguchi¹, Kazuhiko Sugiyama², Fumiyuki Yamasaki¹; ¹Department of Neurosurgery, Graduate School of Biomedical and Health Sciences, Hiroshima University

BACKGROUND AND PURPOSE: About 30% of intracranial germ cell tumors are mixed germ cell tumors and teratomas are often found as those components. Intense chemoradiotherapy is performed according to the malignancy of the histopathology, but high-intensity lesion inside the cystic tumor on diffusion weighted imaging (DWI) sometimes remains after completion of the chemoradiotherapy. In this study, we examined the clinical significance of the DWI high-intensity lesion remaining in the cyst. **METHODS:** Five patients after initial chemoradiotherapy were resected residual tumor by craniotomy at our hospital from 2009 to 2019. Preoperative gadolinium-enhanced MRI defined the non-contrast-enhanced part of the tumor as intracystic, and DWI intensity was classified by its look as low-intensity, equal-intensity, and high-intensity compared to the cortex of the same slice. DWI signals in the solid area, cyst wall, and cyst were evaluated. **RESULTS:** All cases were mature teratoma in histopathology, and no other tumor components were observed. On DWI, the cyst wall and solid part were visualized with low signal. High-intensity lesions and equal-intensity lesions in the cyst cavity were found in 3 and 1 cases, respectively. In these cases, pathological findings revealed a keratin-like substance in the cyst. **DISCUSSION:** The intracystic high and equal intensity lesions on DWI removed after completion of chemoradiotherapy are considered to reflect the keratin-like component of mature teratoma. If DWI high intensity and equal intensity lesions remain in the cyst of the tumor after the completion of chemoradiotherapy, tumor shrinkage cannot be expected even if the chemotherapy is strengthened. In such cases, we should consider to removing them by surgery. **CONCLUSION:** When DWI high and equal intensity lesions are found in the cysts of tumors remaining after chemoradiotherapy for intracranial germ tumors, it is possible that mature teratoma remains.

NI-13

THE EFFECTIVENESS AND LIMITATION OF SURVIVAL PREDICTION IN PRIMARY GLIOBLASTOMA USING MACHINE LEARNING-BASED TEXTURE ANALYSIS

Toru Umehara^{1,2,12}, Manabu Kinoshita^{1,3,12}, Takahiro Sasaki^{4,12}, Hideyuki Arita^{1,5,12}, Ema Yoshioka^{6,12}, Tomoko Shofuda^{6,12}, Yoshinori Kodama^{7,12}, Ryuichi Hirayama^{1,12}, Noriyuki Kijima^{1,12}, Naoki Kagawa^{1,12}, Yoshiko Okita^{3,8,12}, Koji Takano^{8,12}, Takehiro Uda^{9,12}, Junya Fukai^{4,12}, Daisuke Sakamoto^{10,12}, Kanji Mori^{10,11,12}, Yonehiro Kanemura^{6,8,12}; ¹Department of Neurosurgery, Osaka University Graduate School of Medicine, Osaka, Japan

INTRODUCTION: Clinical application of survival prediction of primary glioblastoma (pGBM) using preoperative images remains challenging due to a lack of robustness and standardization of the method. This research focused on validating a machine learning-based texture analysis model for this purpose using internal and external cohorts. **METHOD:** We included all cases of IDH wild-type pGBM available of preoperative MRI (T1WI, T2WI, and Gd-T1WI) from the databases of Kansai Molecular Diagnosis Network for CNS tumors (KN) and The Cancer Genome Atlas (TCGA). Of 242 cases from KN, we assigned 137 cases as a training dataset (D1), and the remaining 105 cases as an internal validation dataset (D2). Furthermore, we extracted 96 cases from TCGA as an external validation dataset (D3). Preoperative MRI scans were semi-quantitatively analyzed, leading to the acquisition of 489 texture features as explanatory variables. Dichotomous overall survival (OS) with a 16.6 months cutoff was regarded as the response variable (short/long OS). We employed Lasso regression for feature selection, and a survival prediction model constructed for D1 via cross-validation (M1) was applied to D2 and D3 to ensure the model robustness. **RESULTS:** The population of predicted short OS by M1 significantly showed poorer prognosis in D2 (median OS 11.1 vs. 19.4 months; log-rank test, $p=0.03$), while there was no significant difference in D3 (median OS 14.2 vs. 11.9 months; $p=0.61$). In the comparative analysis using t-SNE, there was little variation in the feature distribution among three datasets. **CONCLUSION:** We were able to validate the prediction model in the internal but not in the external cohort. The presented result supports the use of machine learning-based texture analysis for survival prediction of pGBM in a localized population or country. However, further consideration is required to achieve a universal prediction model for pGBM, irrespective of regional difference.

NI-17

EVALUATION OF PREOPERATIVE APPARENT DIFFUSION COEFFICIENT (ADC) OF PERITUMORAL FLAIR HIGH LESION AND HISTOPATHOLOGICAL FEATURES IN PATIENTS WITH GLIOBLASTOMA

Kenichiro Matsuda¹, Rintaro Oe², Yukihiko Sonoda¹; ¹Department of Neurosurgery, Faculty of Medicine, Yamagata University, Yamagata, Japan

OBJECTIVE: In removal of the glioblastoma, maximum and safe removal is desired for recurrence prevention with functional preservation. In recent years, the setting of the removal range has also been studied not only the contrast enhanced lesions, but also the surrounding FLAIR high signal lesion. We are studying the prediction of the site that is likely to occur recurrence in the FLAIR high signal lesion of glioblastoma, and we are focusing on the ADC of pre-operative MRI as an index. The purpose of this study is to evaluate the ADC and the actual pathological tissue image in the FAIR high signal lesion around the contrast enhanced lesion of glioblastoma. **METHOD:** We examined the case of removal of the glioblastoma treated in our department. Analysis was performed using a pathological tissue specimen of excised tumors and their surrounding tissues in each case, and the ADC value of pre-operative MRI. Pathological tissue image and ADC values of FAIR high signal lesion were compared. **RESULTS:** 19 tissue samples which were taken from the FLAIR high signal lesion around the contrast enhanced tumor from 10 cases. For a total of 19 locations, it was compared with the histopathological features of the site. As a result, in the low part of the ADC value in the preoperative MRI relatively had high cell density of atypical cells, it was often exhibited findings that infiltration of tumor cells is suspected. **CONCLUSION:** In general, ADC is said to suggest an increase in cell density and thus infiltration of tumor cells. However, the same findings were obtained in the pre-operative MRI examined this time. Since ADC also suggests cell density and tumor infiltration in pre-operative MRI, ADC of pre-operative MRI was considered useful for examination of the removal range and radiation therapy planning in surgery for glioblastoma.

NI-19

USE OF ¹¹C-METHIONINE PET FOR DECISION OF DISCONTINUATION OF ADJUVANT CHEMOTHERAPY WITH TEMOZOLOMIDE

Takaaki Beppu¹, Yuichi Sato¹, Toshiaki Sasaki², Kazunori Terasaki², Kuniaki Ogasawara¹; ¹Department of Neurosurgery, Iwate Medical University, Iwate, Japan

BACKGROUND: The aim was to clarify whether positron emission tomography with ¹¹C-methyl-L-methionine (met-PET) is useful to decide on discontinuation of TMZ-adjuvant therapy in patients with residual diffuse astrocytic tumor. **METHODS:** Subjects were 44 patients with residual tumor comprising 17 with IDH1-mutant diffuse astrocytoma (DA), 13 with IDH1-mutant anaplastic astrocytoma (AA), and 14 with IDH1-wild glioblastoma (GB). All patients received TMZ-adjuvant chemotherapy (median, 12 courses), and whether to discontinue or continue TMZ-adjuvant chemotherapy was decided on the basis of the tumor-to-normal ratio in standardized uptake value from met-PET (T/N); patients with T/N < 1.6 immediately discontinued TMZ, and patients with T/N > 1.6 were either to continue or discontinued TMZ. Progression-free survival (PFS) was compared between patients with T/N > 1.6 and T/N < 1.6 in each tumor type. Median observation period was 434 days after met-PET scanning. **RESULTS:** The number of patient who underwent recurrence was 10 in DA, 7 in AA, and 11 in GB. All patients showing T/N > 1.6 underwent tumor recurrence. PFS was significantly longer in patients with T/N < 1.6 than T/N > 1.6 in DA and AA ($p < 0.01$ in both types), but was no significant difference between 2 groups in GB ($p = 0.06$). Sixteen of 17 patients (94%) in DA and AA showed recurrence from residual tumor, whereas 4 of 11 patients (36%) in GB showed recurrent tumor at remote regions which were different from residual tumor. **CONCLUSIONS:** The present study suggested that met-PET is beneficial to decide to discontinue adjuvant chemotherapy with TMZ in patients with residual tumors of DA and AA, but not useful for patients with GB. Reasons for unsuccessful results in GB might have been small sample size, failure of establishing the cut off value in T/N, recurrences at remote regions where not be assessed by met-PET.

NEURO-COGNITIVE FUNCTION/QOL/PATIENT CARE/PALLIATIVE CARE (NQPC)

NQPC-02

LONG-TERM SURVIVAL IN PATIENTS WITH PRIMARY INTRACRANIAL GERM CELL TUMORS TREATED WITH SURGERY, PLATINUM-BASED CHEMOTHERAPY, AND RADIOTHERAPY: A SINGLE-INSTITUTION STUDY

Kazuya Motomura¹, Hiroyuki Shimizu¹, Fumiharu Ohka¹, Kosuke Aoki¹, Kuniaki Tanahashi¹, Masaki Hirano¹, Lushun Chalise¹,