ation were retained in the BEV group. Percentages of vessels with pericytes and vascular endothelium with LAT1 expression were lower in the BEV group than in controls. Uptake of 11C-met correlated significantly with microvascular density in the BEV group, but not with LAT1expression. CONCLUSIONS: The present study showed that even one course of BEV administration induced reductions in microvessels, vascular pericytes, and LAT1 expression in glioblastomas. One course of BEV therapy also reduced 11C-met uptake, which might have been largely attributed to reductions in microvessels rather than reductions in LAT1 expression, in addition to reduction of vascular permeability.

NI-13

PREDICTION OF PROGNOSIS IN NEWLY DIAGNOSED GLIOBLASTOMA USING MACHINE LEARNING-BASED TEXTURE ANALYSIS OF PREOPERATIVE MRI

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INTRODUCTION: Preoperative magnetic resonance imaging (MRI) is a critical modality for the determination of glioblastoma (GBM) treatment strategy, as it is thought to reflect the biology of the tumor to some extent. The authors attempted to predict prognosis of newly diagnosed GBM (nGBM) using machine learning-based texture analysis of preoperative MRI in this study. METHOD: A total of 160 nGBMs with determined overall survival were collected from Kansai Molecular Diagnosis Network for CNS tumors. Preoperative MRI scans (T1WI, T2WI, and Gd-T1WI) from all cases were semi-quantitatively analyzed leading to acquisition of 489 texture features as explanatory variables using Matlab-based in-house software. Dichotomous overall survival (OS) with a cutoff of 15 months was regarded as the response variable (short or long OS). Lasso regression was employed for feature selection to ensure robustness of the prediction model. One hundred patients were randomly assigned as training dataset (TR), followed by predictive model construction via 5-fold cross-validation. Subsequently, the constructed model was transferred to the remaining 60 patients, which was assigned as test dataset (TD). The survival distribution between populations with predicted short and long OS was compared using log-rank test. RESULTS: Distributions of the analyzed data were as follows; 53 short OS cases in the TR (53.0%) and 27 cases in the TD (45.0%). As for the result of transfer analysis in TD, 38 cases out of 60 (63.3%) were predicted to be short OS (76.3 % of recall, 54.3% of precision, and 63.5% of F-measure). The population of predicted short OS significantly showed poorer prognosis (median OS 14.0 vs 19.1 months) (p=0.02, log-rank test). CONCLUSION: Short OS was successfully identified from preoperative MRI with high recall rates with our algorithm. The presented result ensures the potential of machine learning-based texture analysis for prognostic stratification of nGBM.

NI-14

EVALUATION OF PREOPERATIVE APPARENT DIFFUSION COEFFICIENT (ADC) OF PERITUMORAL LESION FOR PREDICTING SITE PRONE TO RECURRENCE IN PATIENTS WITH GLIOBLASTOMA

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PURPOSE: In the surgery of glioblastoma (GBM), the maximum safe resection is desired in order to prevent recurrence. The purpose of this study is to make it possible to evaluate the site in which the recurrence after resection of the tumor occur, according to the findings in preoperative MRI, and to avoid the recurrence. METHOD: The 26 initial cases with GBM treated in our department was investigated. Preoperative MRI, postoperative MRI, and follow-up MRI during the course were analyzed in a retrospective view. In the FLAIR high-signal area around the contrast-enhanced tumor body in preoperative MRI, we investigated the relationship between the site and the ADC value, from the standpoint of whether a recurrence occurred or not. RESULTS: For preoperative MRI of 26 patients, the FLAIR high-signal region was set to a total of 54 ROI, and several values, such as the ADC values, were measured. In the preoperative images, ADC were higher in the site where the no recurrence occurred during the postoperative course and lower in the site where the recurrence occurred. CONCLUSION: In the FLAIR high-signal area around the tumor in preoperative images, ADC value is useful in evaluating whether it has tendency to develop the recurrence in the future course or not. It was suggested that significant recurrence occurs at part with low-ADC value. It is considered useful for the planning of the extent of resection in the surgery and the irradiation range in radiation treatment.

NI-15

THE USEFULNESS OF PET IMAGING IN MOLECULAR DIAGNOSIS OF GLIOMA

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OBJECTIVE: After WHO 2016 Classification of Tumors of the Central Nervous System have published, molecular diagnosis became part of the diagnostic criteria. In this study, we investigated the correlation between PET images and molecular diagnosis of glioma. METHODS: We performed retrospective review of newly diagnosed supratentorial glioma patients who preoperatively underwent all four PET examinations (^{18}F-FDG, ^{11}C-MET, ^{18}F-FLT and ^{18}F-FMISO) from April 2009 to March 2019. The standardized uptake value (SUV) from the accumulation of each PET tracers, TNR (tumor to contralateral normal tissue ratio) of ^{18}F-FDG,^{11}C-MET and ^{18}F-FLT, TBR (tumor to blood values ratio) of ^{18}F-FMISO were measured. We investigated the correlation between these PET images and molecular diagnosis of glioma. RESULTS: Data from total of 79 patients which were 42 cases of IDH wild type glioblastoma, 2 cases of IDH mutated glioblastoma, 9 cases of IDH wild type astrocytoma, 13 cases of IDH mutated astrocytoma and 13 cases of IDH mutated and 1p/19q co-deleted oligodendroglioma were included in this study. Both TNR of ^{11}C-MET($p<0.01$) and ^{18}F-FLT($p<0.01$), and also TBR of ^{18}F-FMISO($p<0.01$) in IDH wild type gliomas showed significantly higher than IDH mutated gliomas. In WHO Gr2-3 gliomas, only TNR of ^{18}F-FLT showed a significant difference between IDH wild type gliomas and IDH mutated gliomas($p<0.01$). TNR of ^{18}F-FLT($p<0.01$) and TBR of ^{18}F-FMISO($p<0.01$) in 1p/19q co-deleted gliomas were significantly lower than gliomas without 1p/19q co-deletion, but there were no significant differences in WHO Gr2-3 gliomas. Among IDH mutated gliomas, TNR of ^{11}C-MET in 1p/19q co-deleted gliomas showed significantly higher uptake than gliomas without 1p/19q co-deletion($p<0.05$). CONCLUSION: Preoperative PET evaluation of each PET tracers may be useful for the molecular diagnosis of glioma.

NI-17

T2-FLAIR MISMATCH SIGN IN DIFFUSE GLIOMA AND DYSEMBRYOPLASTIC NEUROEPITHELIAL TUMOR

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BACKGROUND: T2-FLAIR mismatch sign was reported as a specific imaging marker for diffuse astrocytoma with IDH-mutant and 1p/19q non-codeletion. However, most of the previous studies for T2-FLAIR mismatch were confirmed only among low grade glioma. The purpose of this study is to assess the T2-FLAIR mismatch sign in supratentorial diffuse glioma, diffuse midline glioma and dysembryoplastic neuroepithelial tumor (DNT) to unveil the exception rules of the sign. METHODS: In total, 51 patients were included in this study; 33 supratentorial diffuse glioma (18 diffuse astrocytoma with IDH mutant (IDHmut-Noncodel), 12 oligodendroglioma with IDH-mutant and 1p19q codeletion (IDHmut-Codel), 3 diffuse astrocytoma with IDH wildtype (IDHwt)), 18 diffuse midline glioma and 11 DNT. The tumors were evaluated by 2 independent reviewers to assess presence or absence of T2-FLAIR mismatch sign. RESULT: Ten out of 18 cases of IDHmut-Noncodel presented T2-FLAIR mismatch sign. None of the other supratentorial diffuse glioma (IDHmut-Codel and IDHwt) presented T2-FLAIR mismatch. The T2-FLAIR mismatch sign for IDHmut-Noncodel presented 100% positive predictive values among supratentorial diffuse glioma. However, 8 out of 18 cases of diffuse midline glioma and 8 out of 11 cases of DNT also presented the T2-FLAIR mismatch. CONCLUSION: The T2-FLAIR mismatch sign was specific marker for IDHmut-NonCodel among supratentorial diffuse glioma. Physicians need to be aware that diffuse midline glioma and DNT could present the T2-FLAIR mismatch sign.

NI-18

INVASIONS OF WHITE MATTER AS A PROGNOSTIC FACTOR IN LOW GRADE GLIOMAS

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INTRODUCTION: Gliomatosis cerebri (GC), which was characterized by widespread infiltration of the brain involving three lobes, was deleted in the 2016 WHO classification. However, it is known that gliomas with