GC growth pattern have a poor prognosis even in low histological grading. In this study, we focused on tumor invasion into white matter fibers. We analyzed the MRI findings focusing on white matter fibers and compared in patients with histologically proven low grade gliomas (LGGs) with GC pattern and localized LGGs. METHOD: The patients can be classified into four groups according to the range of tumor invasion in T2-weighted image as follows: group 1, more than 3 lobes (n=6); group 2, 1 or 2 lobes infiltrate the basal ganglia (n=5); group 3, multicentric (n=2) and group 4 (n=12), localized. In reference to the human brain white matter atlas, the infiltration to the major white matter fibers (uncinate fasciculus, genu &splenium of corpus callosum, inferior fronto-occipital fasciculus, superior& inferior longitudinal fasciculus) was examined. RESULTS: Twenty-five patients (median 39.5 years) were included in the study. Of these, 20 patients were histologically diagnosed with diffuse astrocytomas, and 5 patients with oligodendrogliomas. The infiltrations into ifo, slf, and ilf of white matter fibers were a poor prognostic factor. The number of infiltrating white matter fibers correlated significantly with the Kaplan-Meier survival curve. CONCLUSIONS: The 2016 WHO classification defines diagnostic entities by combining molecular and histological information and remove GC as a distinct glioma entity. LGGs with GC pattern should be considered to be detected in different types of histologically and molecularly defined gliomas. As the patient numbers analyzed here were small, and larger series reproducing these results would be desirable. MRI findings particularly focusing on infiltration of LGGs into white matter fibers might be important to estimate the prognosis of patients.

NI-19

USEFULNESS OF AMIDE PROTON TRANSFER IMAGE IN IMAGING DIAGNOSIS OF GLIOMA.

Masami Shirota[1], Masayuki Nitta, Takashi Maruyama, Taiichi Saitou, Syunsuke Tsuduki, Souko Ikuta, Ayako Yoshida, Kayoko Abe, Kouichirou Abe, Yoshihiro Muragaki, Takakazu Kawamata; [1]Tokyo Women's Medical University Yachiyo Medical Center Chiba, Japan

INTRODUCTION: APT image is one of the imaging methods in MRI, and it is a molecular image that images the concentration of an amide group having an amino acid increasing in a tumor, and is expected to be clinically applied in the imaging diagnosis of glioma. on the other hand, MET-PET is useful for diagnosis of glioma because it is well accumulated in tumor cells. Based on the results of pathological diagnosis, we compared the two and verified that APT image is useful. METHOD: The study included 36 patients who underwent APT image and MET-PET. (Glioma WHO2016 Grade:GII/III/IV,and Pseudoprogression). MET-PET was administered 370MBq/kg, and the accumulation ratio (TNR) of the tumor part to the normal part was measured. APT image measured APT signal with the region of interest at the tumor site. RESULTS: APT signal in all 36 cases was correlated with 2.19±0.94 and TNR with 2.61±1.55 ($r=0.67, p<0.001$). The discrimination accuracy between GII/III/IV and Pseudoprogression by APT signal was 84% sensitivity and 100% specificity at threshold 2.0.GII APT signal 2.30±0.43, TNR 4.02±2.12, GIII APT signal 2.67±0.69, TNR 2.81±0.72, GIV APT signal 2.78±0.61, TNR 3.37±1.28 in grade diagnosis At high grade, APT signal and TNR were high. The APT signal of the oligodendroglioma line (GII/III) was 2.44±0.7, the TNR was 3.78±1.51, the APT signal of the astrocytoma line (GII/III) was 2.69±0.51, and the TNR was 2.43±0.98.The oligodendroglioma lineage was lower in APT signal than the astrocytoma lineage, and the TNR was higher. DISCUSSION: APT images are non-invasive, can easily provide important information, and have the same diagnostic potential as MET-PET. Although TNR of oligodendroglioma (GII/III) tends to be high, the APT signal which is not affected by the blood-brain barrier is consistent in measurement value and is useful for diagnostic imaging of glioma.

NI-20

IS GLIOMATOSIS CEREBRI DIAGNOSED AS GRADEII IN NEUROIMAGING A POTENTIALLY GRADEII GLIOMA?

Etsuko Owashi[1], Hiroaki Takei[1], Yuka Ikegame[1], Yoshitaka Asano[1], Kazuhiro Miwa, Takeshi Ito, Kazutoshi Yokoyama, Jun Shinoda[1], Takashi Maruyama, Yoshihiro Muragaki, Hirohito Yano, Toru Iwama; [1]Kizawa Memorial Hospital,Chubu Medical Center For Prolonged Traumatic Brain Dysfunction, Minokamo, Gifu, Japan

The 2007 World Health Organization (WHO) classification defined gliomatosis cerebri (GC) as a rare entity and an extensively infiltrating diffuse glioma involving three or more cerebral lobes. Although the revised 2016 WHO classification removed GC as a separate glioma entity due to the common histopathological findings shared with other gliomas, GC exhibits a distinct growth pattern and worse prognosis compared with other grade-matched gliomas. We retrospectively reviewed five patients with GC and five patients with insulo-opercular diffuse astrocytoma (IODA) who underwent both proton magnetic resonance spectroscopy (MRS) and [^{11}C]-methionine positron emission tomography (MET-PET).

The patients were diagnosed with GC or IODA by T2-weighted magnetic resonance imaging /fluid-attenuated inversion recovery from April 2014 to August 2019 at our institution. The locations of lesions where single-voxel MRS to measure the N-acetylaspartate (NAA)/choline (Cho) ratio and MET-PET to measure the tumor/normal (T/N) ratio were performed were the same in every patient.

The mean age of all patients was 46.3±13.7 years. The mean ages of the GC (three males and two females) and IODA (two males and three females) groups were 54.0±14.0 and 38.6±8.7 years, respectively. The mean NAA/Cho ratios in the GC and IODA groups were 1.010±0.441 and 0.594±0.449, respectively. The mean T/N ratios in the GC and IODA groups were 1.201±0.050 and 1.169±0.009, respectively.

The higher NAA/Cho ratio in the GC lesions may reflect the abundance of normal neural tissue in GC compared with IODA. Nonetheless, the T/N ratios of the two groups were comparable. The discrepancy suggests that GC cells have higher tumor metabolic activity than IODA cells. Therefore, when GC is simply classified as grade II glioma based on neuroimaging diagnosis, the possibility of underestimating its malignant potential at the single-cell level should be considered.

NI-22

IMPROVED DELINEATION OF THE SUPERFICIAL CEREBRAL VENOUS SYSTEM IN BRAIN CT ANGIOGRAPHY BY ULTRAHIGH-RESOLUTION CT FOR ASSISTING BRAIN TUMOR SURGERY

Masamichi Koyanagi[1], Mitsuru Suzuki[1], Satoshi Kikuyama[1], Akihito Nakanishi[1], Miho Gomyou, Haruhiko Machida, Kenichi Yokoyama, Kazuhiro Tsuchiya, Keiichi Kobayashi, Yoshiaki Shiokawa, Motoo Nagane; [1]Department of Radiology, Kyorin University Hospital,Tokyo,Japan

BACKGROUND: In brain CT angiography (CTA) for assisting brain tumor surgery, delineation of the superficial cerebral venous system is critical for selecting the optimal surgical approach. This delineation is, however, limited using conventional CT scanners, including an area-detector CT (ADCT) scanner, due to their insufficient spatial resolution. Since March 2017, a state-of-the-art ultrahigh-resolution CT (UHRCT) scanner has been clinically available to improve in- and through-plane spatial resolution compared with conventional CT scanners, mainly due to smaller slice thickness from 0.5 mm to 0.25 mm, larger channel number from 896 to 1792, and smaller x-ray focus from 0.9 x 0.8 mm to 0.4 x 0.5 mm.PurposeWe assessed usefulness of UHRCT to improve delineation of the superficial cerebral venous system in brain CTA for assisting brain tumor surgery compared with conventional ADCT. METHODS: We retrospectively enrolled patients with intra- and/or extra-axial brain tumors who underwent preoperative brain CTA for assisting brain tumor surgery by UHRCT or ADCT using our routine technique and generated the CTA to delineate the superficial cerebral venous system using the same technique. Two reviewers by consensus subjectively counted the number of the superficial sylvian veins and the cortical veins draining into these veins and the maximal bifurcation order of the cortical veins draining into the superior sagittal sinus. We compared these numbers and the maximal bifurcation order in the CTA between the UHRCT and ADCT groups using the intraoperative findings as the reference. RESULTS: The numbers and the maximal bifurcation order in the UHRCT group were significantly greater and more accurate than those in the ADCT group. CONCLUSIONS: Use of UHRCT can be clinically useful for better delineating the superficial cerebral venous system in brain CTA and assisting brain tumor surgery.

NI-23

ULTRA-HIGH-RESOLUTION CT ANGIOGRAPHY FOR BRAIN TUMOR SURGERY

Kuniaki Saito[1], Keiichi Kobayashi[1], Shohei Iijima[1], Yoshie Matsumoto[1], Daisuke Shimada[1], Masamichi Koyanagi, Miho Gomyo, Yoshiaki Shiokawa[1], Motoo Nagane[1]; [1]Department of Neurosurgery, Kyorin University Faculty of Medicine

BACKGROUND: Preoperative accurate evaluation of arteries and veins can help avoid ischemic complication of brain tumor surgery. The latest ultra-high-resolution CT (UHRCT) angiography (Aquilion Precision^{TM}; Canon Medical Systems) has recently become available for clinical testing of the main arteries and critical perforating arteries by brain CTA, compared to conventional CT. METHODS: UHRCT provides slice collimation of 0.25 mm x 160 and matrix size of 1024 x 1024 or 2048 x 2048. Major features of this CT scanner include an improved detector system (the minimal slice thickness, 0.25 mm; the maximal channel number, 1792) and a small x-ray focus (the smallest size, 0.4 x 0.5 mm) compared to a standard multi-detector CT (MDCT) scanner (the minimal slice thickness, 0.5 mm;