relation with cell density (R = 0.887, P < 0.0001). ASL-CBF showed no correlation with cell density (R = 0.240; P = 0.3836) but a correlation with vessel density (R = 0.697; P = 0.0038). In linear regression analysis, APT SI showed a positive relationship with cell density (R2 = 0.787, P < 0.0001, linear regression; y = 30.70 + 6.24E-3*x). CONCLUSIONS: APT imaging was superior in predicting cellular proliferation than ASL-CBF and a powerful predictor of cell density. APT imaging allowed revelation of novel clues reflecting tumor proliferation in brain tumor; to date, this is the first known report to assess cell density among various brain tumors and conditions after treatment.

Key words: APT imaging | ASL | Glioma

NI-16

VERIFICATION OF APT IMAGE AND RELATIONSHIP WITH T2/FLAIR MISMATCH SIGN IN WHO2016 BRAIN TUMOR PATHOLOGY CLASSIFICATION

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Introduction: Amide Proton Transfer Imaging(APT)is an MRI imaging method that images the increased concentration of amide groups in tumors and is expected to be clinically applied to the diagnostic imaging of gliomas.On the other hand,T2/FLAIR mismatch sign(T2/FLms) has been proposed as an MRI finding specific to astrocytoma with IDH gene mutation.This time,in the WHO2016 Brain Tumor Pathological Classification,we report the verification of the pathological gene classification of APT and the retrospective verification based on the pathological diagnosis results of whether there is a relationship between APT and T2/FLms. Method: We examined 88 cases of preoperative glioma (Grade:G2/3/4)in which APT/T2/FLAIR was imaged.resultIt showed a high value in high malignancy and a significant difference was observed. In the verification of genetic classification, the measured APT values were 1.91 ±0.71 for oligodendroglioma(16 cases),2.58±0.17 for astrocytoma(2 cases),2.40±0.90 for anaplastic oligodendroglioma(12 cases),Anaplastic astrocytoma(20 cases)2.63±0.42,The oligodendroglioma system showed lower values than the astrocytoma system.For anaplastic astrocytoma IDH mutant and glioblastoma IDH mutant,APT measurement values were measured after evaluating the presence or absence of T2/FL ms. APT measured values are anaplastic astrocytoma IDH mutant T2/FL ms present(7 cases) 2.63±0.38,T2/FL ms not (5 cases) 2.76±0.37, glioblastoma IDH mutant T2/FL ms present(5 cases)2.67±0.50, no T2/FL ms(3 cases)3.48±0.27,suggesting low APT measured values with T2/FL ms,respectively.ConclusionIn the verification of genetic classification, the oligodendroglioma system shows a lower value than the astrocytoma system,and it is considered that it can be one of the options such as treatment policy.Regarding the relationship between T2/FL ms and APT,it was suggested that the APT measured value with T2/FL ms tended to be low,but since it wasreported that the sensitivity of T2/FL ms was 30%,it was verified by accumulating cases.is required.

Key words: APT | T2/FLAIR mismatch sign, glioma

NI-18

A QUANTITATIVE ANALYSIS OF INTRAOPERATIVE 3T-DIFFUSION TENSOR IMAGING PARAMETERS FOR FUNCTIONAL PREDICTION WITH MOTOR ELOQUENT GLIOMA PATIENTS

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OBJECTIVE: In motor eloquent glioma surgery, the value of intraoperative diffusion tensor (iDT) imaging was not established to preserve motor function. This study aimed to investigate a relationship between postoperative motor function and iDT imaging parameters, including fractional anisotropy (FA), mean diffusivity (MD), and shortest distance (SD) from resected tumor margin to the corticospinal tract (CST) of gliomas in motor eloquent areas. METHODS: This retrospective study enrolled 20 patients with newly diagnosed supratentorial glioma who underwent surgery and intraoperative magnetic resonance imaging at our hospital. Patients were divided into two groups (i.e., worsening and non-worsening groups) based on their manual muscle test scores before and three months after surgery. We obtained the mean FA and MD values bilaterally, along with identification of the CST and determined the ratios (the affected side / the contralateral side). The SD was measured between the CST and the resected margin of the tumor. We evaluated the quantitative analysis of these parameters related to motor functional outcomes. Moreover the correlation was measured between these parameters and the maximum reduction rate of cortical motor evoked potentials (MEPs) during surgery. RESULTS: In the worsening group (n = 5), the mean FA ratio was lower and the mean MD ratio was higher compared with the non-worsening group (n = 15; P < 0.001 and P < 0.01, respectively). Cut-off values were 0.87 for FA and 1.08 for MD. SD was 7.95 mm in the non-worsening group and 0.44 mm in the worsening group (P < 0.01). These iDT based parameters, the mean FA ratio and the SD, were well correlated with the maximum reduction rate in MEP (R = 0.72 and 0.80, respectively). CONCLUSIONS: The mean ratio of FA, MD, and SD using iDT imagings predict postoperative motor function and help in optimal surgical planning in patients with motor eloquent glioma.

Key words: 3T iMRI | DTI-tractography | motor eloquent glioma surgery

NI-19

A CASE OF LEBER'S HEREDITARY OPTIC NEUROPATHY WITH DIFFUSE WHITE MATTER CHANGES MIMICKING GLIOMATOSIS CEREBRI.

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BACKGROUND: Leber's hereditary optic neuropathy (LHON) is a mitochondrial disease characterized by bilateral severe subacute central vision loss and a mutation in the mitochondrial DNA (mtDNA). The cranial magnetic resonance imaging (MRI) of LHON patients varies from subtle to multiple white matter changes. However, they rarely present with diffuse infiltrative white matter changes. CASE REPORT: We report a case with diffuse white matter changes mimicking gliomatosis cerebri (GC). The histological findings included only mild glial hyperplasia without immunohistochemical positivity supporting the diagnosis of glial tumors. Analysis of mtDNA obtained from the blood and brain tissue revealed mutation of m.11778G>A in the NADH dehydrogenase 4 gene, which confirmed the case as LHON. Immunohistochemistry of the brain tissue revealed 8-hydroxy-2'-deoxyguanosine positivity, suggesting the presence of oxidative stress. CONCLUSION: LHON is extremely difficult to diagnose unless we suspect or know the disease. The present case brings attention not only to LHON but other mtDNA mutated diseases that need to be considered with diffuse white matter changes or GC.

Key words: Leber's hereditary optic neuropathy | gliomatosis cerebri | mitochondrial disease

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

NQPC-2

COGNITIVE FUNCTION OF A LOW-GRADE GLIOMA PATIENT TREATED WITH RADIATION THERAPY 28 YEARS AGO

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While there are many reports that long-term survivors of low-grade glioma patients treated with radiation therapy cannot lead a healthy social life due to cognitive dysfunction, we report a low-grade glioma patient with almost normal cognitive function even after radiation therapy 28 years ago. CASE REPORT. A 64-year-old woman developed with sudden left hemiparesis and was diagnosed as a small infarction in the left corona radiata. After treated by anticoagulant therapy, she was admitted to our hospital for rehabilitation. Twenty-eight years ago, she underwent surgical resection and radiation therapy with 60 Gy for astrocytoma (WHO grade 2) in the right insular cortex. At the time of this admission, she presented with a good MMSE score of 30 points, but she couldn't walk and her left hand was less maneuverable. After 109 days of intensive rehabilitation in our hospital, she was discharged on a cane walk, and returned to work as a gas station clerk. COGNITIVE FUNCION. We evaluated her cognitive function on TMT-A/B test, CAT (Clinical Assessment for Attention)and WAIS-4. The TMT test was normal with age adjustments. In CAT, the percentage of correct answers for the 7 constituent items was within the standard range, but in the task of evaluating the required time, a slight delay in processing speed was observed. In WAIS-4, the Full scale IQ was 98 points (normal range) including normal 3 of 4 constituent items. But, only the PSI (processing speed) of 75 point was below the standard range. CONCLUSION: We observed a slight delay in processing speed on her high-level cognitive function tests, but determined

that she would be well-adapted to a familiar job in a small community. In fact, she was doing well on the job 10 months after her discharge.

Key words: cognitive function | glioma | radiation therapy

NQPC-3

A SHORT-TIME INTENSIVE REHABILITATION FOR BRAIN TUMOR PATIENTS WITH KARNOFSKY PERFORMANCE STATUS OF 60-30

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OBJECTIVE: Brain tumor patients with KPS of 60 to 30 after the initial treatment are not able to spend independent life at home. The goal of this study is to return these patients to their home with minimal family support by delivering intensive rehabilitation to them. Seventy-five brain patients were evaluated every 10 days from the beginning to the end of rehabilitation treatment, according to clinical scales of Functional Independence Measure (FIM) of 1–7 points depending on the degree of independence. The rehabilitation effect was judged by the degree of improvement of 11 out of 13 motor FIM items, excluding stair climbing and bathing movements. When more than half number of the 11 motor FIM items requiring physical assistance (4 points or less) improved up to non-assistance (5 points or more), it was judged as a significant effect. In addition, when all 11 items present with 6 points (independence possible) or more and all 5 of FIM recognition items are 5 points or more (understand the domestic rules), it was judged that the patients acquired independent living ability. RESULTS: 1. Of the 75 patients, 54 (72%) showed a significant effect, and 38 of them (50.7% of the total) aquired independence at home. The acquisition-rate of independent living ability by tumor was 44.7% for 38 malignant gliomas, 53.8% for 13 metastatic tumors, 50% for 14 meningiomas, and 71.4% for 7 vascular tumors, and there was no significant difference between them. 2. The median time to reach the maximum rehabilitation effect was 35 days. CONCLUSION: Intensive rehabilitation for brain tumor patients with KPS of 60 to 30 is effective and should be incorporated into the palliative treatments in the brain tumor treatment guidelines.

Key words: brain tumor | Karnofsky Performance Status | rehabilitation

NQPC-5

DOES HIGH-DOSE METHOTREXATE-BASED CHEMOTHERAPY FOR RELAPSED PRIMARY CNS LYMPHOMA INCREASE A RISK OF LEUKOENCEPHALOPATHY WITH PRIOR WHOLE BRAIN RADIOTHERAPY?

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Backgrounds: Standard care for primary central nervous system lymphoma (PCNSL) comprises high-dose (HD) methotrexate (MTX) -based chemotherapy with or without consolidation whole brain radiotherapy (WBRT). HD-MTX administration following WBRT has been suggested to increase a risk of leukoencephalopathy. However, given that there are no other agents with efficacy similar to or better than MTX, patients with relapsed PCNSL may often be treated with regimens containing HD-MTX if the initial MTX treatment achieved a long-term complete remission. Here, we retrospectively analyzed prevalence and an extent of white mater damages in association with prior WBRT in patients with relapsed PCNSL treated with HD-MTX based therapy. Patients & methods: Among 79 patients with relapsed/refractory PCNSL in a total of 162 patients with newly-diagnosed PCNSL treated in our institution from April, 2000 to February, 2021, 35 patients were identified with evaluable KPS, MMSE, and Fazekas scale data at both baseline and follow-up periods. Of the 35 patients, 22 were treated with chemotherapy at a relapse (10 with prior WBRT, while 12 without WBRT), and were included in this preliminary study. Results: In the WBRT group (male/female: 5/5), median age was 65 years (range, 45–73), initial median KPS was 70 (40–90), and median WBRT dose was 27 Gy (23.4–40). Median progression-free survival (mPFS) was 11.8 months, and median overall survival (mOS) was not reached. In the non-WBRT group (M/F 8/4), median age 75 (62–84), initial mKPS 80 (50–90), mPFS 16.2 m, and mOS not reached. Initial KPS and MMSE score tended to be worse in WBRT group, presumably due to enrichment of patients with poorer performance status and more comorbidities. A decline in the Fazekas score was not associated with MMSE deterioration.Conclusions: The preliminary analysis was not informative enough, and further extensive imaging analysis will be exploited.

Key words: PCNSL | irradiation | leukoencephalopathy

NQPC-7

REHABILITATION PROGRAM TOWARD REINSTATEMENT SUPPORT BASED ON NETWORK CONSTRUCTION AMONG RELATED DEPARTMENTS FOR THE PATIENTS AFTER TREATMENT OF BRAIN DISEASE INCLUDING BRAIN TUMOR

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Introduction: We have conducted a rehabilitation program to support a return to work for patients with brain disease since 2019. The program focuses on independence in the home environment; physical ability for desk work, commuting and conversation; and concentration and executive ability in the office. The "Promotion of Health and Employment Support" document of the Ministry of Health, Labour and Welfare has been used to update the program since May 2021. Here, we report the status of this program.Methods: Patients desiring employment reinstatement attended the program. A doctor first gave an overview. Social workers then used the QLQ-C30/BN-20 questionnaire to assess mental and physical health, a therapist evaluated physical and higher cognitive function, and nurses advised on work-life balance and mental state. This information was used to develop suitable rehabilitation for each patient. The employment situation was surveyed after discharge. Results: The program included 77 patients (55 men, 22 women, mean age 54) from January 2019 to July 2021, after treatment for stroke (n=55), brain tumor (n=14), and traumatic brain injury or other conditions (n=8). FIM (94.2) and MMSE (26.3) at admission indicated that almost all patients were independent in ADL. A return to work was achieved by 25 (83%) of the 30 patients that could be investigated, including all 4 with brain tumors. The period until reinstatement was <1 month in 16 cases, but >1 month in 3 with brain tumors. The program was found useful by 26 patients (86%). Employment reinstatement was not achieved due to company reasons and family circumstances. Only 4 patients were interviewed by an industrial physician. Conclusion: The physical and cognitive functions of patients wishing for employment reinstatement were relatively well maintained. Cooperation with the company, information sharing with an industrial physician, and adjustment to the home environment were also important for reinstatement.

Key words: Reinstatement support | Brain disease | Network construction between medical and company

NQPC-10

(RARE) CANCER PATIENTS' UNMET NEEDS (PATIENT-FOCUSED HEALTHCARE NEEDS) SURVEY

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Background: Rare Cancers Japan (RCJ) consists of members of 20 rare cancer patient groups and individual rare cancer patients, including the Japan Brain Tumor Alliance (JBTA), the Pediatric Brain Tumor Network, and the DIPG Symposium Organizing Committee, and aims to solve the challenges of rare cancers. RCJ, together with the National Cancer Center Japan and the Japan Federation of Cancer Patient Groups is currently conducting a survey to clarify unmet needs of patients, as a follow-up survey to surveys conducted in 2018. Since then, a major paradigm shift happened in Japan, with the advent of genomic medicine and development of new treatments. This study plans to identify the latest unmet needs of cancer patients and to clarify the differences between cancer types to provide data for the improvement of healthcare systems. Purpose: Focusing on unmet needs of cancer patients, we conduct an online questionnaire survey of a total of 1,600 cancer patients (including brain tumor patients) regarding the following endpoints (1) detection and diagnosis, (2) treatment, (3) genomic medicine (access to genetic mutation testing), (4) clinical trials, (5) necessary information, medical care and support systems and (6) quality of life. The collected information will be analyzed to clarify the needs of patients and the nature of patient-centered healthcare. Method: The survey will be administered online, including a mix of open-ended and multiple-choice questions. The total number of questions, including respondent demographics, is 38, and the time required to answer them is expected to be between 15 and 20 minutes. Data analysis will take into account cancer type of cancer, gender, age group and region of residence of the respondent.Expected results: By February 2022, the results of the survey are expected to be available, as basis of discussion to improve brain tumor treatment and follow up, from a multidisciplinary perspective.

Key words: rare cancer | unmet needs | survey