

COT-12

CLINICAL FEATURE OF END-STAGE GLIOBLASTOMAS

Norihiko Saito¹, Nozomi Hirai¹, Naoki Kushida¹, Sho Sato¹, Yu Hiramoto¹, Satoshi Fujita¹, Haruo Nakayama¹, Morito Hayashi¹, Keisuke Ito¹, Satoshi Iwabuchi¹; ¹Department of Neurosurgery, Toho University Ohashi Medical Center, Tokyo, Japan

Glioblastoma is the most common and most aggressive primary brain tumor. Even with optimal treatment, tumors repeatedly recur and grow, eventually invading the entire brain. Few studies have evaluated the pathogenesis and pathophysiology of terminal glioblastoma. In this study, we describe the pathological characteristics of 26 glioblastoma cases (including 18 autopsy cases) that were analyzed from initial treatment to confirmation of death at our hospital. The mean age of the 26 patients was 60.7 years, and mean overall survival was 16.7 months. The interval of clinical symptoms from coma to death was 36.2 days, and the interval from onset of respiratory depression to death was 12 days. Steroids and antiepileptic drugs were often continued after completion of active treatment. Psychiatric symptoms and central fever were observed in patients with intrathecal dissemination, and disease progression was rapid in these patients. These patients presented with a variety of symptoms, including psychiatric symptoms, headache, neck pain, and central fever. In addition, a case of diffuse infiltration from the brain parenchyma to the periventricular area in a patient treated with bevacizumab suggested a possible change in the form of recurrence. In the terminal stage of glioblastoma, hypoxemia due to disturbance of the respiratory center results in progression from impaired consciousness to death. Because convulsive seizures are rare when patients are close to death, continuation of antiepileptic drugs may not be necessary. Although many patients develop local recurrences, new treatments may change the mode of recurrence or alter tumor cell characteristics. The number of patients receiving home care and end-of-life care has recently been increasing because of medical improvements, such as home care. Further study of the pathophysiology of glioblastoma may yield better end-of-life care.

Key words: glioblastoma | end-stage | autopsy

COT-13

LUMINANCE ANALYSIS OF 5-AMINOLEVULINIC ACID USING IMAGE J FOR MALIGNANT BRAIN TUMOR

Takashi Kon¹, Yusuke Kobayashi¹, Yusuke Sato¹, Katsuyoshi Shimizu¹, Tohru Mizutani¹; ¹Department of Neurosurgery, Showa University School of Medicine, Tokyo, Japan

Purpose: For malignant brain tumor surgery, photodynamic diagnosis (PDD) with 5-aminolevulinic acid (5-ALA) is useful for maximal removal of the tumor. Although it has the advantage of identifying the presence or absence of residual tumors during surgery, there are variations in positive rates, and the classification is limited, based on visual inspection such as Stummer's classification (strong, vague, none). We analyzed the luminance of positive findings using software Image J for brain tumor surgery using 5-ALA, and we report the results. Materials and Methods: From April 2018 to March 2021, 31 patients with suspected malignant glioma before surgery were included. Intraoperative 5-ALA positive findings were analyzed by software Image J (Wayne Rasband: NIH), the luminance was measured with a histogram, and compared the maximum luminance titer. Results: Among the positive cases, the average maximum luminance value for malignant glioma was 101 (50–168), which consisted of 11 cases of Glioblastoma, 1 case of Oligodendroglioma, and 1 case of anaplastic astrocytoma. The average maximum brightness of metastatic brain tumors is lower than that of malignant gliomas, even if they are visually strong, 83.5 (28–121). Conclusions: Even if it is visually strong in the conventional Stummer classification, it may be possible to classify in detail by analyzing luminance with Image J. In addition, more objective index is necessary to classify the vague findings.

Key words: 5-ALA | malignant brain tumor | fluorescence—guided surgery

COT-16

DEVELOPMENT OF AUTOMATIC LESION EXTRACTION APPLICATION USING ARTIFICIAL INTELLIGENCE FOR THE PURPOSE OF SIMPLIFYING TUMOR VOLUME MEASUREMENT OF MENINGIOMA

Ryuichi Hirayama¹, Takamitsu Iwata¹, Shuhei Yamada¹, Hideki Kuroda¹, Tomoyoshi Nakagawa¹, Noriyuki Kijima¹, Yoshiko Okita¹, Naoki Kagawa¹, Haruhiko Kishima¹; ¹Department of Neurosurgery, Osaka University School of Medicine, Suita, Osaka, Japan

BACKGROUND: With the widespread use of MRI equipment and brain scans, opportunities to perform follow-up examinations for meningiomas have increased. On the other hand, an objective evaluation index for meningiomas characterized by slow changes on imaging has not been established. To establish a volume-based evaluation index for meningiomas,

we are developing an application for automatic lesion extraction using artificial intelligence as a highly reproducible tumor volume measurement technique that enables large volume image data processing. METHODS: In this study, 195 patients with meningioma who underwent contrast-enhanced MRI imaging at Osaka University Hospital were included. The images were manually extracted by three neurosurgeons and used as supervised data. deeplabV3 was used as the learning network. All the supervised data were randomly divided into training (80%) and testing (20%) data, and the application was constructed by deep learning and validation with 5-fold cross-validation. The matching rate of the area of the region automatically extracted by the device against the test data and the mean square error rate of the calculated tumor volume were used as indices of the product measurement performance. RESULTS: The matching rate using the automatic extraction application for the correct data (Dice index) was 91.5% on average. The mean squared error rate of the tumor volume calculated from these extracted regions was 8.84%. CONCLUSION: We consider that this application using artificial intelligence has a certain degree of validity in terms of the accuracy of extracted lesions. In the future, it is necessary not only to improve the performance of the equipment but also to clarify the clinical significance of the new imaging biomarkers based on tumor volume that can be obtained from these lesion extraction techniques.

Key words: Meningioma | Automated volumetry | Artificial intelligence

COT-18

TRENDS IN PRIMARY BRAIN TUMORS IN KUMAMOTO PREFECTURE WITH DECLINING BIRTHRATE AND AGING POPULATION - KUMAMOTO PREFECTURE BRAIN TUMOR EPIDEMIOLOGICAL SURVEY

Naoki Shinoyama¹, Takashi Itoyama¹, Akitake Mukasa¹; ¹Department of Neurosurgery Kumamoto University Hospital, Kumamoto, Japan

Backgrounds: The demographic characteristics of Kumamoto Prefecture are that there is little population movement and the total population remains constant at about 1.8 million, but in recent years the birthrate is declining and the population is aging. We have been conducting the Kumamoto Prefecture Brain Tumor Epidemiological Survey since 1989 in cooperation with neurosurgical institutions in the prefecture. In this study, we examined whether recent demographic changes have affected the incidence of primary brain tumors (BT). Methods: Patients with primary BT were collected annually from 44 institutions in Kumamoto Prefecture (as of 2020), and the number of incidences per 100,000 population was calculated for each BT for each year, excluding patients living outside the prefecture and duplicate cases. Results: The total number of primary BT was 11441 (top 3: meningioma 40%, pituitary adenoma 17%, glioma 17%). Of 4261 men with primary BT, the top 3 were meningioma (27%), glioma (23.7%), and pituitary adenoma (18.4%), and 7180 women (top 3: meningioma (47.7%), pituitary adenoma (16.2%), and glioma (12.9%)). The number of primary BT increased every year, and the incidence increased significantly when comparing 1989–2004 and 2005–2020 (13.6 vs. 25.0/100,000, p<0.000001). Typical brain tumors (meningioma, pituitary adenoma, glioma, schwannoma, malignant lymphoma) also increased year by year, especially asymptomatic meningioma. The median age of asymptomatic meningiomas was significantly higher than that of symptomatic meningiomas (69 vs. 65 years, p<0.0001). Gliomas increased significantly in the later stages compared with the early stages in children (0–14 years) and the elderly (65 years and older). Conclusion: Our results suggest that an increase in the number of BT such as glioblastoma, which are more common in the elderly, as well as an increase in the number of opportunities for intracranial examinations in the aging of the population may be responsible for the increased incidence of primary BT.

Key words: Kumamoto Prefecture Brain Tumor Epidemiological Survey | low birthrate and longevity | primary brain tumor incidence

COT-28

QUESTIONNAIRE SURVEY REGARDING WORKING CONDITION OF THE MEMBERS BELONGS TO THE JAPAN SOCIETY FOR NEURO-ONCOLOGY (JSNO) BY THE GENDER EQUALITY AND DIVERSITY COMMITTEE OF THE JSNO, 2021

Takamitsu Fujimaki^{1,2}, Kaoru Tamura^{1,2}, Tatsuya Abe^{1,2}, Mitsutoshi Nakada^{1,2}, Akiko Higuchi^{1,2}, Yuko Watanabe^{1,2}, Motoo Nagane²; ¹Gender Equality and Diversity Committee of the Japan Society for Neuro-oncology, ²Japan Society for Neuro-oncology

Gender Equality and Diversity Committee (“Women and Diversity in Neuro-oncology - WING”) of the Japan Society for Neuro-oncology (JSNO) was established in November 2020 with the aim of supporting and providing better opportunities for diverse members including women in JSNO. In order to achieve this goal, the JSNO and WING planned to conduct a questionnaire survey of all members in the fall of 2021 to investigate the actual situation of members. The targets of this study were clinicians, basic researchers, nurses and allied health professionals including