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INTRODUCTION: Cerebellar glioblastoma (cGBM) is extremely rare, accounting for 0.7–0.9% of all gliomas. Few studies have reported on clinical course, histopathology, and prognosis. In this report, we discussed cases which were diagnosed as cGBM, and were treated in our institute. Materials and Methods. We retrospectively analyzed 9 cGBMs (age ranged 41 to 85 years, median 69), operated at our institute after 2010 January, and evaluated their <MGMT> promoter methylation, <IDH1> mutation, and Copy Number Variation status detected by methylation-specific PCR (MSP), DNA sequencing or immunohistochemistry, and Multiplex Ligation-dependent Probe Amplification (MLPA), respectively. RESULTS: All patients underwent resection; 3 gross total resections (GTRs, 33%), 2 subtotal resections, 4 partial resections, with relatively low achievement of GTR. The tumor location predominated in the cerebellar hemisphere (7 patients, 78%) over vermis (2). One patient had brain stem invasion. After surgery, 8 patients received temozolomide (TMZ) and radiotherapy (RT), while did only one RT alone. After recurrence, three patients were treated with bevacizumab monotherapy, and other three received either TMZ and RT, TMZ and ACNU, or TMZ monotherapy. The median progression-free survival (PFS) was 12.0 months, and the median overall survival (OS) was 17.1 months. Five patients (56%) were <MGMT> methylated, whereas all were <IDH1>wild-type. <PTEN> deletion was negative in all patients. <EGFR> amplification and combined <PDGFR> amplification and <CDKN2A> deletion were found in one patient each. DISCUSSION: Despite the lower rate of GTR, there was a tendency of longer PFS compared to supratentorial GBM (sGBM). The clinical course after recurrence was unfavorable, and OS thereafter was similar to that of sGBM. cGBMs appeared to lack the typical genetic mutations occurred in sGBM, suggesting that cGBMs might be stimulated with different regulatory cellular signals.

BT-10

A RARE CASE OF RADIATION-INDUCED GLIOBLASTOMA 29 YEARS AFTER TREATMENTS OF GERMINOMA

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BACKGROUND: Germinoma is one of the most radiosensitive tumors. Although radiotherapy (RT) can lead to long term-survival, it has the possibility to cause adverse effects. One of the more serious side effects include radiation-induced tumors that can contribute to a life-long prognosis. Case presentation: A 40-year-old man was diagnosed with left basal ganglia germinoma at the age of 11 years old. Postoperatively, he received whole-brain radiotherapy 40Gy, focal radiotherapy 9.26Gy, and craniospinal irradiation. After these treatments, he was free from tumor recurrence or a secondary tumor during the long-term follow up. However, after 29 years, he began experiencing aphasia. A Magnetic Resonance Imaging (MRI) showed a developing 4.5cm round mass in the left parietal lobe with marked surrounding edema. He underwent surgical resection of the tumor at the left partial lobe. Pathological examination showed the tumor to consist of unclear pleomorphism, and the diffuse proliferation of heterocyst. Therefore, the pathologic diagnoses concluded as glioblastoma (Ki-67 labeling index was 50%). Conclusion: The tumor developed in the previously irradiated field, and it was not present prior to the RT. He did not suffer from pathologies favoring the development of the tumor. The interval between the radiation exposure and the onset of the second tumor was approximately 29 years, and the histotype of the tumor differed from the original tumor. Considering these clinical features, we diagnosed the glioblastoma as a radiation-induced tumor. Radiation-induced malignant glioma occurs frequently in patients after the treatment for acute lymphoblastic leukemia. Therefore, the radiation-induced malignant glioma after the treatment for germinoma is rare. Regardless of age, histology, and RT dosages, the patient has the possibility to develop radiation-induced malignant glioma. In conclusion, it is necessary to have careful monitoring even after 20–30 years of RT.

RARE CASE SERIES (CS)

CS-01

GIANT CELL TUMOR IN THE SKULL BASE BONE TREATED WITH ANTI-RANKL INHIBITOR

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Giant cell tumor of bone is a rare and osteolytic neoplasm that that usually affecting the epiphyses in long bones of the extremities. They seldom occur in the skull, preferentially affecting the sphenoid and temporal bones. Most pathologically benign, and total removal by surgery was regarded as the first treatment, however, it was very difficult in skull lesion. In 2014 the molecular targeting drug anti-RANKL inhibitor was approved in Japan. We report a case in which an anti-RANKL inhibitor was administered to a skull base bone giant cell tumor that was difficult to remove completely. A 56-year-old man with a sudden right neck pain followed by dysphoria and dysphagia was referred to our hospital. Computed tomography showed 4.4 x 2.0 cm osteolytic lesion involving the right occipital bone and occipital condyle. Magnetic resonance imaging demonstrated an extensive soft-tissue mass occupying. Surgical biopsy was performed and the pathological diagnosis was giant cell tumor. Patient received the anti-RANKL inhibitor (Denosumab®). After 4 weeks, ossification was observed, and neurological symptoms were improved after 12 weeks. Patient has been on good course for 5 years without recurrence and is still following-up.

CS-02

CLINICAL AND MOLECULAR ANALYSIS OF ASTROBLASTOMAS

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Astroblastoma is extremely rare brain tumor which mostly arise in cerebral hemisphere of children and young adult. Limited data exists on its clinical feature and molecular analysis. We recently experienced two female patients with astroblastoma in the cerebrum.

Case 1 is three-year-old girl. She developed left hemiparesis. CT and MRI revealed large supratentorial mass with cystic component and calcification. Gross total removal was achieved. She is well without recurrence on MRI one year after surgery. Case 2 is 42-year-old lady. She developed partial seizure. CT and MRI revealed a mass with ring-enhancement in the left temporal lobe. Gross total removal was achieved under awake craniotomy. She is well without recurrence on MRI six months after surgery. Pathologic examination of both patients showed pseudorosette formation of tumor cells around vasculature. Molecular analysis revealed rearrangement of MN-1 in case 1 but not in case 2. Case 2 showed BRAF V600E mutation and loss of CDKN2A/2B. Both patients received no adjuvant therapy.

Prognosis of astroblastoma varies and standard of treatment is not established. Gross total resection is associated with increased survival, but the role of adjuvant chemotherapy and radiation therapy are controversial. Advances in molecular analysis will lead to establish molecular classification and risk-adapted treatment strategy.

CS-03

LARGE CYSTIC INTRADURAL SCHWANNOMA IN CERVICAL REGION: A CASE REPORT

Yuki Takeshima[1], Tatsuya Takezaki, Tadashi Hamasaki, Seiji Tajiri[1], Akitake Mukasa; [1]Minamata City General Hospital and Medical Center, Kumamoto, Japan

Schwannomas are the most common intradural extramedullary spinal tumors. However, they are usually solid tumors, and totally cystic changes are rare. Herein, we report a case of a 46-year-old male presenting with numbness of right limbs, right hemiplegia, and posterior neck pain for one year. MRI revealed a well-defined cystic long-segment, from C1 to C6, intradural extramedullary mass. The lesion showed hypointense on T1WI, hyperintense on T2WI, hyperintense on DWI, and it was marginally enhanced on the contrast image with Gd-DTPA. C1 laminectomy and hemi-laminectomy from C2 to C6 was performed for tumor resection. The tumor was found to be totally cystic and tensed with a jelly-like content. It was completely resected with the attachment of the C3 dorsal root. Histopathological examination confirmed it to be a schwannoma. The mechanism of cyst formation in schwannoma is considered as results of ischemic necrosis associated with tumor growth, or cystosis due to degeneration of Antoni-type B region. The long-segment, totally cystic intradural cervical schwannoma is rare, bit it should be included in the differential diagnosis of a cystic mass in the spinal region. It can be difficult to distinguish cystic spinal schwannomas from other cystic lesions like arachnoid cyst, epidermoid cyst, and neurenteric cyst. Contrast enhanced MRI is useful by enhancing the margin of the tumor.

CS-04

INTEGRATED CLINICAL, HISTOPATHOLOGICAL, AND MOLECULAR DATA ANALYSIS OF 190 CENTRAL NERVOUS SYSTEM GERM CELL TUMORS FROM THE IGCT CONSORTIUM

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Ryo Nishikawa, Masao Matsutani, Koichi Ichimura[1]; [1]Division of Brain Tumor Translational Research, National Cancer Center Research Institute, Tokyo, Japan

BACKGROUND: We integrated clinical, histopathological, and molecular data of central nervous system germ cell tumors to provide insights into their management. METHODS: Data from the Intracranial Germ Cell Tumor Genome Analysis Consortium were reviewed. A total of 190 cases were classified as primary GCTs based on central pathological reviews. RESULTS: All but one of the cases that were bifocal (neurohypophysis and pineal glands) and cases with multiple lesions including neurohypophysis or pineal gland were germinomas (34 of 35). Age was significantly higher in patients with germinoma than other histologies. Comparison between tumor marker and histopathological diagnoses showed that 18.2% of histopathologically diagnosed germinomas were marker-positive and 6.1% of non-germinomatous GCTs were marker-negative, suggesting a limitation in the utility of markers or histopathology alone using small specimens for diagnosis. Comparison between local and central histopathological diagnoses revealed a discordance of 12.7%. Discordance was significantly less frequent in biopsy cases, implying difficulty in detecting all histopathological components of heterogeneous GCTs. Germinomas at the typical sites (neurohypophysis or pineal gland) showed a better PFS than those at atypical sites (p=0.03). A molecular-clinical association study revealed frequent MAPK pathway mutations in males (51.4 vs 14.3 %, p=0.007), and PI3K/mTOR pathway mutations in basal ganglia cases (p=0.004). Basal ganglia cases also had frequent chromosomal losses. Some chromosomal aberrations (2q, 8q gain, 5q, 9p/q, 13q, 15q loss) showed potential prognostic significance.

CONCLUSIONS: These in-depth findings of this study regarding the clinical and molecular heterogeneity will increase our understanding of the pathogenesis of this enigmatic tumor.

CS-05

EXTRA-PARENCHYMAL (PERIPHERAL) ATYPICAL TERATOID / RHABDOID TUMORS

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AT/RT is a malignant embryonal tumor reported by Rorke in 1996. Authors reported first AT/RT in Japan in 1998. This tumor entity was included as new malignant embryonal tumor in WHO 2000, and tumors of Japanese patients has been reported more than 60 cases in the past. This AT/RT is a tumor in the brain parenchyma that a medulloblastoma and PNET and the possibility that it has been misdiagnosed have had pointed out. On the other hand, it is reported that there is the type that we should call peripheral AT/RT which rarely occurs in extra-parenchyma. We want to propose that there is such special tumor group. In the results, age: 6 infants were main (2nd - 14 years old after birth). tumor location: 6 sellar region, 3 civuses, 2 petrous bone or cerebellum and 2 conexities. treatment: duration of survival significantly improved all macroscopic tumor resection by the operation, but, in small pontine part AT/RT, an outcome tended to be poor. On the other hand, in AT/RT which occurred in the sellar region, all cases adult woman tended to have good prognosis. It is necessary for AT/RT (central AT/RT) in the brain to recognize that there is extra-parenchymal AT/RT (peripheral AT/RT) tumor which we reported this time which came to be recognized widely.

CS-06

A CASE OF GLIOBLASTOMA METASTATIC TO THE LUMBAR VERTEBRA

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BACKGROUND: Most cases of glioblastoma recur within one year even under the standard treatment of surgical resection, radiation therapy and chemotherapy. 60–70% of recurrences are local, and in rare cases of metastasis, most are within the CNS. Extradural metastasis is considered exceedingly rare. CASE REPORT: We present a 21-year-old man post total resection of right parietal lobe glioblastoma, diagnosed with lumber metastasis. He originally presented with impaired consciousness and left hemiplegia at the age of 20 and underwent gross total resection of the tumor. Pathology was IDH wild type, H3F3A K34R/V wild-type glioblastoma. Radiotherapy and adjuvant temozolomide per the Stupp regimen as well as infusion of bevacizumab were conducted. 6 months after the resection of tumor, the patient presented with severe back pain. Radiographic studies showed an osteolytic mass on the first lumbar vertebrae, and needle biopsy was consistent with glioblastoma. Posterior spinal fusion, internal decompression and radiotherapy were conducted to relieve the pain. At 3 months after the diagnosis of lumbar metastasis, he is currently treated with temozolomide and bevacizumab, without the enlarging of the tumor. DISCUSSION: As far as we investigated, there has been 30 cases of vertebral metastasis of glioblastoma reported in literature. Considering the biological obstacles that prevent glioblastomas from infiltrating outside of the CNS, it can be speculated that deposition of tumor cells into the blood stream or excision of the dura due to surgical interventions may attribute to extracranial metastasis. Due to the improvement of overall survival of glioblastoma, vertebral metastasis is suspected to be more common. Therefore, investigation of its risk factors and standardization of its treatment is necessary. CONCLUSION: We reported a case of lumbar metastasis of glioblastoma. Extradural metastasis of glioblastoma must be included in differential diagnoses in treating patients with glioblastoma.

CS-07

A CYSTIC LONG-SEGMENT CERVICAL SCHWANNOMA: A CASE REPORT

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Schwannomas are the most common intradural extramedullary spinal tumors. However, they are usually solid tumors, and totally cystic changes are rare. Herein, we report a case of a 46-year-old male presenting with numbness of right limbs, right hemiplegia, and posterior neck pain for one year. MRI revealed a well-defined cystic long-segment, from C1 to C6, intradural extramedullary mass. The lesion showed hypointense on T1WI, hyperintense on T2WI, hyperintense on DWI, and it was marginally enhanced on the contrast image with Gd-DTPA. C1 laminectomy and hemi-laminectomy from C2 to C6 was performed for tumor resection. The tumor was found to be totally cystic and tensed with a jelly-like content. It was completely resected with the attachment of the C3 dorsal root. Histopathological examination confirmed it to be a schwannoma. The mechanism of cyst formation in schwannoma is considered as results of ischemic necrosis associated with tumor growth, or cystosis due to degeneration of Antoni-type B region. The long-segment, totally cystic intradural cervical schwannoma is rare, but it should be included in the differential diagnosis of a cystic mass in the spinal region. It can be difficult to distinguish cystic spinal schwannomas from other cystic lesions like arachnoid cyst, epidermoid cyst, and neurenteric cyst. Contrast enhanced MRI is useful by enhancing the margin of the tumor.

CS-08

A CASE OF CD 57 NEGATIVE OLFACTORY GROOVE SCHWANNOMA IN WHICH SCHWANN / 2 E AND SOX10 WAS USEFUL FOR DISTINGUISHING FROM OEC TUMOR: A CASE REPORT AND REVIEW OF THE LITERATURES

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INTRODUCTION: In the case of the differentiate between olfactory groove schwannomas(OGS) and olfactory ensheathing cell (OEC) tumors, CD57 which is the marker which is specific for Schwann cell is useful. We experienced a case of OGS that was negative for CD57. CASE PRESENTATION: This case was a 13-year-old girl. Medical history: She visited the pediatric department with a chief complaint of headache. On the magnetic resonance image (MRI), a tumorous lesion was found in the anterior skull base and was referred to our department. No dysosmia, visual impairment, or cafe au lait spots were observed. Past history: As a medical history, she has developed acute lymphocytic leukemia at the age of 1 and has achieved complete remission after chemotherapy. At that time, radiation treatment to the head was not performed. Neuroradiological findings: The tumor was strongly enhanced heterogeneously in Gadolinium (Gd) enhanced MRI and the angiography showed hypovascular. Progress after hospitalization: The tumor was clearly demarcated from the surrounding brain surface and adhered strongly to the cribriform plate. Eventually, all tumors were removed and the patient was discharged on the 10th postoperative day. Five years have passed since the operation, and no recurrence of the tumor has been confirmed by MRI. Pathological findings: Antoni A and Antoni B were seen by Hematoxylin & Eosin (H & E) staining. Immunostaining showed S-100 strong positive, Schwann / 2E and Sox10 positive, and CD57 negative. Discussion: In our case, CD57 (Leu7) was negative, but Schwann / 2E and Sox10 were positive, so OGS was diagnosed. CONCLUSION: We experienced a case of OGS that was negative for CD57 (Leu7) but positive for Schwann / 2E and Sox10. For pathological differentiation between OGS and the OEC tumor, Schwann / 2E and Sox10 immunostaining would also be necessary in addition to H & E stain and CD57 (Leu7).