scores of 48 LGG patients on a prospective, longitudinal study. General linear mixed models evaluated change in cognitive scores over time. RESULTS: The sample included 16 patients treated with PRT and 32 with SO (median follow-up: 3.1 years, range 0.9–6.1). Median age of PRT patients was 8.2 years at diagnosis (range 1.0–14.4) and 9.4 years at PRT (range 4.2–16.7). 13 PRT patients also received surgery: 53.8% biopsy, 30.8% subtotal resection, 15.4% gross total resection. Tumor sites included: 31.2% hypothalamic/suprasellar, 25.0% optic chiasm, 17.5% other. Median age of SO patients was 8.2 years at diagnosis (range 2.9–18.6). Surgical outcomes were: 75.0% gross total resection, 21.9% biopsy/other. There were no group differences in diagnosis age, tumor volume, or shunt history (all p>0.05). Both PRT and SO groups displayed stable cognitive functioning over time (all p>0.01). Slopes (i.e., change in scores over time) did not differ between groups (all p>0.1). Age at treatment was not associated with slope or performance at last follow-up in either group (all p>0.05). CONCLUSIONS: We observed stable cognitive functioning, independent of age at treatment, following PRT for LGT. Outcomes were similar to patients receiving surgery only. Further examination in a larger sample is warranted.

RONC-13. RADIATION INDUCED BRAIN STEM GLIOMA AFTER RADIATION THERAPY FOR MIXED GERM CELL TUMOR Natsumi Yamamura, Masahiro Nonaka, and Akio Asai; Kansai Medical University, Osaka, Japan

We report a case of radiation-induced glioma in the pons after radiation therapy for germ cell tumor. A 17-year-old man was diagnosed as HCG and PLT, the primary germ cell tumor at the age of 9. The tumor was located in the suprasellar region, which filled up most part of the third ventricle. Five courses of chemotherapy with cisplatin, etoposide, and cyclophosphamide, and whole ventricle plus local radiation therapy (total 51.2 Gy / 32Fr) were performed. After the treatment, most part of the tumor was regressed, and only small enhanced lesion remained. Six years after the treatment, he started to be ataxic, and worsened. An MRI revealed an enhanced lesion in the pons. Lesion biopsy was performed via the right cerebellar peduncle. Pathological diagnosis confirmed the lesion as high grade glioma. He underwent extended local radiation therapy (50.4 Gy / 28 Fr) and administered temozolomide. Later, bevacizumab was added, and 3 months after treatment started, the size of the tumor was reduced and his symptoms were improved. He established treatment for radiation induced glioma. However, additional radiation therapy, temozolomide and bevacizumab appears to be useful to reduce tumor size and resolve the symptoms, even if it is transient.

RONC-15. OUTCOMES OF BRAIN AND SKULL-BASE TUMOURS IN ADOLESCENTS AND YOUNG ADULTS TREATED WITH PENCIL BEAM SCANNING PROTON THERAPY Kari-Liisa Lemmetyinen, Jari Trani, Stephanie GC Kroese, Alessia Pica, Jan HBracke, Barbara Bachtary, Marc Walsler, Anthony J Lomax 1,4, and Damien C Weber 2,4; 1University College London Hospitals, London, United Kingdom, 2Centre for Proton Therapy, Paul Scherrer Institute, Villigen, Switzerland, 3University of Zürich, Zürich, Switzerland, 4ETH, Department of Physics, Zürich, Switzerland

BACKGROUND: The use of highly conformal proton therapy in adolescents and young adults (AYAs) for management of brain/skull-base tumours is becoming increasingly common. This study aims to assess the long-term clinical outcomes, prognostic factors and employment status of AYAs (13–39 years) treated with pencil-beam-scanning proton therapy (PT). METHODS: Between 1997–2018, 176 AYAs were treated with PT at the Paul Scherrer Institute. Median age was 30 years (range, 15–39) and the male/female ratio was 0.8. RESULTS: After a median follow-up of 66 months (range, 12–236), 24 (13.6%) local failures and 1 (0.6%) distant failure were observed between 6 and 152 months after PT. The most common histologies treated were chordomas/chondrosarcomas (61.4%), followed by meningiomas (14.2%) and gliomas (15.3%). The 6-year local control rate was 83.2%, 97.4% and 90.2% respectively. On univariate analysis, age ≥24 years was a negative prognostic factor for LC and OS. The 6-year ≥G3 PT-related late toxicity rate was 37.8% G2, 12.2% G3, 0.6% G4 and 0.6% G5. No secondary malignancies were observed. The unemployment rate was 7.3% at PT, rising to 21.5% at survival. High-grade(G3) toxicity rate in the employed vs employed group was 21% vs 8.5%. CONCLUSION: PT is an effective treatment for AYAs with brain/skull-base tumours with good tumour control and acceptable long-term toxicity. Despite having satisfactory clinical outcomes, around 1 in 4 AYAs surviving brain/skull base tumours are unemployed.

RONC-16. PROTON BEAM THERAPY FOR PATIENTS WITH INTRACRANIAL EPENDYMOMA UNDER 3 YEARS OLD: INITIAL CLINICAL OUTCOMES Mayuko Adachi, Shigeru Yamaguchi, Takashi Mori 1,4, Akihiro Iiguchi 1, Yukitomo Ishi 2, Hiroaki Motoi 2, Rikuya Onuma 3, Atsushi Manabe 1, Shinichi Shimizu 1, and Hidetumi Aoyama 2; 1Department of Radiation Medicine Science and Engineering, Hokkaido University School of Medicine, Sapporo, Japan, 2Department of Neurosurgery, Faculty of Medicine, Hokkaido University, Sapporo, Japan, 3Department of Oral Radiology, Faculty of Dental Medicine, Hokkaido University, Sapporo, Japan, 4Department of Therapeutic Radiology, Faculty of Medicine, Hokkaido University, Sapporo, Japan, 5Department of Pediatrics, Hokkaido University Graduate School of Medicine, Sapporo, Japan

BACKGROUND: Proton beam therapy (PBT) provides dosimetric benefits in sparing normal tissue when treating pediatric patients with brain tumors. We report the preliminary clinical outcomes of surgery and adjuvant PBT for patients under 3 years old diagnosed as intracranial ependymoma at our institute. METHODS: This is a retrospective review of the medical records for 3 children with ependymoma in the fourth ventricle, diagnosed between March 2013 and September 2019. PBT was performed after tumor resection in all the patients. RESULTS: Gross total resection was achieved in 2 males and 1 female patient with fourth ventricle WHO grade II to III ependymoma at 15, 18, and 37 months old. All the patients are alive without recurrence. No serious late adverse events were observed in any of the patients. CONCLUSION: The number of patients in this study remains small for drawing any definite conclusion, however our preliminary results are still encouraging. Further studies of a large number of pediatric patients with long term follow-up are needed to more fully assess tumor control and late adverse events.

RONC-17. STEREOTACTIC RADIOSURGERY FOR SPINE METASTASES IN PEDIATRIC MALIGNANCIES Kristina Woodhouse 1, Victor Albornoz Alvarez 2, David Boyce 1, Debra Yehbo 1, David Burrowshave 1, Tim Brown 1; 1Department of Radiation Medicine Science and Engineering, Hokkaido University School of Medicine, Sapporo, Japan, 2Department of Radiation Medicine Science and Engineering, Hokkaido University, Sapporo, Japan

BACKGROUND: Spine stereotactic radiosurgery (SRS) is a non-invasive technique that delivers ablative radiotherapy for optimal control of bony disease. While SRS is known to provide excellent local control, the role of SRS for minimizing toxicity in the pediatric setting remains small for drawing any definite conclusion, however our preliminary results are still encouraging. Further studies of a large number of pediatric patients are needed. PURPOSE: To evaluate SRS in pediatric patients with spinal metastases. METHODS: A retrospective review of patients (<18 years) treated with SRS at MDACC was performed after IRB approval. Descriptive statistics were utilized for analysis. RESULTS: From 2011–2019, 12 metastatic osseous sites (3 cervical, 4 thoracic, 5 lumbar-sacral) in 9 patients were treated. Median follow-up was 9 months (range 2–41). Six males (67%) and 3 females (33%) all KPS ≥70, received radiation to 53 contiguous vertebral bodies. Median age was 16 years (range 8–18). No patients required sedation. Histologies included 7 osteosarcomas, one rhabdomyosarcoma and one Ewing’s sarcoma. Metastatic epidural spinal cord compression scores ranged from 0 (6), 1b (3) and 3 (3). No site had surgery prior to SRS and one site received prior conventional radiation. SRS doses included 24 Gy in 1 fraction (7), 24–27 Gy in 3 fractions (4) and 50 Gy in 5 fractions (1). Six-month LC was 83% with one local failure following 27 Gy. OS at 6 and 12 mo were 53% and 23%. There was no grade ≥3 acute toxicity, no radiation myelopathy or vertebral compression fractures. CONCLUSION: In this initial report, SRS represents a promising modality that is well tolerated and provides excellent LC. However, further follow-up is warranted in the pediatric setting.

RONC-18. ANALYSIS OF BRAIN TUMOR INDUCED BY IRRADIATION IN CHILDHOOD - A SINGLE INSTITUTIONAL ANALYSIS Takashi Sano, Kaoru Tamura, Mase Kuroha, Kazutaka Sumita, Yuki Arai, Takashi Sugawara, Motoki Inaji, Yos Tanaka, Tadasu Naitai, and Taketoshi Maehara; Department of Neurosurgery, Tokyo Medical and Dental University, Bunkyo, Tokyo, Japan

BACKGROUND: Radiation-induced brain tumors are rare tumors that appear during long-term follow-up after radiation therapy. Children are at greater risk for radiation-induced brain tumors than adults. The clinical characteristics of radiation-induced brain tumor treated at our hospital
were retrospectively examined. PATIENTS AND METHODS: Clinical characteristics of seven radiation-induced brain tumors that developed in 6 patients irradiated in their childhood at our hospital were analyzed. The background disease, age at irradiation, irradiation dose, and time from irradiation to onset, pathological diagnosis, and treatment for radiation-induced brain tumor were examined. RESULTS: Background diseases for irradiation were leukemia in 3 patients, germinoma in 2, medulloblastoma in 1, and stage cranial irradiation dose was 33.2 Gy. The patients tended to be young at irradiation (2-17 years; median:4 years old). The time between irradiation and the onset of radiation-induced brain tumors ranged from 9.5 to 39.1 years (median:28 years). Radiation-induced brain tumors comprised 6 meningioma ( grade I-3, grade II:1 ) and 1 high-grade gliomas. All patients underwent surgical removal of the radiation-induced brain tumors and 2 received additional irradiation. During a median of 5.3 years of follow-up after the diagnosis of radiation-induced brain tumors, 2 underwent second surgery, while the remaining 4 have no recurrence. DISCUSSION: In most cases, radiation-induced brain tumors occur for a long time after irradiation in childhood. Monitoring of radiation-induced brain tumors as well as primary tumor recurrence was considered important.

RCON-19. TWO CASES OF RE-IRRADIATION FOR LATE RECURRENT OR RADIATION-INDUCED TUMOR AFTER RADIATION THERAPY FOR PEDIATRIC BRAIN TUMORS

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BACKGROUND: As the outcome of pediatric brain tumors improves, late recurrence and radiation-induced tumor cases are more likely to occur. We report on the number of cases requiring re-irradiation is expected to increase. Here we report two cases performed intracranial re-irradiation after radiotherapy for pediatric brain tumors. CASE 1: 21-year-old male. He was diagnosed with craniohypophyseoma at eight years old and underwent resection. At 10 years old, the local recurrence of the suprasellar region was treated with 50.4 Gy/28 fr of stereotactic radiotherapy (SRT). After that, other recurrent lesions appeared in the left cerebellumopine angle, and he received surgery three times. The tumor was gross totally resected and re-irradiation with 40 Gy/20 fr of SRT was performed. We have found no recurrence or late effects during the one year follow-up. CASE 2: 15-year-old female. At three years old, she received 18 Gy/10 fr of craniospinal irradiation and 36 Gy/20 fr of boost to the posterior fossa as postoperative irradiation for anaplastic ependymoma. However, a anaplastic meningioma appeared on the left side of the skull base at the age of 15, and 50 Gy/25 fr of postoperative intensity-modulated radiation therapy was performed. Two years later, another meningioma developed in the right cerebellar tonsil with 54 Gy/30 fr of SRT. At 5 years old, MRI revealed a slight increase of the lesion, but no late toxicities are observed. CONCLUSION: The follow-up periods are short, however intracranial re-irradiation after radiotherapy for pediatric brain tumors were feasible and effective.

RCON-20. RECURRENT HIGH-GRADE ASTROBLASTOMA TREATED WITH STEREOTACTIC RADIOTHERAPY

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INTRODUCTION: Astroblastoma is a rare, mostly supratentorial glial tumor, occurring predominantly in children and young adults. However, treatment strategies have not yet been established for this rare disease. CASE PRESENTATION: A 6-year-old male presented with headache and left-side weakness. MRI revealed a left frontal mass lesion with slight edema and macrocalifications. Gross tumor resection was performed. Histological examination found neoplastic cells with astroblastic characteristics, and a striking perivascular array of pseudorosettes. The final diagnosis was high-grade astroblastoma. MR imaging 13 months after surgery suggested local recurrence and enlargement was found 3 months later. Stereotactic radiotherapy (SRT) was performed. MR imaging after SRT showed enhanced cyst formation around the tumor bed, suggesting pseudoprogression. However, MR imaging at 3 months after chemotherapy PET/CT revealed no evidence of radiation necrosis. The last follow-up MR imaging 15 months after SRT showed no further recurrence. CONCLUSION: Astroblastoma is rare, so no optimal management is known. SRT may be effective to treat recurrent astroblastomas. 1C-methionine PET/CT is useful for the differentiation from radiation necrosis.