LGG-38. GENETIC ANALYSIS OF NEUROEPITHELIAL TUMORS IN THE PEDIATRIC AND ADOLESCENT AND YOUNG ADULT AGE IN A SINGLE INSTITUTE

Yasuhide Makino[1,2], Takeshi Kawauchi[1,3], Yoshiki Arakawa[1], Tomoko Shofuda[2], Ema Yoshioka[2], Masahiro Tanji[1], Yohei Mineharu[1], Yonehiro Kanemura[2], and Susumu Miyamoto[1]; [1]Department of Neurosurgery, Kyoto University, Kyoto, Japan, [2]Department of Clinical Research, Osaka National Hospital, Osaka, Japan, [3]Department of Clinical, Osaka, Japan

Molecular diagnosis in brain tumors has been widely spread after the publication of WHO 2016 classification. But it become a major problem that there are some tumors not to be classified on its criteria, especially in pediatric neuroepithelial tumors. To clarify the characteristics of gliomas in pediatric and adolescent and young adult age (AYA), we picked up 131 neuroepithelial tumors under 30-year-old at Kyoto University and analyze their molecular profiles. Hot spot mutations in *IDH1/2*, *H3F3A*, *HIST1H3B*, *TERT* promoter, and *BRAF* were analyzed by Sanger sequencing, and 1p/19q codeletion was examined by FISH or MLPA. With the pathohistological diagnosis and genetic information, all tumors were classified based on WHO 2016 classification. The terms "not otherwise specified" (NOS) and "not elsewhere classified" (NEC) were used based on cIMPACT-NOW. There were 25 glioblastomas and 34 pilocytic astrocytomas, which accounted for a larger percentage than in adult tumors. IDH-wild type gliomas accounted for 55% in diffuse astrocytomas and 69% in anaplastic astrocytomas. The percentages of gliomas with NEC were 50% of oligodendrogliomas and 20% in anaplastic oligodendrogliomas, respectively. Most pilocytic astrocytomas were under 20-year-old (27 patients) and located in infratentorial area (21 patients). Based on WHO 2016 classification, not a few neuroepithelial tumors in pediatric and AYA ages could be classified clearly. These tumors had more different genetic abnormalities than those in adult. Therefore, it may be important to evaluate these tumors with comprehensive genetic analysis.

LGG-40. NATURAL COURSE AND MANAGEMENT OF SMALL ASYMPTOMATIC LESION SUSPECTED OF LOW-GRADE GLIOMA IN CHILDREN

Ai Muroi[1], Takao Tsurubuchi[1], Hidehiro Kohzuki[1], Ryoko Suzuki[2], Hiroko Fukushima[2], Yuni Yamaki[2], Eiichi Ishikawa[1], and Akira Matsumura[1]; [1]Department of Neurosurgery, Faculty of Medicine, University of Tsukuba, Tsukuba, Japan, [2]Department of Pediatrics, Faculty of Medicine, University of Tsukuba, Tsukuba, Japan

OBJECTIVE: The natural course of incidentally discovered small intracranial lesions has not been well discussed. Surgical intervention, including resection and biopsy, could be achieved if the lesion is growing. We present 13 cases with incidentally found, small non-enhancing lesions without related symptoms. METHODS: We retrospectively reviewed a series of 13 children with T1 hypointense and T2 hyperintense intracranial lesions less than 20 mm in diameter without enhancement. We excluded the patients with NF-1 or Tuberous sclerosis. RESULTS: Most patients underwent MRI for headache unrelated to the lesions. All cases were located supratentorially. The median age of the patients at the initial examination was 8.9 years (range, 2.2–14.6). Of these children, 2 patients (15.3%) underwent surgery because of progression on follow-up MR images. The pathological diagnosis was compatible with diffuse astrocytoma. Patients were followed for a median of 55 months (range, 11–87) and the overall survival rate was 100%. No patient experienced increase in size after 3 years of follow-up. CONCLUSIONS: In most patients with small intracranial lesions, the lesions remained stable and conservative management was appropriate. However, in a few cases, the lesions changed in size or quality and surgical intervention was necessary. Long-term follow-up at least 3 years is mandatory.

LGG-42. BEVACIZUMAB-ASSOCIATED SECONDARY AMENORRHEA AND PREMATURE OVARIAN FAILURE IN ADOLESCENT FEMALE PATIENTS WITH LOW-GRADE CNS DISEASE

Nataliya Zhukova[1,2], Kiri Chan[3], Kathryne Walshe[1], Peter A Downie[1,4], and Paul Wood[1,2]; [1]Children Cancer Centre, Monash Children Hospital/ Monash Health, Clayton, VIC, Australia, [2]Centre for Cancer Research, Hudson Institute of Medical Research, Clayton, VIC, Australia, [3]Department of Adolescent Gynaecology, Monash Children Hospital/ Monash Health, Clayton, VIC, Australia, [4]Department of Pediatrics, Monash University, Clayton, VIC, Australia

Compelling body of evidence exists to use bevacizumab, a humanized monoclonal anti-VEGF antibody, in selected paediatric patients with low-grade CNS tumours. Common toxicities of bevacizumab, hypertension, proteinuria, epistaxis, mucosal perforation, decreased wound healing are well reported. However, the effect of bevacizumab on female ovarian function and long-term fertility is still being documented. Current evidence for bevacizumab-associated decline in ovarian function is largely from breast and colon cancer cohorts where exposure to multimodal chemotherapy confounds causative relationships. Fertility counseling and oocyte cryopreservation is currently offered as standard of care to post-pubertal females at high risk of infertility due to high-dose radiation and chemotherapy. Adolescent females with low-grade CNS tumours on bevacizumab represent a unique population which could potentially be at high risk for infertility. We report 2 cases of adolescent girls treated with bevacizumab as a single agent and in combination with vinblastine for NF2-associated vestibular schwannomas and brainstem glioma respectively. Both patients were post-pubertal with established menstrual cycles and normal baseline FSH/LH/ oestradiol/AMH values prior to commencement of therapy. They became amenorrhoeic shortly after starting of therapy with levels of FSH/LH/oestradiol suggestive of premature ovarian failure. One patient has remained asymptomatic, whereas the other has developed profound post-menopausal symptoms interfering with quality of life which necessitated commencement of hormone-replacement therapy. Appropriate pretreatment fertility investigation and consultation should be offered to all post-pubertal females starting on bevacizumab. Further research into the long-term effects of gonadal toxicity in both females and males with drugs inhibiting angiogenesis is needed.

LGG-44. PROGNOSTIC SIGNIFICANCE OF IMAGING CHARACTERISTICS IN PEDIATRIC LOW GRADE GLIOMAS

Muhammad Baig, Michael Chan, Jason Johnson, Sana Mohiuddin, Ruitao Lin, Michael Roth, Zsila Sadighi, John Slopis, Soumen Khatua, and Wafik Zaky; MD Anderson Cancer Center, Houston, TX, USA

Pediatric low-grade gliomas (pLGG) account for one third of all central nervous system (CNS) tumors. MRI is the preferred imaging modality for diagnosis and response evaluation. This study aims to evaluate if radiographic characteristics of pLGG at diagnosis are prognostic. Medical records of 700 pLGG patients were reviewed who were seen between 1998- 2019 at our institution. Summary statistics were provided to describe patient demographic and clinical characteristics. 603 patients were not eligible because incomplete records, 97 patients were identified and eligible for the review. There were 45 females and 52 males with the mean age of 6.5 years at diagnosis. Patients were categorized based on contrast enhancement to 2 groups; none/mild versus moderate/high with 65 and 32 patients respectively. 31 patients had infiltrative glioma (32.3%) with more than one lobe involved at diagnosis. Fifteen patients (15.46%) had hydrocephalous at initial diagnosis. 32 patients (32.9%) did not have any treatment and remained stable while 65(67.0%) had either surgery, chemotherapy or radiation or combination. 21 patients had neurofibromatosis type-1(NF-1) with better outcome comparing to non-NF1 as previously reported. No statistically significant difference in outcome was found based on the imaging characteristics at diagnosis including contrast enhancement, hydrocephalus, tumor size, presence of cyst or infiltrative tumors. The 5 years PFS rate for the entire cohort was 47%. Our study results are limited by low patient number, hence collaborative multi-institutional studies are warranted to delineate consensus and investigate prognostic factors to improve the outcome of pLGG.

LGG-45. A REPORT OF IDH-MUTANT BRAINSTEM ASTROCYTOMAS IN YOUNG ADULTS

Ellen Chang, Benita Tamrazi, Jennifer Cotter, and Ashley Margol; Children's Hospital Los Angeles, Los Angeles, CA, USA

IDH-mutant astrocytomas are well-recognized in the adult population and while increasingly identified, are rare in children and young adults. These tumors typically arise in cortical locations, however cases of these tumors occurring in the brainstem have been reported in the adult literature. Here we present two cases of young adults with IDH-mutant astrocytomas of the brainstem. Patient 1 was initially diagnosed with an infiltrative low grade glioma (LGG) of the brainstem at 19 years of age based on conventional magnetic resonance imaging and magnetic resonance spectroscopy characteristics. She was treated with LGG therapy and had stable disease for over three years. At the time of disease progression she underwent biopsy and pathology was consistent with an anaplastic astrocytoma, IDH1 R132S mutant. Despite treatment she experienced rapid disease progression and died six months later. Patient 2 is a 17-year-old male who underwent up-front biopsy of an infiltrating brainstem lesion; pathology was consistent with diffuse astrocytoma, IDH1 R132H mutant. He was treated with focal irradiation and chemotherapy and continues to have stable disease 26 months post diagnosis. To our knowledge, this is the first report of IDH-mutant astrocytomas occurring the brainstem in young adult patients. Both patients' tumors harbored accompanying TP53 mutations, but not ATRX mutations. These two cases reveal the importance of obtaining biopsies for brainstem tumors to perform molecular characterization and appropriate prognostication.