oncology tumor board via zoom videoconferencing was established in January 2021. This effort is a collaboration between Washington University School of Medicine, in St. Louis, Missouri, USA and nine international sites. Given the significant contributions of this international effort, it has since grown to include 20 institutions and cancer centers from 12 countries in the Middle East, Europe, Australia and South America. RESULTS: As of January 2022, we have held 11 tumor boards, 35 cases were reviewed, and have had 320 experts attend from several specialties – neuro-oncology, neurology, neurosurgery, neuroradiology and neuropathology. A multidisciplinary team of physicians reviewed each case and recommendations were given accordingly. We also started a quarterly neurofibromatosis (NF) meeting focused to leverage the expertise of dedicated specialists in the NF center. Two NF-focused meetings took place since establishing the program, and total of five cases were discussed. CONCLUSION: Virtual videoconferencing promotes a multi-disciplinary approach for the management of pediatric CNS tumors, and it allows access for medical expertise. We anticipate the current initiative will also provide a platform for future international research collaborations and deliver the optimal medical care for neuro-oncology patients globally. Multiple potential collaborative projects are currently underway.

LINC-09. COEXISTING GLIONEURONAL TUMOR AND ADRENAL GANGLIONEUROMA

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BACKGROUND**:** While both glial/glioneuronal neoplasia and ganglioneuroma have been reported as components of multiple primary neoplasms, no patient has been diagnosed with multiple primary neoplasms of cerebral glial/glioneuronal tumors with oligodendroglioma-like features and adrenal ganglioneuroma up to now. CASE**:** A previously healthy five-year-old girl was admitted with a two-week history of headaches and vomiting. Brain Magnetic resonance imaging (MRI) showed a massive heterogenous multi-cystic enhancing lesion in the right temporoparietal area with substantial vasogenic edema. The patient underwent craniotomy and tumor gross total resection. The intra-operative histomorphological assessment of the tumor was well-matched with a glial tumor. The patient developed systolic hypertension during postoperative care in the Intensive Care Unit. Subsequent abdominal CT scan unveiled a calcified mass of the left adrenal gland origin. Blood and urine catecholamine tests, vanillylmandelic acid (VMA), were within the normal range. The surgical excision specimen exhibited a clear cell neoplasm with diffuse infiltrative growth. A distinguishing combination of oligodendroglioma-like perinuclear haloes, clear cell appearance and vascular proliferation rendered the diffuse Glioneuronal tumor with Oligodendroglioma-like features. With the combination of oligodendroglial-like appearance, negative 1p/19q codeletion, Wild IDH, no BRAF mutation, weak GFAP, and positive synaptophysin altogether, the tumor was compatible with the novel diffuse glioneuronal tumor with oligodendroglioma-like features and nuclear clusters (DGONC). The patient underwent laparotomy and tumor resection subsequently. Morphologic histopathological examinations of the adrenal mass were in line with ganglioneuroma. After discharge, no pathological uptake was identified with iodine-131 meta-iodobenzylguanidine scan (MIBG scan). No tumor residue was apparent on postoperative brain MRI. The patient received no adjuvant therapy for brain and adrenal tumors and underwent close surveillance for both tumors. No clinical or radiologic recurrence was recognized after six months of follow-up. CONCLUSIONS**:** Concurrent glioneuronal tumor and ganglioneuroma can be managed safely when diagnosed timely, leading to favorable outcomes.

LINC-10. THE ADEQUATE TREATMENT OF CHILDREN AND ADOLESCENTS WITH PRIMARY CENTRAL NERVOUS SYSTEM GERM CELL TUMORS (CNS GCT) IN A DEVELOPING COUNTRY

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INTRODUCTION: Primary central nervous system germ cell tumors (CNS GCT) are a heterogeneous group of malignancies that can be divided into germinomas and non-germinomatous GCT (NGGCT), accounting for 2-3% of brain tumors in children/adolescents in the Western hemisphere. The study aim is to report the ability to adequately treat Brazilian patients with CNSGCT through a consortium protocol, reporting their treatment, response and survival. Methods: Since 2013, 58 patients with histologic and/or tumor marker (TM) diagnosis of germinoma with/without HCGβ levels ≤200mIU/ml (n=43), five of them between 100-200mIU/ml, received carboplatin/ etoposide (4 cycles) and NGGCT (n=15), received carboplatin/ etoposide/cyclophosphamide (6 cycles), all followed by 18Gy ventricular field irradiation and primary site(s) boost. Autologous hematopoietic cell transplant (AuHCT) was undertaken for NGGCT slow responders. Results: Mean age 13.2 years, 42 males. Diagnosis was made by TM (n=19), surgery (n=25) and both (n=12). Two bifocal cases with negative TM and inconclusive biopsy were treated as germinoma. Primary tumor location was pineal (n=30), suprasellar (n=16), bifocal (n=11) and basal ganglia/ thalamus (n=1). Eighteen had ventricular/spinal spread. Second-look surgery occurred in seven patients. For the germinoma group, 36 achieved complete responses (CR) after chemotherapy, seven showed residual teratoma/ scar. For the NGGCT after 4/6 cycles, six patients showed CR, two failure/ progression and seven partial responses (five with negative TM). Two with positive TM underwent AuHCT. Radiotherapy was utilized as described, except in three patients. Four NGGCT patients died (two disease progression, two other causes with no disease). Toxicity was mostly grade 3/4 neutropenia/thrombocytopenia during chemotherapy. At a median follow-up of 40 months, event-free and overall survival was 100% for germinoma and 64.5% NGGCT. Conclusion: The proposed treatment was feasible to be performed in a developing country, with suitable survival even with VFI dose reduction to 18Gy.

LINC-11. INTRATHECAL METHOTREXATE IN A YOUNG CHILD WITH MEDULLOBLASTOMA WITH EXTENSIVE NODULARITY. AN ALTERNATIVE TO INTRA-VENTRICULAR ROUTE IN LOW AND MIDDLE INCOME COUNTRIES?

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BACKGROUND: In places where determination of molecular subgrouping of Medulloblastoma is not available, histology remains standard for risk stratification and treatment. Young children with medulloblastoma treated with craniospinal irradiation show a negative impact in neurocognitive functions, thus avoiding radiation in this specific population is encouraged. High dose chemotherapy and stem cell rescue have been internationally used as a strategy to spare radiation in infants and young children with Medulloblastoma. German HIT protocol (SKK) reported a PFS 85±8 % and good cognitive outcome in patients with Desmoplastic Medulloblastoma treated with intra-ventricular (i.vtr.) methotrexate (MTX). SKK protocol includes 36 i.vtr. administrations of MTX through a subcutaneous reservoir. Complications related to the use of this kind of reservoir could be due to the lack of experienced staff. METHODS: We report a patient with localized Medulloblastoma with extensive nodullarity (MBEN) treated as per SKK using intrathecal route instead of i.vtr MTX. A 2.5 year old boy was diagnosed with MBEN, surgery was complete and no shunt was required. Spinal MRI and CSF cytology were negative. Patient received 3 cycles of SKK protocol and 2 cycles of modified SKK. During the first 3 cycles he received one dose of intrathecal MTX 8mg on weeks 1, 3, 5 and 7 (12 doses in all). Patient remains free of disease 2 years after chemotherapy completion and without signs of leukoencephalopathy on T_2 weighted cranial MRI. DISCUSSION: Intrathecal administration of MTX is commonly used for the treatment of Acute Lymphoblastic Leukemia, the most common childhood cancer. Staff in Low and Middle Income Countries (LMIC) may be better trained for such procedure than using a ventricular access device. This strategy could be considered when using SKK protocol in selected young children with Demoplastic Medulloblastoma and MBEN in LMIC where centers with enough experience with ventricular access device placement and handling are scarce.

LINC-12. ENCOURAGING EARLY OUTCOMES WITH IMAGE GUIDED PENCIL BEAM PROTON THERAPY FOR CRANIO-SPINAL IRRADIATION AND UNIQUE CONSIDERATIONS FOR PAEDIATRIC POPULATION – FIRST REPORT FROM INDIA

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BACKGROUND: To report our experience with image guided pencil beam proton beam therapy (PBT) for craniospinal irradiation (CSI). MATERIALS AND METHODS: Between January 2019 to Dec 2021, we carried out a detailed audit of the first forty patients treated with PBT. All patients were carefully selected after approval from our institutional multidisciplinary tumour and proton board meetings. Median age of the patient cohort was 8 years, and histologies include 20 medulloblastoma, 7 recurrent ependymoma, 3 pineoblastoma, 3 were germ cell tumors and remaining 7 constituted other diagnoses. Forty percent patients received concurrent chemotherapy. We had recorded acute toxicities on a prospectively main-

tained database. We also report early outcomes in this cohort and discuss limitations of current contouring guidelines during CSI PBT planning. RESULTS: Median CSI dose was 23.4 GyE (Gray Equivalent; range 21.6 - 35). Thirty-five patients (87.5%) completed their CSI without interruption as an outpatient procedure. Five patients required hospital admission during treatment, while one developed grade 3 mucosal toxicity, requiring plan adaptation and treatment break. No patient had grade 2 or more weight loss during the treatment. Forty-five percent (18) developed grade 1 hematological toxicities and 20% (8) developed grade 2 or 3 toxicities; none had grade 4 toxicities. At median follow up of 12 months, 90 % patients are alive of whom 88.9 % are having local control. Special consideration with modification in standard contouring used at our institute helped in limiting acute toxicities in paediatric CSI patients. CONCLUSION: Our preliminary experience with modern contemporary PBT using pencil beam technology and daily image guidance in a range of tumours suitable for CSI is encouraging. Patients tolerated the treatment well with acceptable acute toxicity and expected short-term survival outcome. In paediatric CSI patients, modification in standard contouring guidelines required to achieve better results with PBT

LINC-13. SUBEPENDYMAL GIANT CELL ASTROCYTOMA IN A CHILD WITH TUBEROUS SCLEROSIS COMPLEX: A CASE REPORT

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INTRODUCTION: Tuberous sclerosis complex (TSC) is an autosomal-dominant genetic disorder causing the formation of hamartomas in many organs, including the brain. It is generally benign but can block the flow of cerebrospinal fluid that increases intracranial pressure and leads to severe neurologic and behavioural changes. Subependymal giant cell astrocytoma (SEGA) occurs in 10-15% of TSC patients. Routine brain surveillance is important to look for SEGA in all TSC patients. CASE: We report a girl who was previously diagnosed with TSC at the age of two. She had hypomelanotic macules, facial angiofibroma, and a shagreen patch. Her first brain magnetic resonance imaging (MRI) was normal. She had routine consultation until she complained of recurrent headaches, walking instability, and seizures six years later. Her brain MRI showed a solid heterogenous intraventricular mass suggestive SEGA, with multiple subcortical hyperintense lesions (subcortical tubers), and hydrocephalus. She underwent emergency ventriculoperitoneal shunt (VP shunt) and tumor removal surgery. The histopathology examination matches SEGA, World health organization (WHO) grade I. It consists of polygonal to spindle cells with abundant eosinophilic cytoplasm. There are also large to multinucleated cells. After surgery, she had significant clinical improvement, and the seizure was controlled with valproic acid. CONCLUSION: It is essential to do brain evaluation using brain scan or MRI every 1-3 years as surveillance recommendation in all TSC patients. Early detection dramatically increases the chance of giving early treatment or surgery to lower complications and provide better outcomes.

Keywords: Subependymal giant cell astrocytoma, tuberous sclerosis complex, surveillance, early diagnosis

LINC-14. A SINGLE CENTER RETROSPECTIVE ANALYSIS OF PEDIATRIC PINEOBLASTOMA IN BEIJING

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OBJECTIVE: To explore the clinical characteristics and outcome in children with pineoblastoma in Beijing. METHODS: Clinical data of 18 pediatric patients with newly diagnosed pineoblastoma admitted to Beijing Shijitan Hospital between January 2014 and November 2021 were retrospectively analyzed. The diagnoses were confirmed by pathology. RESULTS: Male/female ratio=8:1. The median age at diagnosis was 4.7 (range, 0.2-12.6) years, with 2 cases in infancy, and 13 cases ≥ 3 years. The symptoms at diagnosis included headache (31%), vomiting (29%), convulsions (9%), strabismus (9%), nausea (6%), etc. Four patients experienced metastasis at diagnosis. Ki-67 index was under 30% in 5 cases, 30-80% and ≥80% in 10 and 2 cases, respectively. All were treated with surgery, and 12 children underwent gross total resection (GTR). Seventeen cases were administered both radiotherapy and chemotherapy, with one case only radiotherapy followed by surgery. Median follow-up time was 54 months. Nine patients developed a recurrence and 2 patients died at last follow-up. The 1-year/3-year progression-free survival (PFS) and overall survival (OS) were (77.8±10.5/11.1±10.5)%, and (100/90.9±8.7) %, respectively. The 3-year OS of boys (93.8%) was higher than that of girls (50.0%); and also higher in cases with GTR (91.7%) than STR (83.3%). However, the differences were not significant in the above two groups. The children with Ki-67 index ≥80% had worse 3-year OS than those<80% ($\chi2$=8.000, P=0.005). The median PFS of children treated under the order of craniospinal irradiation followed by chemotherapy was better than that of the inverse order (29m vs 13m, $\chi2$=6.528, P=0.011).**CONCLUSION**: Pineoblastoma is rare and often fatal, but with better OS in our center, although the PFS is dismal. Boys, GTR resections, and Ki-67 index <80% tends to have better OS, and the order of irradiation followed by chemotherapy tends to have better PFS.

Keywords: pineoblastoma; therapy; survival

LINC-15. SUSTAINING MULTIDISCIPLINARY CARE OF CHILDREN WITH CENTRAL NERVOUS SYSTEM TUMORS DURING THE COVID-19 PANDEMIC

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INTRODUCTION: A multidisciplinary team (MDT) approach is essential for quality cancer care. Since 2019, we have conducted regular MDT meetings to discuss pediatric patients with central nervous system (CNS) tumors at the Philippine General Hospital. Because of COVID-19, an abrupt transition from in-person to virtual meetings became necessary. METHODS: We reviewed the proceedings of MDT meetings for pediatric CNS tumors from March 2020–December 2021. We identified the strategies and adaptations of our pediatric neuro-oncology group, and outlined recommendations for other institutions in low- and middle-income countries. RESULTS: Our pediatric neuro-oncology group conducted 18 virtual MDT meetings during the study period. Meetings were scheduled every last Tuesday of the month, with pediatric oncologists, neurologists, neurosurgeons, radiation oncologists, radiologists, and neuropathologists regularly attending. We invited other specialists as needed. In total, we had 135 case discussions for 79 unique patients, or about 8 patients per meeting. These included both inpatients (74%) and outpatients (26%). Ten patients received prior treatment elsewhere. At the time of the meeting, 86% were postoperative, 8% were preoperative, and 6% did not require surgery. Most (60%) had malignant CNS tumors and 15% had disseminated/leptomeningeal disease. Histopathologic diagnosis was obtained for 62 patients (79%). Concerns addressed were: formulating a treatment plan (88%), surveillance strategy (10%), and diagnostic workup (5%). DISCUSSION: Several factors contributed to the ease of online transition: (1) motivated care providers including a patient navigator, (2) fixed schedule, (3) institutional Zoom account for securing data privacy, and (4) availability of picture archiving and communication system (PACS) for neuroimaging. Challenges included: (1) delays due to internet connectivity, (2) Zoom fatigue and online distractions, and (3) risk for miscommunication or misunderstanding. Commitment of the entire neuro-oncology team is essential to ensure the delivery of best possible care for pediatric patients with CNS tumors.

LINC-16. FACTORS ASSOCIATED WITH DELAYED DIAGNOSIS AMONG FILIPINO PEDIATRIC BRAIN TUMOR PATIENTS: A RETROSPECTIVE REVIEW

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BACKGROUND: Delayed diagnosis is observed greatest among pediatric brain tumors compared to other childhood malignancies. Several factors have been found to influence delay. OBJECTIVE: To determine delayed diagnosis measured by the prediagnostic symptomatic interval (PSI) among Filipino pediatric brain tumor patients and identify associated factors. METHODS: Data was collected retrospectively on pediatric brain tumor patients of Philippine General Hospital from 2015-2019. PSI was calculated. Demographic and clinical data were presented using descriptive statistics. Bivariate and linear regression analyses were used to determine factors. RESULTS: The median overall PSI was 80.5days. The median interval from symptom onset to first physician consult was 22days. The median interval from first consult to subspecialty referral was 23.5days. Majority presented with 2 symptoms at onset (42.3%) and during first physician consult (36.2%). Upon subspecialist referral, 52% have ≥4 symptoms. Most patients (68.4%) consulted with a pediatrician. Most were diagnosed with another condition prior to brain tumor diagnosis. Longer PSI was significantly associated with older age (p=0.005), tumor location (p=0.009), tumor grade (p<0.001), and more physicians consulted prior to subspecialist referral (p=0.001). Significant predictors of delayed diagnosis were supratentorial