## PEDIATRIC NEURO-ONCOLOGY IN ASIA AND OTHER LOW/ MIDDLE INCOME COUNTRIES

### LINC-01. COMPLIANCE TO FOLLOW UP IN PEDIATRIC PATIENTS WHO HAVE RECEIVED CRANIOSPINAL IRRADIATION

Khin Pyone[1], Thwe Tun[1], Yin Win[1], Aye Thinn[1], Khin Win[1], Tint Hnin[2], and Aye Khaing[2]; [1]Yangon General Hospital, Yangon, Yangon, Myanmar. [2]Yangon Children Hospital, Yangon, Yangon, Myanmar

OBJECTIVE: Attendance to follow-up after completion of cancer treatment is understudied area. Pediatric cancer patients have sequelae of illness or treatment. Many have no symptom immediately after completion of treatment. Long term follow-up is important to access disease control, early diagnosis of recurrence, second cancer and treatment-related morbidities. Purpose of this study was to evaluate the compliance to follow-up in pediatric patients treated with craniospinal irradiation (CSI). METHODS: This was retrospective review of follow-up in pediatric neuro-oncology patients who received (CSI) from January 2017 to June 2018 in the Radiotherapy Department of Yangon General Hospital, Myanmar. RESULT: Twenty-three patients received CSI; majority (43%) were medulloblastoma. Median age was 7.5 years (3–17 years). Only seven patients (30.4%) were attended to follow-up more than 6 months after completion of treatment. More than two-thirds of patients (n=16,69.6%) were lost to follow-up. Patients in active follow-up were diagnosed and treated at earlier age below 10years (n=5,21.7%). Demographically, 5 patients (22%) were living in the region around tertiary hospital. Sixteen patients (69.6%) from rural area had limited transportation and difficulty for accommodation in which they were treated. In socioeconomic points, 18 parents (78.2%) had poor education and financial status, lack of understanding about disease, treatment, long-term effects and follow-up. CONCLUSION: Although this was limited data in CSI patients only, loss to follow-up after 6 months was high. We need to evaluate in all pediatric cancer patients and collaborate to provide financial support, childcare centres for lodging, transportation and health education to promote compliance to follow-up.

### LINC-02. IMPLEMENTATION OF AN INTEGRATED NEURO-ONCOLOGY SERVICE: CLINICIANS' PERSPECTIVE ON CONDUCT OF NEURO-ONCOLOGY MULTIDISCIPLINARY TEAM MEETING FROM A SINGLE-INSTITUTION IN MALAYSIA

Jen Chun Foo, Jawin Vida, Ariffin Hany, Pei Yuin Loh, Sockalingam Sutharsan, Ganesan Dharmendra, Thambinayagam Hari Chandran, and Rajagopal Revathi; University Malaya Medical Centre, Kuala Lumpur, Federal Territory, Malaysia

INTRODUCTION: Multidisciplinary Team (MDT) meetings are essential in the management of complex cancer cases. There are limited data regarding clinicians' perception on conduct of neuro-oncology MDT meetings and its impact on clinical management. In University Malaya Medical Centre (UMMC), weekly neuro-oncology MDT meeting was established since 2013 to discuss adult and paediatric complex central nervous system tumour cases. OBJECTIVE: To determine clinicians' perception and level of satisfaction of neuro-oncology MDT meeting. METHODOLOGY: Web-based questionnaire was distributed via e-mail to all neuro-oncology MDT clinicians at UMMC in April 2019. RESULT: Eighteen out of 20 clinicians responded to the survey. Respondents were: neurosurgeons (n=5), adult oncologists (n=4), paediatric oncologists (n=3), radiologists (n=2), radiation oncologists (n=2) and pathologists (n=2). Majority of clinicians (65%) agreed at current weekly MDT meeting with maximum length of one hour duration and 75% of them suggested to discuss 5 to 10 cases during each meeting. Almost all of them (94.4%) preferred e-mail as method of communication to disseminate information before and after the meetings. MDT members expected 100% attendance from neurosurgeons. Fourteen (70%) clinicians agreed that patients/ parents/ carers do not receive copy of MDT meeting plans and only seven (35%) clinicians document MDT meeting plans in patients' medical record. Overall, all clinicians felt that MDT meeting improved decision-making process, enhanced continuity of coordinated care and promoted good communication among team members. CONCLUSION: The structure and logistics of neuro-oncology MDT meeting in UMMC are generally agreed upon. However, documentation of post-meeting plan and notification to patients need uniformity.

### LINC-03. MOLECULAR CLASSIFICATION OF PAEDIATRIC MEDULLOBLASTOMA FROM FOUR TERTIARY CENTRES IN MALAYSIA: DIAGNOSTIC DILEMMA WITH CONVENTIONAL METHODS

Revathi Rajagopal[1], Vida Jawin[1], Ay Jiuan Teng[2], Oy Leng Wong[2], Kein Seong Mun[1], Hakimah Mahsin[3], Nor Haizura Abd Rani[4], Kogilavani Gunasagaran[4], Seoh Leng Yeoh[3], Gek Bee Ong[2], Hany Ariffin[1], David Jones[5], and Nicholas G Gottardo[6,7]; [1]University Malaya Medical Centre, Kuala Lumpur, Kuala Lumpur, Malaysia, [2]Sarawak General Hospital, Kuching, Sarawak, Malaysia, [3]Penang General Hospital, Penang, Penang, Malaysia, [4]Sabah Woman and Children's Hospital, Likas, Sabah, Malaysia, [5]Brain Tumour Research Centre, Heidelberg, Heidelberg, Germany, [6]Perth Children's Hospital, Perth, WA, Australia, [7]Brain Tumour Research Programme, Telethon Kids Institute, Nedlands, WA, Australia

OBJECTIVE: To determine the prognostic significance of the four molecular subgroups of medulloblastoma (MB) among children in Malaysia. METHODS: We assembled MB samples of children < 18 years between January 1999 and July 2017 in University Malaya Medical Centre, Penang General Hospital, Sarawak General Hospital and Sabah Woman and Children's Hospital. MB was sub-grouped using 850k DNA methylation profiling. RESULTS: Fifty-one tumour samples were retrieved. Histopathological subtypes were classic (n=12), MB extensive nodularity/desmoplastic (n=9) and 30 MB results without subtypes. Thirteen patients were M1-M4. Fourteen patients were stratified as standard-risk (SR,27.4%), 22 as high-risk (HR,43.2%) and 15 as high-risk children ≤ 3 years old (iHR,29.4%). Molecular subgrouping revealed 16 Group4, 11 SHH, 10 Group3 and 4 Wnt. In 8 patients, DNA methylation profiling identified a diagnosis other than MB and in 2 samples the DNA was inadequate. For patients >3 years old, the 5-year event-free survival (EFS) was 35.7%±13% in HR and 39.7%±20% in SR. The 5-year overall survival (OS) in these two groups was 43.4%±14% and 41.7±30% respectively. iHR had 5-year EFS and OS of 48.0%±16% and 60.0%±16% respectively. WNT tumours had the best 5y-OS of 66.7±22% of the cohort, albeit significantly lower than other reports, followed by SHH (56.8±17%), Group4 (44.3±17.6%) and Group3 (41.7±18%). Treatment abandonment rate was 20%. CONCLUSION: The discrepancy in the histological diagnoses highlights the importance of DNA methylation profiling technique for accurate diagnosis. We observed poor OS across all the subgroups, in part due to treatment abandonment.

### LINC-04. POSSIBLE ROLE OF NEOADJUVANT CHEMOTHERAPY IN METASTATIC PURE GERMINOMA IN LOW AND MIDDLE INCOME COUNTRIES. A PRO POS OF A CASE

Carlos Leal-Cavazos, Paola Escamilla-Luna, Marissa Fernandez-De Luna, and Oscar Vidal-Gutierrez; Hospital Universitario "Dr.Jose Eleutetrio Gonzalez", Monterrey, NL, Mexico

BACKGROUND: CNS germ cell tumors represent about 3–5 % of pediatric brain tumors, 60% are pure germinomas. Germinomas are very sensitive to chemotherapy which has helped to reduce volume and dose of radiotherapy in localized disease while maintaining excellent survival. In metastatic disease the SIOP GCT-96 trial showed no benefit with addition of chemotherapy to craniospinal irradiation alone. Radiotherapy maybe not readily available in Low/Middle Income Countries (LMIC). METHOD: We describe a patient in which the use of neoadjuvant chemotherapy helped to rescue vision. The patient is a 9 year old female with a 3 months history of morning headaches and vomits. Visual decline was noticed a month before admission when the child had completely loss vision of the right eye and left eye was partially affected. MRI showed a large suprasellar mass with ventricular nodules. Beta-hGC in CSF was mildly elevated. Patient received 2 cycles of carboplatin/etoposide. After first cycle there was a complete vision recovery in both eyes. After the second course the MRI showed complete response in primary and metastatic disease. Patient received CSI (24Gy + 16 Gy Boost) after 2 cycles of chemotherapy. Chemotherapy was very well tolerated without side effects. Patient vision is 20/20 in both eyes without deficit in visual fields. CONCLUSION: Although the addition of chemotherapy in metastatic germinoma has no clear role in reducing radiotherapy it could possible help selected patients in attempt to rescue vision when radiotherapy is not readily available.

### LINC-05. PRIMARY CENTRAL NERVOUS SYSTEM EWING SARCOMA IN PEDIATRIC AND AYA PATIENTS: 2 INSTITUTIONS EXPERIENCE IN BUENOS AIRES ARGENTINA

Roberto Nicolas Palomar[1,2], Florencia Yorio[2], Lucas Alessandro[2], Naomi Arakaki[2], Alejandro Muggeri[2], Mercedes Garcia Lombardi[1], and Blanca Diez[2]; [1]Hospital Gutiérrez, CABA, Buenos Aires, Argentina, [2]FLENI, CABA, Buenos Aires, Argentina

INTRODUCTION: Ewing Sarcoma (ES) is defined by molecular markers, being t(11;22)(q24;q12) the most frequent. Intracranial ES usually shows as metastases from extracranial sites. Primary central nervous system (CNS) lesions are extremely rare. MATERIAL AND METHODS: Retrospective review of clinical records from patients with primary CNS ES, assessed at 2

institutions in Argentina between 2007–2019. Translocation was evidenced in all cases through molecular testing. Clinical characteristics, imaging, histopathology, and treatment response were evaluated. Extracranial and osseous lesions were excluded. RESULTS: 15 patients. Median age at beginning of symptoms: 8 yo (2–20). Most patients had intracranial hypertension syndrome (14/15). In brain MRI, 5/15 supratentorial lesions, 4/15 posterior fosa, 1/15 medullary, 2/15 supra and infratentorial, and 3/15 lesions diffuse leptomeningeal infiltration. Histopathologic findings showed diffuse pattern with small round blue cells in most cases, other patterns were also described. CD99 marked positive in all cases. Misdiagnosis with glial tumors (4/15), medulloblastoma (6/15) and infectious diseases (3/15); led to median delay to accurate diagnosis of 3 months (range 0–67). After correct diagnosis patients were treated with standard ES treatment (6 VIDE cycles plus radiotherapy) in 14/15 patients. Vincristine, irinotecan and temozolamide was used as second line treatment in all relapse cases whenever possible. EFS was 22 months (2- 65). OS at 5 years of follow-up was 46,67% (mean OS 31 mo). CONCLUSION: Even though molecular assessment led to accurate diagnosis in all cases, treatment response and outcome showed two different groups of patients with long and very short survival. Adaptative therapy should be considered.

**LINC-06. OBSERVATION ONLY IN A PATIENT WITH SUSPECTED LOW GRADE GLIOMA. SHOULD NEUROSURGERY ALWAYS BE THE FIRST STEP IN LOW AND MIDDLE INCOME COUNTRIES?**

Carlos Leal - Cavazos, Jose Arenas-Ruiz, and Oscar Vidal-Gutierrez; Hospital Universitario "Dr.Jose Eleuterio Gonzalez", Monterrey, NL, Mexico

BACKGROUND: Low grade gliomas (LGGs) are the most frequent pediatric brain tumor and they comprise a variety of histologies. Complete surgery is curative but sometimes its location makes it difficult. Recent publications highlight the excellent long-term outcomes of patients with LGGs with complete and incomplete resected tumors. Current strategies are focused on reducing risks of treatment related sequelae. METHOD: We describe a patient with a suspected LGG managed by close observation. We describe the case of a 6 year old female with 5 months history of focal onset seizures. During this time a brain MRI was requested and tumor was evidenced. After "tumor diagnosis" was made family visited a handful of private neurosurgeons with a uniformly dismal prognosis and high risk morbidity from procedures offered. When first seen at our Hospital, the clinical history seemed compatible with a LGG and seizures well controlled with antiepileptic drugs. Neurological examination was completely normal. MRI showed a large tumor (7x5x5 cm) hypointense on T1, hyperintense on T2, without contrast enhancement, involving the right temporal lobe white matter, insula, internal capsule, hipoccampus, thalamus and mesencephalus with middle cerebral artery encasement. Interval imaging was proposed and after 4.5 years since diagnosis the tumor has been stable and patient clinically excellent. CONCLUSION: Overall survival in pediatric LGGs is excellent and risk of sequelae should always be part of multidisciplinary team considerations. In centers with significant neurosurgical morbidity, biopsy of large tumors that are compatible with LGG may not be required in selected cases.

**LINC-07. PREVALENCE AND SPECTRUM OF EARLY ENDOCRINE DISORDERS IN SURVIVORS OF PEDIATRIC EMBRYONAL BRAIN TUMORS (PEBT): EXPERIENCE FROM INDIA**

Maya Prasad[1], Kalasekhar Vijayasekharan Nair[1], Rahul Krishnatry[1], Girish Chinnaswamy[1], Tejpal Gupta[1], and Sudha Rao[2]; [1]Tata Memorial Centre, Mumbai, India. [2]BJ Wadia Childrens Hospital, Mumbai, India

BACKGROUND: Survivors of pediatric brain tumors are at high risk of developing endocrine disorders, potentially impacting growth,development and quality of life. METHODS: etrospective audit of 2-year survivors of PEBT(3-18years at diagnosis)viz. medulloblastoma(MB),Central nervous system Primitive neuro-ectodermal tumors(CNS-PNET) and atypical teratoid/rhabdoid tumor(ATRT) treated January 2006-December 2017 at Tata Memorial Centre,Mumbai, with surgery, cranio-spinal irradiation(CSI; 35Gy in high-risk MB,CNS-PNET,ATRT and 23.4Gy in average-risk MB with tumor boost 19.8Gy)and six cycles of adjuvant chemotherapy(cycloph osphamide,cisplatin and vincristine).Patients were followed up by a paediatric endocrinology team specialized in management of PEBT. RESULTS: Of 249 PEBT treated during this period,88 are alive in remission >2 years (69-MB, 15-CNS PNET,4-ATRT),median age at diagnosis 6 years. At a median follow-up of 5.6 years (range 3- 12.5years),63 patients(72%) had at least one endocrine disorder,26(29.%)≥2 hormonal deficiencies. The most common endocrine disorders were central hypothyroidism(57%),growth hormone deficiency(40%), central hypogonadism(5%)and central hypoadrenalism (3.5%).The median time to develop hypothyroidism was 2.8 years(range 5months to 8.5 years) from CSI. Growth hormone replacement therapy began after a median period of 4.2 years(range-1.5 to 11.5years) from CSI. Higher dose of CSI was associated with development of endocrine disorder (odds ratio [OR] 2.71; 95% CI, 1.03 to 7.04,p-0.04). CONCLUSIONS: The high incidence of endocrine deficits in survivors of PEBT necessitates early and lifelong monitoring. Early and appropriate management is crucial to achieve full growth potential.

**LINC-08. INCREASED TREATMENT TOXICITIES AND INFERIOR OUTCOMES IN UNDERNOURISHED CHILDREN WITH BRAIN TUMOURS**

Maya Prasad, Ekta Chheda, Girish Chinnaswamy, Tejpal Gupta, Rahul Krishnatry, Tushar Vora, and Jayant Godashastri; Tata Memorial Centre, Mumbai, India

BACKGROUND: Children on treatment for brain tumours are known to be at high risk of undernutrition, the impact on outcome and toxicity is not well understood. METHODS: Retrospective audit of children(<18 years) diagnosed January 2017-December 2018 with embryonal brain tumours (medulloblastoma, primitive neuro-ectodermal tumors, pinealoblastoma, atypical teratoid/rhabdoid tumour) and treated at our centre. Data was retrieved from case records and electronic medical records. Nutritional status(NS) was defined as per World Health Organization (WHO) into severe malnutrition (SAM),moderate malnutrition (MAM),well nourished (WN) and overweight. Undernutrition(UN) was defined as SAM/MAM.Toxicity was documented till end of treatment,defined as treatment delay>1week,significant infection or toxic death. RESULTS: Of 124 eligible patients who received entire chemotherapy at our centre, NS data was available in 73 at diagnosis and 58 at follow-up. At diagnosis-29,16,26 and 2 and at follow-up-20,16,22 and 0 were SAM,MAM,WN and overweight. During treatment, weight gain was documented in 26%, stable weight in 55% and weight loss in 19%. Those UN at diagnosis had worse outcomes at follow-up with 70% alive in remission compared to 88% of WN(p-0.14). There was increased toxicity in UN group(50%) compared to WN(24%),p-0.04.All 3 toxic deaths were in UN. Those who lost weight during treatment had higher toxicities(70%) compared to those with stable weight (30%)or weight gain(20%),p-0.02. CONCLUSIONS: In spite of nutritional intervention, children on treatment for brain tumours tend to lose weight. Increased treatment toxicities and inferior outcomes in undernourished children with brain tumours necessitates proactive and aggressive nutritional monitoring and intervention.

**LINC-09. TREATMENT AND OUTCOME IN CHILDREN WITH LOW-GRADE GLIOMAS IN WESTERN MEXICO: EXPERIENCE AT HOSPITAL CIVIL DE GUADALAJARA**

Regina M Navarro-Martin del Campo[1,2], Erika Casillas -Toral[1], Ana L Orozco-Alvarado[3], Fernando Sanchez-Zubieta[1], Luis A Arredondo-Navarro[4,2], and Lorelai Gutierrez-Oliva[4]; [1]Hospital Civil de Guadalajara "Dr. Juan I Menchaca", Guadalajara, Jalisco, Mexico, [2]Gapno, International, Mexico, [3]Hospital Civil de Guadalajara "Dr. Juan I Menchaca", Guadalajara, Jalisco, Mexico, [4]Hospital Civil de Guadalajara "Fray Antonio Alcalde", Guadalajara, Jalisco, Mexico

BACKGROUND: Brain tumors are the most common solid tumors in childhood, 35% of them being low-grade gliomas (LGGs). Few data is available regard LGGs in low-and-middle-income countries. This study evaluates LGGs in a tertiary center in Mexico. DESIGN: A retrospective review of clinical files of 105 children diagnosed with LGG other than optic nerve glioma from 2007 to 2019 was done. RESULTS: Median age at diagnosis was 7.2 years (from 5 months to 18 years). Male to female ratio was 0.75:1. WHO Grade I represented 68% of the cases. Anatomic sites were: posterior fossa (41%), supratentorial (43.5 %), spinal (8.5%), subependymal (6 %) and pineal (1%). Ten percent of patients had a diagnosed phacomatosis. Treatment was observation without surgery in 3.8%, surgery followed by observation in 49.5%, only chemotherapy in 2.8%, only radiotherapy in 6.7%, and surgery combined with chemotherapy or radiotherapy in 37.2% of cases. Among patients who had surgical intervention, 40% achieved gross total resection, 44% subtotal resection and 16% only biopsy. One or more recurrences were found in 20 % of patients. The 5 and 10-year overall survival (OS) was 83% and 73% respectively. The 5 and 10-year progression-free survival (PFS) was 66 % and 44 % respectively. CONCLUSIONS: In this series the OS were lower compared with countries with high income, reflecting the need to improve surgery, since only 40% achieved complete resection that is a determining factor for the prognosis. We observed a decrease in OS until 10-year follow and the PFS was even lower due to recurrence/progression.

**LINC-10. SIOP PODC ADAPTED TREATMENT GUIDELINES FOR CRANIOPHARYNGIOMA IN LOW- AND MIDDLE-INCOME SETTINGS**

Nisreen amayiri[1], Ariane Spitaels[2], Mohamed Zaghloul[3], Anthony Figaji[4], Sergio Cavalheiro[5], Hermann L. Muller[6], Moawia Elhassan[7], Jeannette Parkes[8], Naureen Mushtaq[9], Mohamed El Beltagy[10],