etic predisposition for pediatric MB_{SHH} to 40%. These results mark MB_{SHH} as an overwhelmingly genetically-predisposed disease and implicate disruption of protein homeostasis in MB_{SHH} development.

MBCL-22. EFFICACY OF DOUBLE-CONDITIONING REGIMEN COMPRISING THIOTEPA AND MELPHALAN FOR RELAPSED MEDULLOBLASTOMA – A SINGLE INSTITUTION EXPERIENCE

Kai Yamasaki[1], Kazuki Tanimura[1], Yuki Okuhiro[1], Kota Hira[1], Chika Nitani[1], Keiko Okada[1], Hiroyuki Fujisaki[1], Noritsugu Kunihiro[2], Yasuhiro Matsusaka[2], Hiroaki Sakamoto[2], and Junichi Hara[1]; [1]Department of Pediatric Hematology and Oncology, Osaka City General Hospital, Osaka, Japan, [2]Department of Pediatric Neurosurgery, Osaka City General Hospital, Osaka, Japan

BACKGROUND: The prognosis of relapsed medulloblastoma was dismal. Recently, we published the promising outcome of metastatic medulloblastomas treated with a double-conditioning regimen comprising high-dose thiotepa and melphalan (HD-TM). Here, we report a single-center study of HD-TM for relapsed medulloblastomas. MATERIALS AND METHODS: From April 2006 to January 2019, 17 consecutive medulloblastoma patients with the first relapse were identified, and of which 10 received HD-TM were retrospectively reviewed. RESULTS: The median age at first relapse was 11.9 years (range 1.8–31.7). The median follow-up period was 23.5 months after 1st relapse. Four localized relapses at the posterior fossa and 6 metastatic relapses including 3 with multiple sites were observed. Surgical resection and re-irradiation were administered in 5 and 9 patients, respectively. Two-year PFS and OS after relapse were 21±18.1% and 60±21.9%, respectively, and significantly better than in patients who did not receive HD-TM. Among 7 evaluable patients, tumor shrinkage was observed in 6 after HD-TM administration including 3 patients who were resistant to prior chemotherapy. At the present time, 5 patients are alive with no evidence of disease (NED). The last 5 patients received re-irradiation including 12 Gy craniospinal irradiation (CSI), and 4 are alive with NED. In multivariate analysis for all patients, both HD-TM and re-irradiation were associated with improved OS and PFS, but disseminated relapse had no prognostic value (p=0.56). CONCLUSION: HD-TM contributes to prolonged survival when combined with re-irradiation. HD-TM might become a curative approach for relapsed medulloblastoma, especially when combined with CSI.

MBCL-23. PRELIMINARY ANALYSIS OF TREATMENT-RELATED TOXICITIES DURING INDUCTION CHEMOTHERAPY FOR PATIENTS ON THE HEAD START 4 TRIAL

Vibhuti Agarwal[1], Joseph Stanek[2], Megan Jaeger[2], Girish Dhall[3], and Jonathan Finlay[2]; [1]Nemours Children's Hospital, Orlando, FL, USA, [2]Nationwide Children's Hospital, Columbus, OH, USA, [3]Children's Hospital of Alabama, Birmingham, AL, USA

The currently active, prospective multi-center Head Start 4 (HS4) trial for CNS embryonal tumors differs from prior HS I-III trials by utilizing absolute phagocyte count (APC) as a measure of myeloid recovery instead of absolute neutrophil count. The aim of this study was to determine if utilization of APC resulted in unanticipated treatment-related toxicities during induction chemotherapy for patients enrolled on HS4. Review of the RedCap database was conducted for treatment-related CTCAE grade 3 and 4 toxicities. Data were summarized descriptively. Nonparametric statistical methods were used for comparisons. At the time of this most recent analysis, a total of 180 induction cycles were completed for the 57 patients enrolled. Of the 57 patients, nine voluntarily discontinued therapy after completing a median of three cycles each. These patients had a higher number of documented infections (59% *versus* 24%, p=0.0004). Veno-occlusive disease (VOD) occurred in five patients, three of whom voluntarily discontinued therapy. Since the protocol amendment utilizing milligram per kilogram dosing for patients less than six years of age, there have been no documented episodes of VOD. The overall toxicities for this cohort were comparable to those reported for induction chemotherapy in HS I-II trials. The toxic death rate is lower for HS4 compared to HS I-II (0.018% *versus* 4.7–6%) (Chi et al 2004). Other than the high rate of infection, possibly associated with shorter duration of the immediately prior cycles, the use of APC as part of a dose-compression strategy in HS4 does not appear associated with more significant toxicities.

MBCL-24. CAN YOUNG CHILDREN WITH RELAPSED MEDULLOBLASTOMA BE SALVAGED AFTER INITIAL IRRADIATION-SPARING APPROACHES?

Craig Erker[1,2], Valérie Larouche[3], Ashley Margol[4,5], Chantel Cacciotti[6], Sébastien Perreault[7,8], Kenneth J. Cohen[9,10], Mohamed S. AbdelBaki[11,12], Juliette Hukin[13,14], Shahrad Rod Rassekh[13,14], David D. Eisenstat[15,16], Beverly Wilson[15,16], Jeffrey Knipstein[17,18], Anna L. Hoppmann[19], Eric S. Sandler[20,21], Kathleen Dorris[22,23], Taryn B. Fay-McClymont[24,25], Ralph Salloum[26,27], Virginia L. Harrod[28,29], Bruce Crooks[1,2], Jonathan L. Finlay[11,12], Eric Bouffet[30,31], and Lucie Lafay-Cousin[24,25]; [1]Dalhousie University, Halifax, Nova Scotia, Canada, [2]IWK Health Centre, Halifax, Nova Scotia, Canada, [3]CHU de Québec-Université Laval, Québec City, Québec, Canada, [4]Keck School of Medicine of University of Southern California, Los Angeles, California, USA, [5]Children's Hospital of Los Angeles, Los Angeles, California, USA, [6]Dana-Farber/ Boston Children's Cancer and Blood Disorders Center, Boston, Massachusetts, USA, [7]Université de Montréal, Montreal, Québec, Canada, [8]CHU Sainte-Justine, Montreal, Québec, Canada, [9]The Sidney Kimmel Comprehensive Cancer Center, Baltimore, Maryland, USA, [10]Johns Hopkins University School of Medicine, Baltimore, Maryland, USA, [11]Ohio State University, Columbus, Ohio, USA, [12]Nationwide Children's Hospital, Columbus, Ohio, USA, [13]University of British Columbia, Vancouver, British Columbia, Canada, [14]BC Children's Hospital, Vancouver, British Columbia, Canada, [15]University of Alberta, Edmonton, Alberta, Canada, [16]Stollery Children's Hospital, Edmonton, Alberta, Canada, [17]Medical College of Wisconsin, Milwaukee, Wisconsin, USA, [18]Children's Hospital of Wisconsin, Milwaukee, Wisconsin, USA, [19]University of Alabama at Birmingham, Birmingham, Alabama, USA, [20]Nemours Children's Specialty Care, Jacksonville, Florida, USA, [21]Wolfson Children's Hospital, Jacksonville, Florida, USA, [22]University of Colorado School of Medicine, Aurora, Colorado, USA, [23]Children's Hospital Colorado, Aurora, Colorado, USA, [24]University of Calgary, Calgary, Alberta, Canada, [25]Alberta Children's Hospital, Calgary, Alberta, Canada, [26]University of Cincinnati, Cincinnati, Ohio, USA, [27]Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio, USA, [28]University of Texas, Dell Medical School, Austin, Texas, USA, [29]Dell Children's Medical Center of Central Texas, Austin, Texas, USA, [30]University of Toronto, Toronto, Ontario, Canada, [31]The Hospital for Sick Children, Toronto, Ontario, Canada

INTRODUCTION: Irradiation-sparing approaches are used in young children with medulloblastoma (MB) given the vulnerability of the developing brain to neurocognitive impairment. Limited data are available following relapse for these patients. We aimed to describe the management and outcomes of young children with MB who relapsed after initial treatment without craniospinal irradiation (CSI). METHODS: International retrospective study including patients with MB diagnosed between 1995–2017, ≤ 72 months old, initially treated without CSI, who subsequently relapsed. RESULTS: Data are available for 52 patients (32 male). Median age at initial diagnosis was 27 months (range, 6–72) with 24 being metastatic. Initial therapy included conventional chemotherapy alone or high-dose chemotherapy (HDC) in 21 and 31 subjects, respectively. Three received upfront focal irradiation. Molecular subgrouping, available for 24 tumors, included 9 SHH and 15 non-WNT/non-SHH. Median time to relapse was 13 months (range, 3–63). Relapse was local, disseminated or combined in 20, 15, and 16, respectively. Salvage therapy with curative intent was given in 42/52 patients, including CSI in 28 subjects (median dose 36Gy, 18–41.4) or focal irradiation in 5 others. Three received HDC only. At a median follow-up time of 46 months (range, 4–255), 25 (48%) were alive, including 7/9 SHH and 7/15 non-WNT/non-SHH. The 2- and 5-year OS was 67% and 56% (SE, 7%), respectively. Two of 3 patients with SHH who did not receive salvage radiotherapy are survivors. CONCLUSION: A substantial proportion of young children who relapse following irradiation-sparing strategies can be salvaged. Neurocognitive and ototoxicity outcomes are being evaluated.

MBCL-25. PILOT STUDY OF A SURGERY AND CHEMOTHERAPY-ONLY APPROACH IN THE UPFRONT THERAPY OF CHILDREN WITH WNT-POSITIVE STANDARD RISK MEDULLOBLASTOMA: UPDATED OUTCOMES

Kenneth Cohen[1], Susan Chi[2], Cynthia Hawkins[3], Fausto Rodriguez[4], Wendy London[2], Robert Craig Castellino[5], Dolly Aguilera[5], Stacie Stapleton[6], David Ashley[7], Daniel Landi[7], and Pratiti Bandopadhayay[2]; [1]Johns Hopkins Sidney Kimmel Comprehensive Cancer Center, Baltimore, MD, USA, [2]Dana-Farber Cancer Institute, Boston, MA, USA, [3]Hospital for Sick Children, Toronto, Ontario, Canada, [4]Johns Hopkins University School of Medicine, Baltimore, MD, USA, [5]Children's Healthcare of Atlanta, Atlanta, GA, USA, [6]Johns Hopkins All Children's Hospital, St. Petersburg, FL, USA, [7]Duke University Medical Center, Durham, NC, USA

BACKGROUND: Wnt+ medulloblastoma (WPM) is a favorable subtype with EFS > 90% when treating postoperatively with craniospinal irradiation and posterior fossa boost (CSI/XRT) followed by adjuvant chemotherapy. This pilot study explored the safety of omitting radiation in standard-risk WPM. METHODS: Subjects had to meet standard-risk criteria (< 1.5 cm2 residual tumor, no metastatic spread, no anaplasia) and have a WPM. Subjects received chemotherapy following the COGACNS0331 AAB-AAB-AAB (A=cisplatin/CCNU/VCR; B=cyclophosphamide/vincristine) backbone. RESULTS: Six children were enrolled on study treatment prior to early study closure. Subject #1 completed planned protocol therapy but relapsed 3 months following the completion of therapy. Subject #2 completed