

months. CONCLUSION: Our findings showed that pseudoprogression can occur early in the treatment course in CMMRD patients. Identification of this entity is important for appropriate clinical management.

RARE-16. SEVEN CASES OF RETINOBLASTOMA WITH CNS INVOLVEMENTS

Chikako Kiyotani, Masahiro Sugawa, Yukihiro Matsukawa, Yoshihiro Gocho, Kenichi Sakamoto, Noriyuki Azuma, Takako Yoshioka, Yoshiyuki Tsutsumi, Hiroshi Fuji, Kenichi Usami, Hideki Ogiwara, Keita Terashima, and Kimikazu Matsumoto; National Center for Child Health and Development, Tokyo, Japan

Treatment strategy for trilateral retinoblastoma (TRb: very rare RB with brain tumor) or retinoblastoma with central nervous system (CNS) involvement is not established yet. We retrospectively reviewed our seven cases of these rare almost fatal tumors. Their ages at diagnosis are 0y3m-1y10m (median 1y3m) (Male 4, Female 3). Only one had RB family history. Their affected eyes were bilateral 3, unilateral 3 and no 1. Their CNS involvements were suprasellar tumor 4, pineal tumor 1 and cerebrospinal fluid (CSF) cytology positive 2. Three of the suprasellar tumor patients had spinal metastasis. Four of the seven patients were TRb and one were genetically classified suprasellar retinoblastoma. All of them were treated with chemotherapy and four received high-dose chemotherapy. Three brain tumors of four TRb almost disappeared with chemotherapy. Two of them also received radiotherapy but relapsed. Although one radiation-free long-term TRb survivor developed secondary osteosarcoma, he got remission again and live 5 more years. One CSF positive Rb patient with chiasm invasion died of disease 11 months later. The other patient had no chiasm invasion nor CSF involvement at diagnosis, but his CSF cytology turned to positive after his second cycle of chemotherapy. He got remission with radiotherapy and high-dose chemotherapy, and alive without disease for 4 years. 2-year RFS and 2-year OS of all patients were 40% and 60%. Although our TRb patients responded to chemotherapy, it was difficult to avoid radiotherapy except one. Data accumulation is necessary for better treatment of these cancer-predisposed patients.

RARE-17. SURVIVAL BENEFIT FOR INDIVIDUALS WITH CONSTITUTIONAL MISMATCH REPAIR DEFICIENCY SYNDROME AND BRAIN TUMORS WHO UNDERGO SURVEILLANCE PROTOCOL. A REPORT FROM THE INTERNATIONAL REPLICATION REPAIR CONSORTIUM

Ayşe Bahar Ercan¹, Carol Durno², Vanessa J. Bianchi¹, Melissa Edwards¹, Melysa Aronson³, Eric Bouffter⁴, Abeer Al-Battashi⁵, Musa Alharbi⁶, Donald Basel⁷, Raymond Bedgood⁸, Anne Bendel⁹, Deborah T. Blumenthal¹⁰, Miriam Bornhorst¹¹, Annika Bronsema¹², Elizabeth Cairney¹³, Sara Carroll¹⁴, Aghiad Chamdin¹⁵, Stefano Chiaravalli¹⁶, Shlomi Constantini¹⁷, Anirban Das¹⁸, Rina Dvir¹⁹, Roula Farah²⁰, William Foulkes²¹, Zehavit Frenkel²², Sharon Gardner²³, Mithra Ghalibafian²⁴, Cathy Gilpin²⁵, Catherine Goudie²⁶, Syed Ahmer Hamid²⁷, Jordan Hansford²⁸, Craig Harlos²⁹, Nobuko Hijiya³⁰, Saunders Hsu³¹, Junne Kamihara³², Jeffrey Knipstein³³, Carl Koschmann³⁴, Valérie Larouche³⁵, Alvaro Lassaletta³⁶, Scott Lindhorst³⁷, Valerie Ling³⁸, Michael Link³⁹, Rebecca Loret De Mola⁴⁰, Rebecca Luiten⁴¹, Michal Lurye²², Jamie Maciaszek⁴², Nanan Magimairajan⁴³, Ossama Maher⁴⁴, Maura Massimino¹⁶, Naureen Mushtaq⁴⁵, Monica Newmark⁴⁶, Garth Nicholas⁴⁷, Kim Nichols⁴², Theodore Nicolaides²³, Enrico Opocher⁴⁸, Michael Osborn⁴⁹, Benjamin Oshrine⁵⁰, Rachel Pearlman⁵¹, Daniel Pettee⁵², Jan Rapp⁵³, Mohsin Rashid⁵⁴, Alyssa Reddy⁵⁵, Lara Reichman³⁶, Marc Remke⁵⁷, Gabriel Robbins⁵³, Magnus Sabel⁵⁸, David Samuel⁵⁹, Isabelle Scheers⁶⁰, Santanu Sen⁶¹, Duncan Stearns⁶², David Sumerauer⁶³, Carol Swallow⁶⁴, Leslie Taylor⁶⁵, Helen Toledano⁶⁶, Patrick Tomboc⁶⁷, An Van Damme⁶⁸, Ira Winer⁶⁹, Michal Yalon⁷⁰, Lee Yi Yen⁷¹, Michal Zapotocky⁷², Vahid Fallah Azad²⁴, Shayna Zelcer⁷³, David Ziegler⁷⁴, Stefanie Zimmerman⁷⁵, and Uri Tabori⁷⁶; ¹The Arthur and Sonia Labatt Brain Tumour Research Centre, The Hospital for Sick Children, Toronto, ON, Canada, ²Division of Gastroenterology, Hepatology & Nutrition, The Hospital for Sick Children, University of Toronto, Toronto, ON, Canada, ³The Familial Gastrointestinal Cancer Registry at the Zane Cohen Centre for Digestive Disease, Mount Sinai Hospital, Toronto, ON, Canada, ⁴Division of Hematology and Oncology, The Hospital for Sick Children, University of Toronto, Toronto, ON, Canada, ⁵Child Health Specialist, Ministry of Health, Muscat, Oman, ⁶Pediatric Hematology Oncology, King Fahad Medical City, Riyadh, ON, Saudi Arabia, ⁷Division of Genetics, Department of Pediatrics, Medical College of Wisconsin, Milwaukee, WI, USA, ⁸Coliseum Medical Centers and Coliseum Northside Hospital, GA, USA, ⁹Department of Pediatric Hematology-Oncology, Children's Hospitals and Clinics of Minnesota, MN, USA, ¹⁰Sackler Faculty of Medicine, Tel Aviv University, Tel-Aviv, Israel, ¹¹Brain Tumor Institute, Children's National Medical Center,

Washington, DC, USA, ¹²Department of Pediatric Hematology and Oncology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany, ¹³Department of Paediatrics, Western University and London Health Sciences Centre, London, ON, Canada, ¹⁴Department of Hematology and Oncology, Cleveland Clinic, Cleveland, OH, USA, ¹⁵College of Human Medicine, Center for Bleeding and Clotting Disorders, Michigan State University, MI, USA, ¹⁶Pediatric Unit, Fondazione IRCCS Istituto Nazionale dei Tumori, Milano, Italy, ¹⁷Department of Pediatric Neurosurgery, Dana Children's Hospital, Tel-Aviv, Israel, ¹⁸Division of Hematology and Oncology, The Hospital for Sick Children, Toronto, ON, Canada, ¹⁹Department of Pediatric Hemato-Oncology, Tel Aviv Medical Center, Tel-Aviv, Israel, ²⁰Saint George Hospital University Medical Center, Beirut, Lebanon, ²¹Division of Medical Genetics, Department of Medicine, McGill University Health Centre, Montreal, QC, Canada, ²²Sheba - Tel Ha Shomer Hospital, Ruhama, Israel, ²³Pediatric Hematology-Oncology, NYU Langone Health, New York, NY, USA, ²⁴MAHAK Pediatric Cancer Treatment and Research Center (MPCTRC), Tehran, Iran, Islamic Republic of, ²⁵The Children's Hospital of Eastern Ontario, Ottawa, Canada, ²⁶McGill University, Division of Experimental Medicine, Montreal, QC, Canada, ²⁷The Indus Hospital, Karachi, Pakistan, ²⁸Children's Cancer Centre, Royal Children's Hospital, University of Melbourne, Melbourne, Australia, ²⁹Department of Medical Oncology and Hematology, CancerCare Manitoba, Manitoba, Canada, ³⁰Division of Hematology, Oncology, and Stem Cell Transplantation, Ann & Robert H. Lurie Children's Hospital/Northwest, University of Chicago, Chicago, IL, USA, ³¹Pediatric Hematology-Oncology, Sutter Health, California, USA, ³²Dana-Farber Cancer Institute and Boston Children's Hospital, Boston, MA, USA, ³³Pediatric Neurology, Medical College of Wisconsin, Milwaukee, WI, USA, ³⁴Division of Pediatric Hematology-Oncology, Department of Pediatrics, University of Michigan School of Medicine, Michigan, USA, ³⁵Hematology/Oncology Centre Hospitalier Universitaire de Quebec, Quebec, Canada, ³⁶CNIO-HNJ Clinical Research Unit, Pediatric Oncology, Hematology and Stem Cell Transplant Department, Hospital Infantil Universitario Niño Jesús, Madrid, Spain, ³⁷Neuro-Oncology, Department of Neurosurgery, and Department of Medicine, Division of Hematology/Medical Oncology, Medical University of South Carolina, Charleston, SC, ³⁸Division of Gastroenterology, Hepatology and Nutrition, The Hospital for Sick Children, University of Toronto, Toronto, ON, Canada, ³⁹Stanford Medicine, The Stanford Cancer Center, California, USA, ⁴⁰Oregon Health and Science University, Portland, OR, USA, ⁴¹Clinical Cancer Genetics Banner MD Anderson Cancer Center, Gilbert, AZ, USA, ⁴²St Jude Children's Research Hospital, Memphis, TN, USA, ⁴³Department of Pediatric Hematology-Oncology, Cancer Care Manitoba; Research Institute in Oncology and Hematology, University of Manitoba, Winnipeg, Canada, ⁴⁴Nicklaus Children's Hospital, Pediatric Hematology and Oncology, Florida, USA, ⁴⁵Agha Khan Hospital, Karachi, Pakistan, ⁴⁶Lurie Children's Hospital of Chicago, Chicago, IL, USA, ⁴⁷University of Ottawa Division of Medical Oncology, Ottawa, Canada, ⁴⁸Pediatric Hematology/Oncology Unit, Department of Pediatrics, University of Padua, Padua, Italy, ⁴⁹Women's and Children's Hospital, North Adelaide, Australia, ⁵⁰Cancer and Blood Disorders Institute, Johns Hopkins All Children's Hospital, St. Petersburg, FL, USA, ⁵¹Department of Internal Medicine, Division of Human Genetics, The Ohio State University Comprehensive Cancer Center, Ohio, USA, ⁵²Akron Children's Hospital, Akron, OH, USA, ⁵³West Virginia University, WVU Cancer Institute, Virginia, USA, ⁵⁴IWK Health Center, Halifax, Canada, ⁵⁵Children's Hospital of Alabama, University of Alabama at Birmingham, Birmingham, AL, USA, ⁵⁶McGill University Health Centre, Research Institute (RI-MUHC), Montreal, Canada, ⁵⁷University Hospital Düsseldorf, Düsseldorf, Germany, ⁵⁸Department of Pediatrics, Institute of Clinical Sciences, Sahlgrenska Academy, University of Gothenburg & Queen Silvia, Gothenburg, Sweden, ⁵⁹Department of Pediatrics, Valley Children's Hospital, California, USA, ⁶⁰Pediatric Gastroenterology, Hepatology and Nutrition Unit, Cliniques Universitaires St Luc, Brussels, Belgium, ⁶¹Department of Pediatrics, Kokilaben Dhirubhai Ambani Hospital & Research Centre, Mumbai, India, ⁶²Department of Pediatric Hematology-Oncology, Rainbow Babies and Children's Hospital, Cleveland, OH, USA, ⁶³Department of Pediatric Hematology and Oncology, ²nd Faculty of Medicine, University Hospital Motol, Charles University, Prague, Czech Republic, ⁶⁴Department of Surgery, Mount Sinai Hospital and Department of Surgery, University of Toronto, Toronto, ON, Canada, ⁶⁵St. Jude's Children's Research Hospital, Memphis, TN, USA, ⁶⁶Pediatric Hematology Oncology, Schneider Children's Medical Center of Israel, Petah Tikva, Israel, ⁶⁷Department of Pediatrics, Ruby Memorial Hospital, West Virginia University, West Virginia, USA, ⁶⁸Department of Pediatric Hematology and Oncology, Cliniques Universitaires Saint-Luc, Université Catholique de Louvain, Louvain, Belgium, ⁶⁹Wayne State University, Detroit, MI, USA, ⁷⁰Sheba Medical Center, Ramat Gan, Israel, ⁷¹Department of Neurosurgery, Neurological Institute, Taipei Veterans General Hospital, Taipei, Taiwan, ⁷²University Hospital Motol, Prague, Czech Republic, ⁷³Children's Hospital, London Health Science Center, London, ON, Canada, ⁷⁴Sydney Children's Hospital, New South Wales, Australia, ⁷⁵University Hospital Frankfurt,