## Title

QOL-47. ApoE4 AS A GENETIC PREDICTOR FOR NEUROCOGNITIVE OUTCOMES IN PEDIATRIC BRAIN TUMOR SURVIVORS



## Journal

Neuro-oncology, 20(Suppl 2)

## ISSN

1522-8517

## Authors

Kline, Cassie
Felton, Erin
Byer, Lennox
et al.

## Publication Date

2018-06-01

Peer reviewed

### QOL-46. VISUAL REHABILITATION: INTEGRAL FOR AFFECTED BRAIN TUMOR PATIENTS

Himika Gupta[1,2], Yash Gala[1], Varun Sarvodaya[1], Purna Kurkure[3], Rakesh Jalali[4,7], Tejpal Gupta[5,7], Aliasgar Moiyadi[4,7], Aadil Chagla[6], and Rahul Krishnatry[4,7]; [1]MGM Medical College, Navi Mumbai,Maharashtra, India, [2]Spectra Eye Care Low vision Service, Navi Mumbai, Maharashtra, India, [3]SRCC Children's Hospital managed by Narayana Health, Worli, Mumbai, Maharashtra, India, [4]Tata Memorial Hospital, Parel, Mumbai, Maharshtra, India, [5]Advanced Centre for Treatment, Research and Education in Cancer, Kharghar, Navi Mumbai, Maharashtra, India, [6]Seth G S Medical College and KEM Hospital, Parel, Mumbai, Maharashtra, India, [7]Homi Bhabha National Institute (HBNI University), Mumbai, India

The eye is one of the most important senses for the overall development of a person, personality and self-esteem. We reviewed records of all patients referred from various centers across the city with visual impairment due to various non-ocular causes from March 2016-December 2017. The demographics, disease and treatment protocols, ophthalmic evaluation comprising of Visual Function Questionnaire 25(VFQ25) NEVI version 2000, functional visual assessment, perimetry, visually evoked potential(VEP), contrast sensitivity test(CST), retinal nerve fibre layer(RNFL) and Macula ocular computed tomography(OCT) were reviewed at baseline and at 6 months' post-intervention. Of total fifty patients, 32 (64%) were with the brain tumor (commonest Optic pathway glioma: 62%). Twenty four(75%) were <21years at diagnosis. Mean age of presentation to us being 10.7 (1.5-22) years. Of these, 21 were students. Visual impairment ranged from bilateral no perception of light (blindness) to 20/20 (none). Average best-corrected visual acuity(BCVA) of the better eye:20/80 (moderate impairment) and of the worst eye: 20/175(severe impairment). Twenty patients (83%) underwent visual rehabilitation. Eight patients were prescribed optical enhancement devices and 11 visual stimulation exercises. Surgical intervention was done for 4 patients of which two were orneo-protective and two restorative procedures for unsightly appearance of the blind eye. Average VFQ score improved from 92.9 at presentation to 76.5 at 6 months. CONCLUSION: This review provides important insight into the baseline spectrum of visual morbidity in brain tumors and supports the benefit of routine integration of such services in the management of these patients.

### QOL-47. APOE4 AS A GENETIC PREDICTOR FOR NEUROCOGNITIVE OUTCOMES IN PEDIATRIC BRAIN TUMOR SURVIVORS

Cassie Kline[1], Erin Felton[1], Lennox Byer[1], Schuyler Stoller[1], Joseph Torkildson[2], Karen Gauvain[3], David Samuel[4], Elizabeth Tong[1], John Liu[1], Heather Fullerton[1], Dena Dubal[1], and Sabine Mueller[1]; [1]University of California, San Francisco, San Francisco, CA, USA, [2]UCSF Benioff Children's Hospital Oakland, Oakland, CA, USA, [3]Washington University, Saint Louis, St. Louis, MO, USA, [4]Valley Children's Healthcare, Madera, CA, USA

Long-term neurocognitive deficits in pediatric brain tumor survivors are challenging to both predict and treat. In a previous cohort analysis, we identified the genetic variant for ApoE4 reliably correlates with decreased neurocognitive function over time. Herein, we present case-control analyses comparing neurocognitive outcomes of ApoE4 carriers versus non-carriers in a group of pediatric brain tumor survivors. Utilizing an existing cohort of pediatric brain tumor patients from a diverse population, we isolated cases heterozygous for ApoE4 and matched these to controls carrying ApoE3. Priority was placed on matching cases and controls along variables previously identified to impact neurocognition – time from radiation and hydrocephalus or seizures at diagnosis. Student t-tests and lowess smoothing regression were used to compare outcomes in 6 neurocognitive domains over multiple time points. Twenty matched cases and controls were included in the analyses. At baseline, there were no statistically significant differences between cases and controls in any domain. Over time, ApoE3 controls performed statistically significantly higher across an increasing number of neurocognitive domains than ApoE4 carriers. Using smoothing regression, cases visibly performed worse over time as compared to controls and as seen by decreasing neurocognitive scores across all domains. ApoE4 carrier status strongly correlates with neurocognition function over time in pediatric brain tumor survivors. This effect appears across multiple domains and may show evidence of progressive deterioration with each year from treatment. Our results identify ApoE4 as a possible genetic predictor for neurocognitive outcomes in pediatric brain tumor survivors and support further investigation of this genetic variant.

### QOL-48. SEIZURE IN PEDIATRIC PATIENTS WITH BRAIN TUMORS

Viviane Robert-Boire, Béatrice Desnous, Alexander Weil, Sébastien Perreault; CHU Sainte-Justine, Montréal, QC, Canada

BACKGROUND: Seizures are one of the most common symptoms of pediatric brain tumors. The purpose of this study was to determine seizures frequency and associated risk in pediatric patients with brain tumors. METHODS: A retrospective study was conducted in a single center over a period of 13 years. Data including demographic, tumor location, pathology, extend of resection, seizure characteristics were collected. A logistic regression model was built to determine which predictors are associated with the occurrence of seizures. RESULTS: Among the 329 children with primary brain tumors, 62 (18.8 %) experienced seizures. Children with cortical tumors were higher at risk to present seizures than patients with infratentorial tumors (OR=96.2; 95% CI=28.8-319.2; p<0,0001). All patients with dysembryoplastic neuroepithelial tumor (DNET, 7/7) and 80% of glioneuronal tumors (8/10) experienced seizures. Twenty-nine patients had focal seizures with impaired awareness (46.8 %), while 25 had focal to bilateral tonic-clonic seizures (40.3 %), and 8 had focal aware seizures (12.9 %). Twenty-nine patients (46.8 %) were eventually seizure-free after antiepileptic drugs withdrawal, while ten patients (16.1 %) had refractory epilepsy. CONCLUSION: Our study is one of the largest cohorts of children with tumor-related seizures and brings new insight in term of seizures frequency, risk factors and evolution following treatment.

### QOL-49. ACADEMIC ACHIEVEMENT PREDICTION AND OUTCOMES IN CHILDREN WITH BRAIN TUMORS

Hannah McAtee, Sheila Barron, Natalie Denburg, Amanda Grafft, Timothy Ginader, Charles Lynch, and Mariko Sato; University of Iowa, Iowa City, IA, USA

The purpose of our study is to identify patterns of academic achievement in children before diagnosis of a brain tumor and to examine longitudinal trends of academic achievement after the treatment, by utilizing two statewide databases: The Iowa Testing Program (ITP) and Iowa Cancer Registry (ICR). The ITP uses a set of standardized academic achievement measures designed for students from kindergarten through high school, while the ICR has records of patients with a brain tumor diagnosis since 1973. A deterministic linkage of the ICR and ITP databases was performed to identify target samples. We identified 593 children with brain tumors who performed academic assessment between 2000-2016. Median age at diagnosis was 9 years old (ranges 0-20). Of the 593 children, 37% had malignant tumors (N=219), and 62% had benign tumors (N=370). Achievement data, in the form of percentile rank scores by grade and content domains (e.g., reading, mathematics) were analyzed. We found no significant difference in academic achievement levels between patients with benign versus malignant tumors at the year prior to diagnosis. Additionally, we found no statistically significant trajectory of academic achievement prior to diagnosis for tumor type, looking specifically at medulloblastoma for our malignant exemplar and low-grade glioma for our benign exemplar. We also found a statistically significant difference in academic achievement trajectory after treatment for those patients who received radiation, rather than chemotherapy, surgery, or combination treatment.

### QOL-51. NEUROCOGNITIVE SEQUELAE OF CHILDREN TREATED FOR CNS TUMORS: EXPERIENCE FROM THE FIRST SYSTEMATIC EVALUATION IN GREECE

Natalia Karra[1], Evangelia Saleptsi[1], Chrysovalanto-Sofia Karatosidi[1], Maria Filippidou[2], Kleoniki Roka[2], and Antonis Kattamis[2]; [1]Brain Injury Day Treatment Unit, ELEPAP, Athens, Greece, [2]Division of Pediatric Hematology-Oncology, First Department of Pediatrics, Athens Medical School, Athens, Greece

CNS tumors are the second most common neoplasms in children and primary cause of childhood cancer morbidity. With the increase of 5-year survival rate, the diagnosis of long-term consequences is necessary. Recent studies suggest that childhood CNS tumors are associated with IQ decline and deficits in specific cognitive functions. Factors such as localization, age at diagnosis and therapeutic modalities influence the range and severity of the neuropsychological deficits. OBJECTIVE: This work presents the results of the first systematic evaluation of neuropsychological performance of Greek children with CNS tumors. METHODS: 72 children underwent neuropsychological testing between September 2015 and December 2017. Forty five children (29 boys, 64%) with mean age of 10.5 (range: 5.3-16.1) years were included in the study. Eighteen (40%) patients had low grade tumors. All patients underwent a comprehensive neuropsychological assessment, covering all domains of cognitive functioning. Impairment was defined as a performance of one standard deviation below the normative mean. RESULTS: Poor neurocognitive performance was found regarding attention (-2sd), speed of processing (-1.5sd), verbal memory (-2sd), learning (-1.5sd) and executive functions (-2sd). Despite the abovementioned deficits, intellectual efficiency was relatively preserved and fell within low average levels (>16%ile). CONCLUSIONS: Our results are in line with previous reports suggesting that children who have been treated for CNS tumors present with a wide range of long-term effects on cognitive functioning. Longer follow-up and expansion of the sample may give for further insights on the factors associated with poor neurocognitive outcome and allow appropriate intervention for optimal outcome.