to CNS responses in patients with LMD. Additionally, genomic and immunologic studies of immune cells in CSF and serum at pre- and post-pembrolizumab using next-generation sequencing and multi-color flow cytometry, respectively. RESULTS/ANTICIPATED RESULTS: We will aim to accrue a total of 20 patients, allowing for a 10% drop-out rate, the final sample size will include all patients who have received at least 1 dose of pembrolizumab. CNS-response at 12 weeks will be assessed radiologically +/- cytologically, and the proportion of patients with CNS response and associated 95% confidence interval with be reported. CNS-progression-free survival and overall survival will be assessed using the Kaplan-Meier method. Cause of death will be recorded. Safety will be assessed as detailed above, and monitored as part of the institutional Data Safety and Monitoring Plan. Exploratory endpoints will include genomics testing of tumor cells and cell-free DNA in CSF and serum, and immunologic studies of immune cells in CSF and serum at pre-defined timepoints. These data will be presented descriptively. We conservatively estimate that we will accrue 1 patient per month at our institution. Study duration will be approximately 24 months, allowing 18 months for accrual and 6 months for follow-up and data analysis. DISCUSSION/SIGNIFICANCE OF IMPACT: There are no currently FDA-approved therapies for patients with LMD from solid tumors. Anti-PD-1 immunotherapy is a promising class of agents, with known efficacy in patients with CNS metastatic disease, across tumor types. This study seeks to identify whether pembrolizumab may lead to CNS responses in patients with LMD. Additional, genomic and immunologic analyses in CSF and blood pre and post-pembrolizumab may identify mechanisms by which immunotherapy affects the CNS in patients with LMD.

2137

Percentage of viable tumor Versus radiation treatment effect in surgical specimens is not associated with outcomes in recurrent glioblastoma

Robert D. Schwab1, Stephen Bagley2, Zev Binder3, Robert Lustig4, Donald O'Rourke5, Steven Brem6, Arati S. Desai6 and MacLean Nasrallah5

1 University of Pennsylvania School of Medicine, Philadelphia, PA, USA; 2 Abramson Cancer Center, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA; 3 Department of Neurosurgery, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA; 4 Department of Radiation Oncology, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA; 5 Department of Pathology and Laboratory Medicine, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA

OBJECTIVES/SPECIFIC AIMS: In patients with recurrent glioblastoma (GBM) who undergo a second surgery following standard chemoradiotherapy, histopathologic examination of the resected tissue often reveals a combination of viable tumor and treatment-related inflammatory changes. However, it remains unclear whether the degree of viable tumor Versus “treatment effect” in these specimens impacts prognosis. We sought to determine whether the percentage of viable tumor Versus “treatment effect” in recurrent GBM surgical samples, as assessed by a trained neuropathologist and quantified on a continuous scale, is associated with overall survival. METHODS/STUDY POPULATION: We reviewed the records of 47 patients with histopathologically confirmed GBM who underwent surgical resection as the first therapeutic modality for suspected radiographic progression following standard radiation therapy and temozolomide. The percentage of viable tumor Versus “treatment effect” in each specimen was estimated by one neuropathologist who was blinded to patient outcomes. RESULTS/ANTICIPATED RESULTS: After adjusting for other known prognostic factors in a multivariate Cox proportional hazards model, there was no association between the degree of viable tumor and overall survival (HR 0.83; 95% CI, 0.20–3.4; p = 0.20). DISCUSSION/SIGNIFICANCE OF IMPACT: The results suggest that, in patients who undergo resection for recurrent GBM following standard first-line chemoradiotherapy, histopathologic quantification of the degree of viable tumor Versus “treatment effect” present in the surgical specimen has limited prognostic influence and clinical utility.

2016

Plasma microRNA markers of upper limb recovery following human stroke

Matthew A. Edwardson, Xiaogang Zhong, Amrita Cheema and Alexander Dromerick

Georgetown – Howard Universities

OBJECTIVES/SPECIFIC AIMS: MicroRNAs are small, non-coding RNAs that control gene expression by inhibiting protein translation. Preclinical studies in rodent stroke models suggest that changes in microRNA expression contribute to neural repair mechanisms. To our knowledge, no one has previously assessed microRNA changes during the recovery phase of human stroke. Our goal was to determine whether patients with significant upper limb recovery following stroke have alteration of neural repair-related microRNA expression when compared to those with poor recovery. METHODS/STUDY POPULATION: Plasma was collected at 19 days post-stroke from 27 participants with mild-moderate upper extremity impairment enrolled in the Critical Periods After Stroke Study. MicroRNA expression was assessed using TaqMan microRNA assays (Thermo Fisher Scientific). Good recovery was defined as ≥6 point change in the Action Research Arm Test (ARAT) score from baseline to 6 months. Bioinformatics analysis compared the plasma microRNA expression profiles of participants with good Versus poor recovery. Candidate biomarkers were identified after correcting for multiple comparisons using a false discovery rate <0.05. RESULTS/ANTICIPATED RESULTS: Eleven microRNAs had significantly altered expression in the good (n = 22) Versus poor (n = 5) recovery groups, with 2 showing increased expression—miR-371-3p and miR-520g—and 9 showing decreased expression—miR-449b, miR-519b, miR-581, miR-616, miR-892b, miR-941, miR-1179, miR-1292, and miR1296. Three of these could be implicated in neural repair mechanisms. Elevated miR-371-3p levels increase the likelihood that pluripotent stem cells will differentiate into neural progenitors. MiR-892b decreases levels of amyloid precursor protein, which has been implicated as a regulator of synapse formation. Finally, miR-941, the only known human-specific microRNA, downregulates the Cspx protein which is involved in neurotransmitter release. DISCUSSION/SIGNIFICANCE OF IMPACT: This preliminary study suggests that circulating microRNAs in the plasma may help serve as biomarkers of neural repair and aid in understanding human neural repair mechanisms. If validated in larger studies with appropriate controls, these markers could aid in timing rehabilitation therapy or designing recovery-based therapeutics.

2196

Pre-treatment sleep disturbance as a risk factor for radiation therapy induced pain in 676 women with breast cancer

Anita R. Peoples1, Wilfred R. Pigeon1, Dongmei Li2, Joseph A. Roscoe2, Sheila N. Garland2, Michael L. Perlis3, Vincent P. Vinciguerra4, Thomas Anderson5, Lisa S. Evans5, James L. Wade III2, Deborah J. Ossip1, Gary R. Morrow1 and Julie R. Wolf1

1 University of Rochester Medical Center; 2 Memorial University; 3 University of Pennsylvania; 4 Northwell Health NCORP, Lake Success, NY, USA; 5 Columbus NCORP, Columbus, OH, USA; 6 Southeast Clinical Oncology Research (SCOR) Consortium NCORP, Winston-Salem, NC, USA; 7 Heartland Cancer Research NCORP, Decatur, IL, USA

OBJECTIVES/SPECIFIC AIMS: The purpose of the present secondary data analysis was to examine the effect of moderate-severe disturbed sleep before the start of radiation therapy (RT) on subsequent RT-induced pain. METHODS/STUDY POPULATION: Analyses were performed on 676 RT-naive breast cancer cases. RESULTS/ANTICIPATED RESULTS: 676 women completed study questionnaires. Pre-treatment sleep disturbance as a risk factor for radiation therapy induced pain was assessed using the Cantril anchor. RESULTS: 676 women completed study questionnaires. Pre-treatment sleep disturbance as a risk factor for radiation therapy induced pain was assessed using the Cantril anchor. RESULTS: Pre-treatment sleep disturbance was associated with radiation therapy induced pain with effect sizes ranging from 0.15 to 0.25.
cancer patients (mean age 58, 100% female) scheduled to receive RT from a conventional echocardiographic measures. Regional inferior LD was the primary source of prognostic information in GLD since only inferior LD remained as an independent predictor after multivariate adjustment. DISCUSSION/SIGNIFICANCE OF IMPACT: GLD provides independent prognostic information in ACS patients over and beyond all conventional echocardiographic measures. Regional inferior LD was the primary source of prognostic information gained from GLD. GLD proved to be a better predictor of cardiovascular events than conventional echocardiographic measures. This could lead to better risk stratification in the clinical setting and open up for earlier intervention in high-risk individuals.

**Racial/ethnic variation in the relationship between metabolic syndrome components and cardiovascular disease and the role of uric acid among population with metabolic syndrome**

Magda Shaheen
David Gefken School of Medicine, UCLA

OBJECTIVES/SPECIFIC AIMS: To examine the racial/ethnic variation in the relationship between metabolic syndrome (MeS) components and cardiovascular disease (CVD) as well as examine the role of uric acid as a predictor of CVD among population with MeS. METHODS/STUDY POPULATION: We analyzed National Health and Nutrition Examination Surveys data (1999–2010) for adults aged >20 years with MeS. Using the ATP III clinical criteria for diagnosing MeS,