address surgical gaps. Barriers included additional stakeholder's perceptions of low user acceptability and appropriateness in some cases and the need for additional study data to inform decision making for practice and policy. DISCUSSION/SIGNIFICANCE OF IMPACT: The innovation is efficacious, acceptable, adds to current coping strategies, and fits within existing fistula programs. Stakeholders' pre-implementation perceptions highlight the importance of partnerships and the need for an evidence base related to effectiveness, acceptability, and cost. Challenges to address include access to resources within these contexts (water, soap, and safe space to empty cup) and development of a culturally appropriate counseling message. Future research warranted.

3358

Developmental Outcomes of Aicardi Goutieres Syndrome

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OBJECTIVES/SPECIFIC AIMS: Metachromatic leukodystrophy (MLD) is a rare, lysosomal storage disorder caused by decreased enzymatic activity of arylsulfatase A. This can be the result of mutations in the ASA gene, or in rare cases PSAP. Historically, MLD has been subdivided into 3 forms based on age of onset: late infantile, juvenile, and adult. These subtypes were defined decades ago, prior to the appreciation of the full clinical spectrum of this lysosomal storage disorder and the advent of genetic testing. As a consequence, these empiric age-based historical definitions do not fully account for the spectrum of disease and are not founded in evidence-based analysis of phenotypic cohorts. Additionally, the antiquated definitions do not fully predict presenting features or disease course, and they fail to stratify outcomes in the few therapies currently available to treat this disease. As novel targeted therapeutics are developed, it is essential to have a clear understanding of the clinical presentation and natural history of MLD. Without properly defined sub-populations, it is difficult to design a therapeutic clinical trial that can demonstrate efficacy in a heterogeneous group. METHODS/STUDY POPULATION: In this project, we collected the retrospective natural history of over 50 individuals from around the world. We created an electronic database in REDCap to able to longitudinally collect clinical information. Using this retrospective natural history approach to understanding the disease course of individuals affected by MLD, we were able to characterize age of onset, delay to diagnosis, and common presenting features. RESULTS/ANTICIPATED RESULTS: Our results suggest distinct clinical phenotypic subgroups, with distinct presentations. DISCUSSION/SIGNIFICANCE OF IMPACT: With a better understanding of the natural history of MLD, we will be able to better counsel families and to design clinical trials with more coherent cohorts and more appropriate clinical endpoints.

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First in Man

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OBJECTIVES/SPECIFIC AIMS: A mimic of congenital infections and a rare genetic cause of interferon overproduction, Aicardi Goutières Syndrome (AGS) results in significant neurologic disability. AGS is caused by pathogenic changes in the intracellular nucleic acid sensing machinery (TREX1, RNASEH2A, RNASEH2B, RNASEH2C, SAMHD1, ADAR1, and IFIH1). All affected individuals exhibit neurologic impairment: from mild spastic paraparesis to severe tetraparesis and global developmental delay. We hypothesize that genotype influences the heterogeneous developmental trajectory found in AGS. METHODS/STUDY POPULATION: To characterize this spectrum, age and symptoms at presentation and longitudinal developmental skill acquisition was collected from an international cohort of children (n=88) with genetically confirmed AGS. RESULTS/ANTICIPATED RESULTS: We found that individuals present at variable ages, with the largest range in SAMHD1, ADAR, and IFIH1. There are 3 clusters of symptoms at presentation: altered mental status (irritability or lethargy), systemic inflammatory symptoms, and acute neurologic symptoms, with variability across all genotypes. By creating Kaplan-Meier curves for developmental milestones, we were able to create genotype-based developmental trajectories for the children affected by the 5 most common genotypes: TREX1, IFIH1, SAMHD1, ADAR, and RNASEH2B. Individuals with AGS secondary to TREX1 were the most severely affected, significantly less likely to reach milestones compared to the other genotypes, including head control, sitting, and nonspecific mama/dada (p-value <0.005). Individuals affected by SAMHD1, IFIH1, and ADAR collectively attained the most advanced milestones, with 44% of the population achieving a minimum of a single word and 31% able to walk independently. Three retrospective scales were also applied: Gross Motor Function Classification System, Manual Ability Classification Scale, and Communication Function Classification System. Within each genotypic cohort, there was pronounced heterogeneity. DISCUSSION/SIGNIFICANCE OF IMPACT: Our results demonstrate the influence of genotype on early development, but also suggest the importance of other unidentified variables. These results underscore the need for deep phenotyping to better characterize subcohorts within the AGS population.

3526

Healthy eating, physical activity, sleep and cognitive function in elderly population: Data from National Health and Nutrition Examination Survey 2011-2014

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OBJECTIVES/SPECIFIC AIMS: To examine the relationship between healthy eating, physical activity (PA), sleep problem and hours of sleep and cognitive function among elderly population and the racial/ethnic differences in this relation. METHODS/STUDY POPULATION: We analyzed data from National Health and Nutrition Examination Survey 2014-2016 for 882 population 60 years and older. Cognitive status was measured by the Digit Symbol Substitution (DSS) exercise score and the Consortium to Establish a Registry for Alzheimer's Disease (CERAD) total score. Healthy eating index (HEI), PA, and sleep problem and hours of sleep were assessed by questionnaire. The association between cognitive function and HEI, PA, sleep problem and hours of sleep were assessed by linear regression after adjusting for age, gender, race/ethnicity, poverty level, lipid profile, fasting glucose level, alcohol, body mass index, stroke and education. Data were analyzed using Stata 14 considering design and sample weight and $p<0.05$ is statistically significant. RESULTS/ANTICIPATED RESULTS: CERAD total score was associated with HEI (Adjusted $B = 0.07$, 95% Confidence Interval

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(CI) = 0.01-0.13, p = 0.02) and not associated with physical activity or sleep problem or hours of sleep (p > 0.05). Animal fluency score was associated only with HEI (Adjusted B = 0.05, 95% CI = 0.01-0.09, p = 0.02). DDS score was not associated with HEI, PA, or sleep problem (p > 0.05) but associated with hours of sleep (p = 0.03). Stratified analysis by race/ethnicity showed that CERAD total score was associated with HEI only in White (Adjusted B = 0.08, 95% CI = 0.01-0.15, p = 0.02). DISCUSSION/SIGNIFICANCE OF IMPACT: CERAD total score was associated with HEI and not associated with PA or sleep problem. Promoting healthy eating is important for improving cognition in elderly population. Culturally sensitive and linguistically appropriate programs that involve community and care providers are needed to promote healthy eating for elderly population.

3111

Heart Rate Variability as a Predictor of Post-Operative Cognitive Dysfunction in Older Adults

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OBJECTIVES/SPECIFIC AIMS: The objective of this project is to determine whether HRV, collected peri-operatively, is predictive of cognitive decline among older adults who undergo elective surgery/anesthesia. METHODS/STUDY POPULATION: This project is a part of the ongoing INTUIT/PRIME study, which is collecting pre- and post-operative cognitive testing, fMRI imaging, CSF samples, and EEG recordings from 200 older adults (age ≥ 60) undergoing elective non-cardiac/non-neurologic surgery scheduled to last > 2 hours at Duke University Medical Center and Duke Regional Hospital. This project utilizes data from the first 60 INTUIT participants who contributed continuous heart rate data before and during surgery. Participants undergo cognitive testing prior to surgery (baseline) and at 6 weeks after surgery. Our primary dependent variable is the change in the composite score from baseline to 6-weeks. Delirium is assessed in the hospital with the twice daily 3D-CAM tool, so we will report the proportion of individuals with 6-week cognitive decline who exhibited delirium in the days following surgery. Participants' echocardiogram (ECG) recordings are extracted pre- and intraoperatively from B650/B850 patient monitors with VSCapture software. HRV is defined as the variability between successive R-spikes or inter-beat-intervals on ECG. RESULTS/ANTICIPATED RESULTS: We anticipate that lower intraoperative HRV is associated with worse cognitive decline at 6 weeks after surgery. As secondary objectives, we will determine whether pre-operative HRV or change in HRV (from pre-operative to intra-operative measures) are predictive of cognitive decline after surgery. We expect that in-hospital delirium will be detected in a higher proportion of those with 6-week cognitive decline, compared to those with stable or improved cognition at 6 weeks. DISCUSSION/SIGNIFICANCE OF IMPACT: HRV may address the present need for pre- and intra-operative cognitive risk stratification in the elderly. Physiological indices like HRV have the potential to dramatically change our understanding of CI in older adults undergoing surgery, as they offer an accessible, cost-effective, and non-invasive means whereby clinicians, particularly those unfamiliar with the nuances of geriatric and CI/dementia-related care, can monitor patients and refer those at high-risk of CI after surgery for early intervention.

3525

Improvement in Suicidal Ideation after Repeated Ketamine Infusions: Relationship to Reductions in Symptoms of Posttraumatic Stress Disorder, Depression, and Pain

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OBJECTIVES/SPECIFIC AIMS: Given the heightened risk for suicide seen in individuals with PTSD+MDD, this report explored the effect of repeated ketamine infusions on SI in a cohort of veterans. METHODS/STUDY POPULATION: Veterans with PTSD+MDD (n = 15) received six intravenous infusions of 0.5 mg/kg ketamine on a Monday-Wednesday-Friday schedule over a 12-day period. All subjects endorsed SI at baseline. Outcome measures included the Montgomery-Asberg Depression Rating Scale (MADRS) total score, MADRS suicidal ideation item, and PTSD symptom Checklist for DSM-5 (PCL-5) subscales (intrusion, avoidance, negative alterations in cognition and mood, and marked alterations in arousal and reactivity), and visual analog scale of pain. Measures were collected immediately before and 24-hours after each infusion. RESULTS/ANTICIPATED RESULTS: Significant improvement in SI was observed 24-hours after the first infusion (Z = 3.21; p = .001) and remained significantly improved at all other post-infusion time points. Improvement in SI at the conclusion of the infusion series was significantly correlated with PTSD subscales of avoidance (r(12) = .610, p = .021), negative alterations in cognition and mood (r(12) = .786, p = .001), alterations in arousal and reactivity (r(12) = .729, p = .003), and pain (r(12) = .591, p = .013), even when controlling for improvement in symptoms of depression. DISCUSSION/SIGNIFICANCE OF IMPACT: The present analysis provides evidence of improvement in SI in a cohort of veterans with PTSD+MDD. Improvements in suicidality were correlated with PTSD symptom subscales and pain independent of improvement in depression. This report extends the interpersonal theory of suicide as it applies to posttraumatic pathology by demonstrating a significant association between improvements in all subclusters of PTSD, improvement in pain and improvement in suicidal ideation.

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Improving Individual Clinical Outcomes in a Sequential Multiple Assignment Randomized Trial (SMART)

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OBJECTIVES/SPECIFIC AIMS: This work develops an algorithm that identifies patients in a Sequential Multiple Assignment Randomized Trial (SMART) who should switch treatments prior to the end of a stage because clinical effectiveness via their current intervention is unlikely. This algorithm uses as inputs patient baseline and interim measurements to assign a probability that a patient should switch or stay on their current intervention. First, the algorithm will be derived assuming both a linear and non-linear patient trajectory. Second, the performance of the algorithm will be assessed

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