into harmful drinking behavior such as binge drinking. Future analyses should examine the impact of suggestibility on alcohol-related pheno-types across the spectrum of drinking from social to binge and heavy drinking patterns.

2273

Synthetic cannabinoid usage among psychiatric inpatients

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OBJECTIVES/SPECIFIC AIMS: Synthetic cannabinoids (SC) are widely available and are associated with acute psychosis. Our recent study indicated that SC using psychiatric inpatients admitted in 2014 had more psychotic symptoms, aggression, and agitation compared with cannabis [marijuana (MJ)] using patients. The current study will review more charts and will characterize the demographics and presentations of current SC Versus MJ using patients. METHODS/STUDY POPULATION: A chart review was conducted of patients admitted to a New York City inpatient dual diagnosis psychiatric unit from 2014 to 2016. Inclusion criteria were self-reported current SC use or MJ use, or urine toxicology (+) for MJ. RESULTS/ANTICIPATED RESULTS: In total, 585 charts met inclusion criteria, 168 reported current SC use (40 f, 128 m SC users; 122 f, 295 m MJ users). SC using patients were younger ($p = 0.050$), more likely to be Black ($p = 0.003$), and homeless or living in a shelter ($p = 0.001$). SC users were also more likely to be agitated (OR: 2.26) and aggressive (OR: 2.04) and have psychotic symptoms (OR: 3.03) compared with MJ users. SC users received more PRN medication ($p < 0.001$) and had longer lengths of stay ($p = 0.001$). DISCUSSION/SIGNIFICANCE OF IMPACT: Results demonstrate that current SC users had a different demographic profile compared with current MJ users. Our results also support our previous findings: SC using patients were more likely to be agitated and aggressive and were more likely to demonstrate positive psychotic symptoms.

2477

Targeting pulsatile load to increase exercise capacity and quality of life after TAVR for severe aortic stenosis
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OBJECTIVES/SPECIFIC AIMS: The objective of the study is to test the effect of oral inorganic nitrate on the primary outcomes of exercise capacity and quality of life in patients who have undergone TAVR for severe aortic stenosis. We will also test the effect of the study drug on various physiology endpoints, including systemic vasodilator response to exercise, LV diastolic function and myocardial strain, late systolic LV load and pulsatile arterial wave reflections. METHODS/STUDY POPULATION: This is a randomized double-blind crossover clinical trial, in which 24 subjects who underwent TAVR for severe AS 3 or more months before enrollment will receive the following 2 interventions, in randomized order: (1) Potassium nitrate (KNO_3), at a dose of 12–18 mmol/day by mouth for ~4 weeks, or (2) Potassium chloride (KCl), at a dose of 12–18 mmol/day by mouth for ~4 weeks. A 1-week washout period will be introduced between the 2 interventions. RESULTS/ANTICIPATED RESULTS: We hypothesize that sustained oral administration of potassium nitrate will lead to improvement of exercise capacity and quality of life in this population. DISCUSSION/SIGNIFICANCE OF IMPACT: His study will have a significant impact on assessment and management of patients after TAVR. We will gain a better understanding of physiologic abnormalities leading to exercise intolerance after TAVR. In addition, there are currently no proven therapies that improve exercise capacity in this population.

2020

The clinical implications of a positive prostate cancer screen in patients undergoing a cardiac transplant evaluation
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OBJECTIVES/SPECIFIC AIMS: Screening the general population for prostate cancer with prostate specific antigen (PSA) continues to be controversial. Patients with advanced heart failure undergoing evaluation for suitability for cardiac transplantation are often requested to undergo prostate cancer screening, with guiding evidence generated from the general population. The objective of this study is to determine the clinical implications of a positive prostate cancer screen result in this patient population. METHODS/STUDY POPULATION: A retrospective cohort study was performed on all men that were referred to a tertiary care cardiac transplant center between January 2000 and December 2015. Patients were classified as having either a "positive screen" ($PSA \geq 4$ ng/mL) or a "negative screen" ($PSA < 4$ ng/mL) at the point of evaluation. The primary outcome of time to listing for cardiac transplant (days) was calculated from the date of referral to the date of listing. A multivariable Cox proportional hazards model was developed to assess the association between a positive prostate cancer test result and listing for cardiac transplantation. RESULTS/ANTICIPATED RESULTS: Among the 704 patients included in this study, 66 men (9.4%) had a positive prostate cancer screen result. Men with a positive prostate cancer screen were approximately 4 year older (mean 58.5 vs. 54.1 years), more likely to have a diagnosis of Ischemic Cardiomyopathy (74% vs. 53%) and require continuous mechanical support (61% vs. 16%) at the point of transplant evaluation. The median time for listing for cardiac transplant was greater in patients with a positive PSA (119 vs. 48 days, $p < 0.05$). After adjusting for age, renal function, clinical status at evaluation, history of COPD, and year of referral, patients with a positive prostate cancer screen had a reduced hazards ratio (HR) for progressing to cardiac transplant listing compared with those with a negative screen (HR 0.58, 95%CI: 0.38–0.91). DISCUSSION/SIGNIFICANCE OF IMPACT: Screening patients undergoing cardiac transplant evaluation for prostate cancer with PSA has a low diagnostic yield. An individual's PSA value is influenced by their age and clinical status at the time of screening, with a positive screen being associated with a reduced likelihood for progressing to listing for cardiac transplant.

2448

The effect of allopurinol on pediatric patients undergoing maintenance chemotherapy for acute lymphoblastic leukemia or lymphoblastic lymphoma
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OBJECTIVES/SPECIFIC AIMS: This study aims to assess the safety, feasibility, clinical benefits and pharmacodynamics of adding allopurinol to standard maintenance therapy that includes 6-mecaptopurine (6-MP) in pediatric patients with acute lymphoblastic leukemia (ALL) or lymphoblastic lymphoma. Our goal is to investigate if allopurinol improves hepatotoxicity and GI toxicity, if it safely decreases acute neutrophil count (ANC), if it reduces the 6-MP dose required during chemotherapy, and if it works through our hypothesized mechanism by lowering the levels of the toxic metabolite, 6-methylmecaptopurine (6-MMP) and by raising the levels of the active metabolite, 6-thioguanine (6-TGN). METHODS/STUDY POPULATION: This is a single arm, nonblinded pilot study of patients under age 30 years who were being treated in the maintenance phase of therapy for ALL or lymphoblastic lymphoma, and had adverse effects such as high 6-MMP:6-TGN ratio, high ANC, and high liver enzymes. Patients enrolled were started with allopurinol in addition to ongoing oral chemotherapy. Data from beginning maintenance to end of chemotherapy was collected in the electronic medical record, EPIC for the 13 patients enrolled at Johns Hopkins, and data analysis was conducted using STATA and Excel. RESULTS/ANTICIPATED RESULTS: Initial data analysis reveals that the required dose of 6-MP after addition of allopurinol to the chemotherapy regimen was significantly lower compared with that before the addition of allopurinol in 11 out of the 12 patients assessed ($p < 0.05$). Among the 10 patients that were assessed for 6MMP:6TG ratio, all had lower average 6MMP:6TGN ratios after allopurinol compared to before allopurinol; the percentage of weeks that goal 6MMP:6TGN ratio (<40) were maintained were statistically significant in 6 patients ($p < 0.05$) and close to significance in 2 other patients ($p = 0.057$). The percentage of weeks that patients maintained alanine aminotransferase levels below 120 was significantly greater after addition of allopurinol compared to before the addition of allopurinol in 9 out of 13 patients assessed, suggesting that allopurinol may be associated with reduced hepatotoxicity. Further data analysis is ongoing to assess the percentage of weeks that patients maintained goal total bilirubin, direct bilirubin, and ANC, as well as average number of admissions for infections and average number of therapy holds after allopurinol addition compared to before allopurinol

addition. DISCUSSION/SIGNIFICANCE OF IMPACT: Allopurinol is associated with reduction in required 6-MP dose, decrease in the percentage of weeks that patients have hepatotoxicity, and reduction in the ratio of toxic metabolite to active anti-leukemic metabolite in several patients. We hope that the results of this study can be used for further research and for guiding clinical practice since there are no established guidelines in pediatric oncology regarding addressing side effects of oral chemotherapy using 6-MP. If allopurinol indeed is safe and effective, adding it to the standard chemotherapy regimen can lead to better tolerance and compliance to oral maintenance chemotherapy, and hopefully improved outcomes for children with ALL and lymphoblastic leukemia.

2244

The effects of gravidity and parity on risk of cognitive impairment and amyloid plaque deposition

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OBJECTIVES/SPECIFIC AIMS: Our study seeks to answer the following questions: (1) To determine whether higher numbers of gravidity and parity are associated with a decreased risk of mild cognitive impairment or dementia; (2) To determine whether higher numbers of gravidity and parity are associated with a decreased risk of amyloid deposition by PET MRI. METHODS/STUDY POPULATION: Our study population includes all female study participants in the Atherosclerosis Risk in Communities (ARIC) study who did not have a diagnosis of dementia before enrollment. Participants were also required to have been evaluated for cognitive impairment in the ARIC-NCS ancillary study, or to have received an MRI PET scan of their brain as part of the ARIC-PET ancillary study. Baseline information on the gravidity and parity of all the women was recorded at initial enrollment. We use statistical analyses and epidemiological measures to explore our study questions. For our first question, we use logistic regression to evaluate the association of gravidity and parity as two separate ordinal variables using adjudicated mild cognitive impairment (MCI) and dementia. For our second question, we use logistic regression to evaluate the association of gravidity and parity (again as ordinal variables) with amyloid positivity. We use STATA for our statistical analyses. RESULTS/ANTICIPATED RESULTS: We hypothesize that increased gravidity and parity will have either no effect or a protective effect against MCI, dementia, and amyloid deposition. Our preliminary analyses show that older age of a woman at first pregnancy and at first live birth are both positively correlated with increased incidence of cognitive impairment. No relationship was found between these surrogates of lifetime estrogen exposure and cerebral amyloid deposition. DISCUSSION/SIGNIFICANCE OF IMPACT: Multiple basic science and clinical research studies have shown that estrogen exposure has an effect on cognitive function, likely through a complex interplay of multiple physiologic systems. Our study expands the research in this area by using a large, established epidemiologic cohort to examine gravidity and parity as important factors in lifetime estrogen exposure as they relate to cognitive impairment and amyloid plaque deposition.

2432

The relationship between cognitive functioning and abnormal eating behavior in behavioral variant frontotemporal dementia

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OBJECTIVES/SPECIFIC AIMS: Abnormal eating behavior is a core and distinguishing diagnostic feature of behavioral variant frontotemporal dementia (bvFTD) that differentiates it from other neurodegenerative disorders and late-life psychiatric conditions. Though it has been proposed that hyperphagia in bvFTD results from cognitive dysfunction, the observation of altered sweet preferences and food foraging indicate that bvFTD is accompanied by fundamental dietary changes associated with hypothalamic and insular atrophy. In the current study, we examined how cognitive dysfunction contributes to abnormal feeding behavior in bvFTD. METHODS/STUDY POPULATION: We analyzed first-visit eating and neuropsychological data from the National Alzheimer's Coordinating Center database (7 centers; September 2017 data freeze) in a subset of bvFTD patients with clinician-rated characterization of disturbed feeding severity. Group differences in cognitive domains of attention, processing speed, language, memory, and executive functioning were examined between patients with abnormal eating behavior (n = 59) and a demographically-matched sample of patients with normal feeding behavior (n = 60). Group differences in informant-reported empathy, behavioral inhibition, and depressive symptoms were also examined. RESULTS/ANTICIPATED RESULTS: Cognitive profiles in bvFTD patients did not vary as a function of disturbed feeding behavior. In a subset of cases pathologically-confirmed at autopsy, processing speed was better in cases with abnormal feeding behavior. No significant group differences were found for behavioral indices. DISCUSSION/SIGNIFICANCE OF IMPACT: These findings suggest that cognitive dysfunction is not the sole driver of abnormal eating behavior in bvFTD. Future studies with comprehensive characterization of feeding behavior, cognition and physiological/neuroimaging indices are warranted.

2157

The socially animated machine (SAM) robot: A social skills intervention for children with autism spectrum disorder

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OBJECTIVES/SPECIFIC AIMS: Autism spectrum disorder (ASD) is a neurodevelopmental disorder that affects one in 68 children. Children with ASD have 2 core areas of difficulty: social communication skills and restricted and repetitive interests and patterns of behavior. Children with social skills deficits are at higher risk of developing mental health problems, and underdeveloped social skills predict poorer quality of life in adulthood. Therapies have been developed to help people with ASD improve social abilities in childhood, often involving a clinician directly teaching social skills lessons, either one-on-one or in a group setting. However, children with ASD can become anxious when interacting with other people and have an intrinsic motivation to interact with technology. To capitalize on this interest, this research team developed a robot, the socially animated machine (SAM) to teach social skills to children with ASD. Previous research found that this intervention was feasible and enjoyable for children with ASD and average cognitive ability, and participants improved in complex emotion recognition following intervention. The purpose of this study was to determine whether participants of all IQ levels were motivated by the SAM intervention, and whether they improved on emotion identification, facial recognition, social skills, and adaptive behavior. METHODS/STUDY POPULATION: This study recruited 20 children with ASD ages 5–14. Children completed tasks measuring ASD symptoms, IQ, receptive language, facial recognition, and emotion identification and were assigned to the control group (nonemotion dance games with SAM robot) or the intervention group (emotion games with SAM robot). Parents and teachers completed questionnaires about the child's social skills. Following the robot intervention, facial recognition, emotion identification, and social skills were measured again, and parents and children rated participant enjoyment during the robot interaction. RESULTS/ANTICIPATED RESULTS: Overall, parents and children in both groups rated the robot interaction as highly enjoyable and motivating (parent ratings: M = 26.4 out of 30, child ratings: M = 17.5 out of 20). There were no differences between groups on post-test measures when controlling for pre-test scores (all $p > 0.05$). Both groups improved over time on emotion identification accuracy (intervention: M = 13.0% improvement, $t = 2.57$, $p < 0.05$; control: M = 10.2% improvement, $t = 2.38$, $p < 0.05$) and parent-rated social skills (intervention: pre-test M = 113.8, post-test M = 100.6, $t = -3.37$, $p = 0.01$; Control: pre-test M = 107.9, post-test M = 89.0, $t = -2.83$, $p < 0.05$; decrease in scores indicates improvement). Teachers saw a decrease in problem behaviors for the intervention group (pre-test M = 127.4, post-test M = 119.6, $t = -3.79$, $p < 0.01$, decrease in scores indicates improvement). DISCUSSION/SIGNIFICANCE OF IMPACT: This study shows that children with ASD and all levels of cognitive ability enjoyed and were motivated by the SAM robot intervention. This is particularly important for children with ASD who often have difficulty with attention and motivation. Children who are intrinsically motivated by the learning process will be more likely to benefit from it; therefore, continuing to pursue the methodology of robot-based interventions with this population is a worthwhile endeavor.