cancer patients (mean age 58, 100% female) scheduled to receive RT from a previously completed nationwide, multicenter, phase II randomized controlled trial examining the efficacy of oral curcumin on radiation dermatitis severity. The trial was conducted at 21 community oncology practices throughout the US affiliated with the University of Rochester Cancer Center NCI's Community Oncology Research Program (URCC NCORP) Research Base. Sleep disturbance was assessed using a single item question from the modified MD Anderson Symptom Inventory (SI) on a 0–10 scale, with higher scores indicating greater sleep disturbance. Total subjective pain as well as the subdomains of pain (sensory, affective, and perceived) were assessed by the short-form McGill Pain Questionnaire. Pain at treatment site (pain-Tx) was also assessed using a single item question from the SI. These assessments were included for pre-RT (baseline) and post-RT. For the present analyses, patients were dichotomized into 2 groups: those who had moderate-severe disturbed sleep at baseline (score ≥ 4 on the SI; n = 101) Versus those who had mild or no disturbed sleep (control group; score = 0–3 on the SI; n = 575). RESULTS/ANTICIPATED RESULTS: Prior to the start of RT, breast cancer patients with moderate-severe disturbed sleep at baseline were younger, less likely to have had lumpectomy or partial mastectomy while more likely to have had total mastectomy and chemotherapy, more likely to be on sleep, anti-anxiety/depression, and prescription pain medications, and more likely to suffer from depression or anxiety disorder than the control group (all p's ≤ 0.02). Spearman rank correlations showed that changes in sleep disturbance from baseline to post-RT were significantly correlated with concurrent changes in total pain ($r = 0.38$; $p < 0.001$), sensory pain ($r = 0.35$; $p < 0.001$), affective pain ($r = 0.21$; $p < 0.001$), perceived pain intensity ($r = 0.37$; $p < 0.001$), and pain-Tx ($r = 0.35$; $p < 0.001$). In total, 92% of patients with moderate-severe disturbed sleep at baseline reported post-RT total pain compared with 79% of patients in the control group ($p = 0.006$). Generalized linear estimating equations, after controlling for baseline pain and other covariates (baseline fatigue and distress, age, sleep medications, anti-anxiety/depression medications, prescription pain medications, and depression or anxiety disorder), showed that patients with moderate-severe disturbed sleep at baseline had significantly higher mean values of post-RT total pain (by 39%; $p = 0.033$), post-RT sensory pain (by 41%; $p = 0.046$), and post-RT affective pain (by 55%; $p = 0.035$) than the control group. Perceived pain intensity ($p = 0.066$) and pain-Tx ($p = 0.086$) at post-RT were not significantly different between the 2 groups. DISCUSSION/ SIGNIFICANCE OF IMPACT: These findings suggest that moderate-severe disturbed sleep prior to RT is an important predictor for worsening of pain at post-RT in breast cancer patients. There could be several plausible reasons for this. Sleep disturbance, such as sleep loss and sleep continuity disturbance, could result in impaired sleep related recovery and repair of tissue damage associated with cancer and its treatment; thus, resulting in the amplification of pain. Sleep disturbance may also reduce pain tolerance threshold through increased sensitization of the central nervous system. In addition, pain and sleep disturbance may share common neuroimmunological pathways. Sleep disturbance may modulate inflammation, which in turn may contribute to increased pain. Further research is needed to confirm these findings and whether interventions targeting sleep disturbance in early phase could be potential alternate approaches to reduce pain after RT.

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Prognostic value of left ventricular mitral annular longitudinal displacement measured by tissue Doppler imaging in patients with acute coronary syndrome

Mats Lassen[1], Kristoffer G. Skaarup[1], Allan Z. Iversen[1], Peter G. Jørgensen[1], Flemming J. Olsen[1], Jan S. Jensen[1] and Tor Biering-Sørensen[1]
[1] University of California, San Francisco, CA, USA; [2] Copenhagen University Hospital Gentofte

OBJECTIVES/SPECIFIC AIMS: To investigate the prognostic value of left ventricular mitral annular longitudinal displacement (LD) measured with color tissue Doppler imaging (TDI) in a large population suffering from acute coronary syndrome (ACS). METHODS/STUDY POPULATION: In total, 501 ACS patients underwent an echocardiography within 9 days after a percutaneous coronary intervention. Regional LD was obtained from the 6 mitral annular regions with TDI and GLD was calculated as an average. RESULTS/ANTICIPATED RESULTS: During a median follow-up time of 4.4 years 46 ACS patients suffered CVD. Mean value of GLD in the population was 8.11 mm (± 2.4). GLD and LD obtained from the inferior wall remained significant independent predictors after multivariate adjustment for clinical parameters, GLD (HR: 1.43, 95% CI: 1.12–1.82, $p = 0.014$, per 1mm decrease), inferior LD (HR: 1.38, 95% CI: 1.14–1.66, $p = 0.001$). Furthermore, inferior wall

LD was the primary source of prognostic information in GLD since only inferior LD remained significant when both measures were included in the same model: GLD (HR: 0.95, 95% CI: 0.64–1.40, $p = 0.781$); inferior LD (HR: 1.60, 95% CI: 1.15–2.22, $p = 0.005$). Of all walls, only inferior wall 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.

2281

Prophylactic broad-spectrum antibiotics for childhood malnutrition

Amy Elizabeth Langdon[1], Xiaoqing Sun[2], Sheila Isanaka[3] and Gautam Dantas[2]
[1] Institute of Clinical and Translational Sciences, Washington University in St. Louis; [2] Washington University in St. Louis; [3] Medecins Sans Frontieres, Epicentre, France

OBJECTIVES/SPECIFIC AIMS: A course of oral broad-spectrum antibiotics frequently has a positive effect on morbidity and mortality in severe acute malnutrition (SAM), but the actual mechanism for this effect is unknown. This mechanism is especially important to find and quantify because of the possibility that using antibiotics prophylactically may accelerate the danger from antibiotic resistant infections. This study aims to answer (1) how antibiotic therapy improves the nutritional recovery and (2) how much it affects the prevalence of resistance genes in the microbiome. METHODS/STUDY POPULATION: Stool samples were collected from children with SAM between 6 and 60 weeks of age who received either one week of amoxicillin or placebo (n = 164). The children were followed for 12 weeks with longitudinal sampling, and a subset were followed out to 2 years. All samples were frozen at $-80°C$ and prepared for metagenome shotgun sequencing via the Illumina Nextera platform. RESULTS/ANTICIPATED RESULTS: Antibiotic treatment at the start of the nutritional program is associated with significant improvements in weight gain, mid-upper-arm circumference, and graduation from the treatment program. It is also associated with qualitative decreases in early-life fermenter Lactobacillus and known enteropathogen Campylobacter. Two years after the use of amoxicillin, the Shannon diversity index is significantly higher than that of malnourished children (effect size 0.507, 95% CI: 0.204–0.630, $p = 0.0007$), while children who received placebo are not distinguishable from malnourished children by the same metric (effect size 0.147, 95% CI: -0.311, 0.630, $p = 0.5878$). Sustained antibiotic resistance gene enrichment within the microbiota did not occur, as the enrichment effects disappears by week 4 of follow-up. DISCUSSION/SIGNIFICANCE OF IMPACT: The use of amoxicillin to treat uncomplicated SAM has therapeutic benefits visible by anthropometry and by content of the gut microbiota. The main concern with the use of prophylactic antibiotics for this purpose is the effect on antibiotic resistance gene enrichment in the children's microbiota. This concern was not supported here. The benefit/cost ratio for the use of prophylactic antibiotics for individuals in this cohort is positive when weighing effects on anthropometry, microbiome, and antibiotic resistance. The results of this study impact the treatment of millions of children each year at nutritional therapy clinics around the world.

2562

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 Geffen School of Medicine, UCLA

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

subjects were classified as having MetS if they had ≥ 3 of the following: waist circumference ≥ 40 inches for men or ≥ 35 inches for women, triglyceride ≥ 150 mg/dL, HDL-C for men ≤ 40 mg/dL; women ≤ 50 mg/dL, pre-hypertension, or fasting glucose ≥ 110 mg/dL. We used multiple logistic regression in STATA 14 survey module to examine the relation between MetS components and CVD adjusting for age, gender, race/ethnicity, education, smoking, alcohol, albuminuria, glomerular filtration rate, C-reactive protein, uric acid and white blood count. To assess the racial/ethnic variation, we examined the same model in each race/ethnic group. RESULTS/ANTICIPATED RESULTS: Of the 3212 subjects, 78% were Whites, 10% were Blacks, and 15% had CVD. MetS components, CVD, and uric acid varied significantly by race/ethnicity ($p < 0.05$). In the multivariate model, HDL-C level [odds ratio (OR) = 1.5; 95% confidence interval (CI) = 1.1–2.0], triglyceride level (OR = 2.0; CI = 1.4–2.9), and elevated uric acid (OR = 1.4; CI = 1.1–1.9) were independently related to CVD ($p < 0.05$). While CVD was independently related to HDL-C, triglyceride, and elevated uric acid in Whites ($p < 0.05$), it was associated with pre-hypertension and triglyceride in Blacks ($p < 0.05$) and no predictors in Hispanics ($p > 0.05$). DISCUSSION/SIGNIFICANCE OF IMPACT: Elevated uric acid, HDL-C, and triglyceride levels are significant independent predictors of CVD among population with MetS. These predictors varied by race/ethnicity. Health care providers should be vigilant in the management of MetS components and control of uric acid level in each racial/ethnic group to prevent the CVD risk among the population with MetS.

2189

Scrambler therapy: Potential new treatment for central neuropathic pain?

Maureen A. Mealy[1], Sharon L. Kozachik[1], Lawrence Cook[2], Marie T. Nolan[1], Thomas J. Smith[3] and Michael Levy[3]
[1] Johns Hopkins University School of Nursing; [2] University of Utah; [3] Johns Hopkins University School of Medicine

OBJECTIVES/SPECIFIC AIMS: Central neuropathic pain is a severely disabling consequence of conditions that cause tissue damage in the central nervous system (CNS) such as multiple sclerosis (MS) and neuromyelitis optica (NMO). It impacts mood, mobility and quality of life, but is often refractory to common treatments. Scrambler Therapy is an emerging non-invasive pain modifying technique that utilizes transcutaneous electrical stimulation of nociceptive fibers with the intent of re-organizing maladaptive signaling pathways. It has been examined for treatment of peripheral neuropathy with favorable safety and efficacy outcomes, but its use in central neuropathic pain has not been reported. We aim to explore acceptability and safety of Scrambler Therapy through a Phase II sham-controlled trial in NMO, and describe its use to date in central neuropathic pain. METHODS/STUDY POPULATION: Two patients with longstanding central neuropathic pain who failed multiple drug trials were treated as proof-of-concept, supporting the recent launch of a Phase II randomized controlled trial in NMO where patients receive 10 daily Scrambler treatments versus sham. Safety and acceptability from those recruited to date will be reported. Acceptability is measured by adherence and responses to patient surveys. RESULTS/ANTICIPATED RESULTS: We plan to recruit 22 patients, randomized 1:1 into experimental and sham arms. We will present acceptability and safety data for Scrambler use in patients with NMO who have been recruited by the time of this conference, as well as effectiveness data from two cases that have been completed outside of the trial. One case involved a 65-year-old woman with a 4-year history of central neuropathic pain following a C3-C5 TM. Her numerical rating scale (NRS) pain score was reduced to 0/10 from a baseline score of 5/10. The second case involved a 52-year-old woman with a 13-year history of pain following a medullary cavernoma bleed. Her baseline NRS pain score was 9/10, which was reduced to 0.5/10 post-treatment. No adverse events were reported. Pain relief was sustained at 30 days' post-treatment. DISCUSSION/SIGNIFICANCE OF IMPACT: We are investigating the acceptability and efficacy of Scrambler Therapy for central neuropathic pain treatment in NMO. Proof-of-concept was supported by two patients whose pain scores improved considerably more in response to this treatment than with previous pharmacologic and non-pharmacologic interventions. Results from this trial may support future investigation in other disorders that cause damage in the CNS, including MS and TM.

2280

Subjective, physiological activation and habituation, and response to written trauma narrative exposure

Mary K. Howell[1], Jennifer R. Myers[2] and Thomas A. Mellman[3]
[1] Georgetown – Howard Universities; [2] Walter Reed Army Medical Center; [3] Howard University

OBJECTIVES/SPECIFIC AIMS: Emotional processing theory and some observations suggest that activation of subjective and physiological distress during therapeutic exposure and habituation across exposure sessions are key to improvement. This study sought to determine whether initial subjective and physiological activation and between-session habituation would predict PTSD symptom reduction after a series of written trauma narrative exposure sessions. METHODS/STUDY POPULATION: In total, 29 urban-residing African-American participants with PTSD participated in four 30-minute writing sessions. Writing sessions 1 and 2 were 12 hours apart and session 3 and 4 were performed 1 week later, also 12 hours apart. PTSD symptoms were measured at baseline, after session 2, and 1 week after all 4 writing sessions with the Clinician Administered PTSD Scale. During each session, Subjective Units of Distress Scores (SUDS) were assessed 4 times and heart rate was measured continuously. RESULTS/ANTICIPATED RESULTS: Participants exhibited PTSD symptom improvement and habituation of subjective distress, but not physiological arousal, across writing sessions. First session baseline-corrected SUDS maximum and SUDS decrease from the initial to the final writing session were both positively associated with symptom improvement. DISCUSSION/SIGNIFICANCE OF IMPACT: Increased subjective, but not physiological, distress in the first exposure session and diminished subjective distress across sessions may be a helpful marker of emotional processing for clinicians and predictor of symptom improvement after written trauma narrative exposure.

2138

Susceptibility to social influence is associated with alcohol self-administration and subjective alcohol effects

Alyssa Schneider, Bethany Stangl, Elgin R. Yalin, Jodi M. Gilman and Vijay Ramchandani
National Institutes of Health

OBJECTIVES/SPECIFIC AIMS: Peer groups are one of the strongest determinants of alcohol use and misuse. Furthermore, social influence plays a significant role in alcohol use across the lifespan. One of the factors that most consistently predicts successful treatment outcomes for alcohol use disorders is one's ability to change their social network. However, the concept of social influence as defined by suggestibility or susceptibility to social influence has not yet been studied as it relates to drinking behavior and acute subjective response to alcohol. Our objective was to examine the relationship between suggestibility and alcohol consumption and responses, using an intravenous alcohol self-administration (IV-ASA) paradigm in social drinkers. METHODS/STUDY POPULATION: Healthy, social drinkers (n = 20) completed a human laboratory session in which they underwent the IV-ASA paradigm. This consisted of an initial 25-minute priming phase, where participants were prompted to push a button to receive individually standardized IV alcohol infusions, followed by a 125-minute phase during which they could push the button for additional infusions. IV-ASA measures included the peak and average breath alcohol concentration (BrAC) and number of button presses. Subjective responses were assessed using the Drug Effects Questionnaire (DEQ) and Alcohol Urge Questionnaire (AUQ) collected serially during the session. Participants completed the Multidimensional Iowa Suggestibility Scale (MISS) to assess suggestibility. The Alcohol Effects Questionnaire (AEFQ) was used to assess alcohol expectancies and the Timeline Followback questionnaire measured recent drinking history. RESULTS/ANTICIPATED RESULTS: After controlling for drinking history, greater suggestibility significantly predicted greater average BrAC, greater peak BrAC, and a greater number of button presses ($p = 0.03$, $p = 0.02$, $p = 0.04$, respectively) during the early open bar phase. Suggestibility significantly predicted subjective alcohol effects following the priming phase which included "Feel," "Want," "High," and "Intoxicated" and was trending for "Like" ($p = 0.02$, $p = 0.03$, $p = 0.01$, $p = 0.03$, $p = 0.054$, respectively) as well as AUQ ($p = 0.03$). After controlling for drinking history, suggestibility significantly predicted "Feel," "Like," "High," and "Intoxicated" peak scores during the open bar phase ($p = 0.03$, $p = 0.009$, $p = 0.03$, $p = 0.03$, respectively). There was no association between suggestibility and "Want More" alcohol. Suggestibility was positively associated with three positive expectancies (global positive; $p = 0.04$; social expressiveness; $p = 0.005$, relaxation; $p = 0.03$), and one negative expectancy (cognitive and physical impairment; $p = 0.02$). DISCUSSION/SIGNIFICANCE OF IMPACT: These results indicate that social drinkers that were more suggestible had higher alcohol consumption, greater acute subjective response to alcohol, and more positive alcohol expectancies. As such, susceptibility to social influence may be an important determinant of alcohol consumption, and may provide insight