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Does dietary fat composition predict short-term elevations in lipid levels in adults on a modified Atkins diet?

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OBJECTIVES/GOALS: The modified Atkins diet (MAD) is used in the management of drug-resistant epilepsy in adults. Some patients on MAD show an increase in serum levels of total cholesterol and low-density lipoprotein (LDL) cholesterol. We explored whether dietary fat composition predicts short-term elevations in serum lipid levels in diet-naïve adults who begin MAD. **METHODS/STUDY POPULATION:** Participants self-reported their diet intake with 3-day food records at baseline, 1 month and 2 months. Food records were analyzed using Nutrition Data System for Research software. Fasting serum levels of total cholesterol (TC), high-density lipoprotein (HDL) cholesterol, and triglycerides were also collected and LDL level calculated at baseline, 1 month, and 2 months. **RESULTS/ANTICIPATED RESULTS:** 38 patients submitted complete food records at each study visit (baseline, 1 month, and 2 month). Compared to baseline diet intake, there was a significant reduction in daily carbohydrate intake at 1 and 2 months (p<0.001). There was also a significant increase in daily saturated fatty acid (SFA) intake at 1 and 2 months (p<0.001), daily mono-unsaturated fatty acid (MUFA) intake at 1 and 2 months (p<0.001), and daily cholesterol intake at 1 month (p<0.05) and 2 months (p<0.001), but no change in daily poly-unsaturated fatty acid (PUFA) intake over time. Compared to baseline, there was a significant increase in serum LDL at 1 month (p<0.001) and 2 months (p<0.01) and an increase in serum TC at 1 month (p<0.01) but not 2 months. **DISCUSSION/SIGNIFICANCE OF IMPACT:** Despite a significant increase in total fat, saturated fat and mono-unsaturated fat intake as well as an increase in total cholesterol and LDL levels following MAD initiation, dietary fat composition appears to minimally predict serum lipid values in the short term. **CONFLICT OF INTEREST DESCRIPTION:** Tanya McDonald has received speaking honoraria from Nutricia North America. Bobbie Henry-Barron receives grants from Johns Hopkins Institute for Clinical and Translational Research (ICTR) which is funded in part by Grant Number UL1 TR 001079 from the National Center for Advancing Translational Sciences (NCATS) a component of the National Institutes of Health (NIH), and NIH Roadmap for Medical Research, Nutricia and VitaFlo. Diane Vizthum receives grants from the Johns Hopkins Institute for Clinical and Translational Research (ICTR) which is funded in part by Grant Number UL1 TR 001079 from the National Center for Advancing Translational Sciences (NCATS) a component of the National Institutes of Health (NIH), and NIH Roadmap for Medical Research. Mackenzie C. Cervenka has received grant support from Nutricia North America, VitaFlo, Army Research Laboratory, The William and Ella Owens Medical Research Foundation and BrightFocus Foundation. She receives speaking honoraria from LivaNova, Epigenix, Nutricia North America and the Glut1 Deficiency Foundation and performs consulting with Nutricia North America and Sage Therapeutics and receives Royalties from Demos Health.

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Early Childhood and Prepubertal Overweight and Obesity are Associated with Earlier Pubertal Onset in Boys and Girls: A Prospective Birth Cohort Study[†]

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OBJECTIVES/GOALS: It is hypothesized that the global secular trend toward earlier puberty onset, with implications for many future health outcomes, is related to the obesity epidemic. This study aims to examine prospective associations between weight during specific developmental windows and timing of puberty onset. **METHODS/STUDY POPULATION:** This study includes 1,296 mother-infant dyads from the Boston Birth Cohort, a predominantly minority (>80% black/Hispanic), low-income, and urban prospective birth cohort recruited and followed between 1998 and 2019. Age at peak height velocity (APHV), a well-defined and standardized proxy for puberty onset, is derived by fitting height measurements recorded during clinical visits using a mixed effects growth curve model. Multiple linear regression is performed to examine the relationships between early childhood (ages 2-5y) and prepubertal (ages 6-9y) overweight and obesity, weight trajectories between these two periods, and APHV, while controlling for known contributors to early puberty. **RESULTS/ANTICIPATED RESULTS:** Compared to counterparts with normal BMIs, kids who were obese during ages 2-5y (boys: -0.21y, CI[-0.39, -0.04]; girls: -0.22y, CI[-0.39, -0.05]) or ages 6-9y (boys: -0.27y, CI[-0.43, -0.11]; girls: -0.37y, CI[-0.52, -0.23]) had an earlier APHV. Being overweight during ages 6-9y was also associated an earlier APHV (boys: -0.26y, CI[-0.46, -0.07]; girls: -0.26y, CI[-0.42, -0.10]). Looking at weight trajectories, kids who were persistently overweight or obese from ages 2-5y to ages 6-9y had an earlier APHV (boys: -0.28y, CI[-0.45, -0.12]; girls: -0.31y, CI[-0.46, -0.16]), as did girls with normal BMIs during ages 2-5y and who were overweight or obese during ages 6-9y (-0.45y CI[-0.64, -0.26]). **DISCUSSION/SIGNIFICANCE OF IMPACT:** The temporal and dose-response relationships seen in this historically understudied population suggests that childhood obesity is etiologically important in the development, and even programming, of early puberty. This has implications for prediction, prevention, and mitigation of health disparities.

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Early Electrographic Seizure Detection by Neuro ICU Nurses via Bedside Real-Time Quantitative EEG[†]

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OBJECTIVES/GOALS:

1. Determine test characteristics of Neuro ICU nurse interpretation of real-time bedside qEEG for seizure detection
2. Determine difference in time to detection of seizures between qEEG interpretation and raw cEEG reads

3. Determine how seizure characteristics affect accuracy of qEEG reads

METHODS/STUDY POPULATION:

- Subjects: Nurses caring for patients admitted to the Neuro ICU at Duke University Hospital who are initiated on cEEG.
- Nurses evaluate qEEG display at the bedside on an hourly basis after undergoing a standardized qEEG training session. The standard practice of independent review of cEEG and treatment by the Neuro ICU team remains unchanged.
- Post-hoc review of cEEG data by two blinded, board-certified neurophysiologists will be performed for each patient. The raw cEEG data will be scored for the number of seizures present per hour, background, seizure duration, and seizure spatial extent.
- The time from first seizure occurrence to clinical recognition will be recorded.

RESULTS/ANTICIPATED RESULTS:

- Thus far, 91 patients with 583 1-hour blocks of nurse interpretations have been studied, with 6 patients experiencing seizures while on study. Enrollment will be completed on 1/17/20
- Preliminary data show a sensitivity of 95.8% (79.9%, 99.9%), specificity of 95.2 (93.1%, 96.8%), positive predictive value of 46.0% (36.9%, 55.4%), negative predictive value of 99.8% (98.7%, 99.9%), positive likelihood ratio of 19.8 (13.6, 28.9), negative likelihood ratio (0.04 (0.01, 0.3). All confidence intervals are 95%. False alarm rate is 0.05/hour.
- Further analyses are pending completion of enrollment in January 2020.

DISCUSSION/SIGNIFICANCE OF IMPACT: Nurse interpretation of real-time bedside qEEG for seizure detection is feasible in the Duke Neuro ICU. QEEG functions well as a screening tool with good specificity and low false alarm rate. Use of qEEG by nurses could lead to shorter time to seizure detection, which may improve patient outcomes. **CONFLICT OF INTEREST DESCRIPTION:** Safa Kaleem, BS: Research reported in this publication was supported by a Pfizer Foundation grant and the Duke Clinical Translational Science Institute (CTSI). The content is solely the responsibility of the authors and does not necessarily represent the official views of the Pfizer Foundation or the Duke CTSI. Jennifer H. Kang, MD: None to declare. Alok Sahgal, MD: None to declare. Christa B. Swisher, MD: Received speaker's honorarium from EISAI and UCB.

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Effects of Single-dose Preoperative Pregabalin on Postoperative Pain and Opioid Consumption in Cleft Orthognathic Surgery

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OBJECTIVES/GOALS: The current opioid epidemic has placed post-operative pain management under scrutiny. Limiting post-operative pain can decrease overall opioid usage in the recovery period, especially after orthognathic surgery. Several studies have illustrated the efficacy of pregabalin in decreasing postoperative pain

and opioid usage in adults undergoing orthognathic surgery. We aim to study the effects of a single dose of preoperative pregabalin on postoperative pain and total opioid consumption after orthognathic surgery in individuals with cleft lip and palate. **METHODS/STUDY POPULATION:** This was a retrospective cohort study of consecutive patients who received Le Fort I midface advancement between June 2012 and July 2019 by one of two surgeons at a single institution. We took advantage of our institution's implementation, beginning in 2016, of a one-time dose of preoperative pregabalin for LeFort I midface advancement. All patients had diagnosed cleft lip and palate. The treatment group received a one-time preoperative dose of pregabalin. The control group did not receive pregabalin. Total morphine milligram equivalents (MME) consumption was calculated by adding intraoperative opioid administration and post-operative opioid consumption during admission. Postoperative pain control during admission consisted of oral oxycodone and intravenous (IV) hydromorphone or morphine. Duration of hospitalization and pain intensity assessed with the numeric pain rating scale (0-10) were also recorded. The mean postoperative pain assessment scores during admission was calculated for each patient. The median of these individual mean pain assessment scores for each group was subsequently computed. **RESULTS/ANTICIPATED RESULTS:** Twenty-three patients (14 males, 9 females) were included in this study; 12 patients received pregabalin (median dose: 150mg, range: 100-200mg). Mean age (years) at operation of the pregabalin (18.3 ± 1.9) and control groups (17.8 ± 1.9) were also equivalent ($p = 0.571$). Median hospital stay for both groups was 1.0 day. The pregabalin group had significantly lower consumption of total opioids during admission (total MME 70.95 MME; IQR: 24.65-150.17) compared to the control group (138.00 MME; IQR: 105.00-232.48) ($MU = 31.00, p = 0.031$). Although pain scores in the treatment group (3.21 ± 2.03) were lower than in the control group (3.71 ± 2.95), the difference was not statistically significant ($p = 0.651, 95\% \text{ CI } [-1.75, 2.75]$). **DISCUSSION/SIGNIFICANCE OF IMPACT:** Based on the results, a one-time preoperative oral dose of pregabalin before orthognathic surgery in patients with cleft lip and palate reduced total opioid consumption during admission. However, there was no difference in length of stay or pain scores within the two groups. A single preemptive oral dose of pregabalin should be considered an effective adjunct to pain management protocols in patients undergoing orthognathic surgery.

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Evaluating the Effect of Prebiotics on the Gut Microbiome Profile and Beta-cell Function in Newly-Diagnosed Type 1 Diabetes

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OBJECTIVES/GOALS: Type 1 diabetes (T1D) results from the autoimmune destruction of insulin-producing β -cells. Emerging data suggest that differences in intestinal microbiota might be critically involved both in autoimmunity and in glucose homeostasis. The prebiotic high amylose maize starch (HAMS) alters the gut microbiome profile and metabolites positively by increasing production of beneficial short chain fatty acids (SCFAs) that have significant anti-inflammatory effects. HAMS also improves glycemia, insulin sensitivity and secretion in healthy non-diabetic adults. Further, an acetylated and butyrylated form of HAMS (HAMS-AB) that increases beneficial SCFA production, namely acetate and butyrate, has been safe and effective in disease prevention in mouse T1D models. The