NCUR 2021 Proceedings

Acoustic Stability of Lipid-Shelled Microbubbles on Weekly Scale

Biological & Chemical Engineering - Time: Mon 3:00pm-4:00pm - Session Number: 2546
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Daniella Jimenez

OBJECTIVES

Lipid-shelled microbubbles (MBs) are contrast agents often used as intravascular stress sources to the blood-brain barrier (BBB). Although MB stability under ultrasound imaging sequences has been studied, their behavior under therapeutic exposure is not well-understood. As a result, MB acoustic stability must be established in order to safely and efficiently penetrate the BBB. Thus, we investigated their acoustic stability when exposed to different acoustic pressures on a weekly scale.

METHODS

C4F10 MBs with a 9:1 molar ratio of 1,2-distearoyl-sn-glycerol-3- phosphocholine (DSPC) and 1,2-distearoyl-sn-glycero-phosphoethanolamine-PEG2000 (DSPE- PEG2000) were manufactured in-house. MBs were diluted to 107 microbubbles/mL and exposed to therapeutic pulses (fc: 0.5 MHz, pulse length: 1 ms, pulse repetition frequency: 1 Hz, n=10) at acoustic pressures ranging from 200 kPapk-neg to 400 kPapk-neg while flowing through 4-mm vessel mimicking phantom (5% w/v gelatin) on day 0, 7, 14 post-activation. A 7.5 MHz passive cavitation detector was used to record MB acoustic emissions.

RESULTS

Acoustic emissions were quantified for cavitation levels and t80, time for which 80% of acoustic energy was released, over a period of 14 days for all acoustic pressures. Harmonic stable cavitation (SCDh) increased significantly for 300kPapk-neg and 400kPapk--neg on day 7 while increasing significantly on day 14 for when exposed to 200kPapk-neg. Inertial cavitation (ICD) showed a significant increase for each pressure throughout. t80 decreased significantly for 300kPapk-neg and 400kPapk-neg but not for 200kPapk-neg (p-value: 0.36, one-way ANOVA; n=10 pulses).

CONCLUSIONS

MB cavitation levels increase significantly over 14 days for all pressures while significantly decreasing t80 with the exception of MBs exposed to 200kPapk-neg. Perhaps, the fragmentation threshold decreases as a result of changes in size and/or lipid distribution of the MB shell. Thus, MBs may be used for a two-week period while taking into account their natural decay with respect to concentration.

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An Analysis of the Correlation Between the Static and Dynamic Impedance During Electroconvulsive Therapy (ECT)

Psychology - Time: Wed 1:30pm-2:30pm - Session Number: 6561
Gozde Unal, Carliza Canela, Jaiti Swami, Samantha Cohen, Marom Bikson, Department of Biomedical Engineering, The City College of New York, CUNY, NY, USA , 85 St Nicholas Terrace, New York, NY 10031 Niranjan Khadka, Department of Psychiatry, Laboratory for Neuropsychiatry and Neuromodulation, Massachusetts General Hospital, Harvard Medical School, MA, USA, 25 Shattuck St, Boston, MA 02115 Harold Sackeim, Department of Psychiatry, Columbia University, NY, USA, 1051 Riverside Dr, New York, NY 10032
Carliza Canela, Gozde Unal, Jaiti Swami, Samantha Cohen, Niranjan Khadka, Harold Sackeim, Marom Bikson

While static impedance and dynamic impedance has long been recognized as markers of individual difference in electroconvulsive therapy (ECT), their etiology and consequence are undetermined – including how they impact seizure generation. A typically high static impedance is relied on to suggest an expected high dynamic impedance, and hence the need to correct electrode setup. Yet, the correlation

between individual static impedance and dynamic impedance has remained elusive, with numerous prior studies suggesting it does not exist. This is a retrospective analysis of static impedance, dynamic impedance, seizure charge threshold, and patient demographic data recorded from a total of 90 patients (with a total of 622 ECT daily sessions and 622 ECT stimulations) involved in two previously published clinical trials. These ECT courses utilized right unilateral (RUL) or bilateral (BL) montage placements, with either 0.3 ms (ultrabrief) or 1.5 ms (brief) pulse duration. Our results demonstrate a correlation between static impedance and dynamic impedance, evident across clinical trial centers, montages, and pulse durations, considering either across session averages or single stimulations. The strength of correlations varied across these conditions, suggesting how they might have been missed in prior analysis.

Examining the Impact of COVID-19 on Cancer-Related Needs in Community-Based Organizations

Health & Human Development - Time: Tue 3:30pm-4:30pm - Session Number: 5126

Nowrin Nisa, Department of Psychology, Biology, & Chemistry, City College of New York, 160 Convent Ave, New York, NY 10031 Jasmin Wang, Chad Henry, Department of Biomedical Science, City College of New York, 160 Convent Ave, New York, NY 10031 Nicolle Basabe, Department of Public Health, City College of New York, 160 Convent Ave, New York, NY 10031 Raul Hernandez, Department of Community Outreach, City College of New York, 160 Convent Ave, New York, NY 10031 Erica Lubetkin, Department of Community Health & Social Medicine, City College of New York, 160 Convent Ave, New York, NY 10031
Nowrin Nisa

COVID-19 has impacted cancer across the spectrum from primary to tertiary prevention. For primary care, individuals may have delayed their routine health-care visits, resulting in missed opportunities to obtain counseling, immunizations, or cancer screenings. COVID-19 has been associated with many cancer-related risk behaviors, including a decrease in physical activity, an increase in caloric consumption, smoking, drinking, substance abuse, and elevated rates of depression and anxiety. Community-based organizations (CBOs) may address these factors and health-care needs in the populations they serve. This project aims to examine the impact of COVID-19 on CBOs located in East, Central Harlem, Morningside, Hamilton, Washington Heights, and Inwood by conducting 10-15 focus groups on these areas to ascertain the impact of COVID-19 on cancer-related programs. Participants will

be asked about the impact of COVID-19 on cancer-related services, perceived challenges in communicating with community members/staff, providing services to the community, with partnerships, funding, changes in ways participants seek information to understand community needs, and COVID-19's impact on their personal ability to access services. After analyzing these focus groups for qualitative data, a community-needs assessment will be constructed and administered to organizations in the target area using an online platform. Responses from 80 agencies, from a variety of CBOs, will be collected. It is expected that programs in primary cancer prevention will be greatly impacted both in the short-term and long-term than programs for secondary or tertiary prevention. Agencies will report an increased demand for mental health programs, and smaller agencies will be more susceptible to changes in funding and personnel. Compared to past patterns, increased health problems may also cause CBOs to develop new and innovative partnerships/programs. COVID-19 will have a lasting effect on the availability and access of health-care services which will continue past the pandemic.

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Family COMIDA: Consumo de Opciones Más Ideales De Alimentios (Consumption of More Ideal Food Options)

Exercise Science & Nutrition - Time: Tue 3:30pm-4:30pm - Session Number: 5033

Debra Chan, Jennifer Leng, Department of Immigrant Health & Cancer Disparities, The City College of New York and Memorial Sloan Kettering Cancer Center, 160 Convent Ave, New York, NY 10031 and 1275 York Ave, New York, NY 10065
Debra Chan

Obesity disproportionately affects Mexicans, the largest Hispanic subpopulation in the United States. Over 78% of Mexican women and 81% of Mexican men are obese or overweight and thus, at higher risk of cardiovascular disease and several cancers. Family COMIDA aims to develop and implement a remote diet and nutrition intervention that will provide education and peer support to encourage

behavioral change among US Mexicans. To inform the development of Family COMIDA, we reviewed the results of a related intervention, SAlud y Nutrición para todOS (SANOS), or Health and Nutrition for All. In SANOS, focus groups were conducted to learn about participants' dietary needs and priorities. Participants described a desire for group-based motivation, family as the primary motivator of healthy eating, an emphasis on short term goal setting, and the need to problem solve around the lack of time needed to prepare healthy meals. Drawing from these results, Family COMIDA will include family nutrition education sessions using teleconferencing technology; access to health information, neighborhood resources, and interactive activities via a website; weekly group teleconference calls to encourage peer support and exchange of ideas; and thrice weekly healthy diet and lifestyle text messages. Participants for the intervention will be recruited remotely through a database of prior visitors to the Ventanillas de Salud (VDS), or Health Windows, program of the Mexican Consulate in New York City. An intake assessment and a three month follow up will be conducted to evaluate changes in dietary behavior, BMI, and knowledge, attitudes, and beliefs related to diet and nutrition. Family COMIDA has the potential to help families eat healthier, exercise more, and achieve and maintain a healthy weight. If successful, Family COMIDA can be further assessed in a large-scale study, and ultimately be disseminated more broadly to reduce obesity and its related diseases among US Mexicans.

Mental Health Perceptions of Muslim American College Students

Psychology - Time: Wed 1:30pm-2:30pm - Session Number: 1041
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Sangida Akter

As of 2018, mental illness is more prevalent among young adults aged 18-25 in the U.S., than any other age group. Furthermore, between 2008-2017, the percentage of U.S. adults (18-25) faced with serious psychological distress in the last month has increased 71%. Relatively little data exists for how this increase is impacting one subset of the population: Muslim American young adults (<30), who

make up a third of the U.S. Muslim population. The available data indicates that Muslim American adults (18-98) often support Western ideas of mental illness as originating from biomedical, social, and environmental causes. Yet, these ideas coexist with opposing beliefs about supernatural and psycho-spiritual roots of mental illness. The present study uses a mixed-methods design to explore the attitudes and beliefs of Muslim American college students regarding mental health and illness, the sources (cultural, religious, or otherwise) of those attitudes and beliefs, lifetime exposure to mental health disorders, willingness to seek out mental health professionals, and knowledge of available mental health resources. Twenty undergraduate, Muslim students between the ages of 18-25 and from various cultural backgrounds and educational disciplines, throughout the City University of New York, completed 3 quantitative survey measures (a demographic and context questionnaire, the *Vancouver Index of Acculturation*, and the *Sahin-Francis Scale of Attitude toward Islam Revised*) and participated in a 1.5-2 hour semi-structured interview. Participants received a $10 Amazon gift card as compensation. It is anticipated that results will show (1) an inverse correlation between degree of religiosity and attitudes about mental illness/treatment, (2) a positive correlation between acculturation and attitudes about mental illness/treatment, and (3) more positive attitudes and beliefs toward mental health/illness in participants than among their parents and/or grandparents, who often have not been college educated and were the generation who immigrated to the U.S.

Neuroscience Education Therapy for Migraine and Other Overlapping Pain Conditions

Psychology - Time: Wed 1:30pm-2:30pm - Session Number: 1041
Sangida Akter, Kayla Kaplan, Mariana Espinosa-Polanco, Dennique Khanns, Jenny Guiracocha, and Dr. Mia Minen, Department of Neurology, NYU Langone Medical Center, 550 First Avenue, New York, NY, 10016
Sangida Akter

Neuroscience Education Therapy (NET) has been successfully used for numerous overlapping pain conditions, but few studies have investigated NET for migraine. We sought to (1) review the literature on Neuroscience Education Therapy (NET) used for the treatment of various pain conditions to assess how NET has been studied thus far and (2) recommend considerations for future research of NET for the treatment of migraine. Regarding NET efficacy, NET has significantly reduced catastrophizing, kinesiophobia, pain intensity, and disability in overlapping pain conditions. In studies focusing on patients with migraine, NET has emerged as a promising therapy by reducing migraine days, pain intensity and duration, as well as acute medication intake when implemented in combination with traditional pharmacological treatments. In reviewing the content of NET, similar curricula were observed across diverse modes of delivery. Overall, a NET curriculum consists of the following topics: pain does not equate to injury, pain is generated in the brain, perception, genetics, reward systems, fear, brain plasticity, and placebo and nocebo effects. Additionally, NET treatments often incorporate exercise programs and/or components of other evidence based treatments such as cognitive-behavioral therapy (CBT), biofeedback, and relaxation. Regarding delivery, NET has been shown to offer benefits both when delivered through individual sessions or group sessions. We propose that a NET curriculum for migraine consist of either individual or group interactive sessions on the neurophysiology of pain and migraine, exercise regimens - to do as part of homework or with an instructor, behavioral strategies for pain management such as relaxation, and conventional medication for migraine pain relief. Future research should focus on refining NET for migraine, considering the type of delivery modality, length of each session, overall duration of intervention, components of other behavioral therapies to integrate, and migraine-specific NET curricula.

The Impact of COVID-19 on the Mental Health of Frontline Health Workers Worldwide

Global Health - Time: Tue 3:30pm-4:30pm - Session Number: 5090
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Kenneth Vuong, Fabliha Hussain

The COVID-19 pandemic has impacted every individual worldwide, especially frontline healthcare workers. Although treating patients and getting this pandemic under control is a priority, oftentimes the impact that the pandemic has on the mental health of frontline workers is overlooked. With the influx of patients, their mental health is being worn down. Most countries are facing similar situations. Knowledge of how the mental health of workers facing the pandemic across different countries, however, is unknown. The aim of the study is to conduct a literature review that compares the mental health trends of healthcare workers in various countries. The impact of COVID-19 on the mental health of frontline health workers could vary between countries and this literature review aims to find out if this is the case. Previous research mentions comparisons of the mental health of frontline workers to those of China but not other countries. Journal articles were examined that included the importance of mental health, the relevance of COVID-19 knowledge, and how COVID-19 impacted the mental health of the frontline workers in order to carry out these comparisons. These articles were found in ScienceDirect, National Institutes of Health, and Google Scholar by searching 'covid19,' 'mental health,' 'frontline workers,' 'questionnaire,' and 'countries.' Based on the literature, frontline healthcare workers faced similar psychological impacts in most countries. Stress, anxiety, and depression were common. Lack of preparedness, knowledge, and personal protective equipment along with the pressure from treating patients and anxiety for their own health were key factors that affected the mental health of frontline workers. Although there are mostly similarities, there were also some significant differences between specific countries. In the end, these factors that are common across countries should be addressed so that healthcare workers can continue working to the best of their abilities.

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Trends and Racial Disparities in US Liver Cancer Mortality, 1999 to 2018

Nursing & Public Health - Time: Tue 12:30pm-1:30pm - Session Number: 526
Rachelle Monteau and Fumiko Chino, MD Department of Radiation Oncology, Memorial Sloan Kettering Cancer Center, 1275 York Ave, New York, NY 10065
Rachelle Monteau

In the United States, most cancers have had declining mortality rates in the past 30 years, however, liver cancer (LC) mortality has increased. Prior research has shown racial disparities with Asian Americans having the highest rates of incidence and mortality, primarily driven by Hepatitis B (HBV), however, it is unclear how this has changed today. Data were collected from the CDC WONDER database containing all US cancer deaths. Age-adjusted mortality was calculated per 100,000 for LC and trended from 1999-2018. LC mortality by race/ethnicity, sex, and age was determined.

From 1999-2018, yearly LC deaths increased from 12,382 to 27,686, while the population increased from 279.0 to 327.2 million. Overall, liver cancer mortality (LCM) increased from 4.5 to 6.7 per 100,000 (trend p<0.001) and was worse in males than females (9.7 vs 4.1 per 100,000 in 2018, respectively). LCM increased in all racial/ethnic groups except for Asians where it declined (White 4.2 to 6.4, 52% increase; non-Hispanic 4.4 to 6.4, 45% increase; Black 5.9 to 8.3, 41% increase; American Indian 5.5 to 7.6, 38% increase; Hispanic 7.2 to 9.2, 31% increase; Asian 10.2 to 8.1, 21% decrease; all trends p<0.001). In Asians, younger age groups had larger proportional decreases in LCM (63.6% age 0-44, 34.0% age 45-64 relative decrease) compared to older groups (10.7% age 65-84 relative decrease).

Since 2018, Hispanic and Black patients have the highest LCM, and Asian LCM has decreased, perhaps reflecting the benefit of HBV vaccination (first available in 1982). This study highlights new racial disparities and presents opportunities for targeted outreach to underserved communities. In addition to vaccination, prevention efforts should include early diagnosis and treatment of viral hepatitis as well as measures to control obesity and decrease alcohol and tobacco use. Equitable access to cancer treatment is also essential to decrease LCM.

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