STATISTICAL ESTIMATION OF ACCELERATED BIOLOGICAL BRAIN AGING AFTER MILD TRAUMATIC BRAIN INJURY IN OLDER ADULTS

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Estimating biological brain age (BA) has the potential of identifying individuals at relatively high risk for accelerated neurodegeneration. This study compares the brain's chronological age (CA) to its BA and reveals the BA rate of change after mild traumatic brain injury (mTBI) in an aging cohort. Using T1-weighted magnetic resonance imaging (MRI) volumes and cortical thickness, volume, surface area, and Gaussian curvature obtained using FreeSurfer software; we formulated a multivariate linear regression to determine the rate of BA increase associated with mTBI. 95 TBI patients (age in years (y): μ = 41 y, σ = 17 y; range = 18 to 83) were compared to 462 healthy controls (HCs) (age: μ = 69 y, σ = 18 y; range = 25 to 95) over a 6-month time period following mTBI. Across the initial ~6 months following injury, patients' BAs increased by ~3.0 ± 1.2 years due to their mTBIs alone, i.e., above and beyond typical brain aging. The superior temporal and parahippocampal gyri, two structures involved in memory formation and retrieval, exhibited the fastest rates of TBI-related BA. In both hemispheres, the volume of the hippocampus decreased (left: μ=0.28%, σ=4.40%; right: μ=0.12%, σ=4.84%). These findings illustrate BA estimation techniques' potential to identify TBI patients with accelerated neurodegeneration, whose rate is strongly associated with the risk for dementia and other aging-related neurological conditions.

TESTING CELLULAR PROLIFERATION RESPONSES TO OXIDATIVE, GLUCOCORTICOID AND METABOLIC CHALLENGES IN THE BABOON

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Aging is associated with progressive loss of cellular homeostasis which results from intrinsic and extrinsic challenges. Testing how such challenges relate to the aging process is often limited by the available model systems. We use primary cells (fibroblasts) isolated from baboons as a non-human primate cellular model to address how stressful challenges affect resilience. Using a real-time live-cell imaging system, we characterized a protocol for testing the effects of pro-oxidant compounds (e.g hydrogen peroxide (H2O2), paraquat and thapsigargin), dexamethasone and low glucose environment on cellular proliferation in fibroblasts derived from baboons across the life-course. The inhibitory effect of H2O2 (50 and 100µM), an oxidative stress, on cell proliferation was dose-dependent, with a higher impact in old males (age 14.52-14.80 years; average life span 21 years) compared to young males (6.35-6.39 years). Exposure to a different oxidative stress, paraquat (100 and 200µM) tended to reduce cell proliferation rate with age in males but not females. Inhibitory effects of thapsigargin, an endoplasmic reticulum stress inducer, on cell proliferation were dependent on challenge duration (2 vs 24h), concentration (0.1 and 1µM) and donor age, with greater resilience in young males than young females (4.33-6.70 years). Dexamethasone (100 and 500µM), a glucocorticoid, reduced cell proliferation dose-dependently, with older males exhibiting more resilience than females. In response to low glucose (1mM), cell proliferation reduced with age. Donor's chronological age and sex are important variables in cellular response to challenge compounds faced during aging, which will guide our on-going studies on the cellular transcriptome and proteome.

SESSION 10170 (LATE BREAKING POSTER)

CHRONIC DISEASE MANAGEMENT

A MOBILE APP FOR TRACKING NON-MOTOR SYMPTOMS OF PEOPLE WITH PARKINSON'S DISEASE: A USABILITY STUDY

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Smart phone-based technology for people with Parkinson's disease has been developed worldwide. Unmonitored non-motor symptoms decrease quality of life of people with Parkinson's disease, so the needs for technology to manage non-motor symptoms are increasing. The technology is needed to detect subtle changes in non-motor symptoms by healthcare professional. There is no mobile app which manage comprehensive symptoms of Parkinson's disease including non-motor symptoms. It is necessary to develop a new tracking system that can effectively manage non-motor symptoms as well as motor symptoms of Parkinson's disease. We developed a prototype of mobile app for Android smartphones, with cooperation with Mazelone company. we also have shaped functions for monitoring of motor symptoms and medication adherence. It also provided a section for caregivers to use on behalf of people with Parkinson's disease who have difficulty to use app due to hand tremor. Through Delphi technique, we obtained content validity from eight medical and nursing experts on the contents of the application. We provided regular telephone counseling to improve and encourage their app usage. Fifteen participants used the app for 6 weeks. To evaluate usability of mobile app, we provided constructed questionnaire and conducted individual telephone interview. A mobile app for tracking non-motor symptoms demonstrated high usability and satisfaction. We learned lessons about facilitators and barriers when implementing an app such as perception and acceptance of mobile technology. The mobile app will improve continuum of care. Future studies need to improve the contents and refine technical approach for people with Parkinson's disease.

DYNAMICS OF MULTIMORBIDITY RESILIENCE AND HEALTH OUTCOMES OVER TIME IN COMMUNITY-RESIDING OLDER ADULTS

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Multimorbidity resilience may mitigate the adverse effects of multiple chronic diseases on older adults' health. Wister et al.'s (2018) multimorbidity resilience index was developed and tested in a cross-sectional sample of older adults in Canada. Building on these findings, we examined the reciprocal relationships of resilience on outcomes to test these potentially mitigating effects in a community-based, U.S. sample of older adults over time. The study sample includes 1,054 older adults from waves 2 and 3 of the National Social Life, Health, and Aging Project (NSHAP) study (Waite et al 2020). Wister et al.'s (2018) index was mapped to NSHAP measures, and reciprocal relationships of multimorbidity resilience and health outcomes over a 5-year period was tested using structural equation modeling (SEM). Results indicated significant effects of multimorbidity resilience on self-rated physical health and pain. Interestingly, a better functional resilience at baseline conferred better self-rated physical health at follow-up, while better psychological resilience predicted lower pain level. By contrast, the influence of health outcomes on any domain of multimorbidity resilience was not detectable at all, supporting the direction of these associations from resilience to outcomes. The study systematically investigated the dynamic hypotheses between multimorbidity resilience and health outcomes. That is, whether they are determinants or consequences, or both. Our findings suggest multimorbidity resilience predicts subsequent 5-year change in health outcomes, especially self-rated physical health and pain level, but not vice versa, strengthening the evidence of the importance of resilience in the health of older adults.

REVIEW OF TYPE-2 DIABETES MELLITUS ILLNESS PERCEPTIONS AND ASSOCIATIONS WITH ILLNESS MANAGEMENT

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Objective: Determine illness perceptions associated most frequently with measures of type-2 diabetes mellitus (T2DM) maintenance. We measured illness perceptions using the Illness Perception Questionnaire (IPQ) and variants (IPQ-Revised and Brief IPQ) Design: Review of literature from publication of IPQ to September 2020. Searched for articles utilizing IPQ but no other models of illness perception and studying T2DM Main Outcome Measures: Glucose control (measured by HbA1c levels), adherence to medications, and adherence to diet, exercise, and other lifestyle recommendations Results: Symptom attribution and fear of consequences are frequently associated with worse T2DM management and sense of control of illness progression and positive emotional valence are frequently associated with better T2DM management. Other subscales have less frequent but generally positive associations with the exceptions of recurring thoughts about T2DM duration, which had a negative association with management, and understanding the causes of T2DM, which had no associations at all. Other reviews found similar associations and highlighted a need for more general T2DM education. Conclusion: Future T2DM management interventions should promote sense of control over illness progression and positive emotional valence and provide education regarding symptoms to expect. Interventions should also consider managing patient fear, which has many associations with worse management.

SOCIAL WELL-BEING AND CHRONIC DISEASE CONDITION AMONG OLDER ADULTS

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Aging is characterized by the decline in physical health, functional status, and loss of social roles and relationships that can challenge the quality of life. A protective factor that moderates the impact of these phenomena is psychological (e.g., social) well-being. Despite the high prevalence of chronic conditions among older adults, research exploring the relationship between social well-being and chronic disease is sparse. The study aims were to investigate the relationship between social well-being among older adults (N = 1,251, R = 65 – 92 years) who participated in the National Survey of Mid-life in the United States (MIDUS 3). This study used variables for the MIDUS 3 study to test a structural equation model to examine the hypothesized relationships between social well-being, chronic conditions, life satisfaction, self-esteem, active coping, optimism, and religious coping. The findings indicate that perceived control, self-esteem, active coping, optimism, and religious coping were statistically significant for the participants' social well-being (β =.29, p <.001, β =.16, p<.001, β =.08, p<.05, β =.35, p<.001, and β =.07, p<.05, respectively). However, life satisfaction was not significantly associate with social well-being (β =.04, p >.05). For individuals' diagnosed with more than one chronic condition, perceived control, self-esteem, and optimism statistically significant impact their social well-being (β = .33, p < .001, β =.17, p < .001, and β =.33, p < .001, respectively). Findings suggested that multiple chronic conditions influence social well-being. Chronic disease management programs may be useful in increasing social well-being among individuals with multiple chronic conditions.

SESSION 10180 (LATE BREAKING POSTER)

COGNITION

CAN LIGHT PHYSICAL ACTIVITY IMPROVE COGNITION AMONG OLDER ADULTS? A SCOPING REVIEW

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Although the physical and cognitive benefits of moderate-vigorous intensity physical activity (MVPA) for older adults is well documented, this population often faces age-related functional and physical limitations impeding recommended MVPA participation. Recently, there has been a surge of interest in the independent health benefits of light-intensity physical activity (LPA) and its association with morbidity and mortality risk. LPA is the most common form of activity among older adults and its potential to combat cognitive aging needs to be investigated. The purpose of this scoping review was to catalog existing evidence on the association