examination of the role of SN in PD patients with differing levels of cognitive impairment.

Categories: Neurodegenerative Disorders
Keyword 1: Parkinson's disease
Keyword 2: mild cognitive impairment
Keyword 3: neuroimaging: structural
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6 Association Between American Football Play and Parkinson's Disease: Analysis of the Fox Insight Data Set

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Objective: Parkinsonism and Parkinson's disease (PD) have been described as consequences of repetitive head impacts (RHI) from boxing, since 1928. Autopsy studies have shown that RHI from other contact sports can also increase risk for neurodegenerative diseases, including chronic traumatic encephalopathy (CTE) and Lewy bodies. In vivo research on the relationship between American football play and PD is scarce, with small samples, and equivocal findings. This study leveraged the Fox Insight study to evaluate the association between American football and parkinsonism and/or PD Diagnosis and related clinical outcomes.
Participants and Methods: Fox Insight is an online study of people with and without PD who are 18+ years (>50,000 enrolled). Participants complete online questionnaires on motor function, cognitive function, and general health behaviors. Participants self-reported whether they "currently have a diagnosis of Parkinson's disease, or parkinsonism, by a physician or other health care professional." In November 2020, the Boston University Head Impact Exposure Assessment was launched in Fox Insight for large-scale data collection on exposure to RHI from contact sports and other sources. Data used in this abstract were obtained from the Fox Insight database https://foxinsight-info.michaeljfox.org/insight/explore/insight.jsp on 01/06/2022. The sample includes 2018 men who endorsed playing an organized sport. Because only 1.6% of football players were women, analyses are limited to men. Responses to questions regarding history of participation in organized football were examined. Other contact and/or non-contact sports served as the referent group. Outcomes included PD status (absence/presence of parkinsonism or PD) and Penn Parkinson's Daily Activities Questionnaire-15 (PDAQ-15) for assessment of cognitive symptoms. Binary logistic regression tested associations between history and years of football play with PD status, controlling for age, education, current heart disease or diabetes, and family history of PD. Linear regressions, controlling for these variables, were used for the PDAQ-15.
Results: Of the 2018 men (mean age=67.67, SD=9.84; 10, 0.5% Black), 788 (39%) played football (mean years of play=4.29, SD=2.88), including 122 (16.3%) who played youth football, 494 (66.0%) played high school, 128 (17.1%) played college football, and 5 (0.7%) played at the semi-professional or professional level. 1738 (86.1%) reported being diagnosed with parkinsonism/PD, and 707 of these were football players (40.7%). History of playing any level of football was associated with increased odds of having a reported parkinsonism or PD diagnosis (OR=1.52, 95% CI=1.14-2.03, p=0.004). The OR remained similar among those age <69 (sample median age) (OR=1.45, 95% CI=0.97-2.17, p=0.07) and 69+ (OR=1.45, 95% CI=0.95-2.22, p=0.09). Among the football players, there was not a significant association between years of play and PD status (OR=1.09, 95% CI=1.00-1.20, p=0.063). History of football play was not associated with PDAQ-15 scores (n=1980) (beta=-0.78, 95% CI=-1.59-0.03, p=0.059) among the entire sample.
Conclusions: Among 2018 men from a data set enriched for PD, playing organized football was

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associated with increased odds of having a reported parkinsonism/PD diagnosis. Next steps include examination of the contribution of traumatic brain injury and other sources of RHI (e.g., soccer, military service).

Categories: Neurodegenerative Disorders
Keyword 1: Parkinson's disease
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Early Career Award Presentation

Speaker: Yakeel Quiroz

Taking it to the extreme: The search for determinants of cognitive vulnerability and resilience in children with autosomal dominant Alzheimer's disease

4:00 - 4:30pm
Thursday, 2nd February, 2023
Pacific Ballroom E

Abstract:
Presenilin-1 (PSEN1) mutations predispose individuals to develop autosomal-dominant Alzheimer's disease (ADAD) in middle adulthood. While the pathogenesis of ADAD may be different from late-onset sporadic AD (e.g., differences in disease etiology, age of disease onset, etc), these conditions share many characteristics, including similar abnormalities in amyloid and tau biomarkers, brain structure and brain activity, and clinical features (Quiroz et al., 2010, Quiroz et al., 2011, Quiroz et al. 2018). Biomarker investigations of families with ADAD have already shed light on the trajectory of some AD-related brain changes, especially prior to the onset of clinical symptoms.
We have been studying a Colombian kindred with a genetic form of AD caused by a single genetic mutation in the PSEN1 (E280A), which serves as a unique model for preclinical AD. Because of a well-defined age at clinical onset, and near 100% penetrance, this kindred provides important information about the time course and relationships between physiological mechanisms and cognitive changes, and in so doing, it has yielded new insights about presymptomatic AD that will enhance future prevention trials for AD, including primary prevention trials.
The well-characterized clinical trajectory of these PSEN1 E280A mutation carriers allow us to examine brain function in children, more than three decades before the average age of onset of mild cognitive impairment (MCI) and dementia in this cohort (45 years for MCI, 50 years for dementia). This is giving us the unique opportunity to characterize the cognitive and behavioral profiles of children genetically determined to develop dementia in their forties, and is helping us improve our understanding of the impact of ADAD mutations in early life cognitive and brain functioning, as well as its potential impact on learning, academic performance and educational attainment.
We previously studied 20 PSEN1 E280A carriers and 20 non-carriers aged 9 to 17 years from the Colombian ADAD cohort and showed that mutation-carrying children were distinguished from non-carriers by plasma biomarker findings consistent with Aβ1-42 overproduction, as well as by increased functional connectivity of the posterior cingulate cortex with medial temporal lobe regions (Quiroz et al 2015). More recently, we used the WISC-IV, a measure of general intellectual abilities to examine cognitive abilities in these children. We reported in 265 children with the E280A mutation and 1089 non-carriers that they did not differ on any of the WISC-IV indices. Surprisingly, male carriers performed slightly worse than female carriers on working memory (mean difference = −4.97; P = .001) (Fox-Fuller et al., 2021). Some of our ongoing work includes comprehensive examinations of social, educational and developmental histories along with functional brain networks, as markers of synaptic dysfunction in individuals with ADAD, as this is particularly relevant to understanding the impact of PSEN1 mutations on the developing brain and subsequent neurodegenerative changes seen later in life, without the confounds of aging and age-related comorbidities that often exist in late-onset sporadic AD.
Disclosures: Financial: Dr. Quiroz receives a consulting fee from Biogen. Non-Financial: Dr. Quiroz is a Hispanic Neuropsychological Society Member-At-Large and serves as the INS Teleneuropsychology Special Interest Group Chair

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