

surgical cognitive deficits in a case series of patients with LGG and to determine the post-surgical effects after resection.

Participants and Methods: 11 adult patients aged 19-65 years ($38 \pm DS:15.5$) with a diagnosis of LGG without cognitive complaint were evaluated with a selection of specific neuropsychological tests to identify possible baseline cognitive deficits and their evolution after tumor resection. All participants completed a comprehensive neuropsychological evaluation assessing memory, language, attention, executive functions, visuospatial functions, social cognition, praxis, agnosias, functionality, mood, and quality of life. The neuropsychological battery design was based on a systematic review of the literature on surgical interventions in low-grade gliomas.

Results: Despite not reporting subjective cognitive complaints, patients showed deficits in multiple cognitive domains in the pre-surgical evaluation when comparing their performance with normative values adjusted for age, sex, and education. Deficits in executive functions and attention were observed: 36% presented failures in graphomotor speed (TMT A), 27% of subjects presented failures in attentional span (Direct Digit Span), working memory (Inverse Digit Span), and cognitive flexibility (Wisconsin Card Sorting Test) and 9% presented difficulties in processing speed (Trail Making Test A) and inhibitory capacity (Stroop Test). Memory: 18% of the patients showed deficits in immediate logical memory and 9% in delayed memory (Craft Story 21). Likewise, 18% of the patients presented compromise in immediate auditory-verbal learning and 27% in delayed auditory-verbal learning (Rey Auditory-Verbal Test). Language: 18% showed failures in naming (Boston 60) and 9% in comprehension (Token Test). Likewise, 27% of the patients presented difficulties in social cognition (Mind in the Eyes Test). Finally 41% of the patients reported symptoms of depression and/or anxiety in the neuropsychiatric questionnaires.

Conclusions: The results highlight the importance of strategically designed pre-surgical cognitive assessment for the detection and follow-up of cognitive and mood disorders associated with the location of the space-occupying lesion (LOE). The patients assessed in this study will be evaluated three months after surgery to document changes in baseline cognitive symptoms. Furthermore, in patients with lesions in the left hemisphere, an intraoperative evaluation will be performed to

minimize subsequent deficits, assessing these functions during surgery and emphasizing language.

Categories: Cognitive Neuroscience

Keyword 1: cognitive neuroscience

Keyword 2: neuropsychological assessment

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15 Socioeconomic Status in Association to Memory-Related Brain Activation in Middle-Aged Adults

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Objective: Socioeconomic status (SES) has been recognized as an important factor in psychological research within the last few decades. Past literature recognizes that having lower SES can have a negative impact on many aspects of one's health, especially in diseases related to brain aging. A recent avenue for research regarding SES and the brain-behavior relationship suggests that socioeconomic status can act as a moderator for brain activation during task performance. The hypothesis for this project was that there will be a negative correlational relationship between brain activity and SES when controlling for participants' age, sex, and performance on the episodic memory tasks, but a positive correlation between task performance and SES was expected.

Participants and Methods: With 100 middle-aged healthy adults from the Reference Ability Neural Network (RANN) study (53 male and 47 female, age $M=48.0 \pm 7.55$ years), three episodic memory fMRI tasks were performed and studied in relation to SES and age. The tasks were Logical Memory, Word Order, and Pair Associates tasks that involved episodic memory for story details, order of words presented, and pairing of words, respectively. We quantified memory performance with average accuracy from performance of the three tasks. We used the FSL software to preprocess and perform voxel-wise group analysis. All brain activation analyses were corrected for multiple comparison using cluster thresholds in FSL.

Results: Correlation between SES and memory performance was found to be marginally significant ($R=.188$, $p=.061$). All tasks had areas of positively correlated activation for age. The Logical Memory task had multiple areas of brain activation that were positively correlated with age, particularly at the lateral occipital cortex, lingual gyrus, and the occipital fusiform gyrus, all areas that underlie visual processing. There were no areas of correlated brain activation for SES, sex, and task performance for the Pair Associates and Logical Memory tasks. Brain activation for the Word order task in the left precuneus cortex and the right middle frontal gyrus, left lateral occipital cortex, left occipital fusiform gyrus, and parts of the lingual gyrus was positively correlated with memory performance when controlled for age, sex, and SES.

Conclusions: The hypothesis was not entirely supported by the results of this study, but the marginal effect between SES and memory performance can suggest that SES may affect memory performance within middle-aged adults. While we did not find a brain association with SES in this age group, we observed regions that underlie task performance. Further research can be done on possible moderating effects of Socioeconomic Status on memory and executive function with structural neuroimaging to further investigate the effects of SES on cognition.

Categories: Cognitive Neuroscience

Keyword 1: neuroimaging: functional connectivity

Keyword 2: executive functions

Keyword 3: memory: normal

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16 Longitudinal Cognitive Functioning in Gulf War veterans with and without Gulf War Illness: Data Mining from the BBRAIN Repository

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Objective: Veterans from the 1991 Gulf War (GW) experienced several neurotoxicant exposures, including chemical weapons, pesticide sprays and creams, oil well fires and pyridostigmine bromide anti-nerve gas pills during the war. Research has shown these exposures to affect cognition and mood. Moreover, MR diffusion imaging has shown microstructural changes in the white matter that may be related to psychomotor slowing. Over a third of all GW veterans suffer from a chronic multi-symptom disorder called Gulf War Illness (GWI). The Kansas Criteria for GWI consists of six distinct criteria including symptoms of fatigue/sleep problems, pain symptoms, neurologic/cognitive/mood symptoms, gastrointestinal symptoms, respiratory symptoms, and skin symptoms. The Boston Gulf War Illness Consortium (GWIC) was a multi-site study designed to assess symptoms of GWI. After the conclusion of the GWIC study, the Boston Biorepository Recruitment and Integrative Network for Gulf War Illness (BBRAIN) was developed to harmonize retrospectively collected GW Veteran data while simultaneously collecting Time 2 data and samples from GW veterans who participated in the original study. This analysis includes the first 58 participants who have completed the GWIC study and the BBRAIN study.

Participants and Methods: We conducted a longitudinal analysis of cognitive outcomes from the BBRAIN data repository. Verbal learning, memory, attention, and executive functioning were assessed using neuropsychological tests including the Continuous Performance Test (CPT3), Trail Making Test A, Delis-Kaplan Executive Function System (DKEFS), California Verbal Learning Test (CVLT-II). A total of 58 participants were re-evaluated from the original GWIC cohort with a total of 47 cases and 11 controls. Paired t-tests for the cognitive measures were completed separately for GWI cases and healthy GW veteran controls for each of the neuropsychological test measures. Average time between assessments was four years.

Results: The overall sample was on average 56 years old, 84% male and 75% White. The average level of education was 15 years. GWI