Behavioral Anatomy of Primary Progressive Aphasia and its Relationship to the Language Network

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Dementias can be classified as amnestic, comportmental or aphasic, according to the nature of the major impairment. Alzheimer’s disease typically leads to an amnestic dementia where memory loss is the major cause of impaired daily living activities. This is consistent with the hippocampal/entorhinal location of the initial neurodegeneration. The frontotemporal Lobar Degenerations (FTLD) constitute the second major class of dementias. The neuropathology is characterized by focal neuronal loss, gliosis, tau inclusions, or TDP-43 inclusions. FTLD can lead to pure cognitive changes as in primary progressive aphasia (PPA) and the behavioral variant of frontotemporal dementia (bvFTD).

Patients with bvFTD have preserved language and memory function but display major impairments of insight, judgment, working memory, problem solving and other executive functions. Disinhibition in the areas of sexual misconduct, shop lifting, impulsive gambling are frequently seen and fail to elicit remorse. The major atrophy in these patients is seen in prefrontal cortex, caudate nucleus and the temporal poles.

The principal focus of this talk will be PPA, a focal neurodegenerative syndrome characterized by an isolated and gradual dissolution of word finding and word usage. The language disturbance is initially the most salient deficit and the major obstacle to the execution of daily living activities. This does not mean that there are no deficits other than the aphasia, but that such additional deficits are relatively minor in the first two years following symptom onset. Some patients develop prominent agrammatism, others profound word comprehension (semantic) deficits. The speech output in PPA can be fluent or non-fluent. Memory, visual processing and personality remain relatively preserved during the initial stages. Terms such as progressive non-fluent aphasia (PNFA) and semantic dementia (SD) have been used to denote subtypes of PPA.

Structural and physiological neuroimaging confirms the selective predilection of PPA for language–related cortices of the left hemisphere. The majority of the autopsies in PPA have shown the neuropathology of FTLD but approximately 30% of PPA can be caused by atypical forms of AD neuropathology. The mechanisms that determine the initial selectivity of the cognitive impairment and the asymmetry of atrophy in PPA remain to be elucidated. An informed approach to PPA helps to address the challenges associated with the care of these patients. This syndrome also offers unique opportunities for exploring the cognitive architecture of language processing and the neurobiological fingerprints of the language network.