p-306

Friday

Activation of microglia in amygdala is concordant with behavioral/comportmental dementia symptoms due to underlying Pick disease

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State of the art: Neuroinflammation in limbic regions may contribute to neuropsychiatric symptoms in dementia. We analyzed the extent of activated microglia in the amygdala of cases with clinical diagnoses of bvFTD or PPA, all of whom showed postmortem 3R-tauopathy Pick Disease (PiD). The goal was to investigate whether behavioral versus aphasic symptoms in dementia syndromes due to a single pathology were concordant with greater inflammatory changes in the amygdala.

Methodology: We compared initial neuropsychiatric symptoms (via NPI-Q) between 9 bvFTD and 8 PPA cases with PiD from the Northwestern University ADRC. In a subset of cases, paraffin-embedded sections from unilateral amygdala were stained immunohistochemically with HLA-DR antibody to visualize activated microglia. HALO software (Indica Labs) was used to generate the number of microglia per mm2 and area occupied by immunopositivity. Unpaired Welch's t-tests and two-way, repeated measures ANOVA were used to determine group differences in clinical and pathological outcomes, respectively.

Results: As expected, behavioral/comportmental symptoms were significantly higher in bvFTD-PiD (M=1.89) than in PPA-PiD participants (M=0.63) at initial visit (p=0.01). Compared to PPA-PiD, the bvFTD-PiD group showed a higher number of activated microglia per mm2 in the amygdala (M=195.60 vs. M=62.14, p = 0.05), and a significantly greater percentage area of tissue was occupied by HLA-DR positivity (M=7.27% vs. M=2.34%, p=0.04).

Conclusion: In line with diagnostic criteria, bvFTD-PiD is characterized by a significantly greater presentation of behavioral/comportmental symptoms early in the disease course compared to PPA-PiD. Initial results suggest concordance between behavioral/comportmental symptoms and heightened inflammation in the amygdala.

Conflicts of interest

The authors have no interests to disclose.