The Clinical Features of Patients with Alzheimer’s Disease and a History of Traumatic Brain Injury

Suzan van Amerongen1 | Dewi Caton2 | Yolande A.L. Pijnenburg3 | Philip Scheltens4 | Everard G.B. Vijverberg4

Abstract

Background: Traumatic brain injury (TBI) has been associated with a greater risk of developing Alzheimer’s disease (AD). Previous studies have argued that AD patients with TBI history have differences in age of disease onset, cognitive features and neuropsychiatric symptoms (NPS), but current evidence is still limited and did not always take into account injury characteristics, such as age at injury, TBI frequency, and severity. The primary objective of this study is to examine whether a history of TBI and specific injury characteristics are associated with differences in age of disease onset, cognitive features and NPS in biomarker proven AD patients.

Method: Biomarker proven AD patients (CSF or amyloid PET, stage MCI or dementia) were selected from the Amsterdam Dementia Cohort. TBI events were classified by severity, frequency and age at injury (TBI <25 or ≥25 years). Cognitive composite scores were calculated from results of a neuropsychological test battery. Neuropsychiatric symptoms (NPS) were assessed with the Neuropsychiatric Inventory Questionnaire (NPI-Q). Linear regression analyses were utilized to examine the association between TBI, injury characteristics and clinical outcome measures.

Result: Among the 1755 selected AD patients (mean age 65.2), 166 patients (9.5%) reported ≥1 TBI in their history. Overall, a history of TBI was not related to differences in age at AD, but age at injury <25 years old was associated with a 2.3 years earlier age at diagnosis (β = -2.34 P = 0.031), which was independent of APOE e4 status. No significant associations were found between TBI history or age at injury and differences in cognitive functioning or NPS.

Conclusion: The findings of our study indicate that TBI during childhood, adolescence or early adulthood may influence age of disease onset in AD patients. This underscores previous findings on vulnerability of the brain during critical development and maturation phases and suggest that an early TBI may contribute to lower resilience or higher vulnerability to neurodegenerative changes. TBI history does not seem to affect cognitive characteristics and NPS profiles in AD patients.