

Cluster analysis dissecting cognitive deficits in elderly with severe mental disorders and the association between neurofilament light chain

Chu Ting Yang, Chih Chiang Chiu^{1,3}, Ming-Chyi Huang^{1,3}, Hsing-Cheng Liu^{1,3}, Chian-Jue Kuo^{1,3,4}, Po-Yu Chen^{1,3}, Po-Hsiu Kuo^{2,5,6*}, Wen-Yin Chen¹

1 Department of Psychiatry, Taipei City Psychiatric Center, Taipei City Hospital, Taipei, Taiwan

2 Institute of Epidemiology and Preventive Medicine, College of Public Health, National Taiwan University, Taipei, Taiwan

3 Department of Psychiatry, School of Medicine, College of Medicine, Taipei Medical University, Taipei, Taiwan

4 Department of Education and Research, Taipei City Hospital, Taipei, Taiwan

5 Department of Public Health, College of Public Health, National Taiwan University, Taipei, Taiwan

6 Department of Psychiatry, National Taiwan University Hospital, Taipei, Taiwan

Background

The elderly with severe mental disorder(SMD) are likely to have cognitive impairments and with higher risk of dementia. With the aging, the cognitive decline maybe can regard as one factor from the deterioration of original psychiatry disorder per se, or another add-on major neurocognitive disorders. Distinguish the different clinical picture and the associated biomarker is important for further clinical management and intervention. Studies focus on their elderly demented course are scarce and there are also lack of valid biomarkers in this field. The present study aims to assess the cognitive deficits in the elderly with SMD and test their association with peripheral blood level of neurofilament light chain (NfL)

Methods

We recruited total 45 participants, that are 15 with schizophrenia, bipolar disorder (BD), and Mini Mental State Examination (MMSE)-matched mild or major neurocognitive disorders, respectively. Measurements included demographic data, clinical variables, MMSE, NfL, depression score, physical activities and frailty. We first compared demographic characteristics and cognitive profile in these three elderly groups of patients. Second, we tested if diagnosis group would impact the NFL levels by analysis of covariance after control the MMSE score. Finally, we used cluster analysis according to their cognitive profile and estimated the correlation with NfL in each cognitive domain.

Results

The correlation between levels of NfL and individual cognitive domains revealed no significant findings in total participants. Through cluster analysis, we noted part of the elderly patients with schizophrenia or BD presented the cognitive deficits more like with major neurocognitive disorder (cluster A). Participants in cluster A showed with obvious worse score at orientation, attention/calculation and memory compared with another cluster (cluster B). There was small to moderated negative association between NfL levels and MMSE total score. ($r=-0.324$, $p=0.053$) in cluster A. In addition, we noted the different correlation pattern between clusters in cognitive domains of orientation ($r=-0.452$, $p=0.010$), attention/calculation ($r=-0.435$, $p=0.013$), memory ($r=-0.352$, $p=0.039$) and comprehension ($r=-0.486$, $p=0.006$).

Discussion & Conclusion

Some elderly patients with SMD could presented the cognitive deficits profile more similar with major neurocognitive disorders. In this subgroup of patients, peripheral blood levels of NfL could be a biomarker correlated to their degree of cognitive deficits. This finding suggested the potential to dissect the heterogeneity of cognitive decline with dementia among patients with SMD.