

LETTER

Could cerebrospinal fluid leak contribute to the link between traumatic brain injury and dementia?

Dear Editor,

We read with interest the fascinating research conducted by Schievink and colleagues on the link between cerebrospinal fluid (CSF) leak and symptoms of behavioral variant of frontotemporal dementia (bvFTD), an early-onset dementia.¹ This study found that CSF venous fistula, a type of spinal CSF leak, is found in $\approx 40\%$ of their included patients with symptoms of bvFTD and spontaneous intracranial hypotension or brain sagging. Nine patients were found to have CSF venous fistula on imaging. Surgical ligation of the spinal CSF leaks resolved bvFTD symptoms in all of these nine patients. It was positive to see that, once identified, correction of CSF venous fistula could reverse such serious and devastating symptoms.

Previous evidence suggests that patients with a history of traumatic brain injury (TBI) are at elevated risk of dementia diagnosis. For example, a population-based study in Taiwan found that, even after adjusting for factors such as socioeconomic status and presence of comorbidities, the risk of developing dementia of any type is 1.7-fold greater among patients with a history of TBI as compared to those without.² This study further identified that the association between TBI and dementia was stronger in younger patients, thus indicating a potential link to early onset dementia.² Similar findings were demonstrated by another study in Sweden. This 33-year follow-up study found that TBI was strongly associated with an increased risk of non-Alzheimer's types of early-onset dementia.³ The association was significant even after adjustment for covariates among those with only one mild TBI, as well as for those with two or more mild TBIs, and those with one severe TBI.³

The underlying mechanism between TBI and dementia is currently unclear. However, the findings of Schievink et al. provide insight into one potentially causal pathway to explain at least some of the observed association. Because CSF leaks are identified in $\approx 1\%$ to 3% of all TBIs in adults,⁴ individuals with a history of TBI may thus be at risk of dementia symptoms and diagnosis partly due to spinal CSF leaks and intracranial hypotension.

In individuals with a history of TBI, the presence of chronic and persistent headaches may suggest spinal CSF leaks and intracranial hypotension.⁵ Future study in individuals with dementia and a history of TBI may benefit from screening for the presence chronic headaches. If, in individuals with past TBI, higher odds of headache are found in

individuals with dementia as compared to those without dementia, then further imaging studies in the select individuals with headaches could be conducted to assess for the presence of frontotemporal dementia brain sagging syndrome and CSF leaks, and thus possibly provide evidence for one of the links between TBI and dementia.

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CONFLICT OF INTEREST STATEMENT

None of the following authors have any proprietary interests or conflicts of interest related to this submission. Author disclosures are available in the [supporting information](#).

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SUPPORTING INFORMATION

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