

PARKINSON DISEASE

Traumatic brain injury increases the risk of Parkinson disease

An analysis of medical records from more than 165,000 patients has revealed that in older adults, the risk of developing Parkinson disease (PD) is elevated after traumatic brain injury (TBI). The results, published in the *Annals of Neurology*, suggest that the link between TBI and PD is, in fact, causal.

“Many studies have reported an association between TBI and PD,” says Raquel Gardner, who led the new investigation. “However, causal inference has been complicated by concerns of confounding or reverse causation.” One particularly concerning possibility has been that a feature of subclinical PD might make older adults more prone to injury. For example, reduced motor reaction times could make people less able to brace or protect themselves during a fall.

Gardner and colleagues identified medical records from people aged over 55 years who had been admitted to an emergency department in California, USA, after TBI. The investigators then constructed a control group of patients

admitted for non-TBI traumas, such as limb fractures. These groups were matched for factors such as sex, race and ethnicity, comorbidities, and trauma severity.

“...TBI sustained in later life is truly an independent risk factor for PD...”

The investigators then looked at hospital visits by these patients for up to 7 years after the trauma. During this period, the group that had experienced a TBI were significantly more likely to be diagnosed with PD than were people with non-TBI traumas (HR 1.44).

In a subsequent analysis, Gardner and colleagues looked at how the risk of PD was affected by the frequency or severity of TBI. The increased risk of PD was of significantly greater magnitude after moderate or severe injuries than after a mild TBI (HRs 1.50 and 1.24, respectively). Similarly, multiple TBIs conferred a greater risk of PD than did a single injury

(HRs 1.87 and 1.45, respectively). These results might reflect a ‘dose–response’ relationship between TBI and the risk of developing PD.

“Our findings suggest that TBI sustained in later life is truly an independent risk factor for PD,” explains Gardner. “This result confirms many prior studies, but drills a bit more deeply into the issues of potential residual confounding and reverse causation, therefore building a stronger case for a truly causal relationship.”

In the paper, the authors point out that prospective studies will be necessary to uncover the mechanisms by which TBI might cause the increase in PD risk. These data would provide valuable insight into the pathogenesis of PD, and might also reveal strategies for delaying or preventing disease onset.

Alex Chase

Original article Gardner, R. C. *et al.* Traumatic brain injury in later life increases risk for Parkinson's disease. *Ann. Neurol.* doi:10.1002/ana.24396