LETTER TO THE EDITOR

Reply: Is nucleus accumbens atrophy correlated with cognitive symptoms of Parkinson’s disease?

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Sir,

We thank Dr Mavridis for this very thoughtful comment about nucleus accumbens atrophy in patients with Parkinson’s disease from a neurosurgical point of view. Indeed it had been previously reported that dopamine loss also occurs in the nucleus accumbens of patients with Parkinson’s disease especially at the advanced stages (Farley et al., 1977). Different groups, including our own have shown that patients with Parkinson’s disease are affected differently on functions relying on the ventral versus the dorsal striatum (MacDonald et al., 2011). To the best of our knowledge, Dr Mavridis’ findings were the first to indicate in vivo that Parkinson’s disease is also associated with nucleus accumbens atrophy (Mavridis et al., 2011) and as suggested in the letter, nucleus accumbens might be associated with the neuropsychiatric non-motor symptoms that are present in the disease, like depression and anxiety (Sturm et al., 2003; Paul et al., 2005; Epstein et al., 2006). Our current results would indicate that this is the case at least for cognition (Hanganu et al., 2014).

However other cortical and subcortical atrophied regions were associated with cognitive deficits in Parkinson’s disease in our study. Furthermore, it remains to be determined exactly how specific the nucleus accumbens volumetry changes are with respect to cognitive impairment versus other non-motor deficits observed in Parkinson’s disease (such as depression, apathy, anxiety). Indeed, nucleus accumbens function has been associated with depression (Epstein et al., 2006) and deep brain stimulation of the nucleus accumbens has been shown to decrease the non-motor deficits (Sturm et al., 2003; Paul et al., 2005). Additionally, patients with Parkinson’s disease who have mild cognitive impairment, have been shown to have a larger presence of depressive symptoms and anxiety compared with patients with normal cognition (Monastero et al., 2013). Finally, it remains to be investigated whether this nucleus accumbens pathology is specific to Parkinson’s disease. In particular, one study revealed no volume difference between early-onset Alzheimer’s disease and healthy controls, but found a significant reduction in the bilateral nucleus accumbens volumes in patients with late-onset Alzheimer’s disease compared to healthy controls (Pievani et al., 2013).

In summary, nucleus accumbens atrophy in Parkinson’s disease might be a marker for cognitive impairment and possibly for other non-motor symptoms in Parkinson’s disease, but further multi-disciplinary studies are warranted to find out how specific it is.

References


