Axial motor impairment

Many aspects of motor performance are impaired in people with Parkinson’s disease. One aspect that has rarely been investigated is the ability to perform whole-body rotations around the longitudinal axis of the body. Turning in bed is markedly impaired in these people.

A reduction in longitudinal spinal rotation in seated subjects during a reaching task has also been observed in Parkinson’s disease.3

Studies have indicated difficulty in coordinating the orientation of the superimposed axial segments along the body’s spinal axis in patients with Parkinson’s disease. The patients also show a marked deficit in performing a wholebody rotation on the spot while standing. Moreover, the ‘‘impairment of turning in bed’’ is usually assessed as an item of daily life activities in Unified Parkinson’s Disease Rating Scale (UPDRS).

This axial disorder has also been described during walking (directional changes, half turns) and is associated with the ‘‘freezing’’ phenomenon. When asked to turn on the spot, patients perform the action very slowly and execute the rotation by taking little steps.

It is not clear, however, whether the marked impairment of axial rotation is related to a specific deficit in the coordination of the superimposed segments or to a deficit caused by the change in body orientation in space.

Treatment

Dopamine replacement therapy and physiotherapy provide, at best, partial relief from axial motor symptoms. In carefully selected candidates, deep brain stimulation (DBS) of the subthalamic nucleus or globus pallidus internus is an established treatment for 'appendicular' motor signs (limb tremor, bradykinesia and rigidity).

However, the effects of DBS on axial signs are much less clear, presumably because motor control of axial and appendicular functions is mediated by different anatomical-functional pathways.

Fasano et al. discuss the successes and failures of DBS in managing axial motor signs. They systematically address a series of common clinical questions associated with the preoperative phase, during which patients presenting with prominent axial signs are considered for DBS implantation surgery, and the postoperative phase, in particular, the management of axial motor signs that newly develop as postoperative complications, either acutely or with a delay. They also address the possible merits of new targets-including the pedunculopontine nucleus area, zona incerta and substantia nigra pars reticulata-to specifically alleviate axial symptoms. Supported by a rapidly growing body of evidence, this practically oriented Review aims to support decision-making in the management of axial symptoms [1)].

1)

Fasano A, Aquino CC, Krauss JK, Honey CR, Bloem BR. Axial disability and deep brain stimulation in patients with Parkinson disease. Nat Rev Neurol. 2015 Jan 13. doi: 10.1038/nrneurol.2014.252. [Epub ahead of print] Review. PubMed PMID:25582445.