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Comparison of Deep Brain Stimulation Targets in Parkinson's Disease: A Systematic Review

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Abstract : Aim and background: Deep brain stimulation (DBS) is regarded as an important therapeutic choice for Parkinson's disease (PD). The two most common targets for DBS are the subthalamic nucleus (STN) and globus pallidus (GPi). This review was conducted to compare the clinical effectiveness of these two targets. Methods: A systematic literature search in electronic databases: Embase, Cochrane Library and PubMed were restricted to English language publications 2010 to 2021. Specified MeSH terms were searched in all databases. Studies which evaluated the Unified Parkinson's Disease Rating Scale (UPDRS) III were selected by meeting the following criteria: (1) compared both GPi and STN DBS; (2) had at least three months follow-up period; (3)at least five participants in each group; (4)conducted after 2010. Study quality assessment was performed using the Modified Jadad Scale. Results: 3577 potentially relevant articles were identified, of these, 3569 were excluded based on title and abstract, duplicate and unsuitable article removal. Eight articles satisfied the inclusion criteria and were scrutinized (458 PD patients). According to Modified Jadad Scale, the majority of included studies had low evidence quality which was a limitation of this review. 5 studies reported no statistically significant between-group difference for improvements in UPDRS ш scores. At the same time, there were some results in terms of pain, action tremor, rigidity, and urinary symptoms, which indicated that STN DBS might be a better choice. Regarding the adverse effects, GPi was superior. Conclusion: It is clear that other larger randomized clinical trials with longer follow-up periods and control groups are needed to decide which target is more efficient for deep brain stimulation in Parkinson’s disease and imposes fewer adverse effects on the patients. Meanwhile, STN seems more reasonable according to the results of this systematic review.

Keywords : brain stimulation, globus pallidus, Parkinson's disease, subthalamic nucleus
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