

Acupuncture therapy for Parkinson's disease: the evidence for effectiveness

Introduction

Parkinson's disease (PD) is an age related, progressive neurodegenerative disorder. It affects one in a thousand people over 60 years of age and is a substantial source of economic cost. Although both genetic and environmental factors are implicated in the development of PD, the cause of disease is still unclear. The clinical manifestation of PD motor symptoms includes bradykinesia, resting tremor, rigidity of muscles and joints, gait and posture imbalance. The occurrence of motor symptoms is mainly caused by the severe loss of dopaminergic neurons in the substance nigra of middle brain and subsequent depletion of dopamine in the striatum (Hornykiewicz, 2001; Obeso et al., 2008). The non-motor symptoms of PD are found in the vast majority of patients with PD, consisting of autonomic dysfunction, neuropsychiatric disturbance, sleep disorders, gastrointestinal symptoms and many others (Chaudhuri et al., 2006, 2011; Garcia-Ruiz et al., 2014). The non-motor symptoms of PD and related disorders usually respond poorly to dopaminergic treatment. This indicates, in addition to the loss of dopamine, the changes in other neurotransmitters, such as serotonin, norepinephrine and gamma-aminobutyric acid (GABA) and glutamate, in the different brain regions and peripheral nervous systems, are involved in the pathogenesis of many non-motor symptoms (Ferrer, 2006). There is currently no cure for PD. The prevalence medication for motor symptoms, such as dopamine replacement therapy, in particular levodopa treatment, is only symptomatic relief with limited effect, but has many adverse effects, e.g. dyskinesia (Olanow, 2013; Salat & Tolosa, 2013; Connolly & Lang, 2014).

Acupuncture has been used to treat many conditions in China for more than 3000 years. Acupuncture is now one of the most popular complementary medicines, and is used for the treatment of a variety of disorders worldwide. In general, acupuncture needle inserted at the specific acupoint stimulates nerve receptors both directly or indirectly, through mechanical coupling via the connective tissues surrounding the needle, then through the local reflex and the central nervous system, induces endocrine, neuroendocrine, autonomic and systemic behavioural responses (Dong et al., 2002; Langevin et al., 2002) This suggests that acupuncture therapy beneficially affects a whole body even if it stimulates, through the fine needles, only limited sites on the body. Within past a few decades acupuncture has become increasingly popular with both public and medical professionals, and it has been reported to be a very safe and well-tolerated therapy with only minor side effects (Posadzki et al., 2012; Rabinstein & Shulman, 2003; Shulman et al., 2002). Many patients with PD are reported using acupuncture as an alternative treatment at some points of their life. Indeed, it has been estimated that more than a quarter of PD patients in the United State (40%), Britain (38.7%), Sweden (34.5%), Singapore (61%), and Argentina (25.7%) have used at least one form of complementary medicine, while 7-49% of them have used acupuncture as an alternative therapy (Ferry et al., 2002; Pecci et al., 2010; Rajendran et al., 2001; Tan et al., 2006; Lökk et al., 2010) Many patients with PD experienced improvement of their conditions after acupuncture.

Literature Search

The following electronic databases were searched in December 2014 for publications between 2000 and 2014: (1) Pubmed; (2) Medline; (3) EMBASE; (4) CNKI and (5)

CINAHL. The reference list of relevant studies and reviews were manually searched in order to identify more potential papers. The search term used in the studies were cross-referenced acupuncture and its proprietary names, and PD and with its derivations.

Summary of Clinical Trials – Table 1

Discussion

Present study reviewed the data of 519 patients with PD from 14 clinical studies. The results from some of the included studies showed the potential benefits of acupuncture for treating PD, especially non-motor symptoms seems to be more beneficial from acupuncture treatment. However, many methodological flaws presented in most studies limited the reliability of results. Therefore, the results included in this study should be interpreted with cautious.

Outcome measures for motor symptoms differed among the included studies. For example, 7 studies used the UPDRS, 2 studies used Webster scale and another 5 studies only described changes in individual motor symptom. Among 7 studies used UPDRS, 4 studies showed moderate to marked improvement in UPDRS III motor scores before and after acupuncture, between acupuncture plus medication and medication alone groups. One study showed negative outcome in UPDRS III motor scores (Eng et al., 2006) and 2 studied presented minor to moderate improvement in total UPDRS scores. Two studies used Webster scale presented marked improvement in motor symptoms. Five of 14 studies described changes in individual motor symptom following acupuncture treatment. For example, Lei et al., (2014) described the improvement in balance, gait and postural transition following acupuncture. It is

difficult to draw a valid comparative conclusion based on inconsistent outcome measures. Suitable outcome measures such as UPDRS should be applied as a standard outcome measure and full data on outcome measures including mean and standard deviation should be presented.

Although many of included studies showed a moderate to marked improvement in motor function, one study (Eng et al., 2006) reported a worsening in UPDRS motor scores (24.0 versus 26.4, $P=0.018$). In this study PD patients were given acupuncture treatment for 7 to 10 min, once a week for 6 months (Eng et al., 2006). However, patients in majority of included studies were given acupuncture for 20 to 60 min, 2 to 3 times a week. This implied that duration and frequency of intervention might play an important role in the outcome of treatment.

Although many non-motor symptoms occur even before the appearance of motor symptoms, only 9 of 14 studies reported presence of the non-motor symptoms. This is not surprise as patients do not spontaneously complain their non-motor symptoms to doctors (Chaudhuri et al., 2006). Within 9 studies, depression was the most reported symptom, followed by sleep disorder, constipation, and bladder dysfunction. This is consistent with other studies showing depression is one of the most complained non-motor symptoms from patients with PD (Gallagher & Schrag, 2012; Reijnders et al., 2009). All studies reported that acupuncture significantly improved depression of PD patients. Beck's Depression Inventory (BDI), PDQ-39 and PDQ8 were applied to rate the changes in depression within different studies. This led to difficult for comparison as each instrument covered different aspect of item and made the data less reliable. Similarly the outcome of sleep disorder was measured by PDSS and ISI scores between studies. Outcome measures for other NMS were barely

mentioned by relevant studies. Indeed, there is a need to achieve an agreement on what are the accepted outcome measures for NMS in PD.

Future clinical acupuncture study should follow accepted standards of methodology such as CONSORT and STRICTA checklists. In particular studies should have sufficiently large sample sizes, should be based on data from appropriate pilot studies and to ensure reproducibility. Even if further clinical studies confirm acupuncture to be therapeutic valuable more evidence should be required on whether it has matched the effectiveness of conventional medicine or has significant advantage over conventional medicine. Further, some common practical settings should help improve the quality of future clinical studies. So we propose that 1). Comprehensive assessment of PD patients, not only about motor symptoms also non-motor symptoms, should be conducted. 2). Using the well-established and universally recognized measures for motor and non-motor symptoms assessment, such as UPDRS in which the scores of each part should be reported. 3). Acupuncture treatment should include obligatory acupoints and optional acupoints. The former should include proven motor-related acupoints such as GB34 and ST36 for motor symptom treatment [66-67]. The selection of latter is dependent on the non-motor symptoms and other conditions. 4). Needle duration should be expected to maintain at least 20 min each time for acupuncture to produce a certain level of therapeutic effect. 5). A proper follow-up to evaluate the sustainable therapeutic effect of acupuncture. We hope that this will help reduce the discrepancy between the studies and improve the quality of treatment.

Conclusion,

Acupuncture either manual or electroacupuncture stimulation at specific acupoints relieved some motor symptoms in patients with Parkinson's and markedly improved many non-motor symptoms such as psychiatric disorders, sleep problems and gastrointestinal symptoms. When it was used as an adjunct for levodopa, acupuncture improved therapeutic efficacy and reduced dosage and the occurrence of side effects of levodopa. However, the results were constrained by small sample sizes, methodological flaws, and blinding methods of studies. Although the evidence for the effectiveness of acupuncture for treating Parkinson's is inconclusive, therapeutic potential of acupuncture seems quite promising. More studies, either comparative effectiveness research or high quality placebo-controlled clinical studies are warranted.

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