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Efficacy of acupuncture in the functioning of the upper and lower limbs in patients after a stroke: A narrative review

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Abstract

Stroke is the second most common cause of death in the world and is one of the leading causes of disability and dependence of older adults for care. Acupuncture for the treatment of stroke has been used in China for thousands of years and is constantly gaining ground in the medical community of the western world. The aim of this review is to describe through recent research data the efficacy of acupuncture in improving the functioning of individuals after a stroke. Data for both the upper and lower limbs were included in this work. The PubMed and Google Scholar databases were searched with the following keywords: Stroke, Acupuncture, disability, Rehabilitation. Both clinical studies and systematic reviews were included in the review, with nine articles included in total. In conclusion, the application of acupuncture seems to have a positive effect on the treatment of motor disorders after a stroke. The results of this review show that acupuncture can contribute and provide significant benefits in improving motor and functional limitations that occur after a stroke and is able to improve the functional level of patients.

Keywords: Stroke, acupuncture, disability, rehabilitation

Introduction

A stroke is a clinically defined syndrome of rapidly developing symptoms or signs of focal loss of brain function for no apparent reason other than that of vascular origin [1]. Stroke is generally categorized as a neurological dysfunction due to a vascular cause and includes ischemic stroke, intraparenchymal bleeding, subarachnoid hemorrhage and venous thrombosis [2]. The number of deaths due to strokes has decreased over the last decade, ranking fifth as the leading cause of death in the US [3]. In addition, the frequency of recurrent strokes may be reduced due to the use of specific drugs [4, 5]. The main risk factors for the occurrence of a stroke are hypertension, diabetes, smoking, hyperlipidemia and other lifestyle factors [6]. The systematic review of Hu et al. [5] for stroke rates from 1980 to 2017 showed that their incidence remained stable at 128.3 cases per 100000 people annually from 1980 to 2005 and increased by 21.3 per 100000 people annually by 2013. There was also a reduction in mortality from 369.2 in 1980 to 154.7 per 100000 people annually in 2013. Stroke is associated with very high medical costs in China at an annual cost of almost \$7.69 billion according to 2015 data [3].

Acupuncture is recommended by the World Health Organization (WHO) as an alternative and complementary strategy for the treatment of stroke and for improving stroke care. Based on a review by Lu *et al.* [7], the application of acupuncture plays a very important role in improving the stroke symptoms and is constantly becoming more and more dynamic in combination with other treatments. However, there are studies in which the results of acupuncture are relatively poor when combined with physiotherapy or other effective treatments. Further research is needed to confirm these findings [8, 9].

The aim of this review is to describe through recent research data the efficacy of acupuncture in improving the functioning of individuals after a stroke.

Method

The PubMed and Google Scholar databases were searched with the following keywords: Stroke, Acupuncture, disability, Rehabilitation. Both clinical studies and systematic reviews were included in the review.

Results

Below are the main findings of the nine articles that were included in this review.

Literature review

Erickson *et al.* [10], studied the efficacy of acupuncture in treating patients with stroke and concluded that acupuncture can protect against its effects through the release of beta-endorphin and other endogenous opioids. This, according to the authors, helps to improve the mood and contributes to a greater willingness to exercise the affected limbs due to reduced pain. There is a reduction in platelet coagulation, reducing the effects of further vascular occlusion. There is also an increase in vasodilators along with a reduction in vasoconstrictors, allowing improved blood flow to damaged areas of the brain and a reduction in edema. According to the results of this review, acupuncture contributes significantly to the reduction of disability of people with stroke.

Furthermore, Park *et al.* [11] studied the efficacy of acupuncture in post-stroke individuals. Nine randomized controlled trials with a total sample size of 538 patients were included in their systematic review. Two studies used acupuncture, five electro-acupuncture and two used both. The Scandinavian Stroke Scale, the Chinese Stroke Scale, the Barthel Index, the Nottingham Health Profile, functional mobility, balance and hospitalization duration were the evaluation tools that were used. Of the nine studies, six yielded a positive result indicating that acupuncture was effective and three produced a negative finding suggesting that acupuncture was not superior to conventional therapy. Only two studies had a Jadad score above three. These methodologically better trials did not show a significant effect of acupuncture. Based on the findings of this systematic review, the issue requires further investigation.

The effect of acupuncture on the restoration of the function of the upper limbs after a stroke was the study focus of Hopwood and Lewith [12]. Upper limb mobility was assessed using the Rivermead Motor Assessment, the Motricity Index and the Nine-hole Peg Test. Six patients received daily treatment for two months, switching from acupuncture to placebo pharmacotherapy at two weeks of treatment. Four evaluations at two-week intervals followed. The results are more impressive in the Motricity index, an average increase of 17.96 points in all six patients with a high 26 and a low 10. The rate of change indicated by the angle of inclination of the graph clearly varies with acupuncture and placebo medication, being steeper with the first. The positive effect of acupuncture on the rehabilitation of stroke according to the authors has been proven to be measurable using some of the selected tools. According to the authors further research is needed to confirm the encouraging results obtained in this study.

Regarding the use of other treatment tools, Agnol and Cechetti [13] studied the effect of acupuncture and Kinesiotaping on improving upper limb mobility after a stroke. In this clinical study, 16 patients were divided into two intervention groups. In the first group, 12 acupuncture sessions were performed and in the second group, 12 sessions were held with acupuncture and use of Kinesio Tape. For the results and to evaluate the function of the affected limb, angulation was used to assess range of motion, as well as the Ashworth scale and the Wolf Motor Function Test (movement speed). An important finding of

the study for both groups was the reduction of spasticity in some studied muscles as well as the increase of the range of motion of the shoulder, without, however, exhibiting significant differences between the groups. In addition, there was no significant improvement in movement speed in both groups. According to the researchers, acupuncture was effective in reducing spasticity and increasing the range of motion of the paretic upper limb, but did not contribute significantly to the speed and quality of movement.

In another study, Wu *et al.* [14] investigated post-stroke acupuncture rehabilitation through a systematic review and meta-analysis of randomized clinical trials. Their study included 35 articles written in Chinese and 21 articles in English. In 38 trials, data were available for analysis and meta-analysis, yielding an OR function in favor of acupuncture compared to controls (OR//4.33, 95% CI: 3=09 έως 6.08, I2//72.4%). Randomization, delivery methods, control method, study country of origin and randomization report may explain some of the heterogeneity observed between studies. Randomized clinical trials show that acupuncture may be effective in post-stroke rehabilitation.

In the study of Lee and Lim [15], the effect of acupuncture on pain in the shoulder area after a stroke was studied. In this systematic review, out of the 453 studies published from 1990 to 2009, seven were selected that met the required criteria. This systematic review provides indications of the efficacy of acupuncture in the treatment of shoulder pain after a stroke. The results of this review show that acupuncture is an effective post-stroke treatment and can be considered as adjunctive therapy in combination with exercise to rehabilitate patients with shoulder pain.

Bai *et al.* [16] attempted to study the effect of acupuncture on the recovery of patients with ischemic stroke and to determine whether the results of combined physiotherapy and acupuncture are superior to those with physiotherapy alone. Limb function was measured with the Fugl-Meyer Assessment (FMA). The modified Barthel Index (MBI) was used to assess daily life activities. The study involved 120 patients (84 men and 36 women) who were divided into 3 groups. In the first group the treatment was with acupuncture, in the second with physiotherapy and in the third with a combination of both. In this study, physiotherapy and acupuncture had a similar effect on upper limb motor function. However, the FMA and MBI scores for the lower limbs were higher in the physiotherapy group than in the acupuncture group. No significant differences were observed between the groups with the combination therapy and the conclusion is that acupuncture is less effective than physiotherapy. In addition, the therapeutic effect of combining acupuncture with physiotherapy was not superior to that of physiotherapy alone. The researchers concluded that further studies are needed to confirm these findings.

Moreover, in the work of Sze *et al.* [17] the effect of acupuncture on the typical motor rehabilitation of the patient after a stroke was studied. Through a randomized controlled trial conducted in a rehabilitation unit in Hong Kong, 106 patients with moderate and severe functional impairment due to a stroke participated. Methods included physiotherapy, specialist nursing, speech therapy and additional acupuncture for research purposes. Results included the FMA, the Barthel index and the Functional Independence Measure, respectively, in weeks one, five and

10. At baseline, patients in each limb were comparable in all important prognostic features. No statistically significant differences were observed between any of the outcome measures over time. The conclusion of this research is that acupuncture does not add value to typical motor rehabilitation after a stroke if all other treatment protocols are followed.

Lastly, Chavez *et al.* [18] also reviewed the efficacy of acupuncture in improving balance and functioning, reducing spasticity and increasing muscle strength and general well-being after a stroke. According to their findings, the mechanisms governing the beneficial effects of acupuncture on stroke rehabilitation remain unclear. The authors report that acupuncture has a beneficial effect after an ischemic stroke, through the formation of different mechanisms derived from the central nervous system.

Discussion – Conclusions

The results of this review show that the positive effect of acupuncture on improving the functional ability of stroke patients is controversial. However, the results of this review also show that there is evidence that acupuncture can help improve motor and functional limitations that occur after a stroke [10, 13, 14]. To be noted is that in other studies, in which acupuncture was applied as part of combination therapy, the results showed that it gives poorer beneficial effects in improving mobility [16]. Although the World Health Organization includes acupuncture in its treatment protocols and the use of acupuncture for faster recovery of patients after a stroke, it seems that its effects have not been clarified. Further research is needed in the future to determine the efficacy of acupuncture in improving the functional ability of people with strokes. The issue requires further investigation.

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