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Acupuncture in the Management of Painful Diabetic Peripheral Neuropathy: A Focused Review

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Abstract

peripheral diabeticneuropathy (pdn) is one of the major complications arising in patients with diabetes. pain relief is a major clinical burden in patients with pdpn due to its associated psychosocial issues like depression, anxiety and suicidal tendencies which arise due to reduced sleep, very severe intensity and its chronic disabling nature. acupuncture had been shown to be an effective therapeutic adjunct to relieve pain in patients with other etiologies of pain. thus there is a dearth need to evaluate the current evidence on effectiveness of acupuncture in diabetic peripheral neuropathy (dpn). the objective of this review is to provide and evidence-informed update on the effects, efficacy and effectiveness of acupuncture treatments in patients with painful diabetic peripheral neuropathy (pdpn). medline was searched for articles and five studies were obtained and a descriptive review found that acupuncture provided short-term symptom relief. there is insufficient evidence to provide any recommendations for acupuncture to be a viable and affordable treatment option for patients with pdpn.

Keywords: Diabetic peripheral neuropathy; Complementary and alternative medicine; Acupuncture.

Introduction

Peripheral diabeticneuropathy (PDN) is one of the major complications arising in patients with diabetes which is the leading cause of foot amputations in those patients.[1] India has an increasingly higher prevalence of diabetes[2] and much higher prevalence of neuropathy amongst its other microvascular and macrovascular complications.[3]Painful diabetic peripheral neuropathy is a condition that describes presence of bilateral tingling and numbness in a glove and stocking distribution, present commonly in the legs as distal symmetric polyneuropathy.[4] The neuropathic pain present in those patients with PDPN is characteristically termed as Diabetic peripheral neuropathic pain (DPNP),[5] to identify and differentiate it from other non-neuropathic etiologies such as musculoskeletal and visceral.[6]

DPNP had been demonstrated to be associated with a huge burden for the patient in biological, psychological and social domains,[7] with studies reporting presence of greater pain intensity in PDPN patients compared to painless diabetic peripheral neuropathy or diabetics and non-diabetics.[8] The increased pain intensity was also shown to be related with greater abnormalities in neurodynamic examination findings, sensory perception thresholds and perceived quality of life.[9]

Complications of impending chronic pain and its related disability and higher persistence rates of DPNP makes it the most challenging clinical symptom amongst non-cancer pain syndromes till date.[10] Thus adequate symptomatic therapeutic management of

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DPNP is necessary and is one of the foremost clinical goals of patient care in PDPN.[11]

Symptom control in PDPN involved an integrated multidisciplinary approach comprising of medical,[12] surgical[13] and non-pharmacological treatments.[14,15] Based upon the clinical examination findings, the treating clinician may use either or combination of various treatments.[16]

Acupuncture was evolved primarily from ancient Chinese Medicine, and is now a comprehensive part of complementary and alternative medicine, and is a field in itself for its range of physiological and therapeutic benefits in a range of patient conditions.[17]It works on the principle of biomeridians and their interactions in the human body. There are acupuncture points which are biomeridianically related to the painful area of the nature of pain, where needles are placed for specific amount of time to obtain lasting relief.[18]

Acupuncture was shown to be effective in many pain syndromes but there is a dearth need to evaluate the current evidence in diabetic peripheral neuropathy (DPN). The objective of this review is to provide an evidence-informed update on the effects, efficacy and effectiveness of acupuncture in patients with painful diabetic peripheral neuropathy (PDPN).

Materials and methods

A systematic review and search with (acupuncture) AND (diabetic OR diabetes) AND (neuropathy OR neuropathic) IN [Title] was used for searching the MEDLINE for all articles published in English. The testers conducted independent search and disagreements were solved through consensus. The selected studies were scrutinized and were organized under four distinct themes (experimental studies, pain, neurological function, foot deformities and autonomic dysfunction).

Main findings

Of the nine studies that were found, four were excluded since they were in Chinese five were included which are summarized as follows:

Basic science research (animal studies)

Lin et al[19] investigated the effects of chronic electrical stimulation of acupuncture points on rat diabeticneuropathy. Diabetes mellitus was induced by a single dose of intravenous streptozotocin. The efficacies of several different protocols of electrical stimulation were compared. The evaluation measures included nerve conduction velocity, tactile threshold and blood perfusion on eye and footpad. Electrical stimulation was administered 30 min/day for 4 weeks. On the 4thweekend of stimulation, when compared with the control group, the stimulated groups showed differential benefits on different evaluation measures.

No treatment or sham/ placebo as a comparison

Tong et al[20] compared 42 cases treated with acupuncture with 21 cases exposed to sham acupuncture and observed the effects on nerve conduction velocity and a variety of subjective symptoms associated with diabetic peripheral neuropathy. Three of the six measures of motor nerves, and two measures of sensory function, demonstrated significant improvement over the 15-day treatment period in the acupuncture group, while no motor or sensory function significantly improved in the sham acupuncture group.

Pharmacological treatment as a comparison

Zhang et al[21] in their randomized clinical trial of 65 patients of whom 32 were given acupuncture and 33 were given oral inositol for 3-months. In the treatment group, 16 cases were markedly relieved, 12 cases improved, and 4 cases failed, with a total effective rate of 87.5%. In the control group, 7 cases were markedly relieved, 14 cases improved and 12

cases failed, with a total effective rate of 63.6%. There was a significant difference in the total effective rate between the 2 groups.

3- excluded (Chinese), 5- excluded (Chinese), 8- excluded (Chinese), 9- excluded (Chinese)

Acupuncture treatment style as a comparison

Ahn et al[22] evaluated the clinical and mechanistic effects of two styles of acupuncture, Traditional Chinese Medicine (TCM) and Japanese acupuncture, for the treatment of painful diabeticneuropathy. Out of seven patients enrolled, three received Traditional Chinese acupuncture while four received Japanese style acupuncture. Treatments were delivered once a week for 10 weeks. Acupuncturists were permitted to select the needle interventions. Substantial differences in diagnostic techniques, choice of acupuncture points, and needle manipulation were observed between TCM and Japanese acupuncturists. Clinically, patients allocated to Japanese acupuncture reported decreased neuropathy-associated pain according to the daily pain severity score, while the group allocated to the TCM acupuncture reported minimal effects. Both acupuncture styles, however, lowered pain according to the McGill Short Form Pain Score. The TCM style improved nerve sensation according to quantitative sensory testing while the Japanese style had a more equivocal effect.

Acupuncture as an adjunctive treatment method

Abuaishaet al[23]reported 46 patients of whom Twenty-nine (63%) patients were already on standard medical treatment for painful neuropathy. Patients initially received up to six courses of classical acupuncture analgesia over a period of 10 weeks, using traditional Chinese Medicine acupuncture points. Forty-four patients completed the study with 34 (77%) showing significant improvement in their primary and/or secondary symptoms ($P < 0.01$). These patients were followed up for a period of 18-52 weeks with 67% were able to stop or reduce their medications significantly. During the follow-up period only eight (24%) patients required further acupuncture treatment. Although 34 (77%) patients noted significant improvement in their symptoms, only seven (21%) noted that their symptoms cleared completely. All the patients but one finished the full course of acupuncture treatment without reported or observed side effects.

Discussion

Historically, acupuncture was considered primarily as an ancient art,[24] which was enigmatically[25] integrated into modern medical science and later was progressively growing in evidence for its effectiveness in virtually all known systemic disease conditions.[26-30]However the existed evidence and findings from the reviewed literature is too insufficient and of poor quality to establish evidence of effectiveness for acupuncture in patients with PDPN. Although the role of acupuncture in PDPN remained empirical, our findings though they are apparently favorable of its role, all studies were published by Chinese or Japanese or Korean authors, and they did not evaluate clinically relevant outcomes (clinical assessment scales) on a longer term.

Acupuncture may have its direct effects on nervous system with its 'acu' points located at intersections of nerves and their terminals.[31]The neurophysiological effects of Acupuncture occur through autonomic pathways which in turn control the other body structures and their functions.[32] Acupuncture analgesia works by stimulating large myelinated nerve fibres which conduct the stimulus to the spinal cord and higher centres. The ascending pain impulses are blocked by a complicated interaction in which serotonin, endorphins, encephalin, norepinephrine and substance P all play important roles.[33]All the above mentioned mechanisms also play a role in pathogenesis of DPNP.

Understanding of the mechanisms of acupuncture analgesia would enable deeper understanding of pain itself,[34] where neurochemical influences predominate amongst other neurological, neurohumoral and psychological factors.[35] Care has to be taken prior to applying acupuncture treatments after thorough knowledge of adverse events, contra-indications and complications in a clinical practice scenario.[36]

The most important implication of this review is that there is further need for high quality pragmatic randomized clinical trials[37] on acupuncture and its effectiveness in PDPN. This was evident in all studies being on effects rather than on effectiveness per se.[38]Thepossible explanation for probable mechanisms for positive benefits of acupuncture is well beyond the scope of present review and it is well accepted that acupuncture has its own non-specific effects which are presently beyond the understanding of science.

There is also need to incorporate mechanism-based decision making[39] by thinking out of the box[40] in acupuncture therapy, to combine with other active treatments such as yoga[41] and physical activity prescription,[42] to ensure long-term patient recovery in a symptom control to quality of life continuum.[43]There is a need for further research on comparison of different acupuncture methods, either alone or in combination and/or comparison with medical,[12]surgical,[13]physiotherapeutic[14] and manual physical therapy interventions[15] in people with PDPN. There is also need for deriving clinical prediction/decision rules utilizing clinical examination findings,[16] clinical assessment scales[44] and treatment subgroups' responses in high quality randomized clinical trials of acupuncture interventions.

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Conflicts of interest

None declared or identified.

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