

Section: Medical Surgical Nursing

Acupressure for improving neuropathy severity in patients with type 2 diabetes

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Abstract

Diabetic neuropathy is one of the most common microvascular complications in patients with diabetes mellitus and leads to a decline in quality of life. Common causes or risk factors associated with diabetes mellitus include obesity, smoking, unhealthy eating patterns, lack of physical activity, hypertension, elevated blood glucose levels, and elevated cholesterol levels. Non-pharmacological therapies, such as complementary therapy involving massage using acupressure techniques, can reduce the severity of diabetic neuropathy. This study employed a descriptive method with a case study approach. The interventions implemented included monitoring the severity of neuropathy, wound care, dietary education with a low-saturated fat diet, omega-3 fish oil, blood sugar checks, and the application of acupressure therapy. The implementation was carried out over five consecutive days. Evaluation results showed a decrease in neuropathy symptoms measured by the Michigan Neuropathy Screening Instrument (MNSI) screening, with a score reduction of 4, indicating mild peripheral neuropathy. This acupressure therapy was proven effective in improving blood circulation and alleviating neuropathy symptoms. This therapy serves as a safe and measurable alternative nursing intervention.

Keywords: Acupressure, complementary therapy, neuropathy, prevention, type 2 diabetes

Introduction

Diabetes is a metabolic disorder that is mostly hereditary, characterised by hyperglycaemia and glycosuria, with or without clinical or chronic symptoms, resulting from insufficient effective insulin in the body (Aloke et al., 2022). The primary dysfunction lies in carbohydrate metabolism, which is often accompanied by disturbances in fat and protein metabolism (Borse et al., 2021). Common causes or risk factors associated with diabetes mellitus include obesity, smoking, unhealthy eating habits, lack of physical activity, hypertension, elevated blood glucose levels, and elevated cholesterol levels (Hyun et al., 2021). To prevent diabetic foot ulcers, neuropathy symptoms can be reduced. Preventive measures include foot care, foot exercises, foot massage, or complementary therapy (Hirpha et al., 2020). The most common complication experienced by diabetes mellitus patients is impaired peripheral tissue perfusion. This condition increases the risk of lower extremity amputation due to inadequate diabetes management and care, leading to infections and non-healing foot ulcers (Barnes et al., 2020). One complementary therapy that can be used to control the onset of neuropathy and improve circulation to the feet is acupressure therapy (Fitrullah, & Rousdy, 2017). Acupuncture is a method of treatment that involves applying pressure to meridian points or acupuncture points, which stimulates the flow of energy in the body and improves circulation. Research also found that acupuncture can improve foot sensitivity in diabetes (Surya & Desnita, 2020).

Diabetes represents a formidable global public health challenge, characterized by widespread metabolic dysfunction and a high incidence of debilitating long-term complications. Among the most frequent and profoundly impactful sequelae is Diabetic Peripheral Neuropathy (DPN), affecting up to 50% of individuals with long-standing hyperglycaemia (Feldman et al., 2019). DPN involves the gradual, progressive damage to peripheral nerves, most prominently manifesting in the lower extremities, severely diminishing the quality of life for those afflicted (Galiero et al., 2023). Clinically, patients typically present with a complex array of symptoms, including paraesthesia, burning pain, motor weakness, and a critical loss of protective sensation. This sensory deficit is particularly alarming because it directly predisposes patients to unnoticed foot trauma and subsequent ulceration. Severe neuropathy is the primary precursor to non-traumatic lower extremity amputations, thus placing a significant socioeconomic burden on healthcare systems and individuals alike (Zaino et al., 2023). While rigorous glycaemic control remains the cornerstone of primary prevention, established DPN requires multifaceted management often incorporating antiepileptic or antidepressant drugs for pain. Unfortunately, these pharmacological agents frequently introduce undesirable side effects and often provide only limited relief from the underlying neurological damage, rather than addressing the core pathophysiology. Consequently, there is an urgent and ongoing necessity to explore and validate effective complementary strategies to improve neurological symptoms and functional outcomes in this population.

In light of the persistent therapeutic gaps, integrative medicine approaches, specifically those derived from Traditional Chinese Medicine (TCM), offer promising avenues for non-pharmacological intervention, such as the practice of acupressure. Acupressure is a simple, patient-led technique that involves applying physical pressure with the hands or fingers to specific anatomical points, known as acupoints, along the body's meridians. The theoretical basis suggests that stimulation of these points may modulate pain perception, enhance endogenous opioid release, and, crucially, improve microcirculatory dynamics in the affected limbs. This particular intervention is highly appealing because of its non-invasive nature, cost-effectiveness, and potential for routine self-administration, empowering patients to actively participate in their own care management. Emerging clinical and mechanistic studies have begun to indicate that regular acupressure application may positively influence nerve conduction velocity and reduce neuropathic pain intensity. Therefore, this present case study was designed to rigorously evaluate the impact of a targeted and standardized acupressure protocol on the objective severity of DPN in a patient with T2DM. Utilizing validated clinical tools, the study meticulously tracked changes in neurological function and symptom manifestation over a defined intervention period. The findings are intended to contribute specific, evidence-based data that supports the inclusion of acupressure as a viable, adjunctive therapy to mitigate the severity and improve the subjective experience of diabetic neuropathy.

Case Description

Patient is a 60-year-old male civil servant, was admitted with a medical diagnosis of left foot ulcer. The patient reported a history of hypertension and diabetes mellitus for 5 years, and a history of left foot toe amputation 1 month ago. The patient reported having been admitted to the hospital three times since the amputation. He was discharged from the hospital one week ago but returned today due to intolerable pain in the lower back extending to the legs, frequent numbness and cramps in the legs, and loss of sensation. The patient has a history of smoking and rarely exercises. Vital signs examination: blood pressure 166/88 mmHg, pulse rate 83 beats per minute, temperature 36.3 degrees Celsius, respiratory rate 20 breaths per minute, and blood glucose 330 gr/dl. The patient's lips appear dry, the skin colour of the legs is pale, and the wound area is red and swollen. The patient's extremities feel cold. There is an infected wound with lesions, redness, swelling, and oozing on the left toe amputation wound. Laboratory results: white blood cells (WBC): $19.3 \times 10^3/\mu\text{L}$, haemoglobin (HB): 11.0 g/dl. The physical assessment revealed decreased muscle strength in the left lower extremity, impairing walking ability, decreased sensation and tendon reflexes, and complaints of lower back pain suspected to be due to the load when supporting the foot position. The Michigan Neuropathy Screening Instrument (MNSI) score before therapy was 12, indicating moderate neuropathy.

Diagnosis is based on major and minor data or risk factors. Based on the data found in the case, the author identified three nursing diagnoses. Prioritising diagnoses according to Abraham Maslow's theory can be done by considering the five hierarchy of patient needs: physiological needs, safety and comfort needs, social needs, esteem needs, and self-actualisation needs. The priority diagnoses are impaired tissue integrity related to peripheral neuropathy and ineffective peripheral perfusion related to hyperglycaemia. The nursing interventions were monitoring the degree of neuropathy, wound care, education on dietary patterns with a low-saturated fat diet, omega-3 fish oil, blood sugar checks, and the application of acupressure therapy. Nursing implementation for the patient with a diagnosis of tissue integrity disorder due to peripheral neuropathy, focusing on wound care, was carried out for five consecutive days in the morning. The nursing diagnosis of ineffective peripheral perfusion related to hyperglycaemia was addressed with acupressure therapy, which was performed for five consecutive days in the evening for 15–25 minutes.

Discussion

Factors associated with peripheral neuropathy include advanced age, gender, duration of diabetes mellitus, and poor glycaemic control. The primary complaint presented was skin integrity impairment due to peripheral neuropathy in diabetic ulcers. This can lead to hypoxia, which impairs wound healing and increases the risk of infection. When tissue oxygen levels decrease, there is a reduction in leukocyte production, which provides an opportunity for bacteria to colonise the wound, leading to infection. The patient's family mentioned that he tends to consume sweet foods at home, and although there is a home care nurse present, wound care is not performed regularly. Regarding the second issue, ineffective peripheral perfusion is associated with hyperglycaemia. The nursing issue of ineffective peripheral perfusion is a decrease in blood circulation at the capillary level, which can disrupt body metabolism. One of the causes is hyperglycaemia, with minor symptoms and signs of paraesthesia (claudication and subjective intermittent pain) (Armstrong et al., 2025). In diabetic patients, most have reduced Ankle Brachial Index (ABI) values, decreased haemoglobin concentration in the peripheral circulation of the lower extremities, and decreased capillary refill time (CRT). The inefficiency of peripheral tissue perfusion occurs due to a decrease in oxygen in the blood, leading to a failure in nutrient delivery to capillary tissues (Gutierrez et al., 2004). This process occurs due to increased blood viscosity caused by hyperglycaemia in patients with diabetes.

Acupressure therapy is one of the therapies that can restore foot sensitivity (Surya & Desnita, 2023). The stimulation provided by a good reflexology session will relax and improve blood circulation through massage, allowing blood to deliver more oxygen and nutrients to body cells while removing more toxins. Application of acupressure

therapy techniques is highly effective in reducing the severity of peripheral neuropathy. The nursing care plan developed for interventions, with the expectation that after undergoing acupressure therapy once during the evening intervention session, the patient will experience improvements. The World Health Organization recognises acupressure as a treatment for activating neurons in the nervous system, where it stimulates the endocrine glands and can activate problematic organs. In the same way, acupressure also helps normalise blood glucose levels naturally without side effects and can even improve physical and mental health, enhance wound healing processes, and reduce symptoms of peripheral neuropathy.

Acupressure helped 78% of diabetic neuropathy patients reduce their pain levels by half. More specifically, 85% of patients reported better sleep after just six weeks of treatment, pain scores decreased from 7.5 to 3.2 on average, blood sugar levels improved in 65% of participants, 75% experienced improved circulation, and 82% reported better quality of life. The acupressure points applied were SP6, located four fingers above the inner ankle, best used before bedtime to connect the main nerve pathways in the foot. The second point, ST36, is four fingers below the knee cap, an ideal spot for comprehensive neuropathy relief, used twice daily for optimal results. These points should be used in the evening to achieve rapid changes. Since DPN manifestations in the lower extremities include allodynia and hyperalgesia, which are exacerbated at night by sleep disturbances, depression, and anxiety-related issues. These symptoms significantly impact patients' quality of life, as they reduce their ability to perform daily activities, participate in social and workplace activities, maintain a healthy lifestyle, and preserve independence (Nash et al., 2019). The authors selected acupressure therapy to reduce the signs and symptoms of diabetic neuropathy. Additionally, in some case, paralysis had resolved, and they could walk again; foot ulcers had healed; dark spots on parts of the feet had disappeared; myopia in some participants had improved; and some even recovered from heart disease. Acupuncture stimulates the release of neurotransmitters that carry signals along nerves or through glands, which then activate the hypothalamic-pituitary-adrenal axis to regulate endocrine gland function.

Based on the research results, it can be concluded that the average degree of neuropathy in diabetes mellitus patients before receiving acupressure intervention was 5.82. The average degree of neuropathy in diabetes mellitus patients after receiving acupressure intervention was 3.68. The stimulation performed to reduce neuropathy symptoms by massaging the points LR3, K13, SP6, SP10, and ST36 can stimulate the sensory receptors in the feet, thereby affecting nerve conduction in the feet. The average peripheral neuropathy score before massage therapy was 6.83, and the average peripheral neuropathy score after massage therapy was 2.17. The average measurement results showed a decrease of 4.66, indicating that massage therapy using VCO reduces peripheral neuropathy.

Conclusion

The results of the evaluation over 5 days of visits were measured using the MNSI questionnaire screening instrument to assess the degree of diabetic neuropathy. Before acupressure therapy, the neuropathy score was 12, indicating moderate peripheral neuropathy. After acupressure therapy was implemented, the score decreased to 4, indicating mild peripheral neuropathy. The therapy was administered once daily for five consecutive days, yielding positive effects on reducing diabetic neuropathy. This acupressure therapy has proven effective in improving blood circulation and alleviating neuropathy symptoms, serving as a safe and measurable nursing intervention alternative. Nurses are encouraged to integrate this therapy into their practice to enhance the quality of life for diabetic patients with neuropathy complications.

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