

The complex treatment of neurologic disorders in patients with diabetes using acupuncture and its point of view on common pathophysiological mechanisms: analysis of two cases

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Taking into account the increase of diabetes mellitus (DM) prevalence, diabetic neuropathy remains one of the most important causes of neuropathology. The treatment of diabetic neuropathy with traditional western medicine protocols and drugs often remains unsuccessful, while Traditional Chinese Medicine (TCM) explains the pathogenesis of DM, its complications and impact on nervous system in different way, that may allow to use additionally the AP methods for more effective treatment.

The objective: to optimize the complex treatment of neurologic disorders in patients with DM with AP and TCM, its point of view on the relationship between endocrine and neurological pathology.

Materials and methods. In order to improve the results of treatment the method of syndromic acupuncture diagnosis was used additionally, that allowed to add to complex treatment with classical medical AP method by influence on the acupuncture point EX-B3 (Waiguanxiashu). The effectiveness of the treatment was assessed by complex examination with Visual Analog Scale, Neuropathy Symptom Score, Neuropathy Disability Score, Autonomic Symptom Score, Montreal Cognitive Assessment, Electroneuromyography.

Results. A complex treatment of 2 patients with DM and neurological disorders with the additional use of medical AP methods are presented. Each patient received 2 courses of treatment, consisting of 10 AP procedures with individual approach, described in the article. Progress in reducing their neurological symptoms was observed only after we used this treatment method that approved by improvement of clinic-instrumental indexes.

Conclusions. The treatment of neurologic disorders in patients with DM using traditional approaches often remains unsuccessful, while TCM explains the pathogenetic interconnection of endocrine and nervous disorders in different way, that may allow to use additionally the AP methods for more effective treatment. Our experience showed that additional use of AP methods in complex treatment of patients with DM and neurological disorders demonstrated the progress in reducing neurological symptoms and improvement of effectiveness of the treatment. AP method is widely used in holistic approach in primary care practice.

Keywords: diabetes mellitus, neurological disorders, Traditional Chinese Medicine, acupuncture, clinical cases.

Комплексне лікування неврологічних розладів у пацієнтів із цукровим діабетом за допомогою акупунктури та погляд на загальні патофізіологічні механізми: аналіз двох випадків Г. М. Чуприна, В. І. Ткаченко, В. М. Дубинецька, О. С. Комісарова

Враховуючи зростання поширеності цукрового діабету (ЦД), діабетична нейропатія залишається однією з найважливіших та найчастіших причин нейропатології. Лікування діабетичної нейропатії за допомогою протоколів і препаратів традиційної західної медицини часто залишається безуспішним, тоді як традиційна китайська медицина (ТКМ) пояснює патогенез ЦД, його ускладнення та вплив на нервову систему по-іншому, що може дозволити додатково використовувати методи акупунктури (АП) для ефективнішого лікування.

Мета дослідження: оптимізувати комплексне лікування неврологічних розладів у пацієнтів із ЦД шляхом застосування АП та підходів ТКМ, її погляду на взаємозв'язок між ендокринною та неврологічною патологією.

Матеріали та методи. Для покращення результатів лікування додатково використовувався метод синдромальної акупунктурної діагностики, що дозволило додати до комплексного лікування класичний метод медичної АП шляхом впливу на акупунктурну точку EX-B3 (Вайгуаньсяшу). Ефективність лікування оцінювали за допомогою комплексного обстеження з використанням Візуальної аналогової шкали, Шкали симптомів нейропатії, Шкали інвалідизації при нейропатії, Шкали вегетативних симптомів, Монреальської шкали оцінки когнітивних функцій та електронейроміографії.

Результати. Представлено комплексне лікування 2 пацієнтів із ЦД та неврологічними розладами з додатковим використанням методів медичної АП. Кожен пацієнт отримав 2 курси лікування, що склалися з 10 процедур АП з

індивідуальним підходом, описаним у статті. Прогрес у зменшенні неврологічних симптомів спостерігався лише після використання цього методу лікування, що підтвердилося покращенням клініко-інструментальних показників.

Висновки. Лікування неврологічних розладів у пацієнтів із ЦД за допомогою традиційних підходів часто залишається безуспішним, тоді як ТКМ по-іншому пояснює патогенетичний взаємозв'язок ендокринних та нервових розладів, що може дозволити додатково використовувати методи АП для ефективнішого лікування. Наш досвід показав, що додаткове використання методів АП в комплексному лікуванні пацієнтів із ЦД та неврологічними розладами продемонструвало прогрес у зменшенні неврологічних симптомів та покращенні ефективності лікування. Метод АП широко використовується в цілісному підході в практиці первинної медичної допомоги.

Ключові слова: цукровий діабет, неврологічні розлади, традиційна китайська медицина, акупунктура, клінічні випадки.

Nervous and endocrine systems are closely related and play the most important role in maintaining homeostasis of the organism [1, 2]. Back in 2017 there were about 2,757.7 million people with diabetes mellitus (DM) in Ukraine [3], which allows us to calculate the number of patients with diabetic neuropathy (DN) at the level of 66 thousand to 2.17 million (median – 1.627 million). Taking into account the increase of DM prevalence, DN remains one of the most important and most frequent causes of neurological disorders [4–7].

The treatment of DN with traditional western medicine protocols and drugs often remains unsuccessful, while Traditional Chinese Medicine (TCM) explains the pathogenesis of DM and its complications and impact on nervous system in different way, that may allow to use additionally the acupuncture (AP) methods for more effective treatment.

The basis of the AP effect is primarily the effect of stimulating receptors (which are most densely located in the area of the AP point), which causes specific secondary, including “trigger reactions”. As a result of the impact on AP points by various factors, the secretion and incretion of biologically active substances in the quantities necessary for the body are strengthened, as well as their inhibition in hyperactivated systems (i.e., adaptogenic effect), membrane-cellular structural and functional elements (receptors, ion channels) are successively updated, which restores their sensitivity to specific and non-specific inducers [8, 9].

In the integrated picture of functional changes in the state of the body under the influence of AP, local, segmental and general levels are conditionally distinguished. Local reactions are implemented through axon-reflex mechanisms and are sources of long-term afferent impulses in the segmental and suprasedgmental departments of the central nervous system. The segmental reaction is manifested by reflex changes within the innervation of those segments of the spinal cord, which are connected to the areas of the skin and underlying tissues that are under the influence of AP. In particular, so-called “movement points” and AP points located on AP meridians have the same representation at the segmental level. Nerve impulses, arriving via afferent fibers in the corresponding segments of the spinal cord, switch there to efferent somatic and vegetative fibers and reach various internal organs, vessels, and muscles. The general, generalized reaction to AP is due to the arrival of a stream of afferent impulses in the suprasedgmental departments of the central nervous system: brain stem, reticular formation, thalamus, hypothalamus, limbic system, and cortex of the large hemispheres. There is an activation of integrative systems of the brain followed by the inclusion of

complex neurohumoral mechanisms. Such reactions are largely adaptive in nature. They are characterized by an analgesic effect, a normalizing effect on central and peripheral hemodynamics, muscle tone, trophic connective and bone tissue. Of particular importance is the analgesic effect of AP, mediated by the activation of endogenous opioid systems [10–12]. That is why the additional use of AP can improve the results of treatment of patients with diabetes and neurological disorders.

The objective of the study was to optimize the complex treatment of DN with AP and TCM, its point of view on the relationship between endocrine and neurological pathology.

MATERIALS AND METHODS

In order to improve the results of treatment of patients with diabetes and neurological disorders, we used additionally to traditional diagnostic the method of syndromic AP diagnosis, which consisted in the analysis of complaints, objective examination data of patients with DM, as well as in conducting pulse, tongue and Nakatani acupuncture diagnostic method in accordance with the concepts of TCM [10–12]. This allowed us to understand more deeply the pathological interconnection between endocrinological and nervous disorders and try to find the new approaches to complex treatment with point of view of TCM. We added to the complex treatment the use of the classical medical AP method [8, 9]. Each patient received 2 courses of treatment, consisting of 10 AP procedures. The effectiveness of the proposed treatment was assessed by complex examination which included Visual Analog Scale, Neuropathy Symptom Score, Neuropathy Disability Score, Autonomic Symptom Score, Montreal Cognitive Assessment, Electroneuromyography. Progress in reducing their neurological symptoms was observed only after we used this treatment method.

RESULTS AND DISCUSSION

Case presentation, acupuncture treatment and outcome. We would like to present to your attention 2 clinical cases of patients with DM, where medical AP methods were used in the complex of treatment measures to improve the neurological disorders.

Clinical case 1: patient S., a 62-year-old man, resident of Kyiv region, former police officer. He complained of “heaviness and distension in the epigastrium” – according to him, “the stomach has stopped”, weakness of facial muscles on both sides, memory impairment, agitation. Patient received diabetes treatment according to modern national and international clinical protocols, that included dapagliflozin, metformin, thioctic acid 600 mg per day, vitamin B, but nevertheless on it

and subcompensated glucose levels (HbA1c = 7.5%) he still had the neurological symptoms.

Clinical diagnosis: type 2 DM, sub compensation stage, diabetic gastroparesis; diabetic polyneuropathy, diplegia of both facial nerves (*as a variant of DN*), stage 2 arterial hypertension, cerebral atherosclerosis, moderate cognitive impairment. The method of syndromic AP diagnosis consisted in the analysis of complaints and objective examination data of patients with DM, as well as in conducting pulse, tongue and Nakatani method diagnostics in accordance with the concepts of TCM [10–12].

AP diagnosis: “Fire” (YIN deficiency) of the middle heater (stomach and liver affect the spleen). Hyperactivity of the “YANG” of the liver. According to the Nakatani method (Fig. 1) – sharp hyperactivity of the AP meridians of the liver and stomach, deficiency – of the spleen-pancreas (not the first such case in the case of DM).

Due to the results of AP diagnostic we used additional treatment using the method of classical medical AP [8, 9].

AP treatment (influence on the AP points for the treatment of DM and neurological disorders): GV20 (Bai Xui), EX-B3 (Waiguanxiashu), B17 (Ge Shu), B13 (Fei Shu), B20 (Pi Shu), B23 (Shen Shu), ST36 (Zu San Li), SP6 (San Yin Jiao), SP4 (Gung Sun), SP9 (Yin Ling Quan), B21 (Wei Shu), ST44 (Nei Ting), ST21 (Liang Men), ST22 (Guan Men), ST37 (Shang Ju Xu), ST39 (Xia Ju Xu), LR2 (Xing Jian), LR (Tai Chun), zones of the stomach, liver, and gallbladder of scalp AP.

Clinical outcome. As a result of the treatment using the of AP the patient’s condition improved: his condition stabilized, facial muscle movements were fully restored, blood pressure decreased, cognitive functions improved (Table).

Clinical case 2: patient K., 68 years old, female, resident of Kyiv region. She complained on face pain and mimic disorders, weakness and paraesthesia in feet. Patient received diabetes treatment according to modern national and international clinical protocols, that included empagliflozin, metformin, thioctic acid 600 mg per day, vitamin B, her glucose level was sub compensated (HbA1c = 7.2%), but the neurological symptoms remained.

Clinical diagnosis: type 2 DM, subcompensation stage. DN, diplegia of both facial nerves (*as a variant of DN*), stage 2 arterial hypertension, cerebral atherosclerosis, traumatic amputation of the right thumb.

The syndromic AP diagnostic method was used to analyse the complaints and objective changes, as well as examination of pulse, tongue and Nakatani method diagnostics in accordance with the concepts of TCM [10–12].

AP diagnosis: “Fire” (YIN deficiency) of the upper heater (lungs affects the spleen). According to the Nakatani method – almost everything within the “physiological corridor”. It was described as “The phenomenon of false energy well-being” (Fig. 2).

Due to the results of AP diagnostic we used additional treatment using the method of classical medical AP [8, 9].

AP treatment (influence on the AP points for the treatment of DM and neurological disorders): EX-B3 (Waiguanxiashu), GV20 (Bai Xui), EX-B3 (Waiguanxiashu), B17 (Ge Shu), B13 (Fei Shu), B20 (Pi Shu), B23 (Shen Shu), ST36 (Zu San Li), SP6 (San Yin Jiao), SP4 (Gung Sun), SP (Yin Ling Quan), B15 (Xin Shu), LU9 (Tai Yuan), LI10

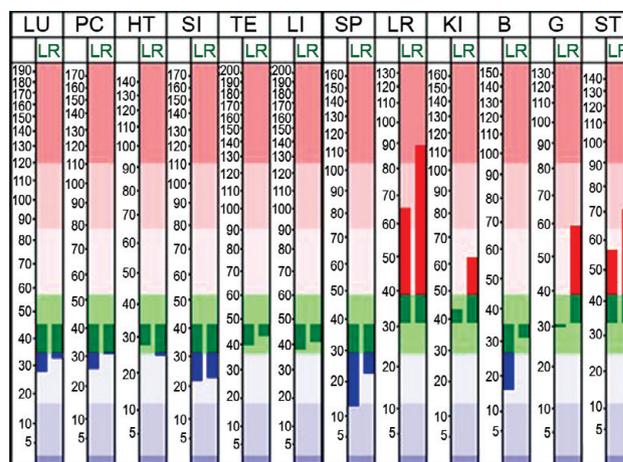


Fig. 1. The Nakatani card clinical case 1

Notes: LU – Lung; PC – Pericardium; HT – Heart Meridian; SI – Small Intestine; TE – Triple Energizer; LI – Large Intestine; SP – Spleen; LR – Liver; KI – Kidney; B – Bladder; G – Gallbladder; ST – Stomach.

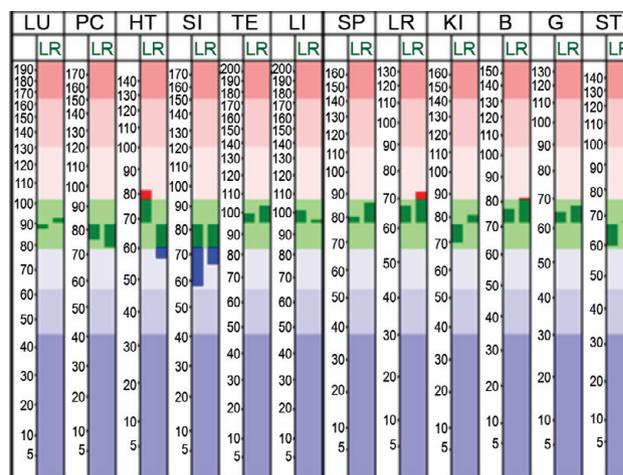


Fig. 2. The Nakatani card clinical case 2

Notes: LU – Lung; PC – Pericardium; HT – Heart Meridian; SI – Small Intestine; TE – Triple Energizer; LI – Large Intestine; SP – Spleen; LR – Liver; KI – Kidney; B – Bladder; G – Gallbladder; ST – Stomach.

(Yu Ji), LU7 (Le Que), LU5 (Chi Ze), HT8 (Shao Fu), PC8 (Lao Hung), CV17 (Tan Zhong).

Clinical outcome. As a result of the treatment using the of AP the patient’s condition improved: the movements of the facial muscles were completely restored, cognitive functions improved too (Table).

In TCM, all extraordinary AP meridians (EM), and especially the EM Chong Mai corresponds to the hypothalamic-pituitary regulation. This EM Chong Mai computer is quite naturally connected to the spleen and pancreas system, which regulates cortical activity [10].

The EM Chong Mai computer is called the “central intersection” of all AP channels, the AP point that “turns it on” is SP4 (Gong Sun) – the point of the spleen-pancreas AP meridian.

DM develops as a result of the interaction of various genetic mechanisms and nonspecific environmental factors. There is a point of view that mental stress (acute and chronic) can lead to the development of DM as a result of

The indexes of neurological functioning before and after complex treatment

Indexes		Case 1		Case 2	
		Before	After	Before	After
Blood pressure, mmHg		150/100	145/90	155/100	140/90
Hb1Ac, %		7.5	7.3	7.2	7.1
Visual Analog Scale, points		6	3	5	3
Neuropathy Symptom Score, points		10	6	9	6
Neuropathy Disability Score, points		10	5	9	4
Autonomic Symptom Score, points		32	26	28	22
Montreal Cognitive Assessment, points		25.65	28.71	24.82	27.99
Electroneuromyography indexes					
<i>n. facialis</i> left	APA, mV	0.40	0.92	0.32	0.82
	ECV, m/s	35.11	39.20	38.11	41.08
<i>n. facialis</i> right	APA, mV	0.43	1.04	0.38	0.94
	ECV, m/s	39.75	41.14	40.13	45.13
<i>n. peroneus superficialis</i> left	APA, mV	2.61	3.11	3.16	4.02
	ECV, m/s	36.16	38.23	37.92	40.12
<i>n. peroneus superficialis</i> right	APA, mV	2.28	3.01	2.53	3.83
	ECV, m/s	35.63	38.47	36.74	39.21
<i>n. suralis</i> left	APA, mV	4.23	4.98	3.83	4.24
	ECV, m/s	38.00	41.22	37.68	40.06
<i>n. suralis</i> right	APA, mV	3.84	4.82	4.41	4.81
	ECV, m/s	37.40	41.23	40.33	43.51
<i>n. medianus</i> left	APA, mV	6.16	7.26	7.58	8.91
	ECV, m/s	42.92	48.13	41.25	46.64
<i>n. medianus</i> right	APA, mV	6.18	8.34	7.20	8.96
	ECV, m/s	43.65	49.16	37.95	41.87
<i>n. ulnaris</i> left	APA, mV	8.92	9.12	5.34	6.72
	ECV, m/s	43.05	46.65	41.80	44.12
<i>n. ulnaris</i> right	APA, mV	6.82	7.93	3.84	4.36
	ECV, m/s	40.26	43.75	39.77	42.56

Notes: *n.* – *nervus*; APA – action potential amplitude; ECV – excitation conduction velocity

overexertion of cortical processes, disinhibition of subcortical hypothalamic centres, which leads to a violation of neurohormonal regulation [11].

In TCM, DM is the “Fire” (excitation of YANG and deficiency of YIN) of the spleen and pancreas system. There are three types of DM in TCM (upper, middle and lower) (Fig. 3).

Clinical manifestations of DM according to TCM are additional to those known to all doctors [8, 9, 12].

The key AP point for AP correction of DM of any type is EX-B3 (Waiguanxiashu).

Upper type – “Fire” (deficiency of YIN, i.e. trophic influences) of the upper heater (lungs affects spleen and pancreas) (clinical signs): thirst, polydipsia, dry mouth and tongue, polyuria, red tip and edges of the tongue, yellow and thin coating, often with cracks, rapid and full pulse.

AP correction (influence on the AP points):

Basic: EX-B3 (Waiguanxiashu), B17 (Ge Shu), B13 (Fei Shu), B20 (Pi Shu), B23 (Shen Shu), ST36 (Zu San Li), SP6 (San Yin Jiao), SP4 (Gung Sun), SP9 (Yin Ling Quan).

Additional: B15 (Xin Shu), LU9 (Tai Yuan), LI10 (Yu Ji), LU7 (Le Que), LU5 (Chi Ze), HT8 (Shao Fu), PC8 (Lao Hung), CV17 (Tan Zhong).

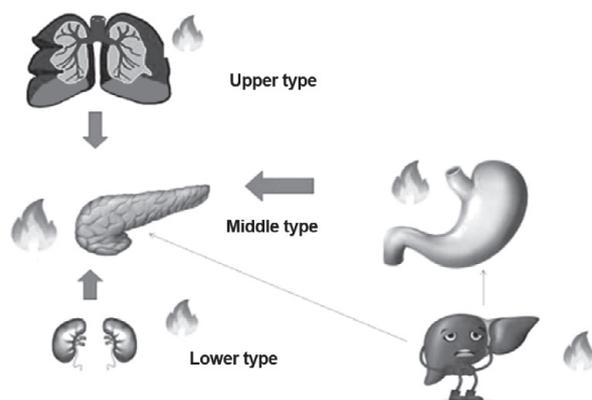


Fig. 3. Types of DM in TCM [adapted by 11]

Notes: DM – diabetes mellitus; TCM – Traditional Chinese Medicine.

Middle type – “Fire” of the middle heater (stomach and liver affects spleen and pancreas) (clinical signs): polyphagia, heartburn, anxiety or fever, profuse sweating, weight loss (especially in the legs), exhaustion, constipation, yellow and dry tongue coating, rapid and slippery pulse.

AP correction (influence on the AP points):

Basic: EX-B3 (Waiguanxiashu), B17 (Ge Shu), B13 (Fei Shu), B20 (Pi Shu), B23 (Shen Shu), ST36 (Zu San Li), SP6 (San Yin Jiao), SP4 (Gung Sun), SP9 (Yin Ling Quan).

Additional: B21 (Wei Shu), ST44 (Nei Ting), ST21 (Liang Men), ST22 (Guan Men), ST37 (Shang Ju Xu), ST39 (Xia Ju Xu), LR2 (Xing Jian), LR3 (Tai Chun).

Lower type – “Fire” of the lower heater (kidneys) affects the spleen (clinical signs): cloudy urine, thirst and polydipsia, dizziness, blurred vision, red cheeks, depression, lower back pain and weakness in the knees, dry skin, general itching, red tongue, thin and rapid pulse.

AP correction (influence on the AP points):

Basic: EX-B3 (Waiguanxiashu), B17 (Ge Shu), B13 (Fei Shu), B20 (Pi Shu), B23 (Shen Shu), ST36 (Zu San Li), SP6 (San Yin Jiao), SP4 (Gung Sun), SP9 (Yin Ling Quan).

Additional: B18 (Gan Shu), B52 (Zhi Shi), KI3 (Tai Xi), KI6 (Zhao Hai), KI7 (Fu Liu), LR2 (Xing Jian), LR3 (Tai Chun), CV4 (Guan Yuan), GV4 (Ming Men).

Prolonger duration of DM will give rise to asthenia YIN and YANG [10].

Deficiency of YIN and YANG (clinical signs): frequent urination, turbid urine like paste, blackish complexion, dryness of earlobe, aversion to cold and cold limbs, sexual hypoesthesia, light and dull coloured tongue with white fur, deep, thin and weak pulse. AP correction: EX-B3 (Waiguanxiashu), B17 (Ge Shu), B13 (Fei Shu), B20 (Pi Shu), B23 (Shen Shu), ST36 (Zu San Li), SP6 (San Yin Jiao), SP4 (Gung Sun), SP9 (Yin Ling Quan).

The authors of all the articles listed below share a positive opinion on the use of AP methods for pathology

of endocrine glands [13–15], but they all emphasize that AP methods are effective for preventing exacerbation of endocrine glands pathology, with the complex use of AP and drug treatment, when AP methods are used after a course of drug treatment with its incomplete effectiveness. Many authors argue about adapting different AP methods to specific pathology of endocrine glands and determining diagnostic and treatment algorithms for them. It is also advisable to conduct larger-scale studies to assess the safety and effectiveness of AP methods for pathology of endocrine glands, and to study the mechanisms of therapeutic effects of AP methods for pathology of endocrine glands.

Limitations. This article represents only 2 cases of additional use of AP and TCM approach in treatment of diabetes with neurological disorders, the study is ongoing, and the results will be represented in further publications.

CONCLUSIONS

The treatment of neurologic disorders in patients with diabetes using traditional approaches often remains unsuccessful, while TCM explains the pathogenetic interconnection of endocrine and nervous disorders in different way, that may allow to use additionally the AP methods for more effective treatment. Our experience showed that additional use of AP methods in complex treatment of patients with diabetes and neurological disorders demonstrated the progress in reducing neurological symptoms and improvement of effectiveness of the treatment. AP method is widely used in holistic approach in primary care practice.

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REFERENCES

- Hussein WI, Reddy SS. Prevalence of diabetes in patients with multiple sclerosis. *Diabetes Care.* 2006;29(8):1984-5. doi: 10.2337/dc06-0811.
- Chupryna H, Dubynetska V. Thyroid lesion as a manifestation of comorbidity in patients with diabetic polyneuropathy. *Fam Med.* 2021;(5-6):36-40. doi: 10.30841/2307-5112.5-6.2020.225300.
- Ogurtsova K, da Rocha Fernandes JD, Huang Y, Linnenkamp U, Guariguata L, Cho NH, et al. IDF Diabetes Atlas: Global estimates for the prevalence of diabetes for 2015 and 2040. *Diabetes Res Clin Pract.* 2017;128:40-50. doi: 10.1016/j.diabres.2017.03.024.
- Boulton AJ. Diabetic neuropathy and foot complications. *Handb Clin Neurol.*

- 2014;126:97-107. doi: 10.1016/B978-0-444-53480-4.00008-4.
5. Bowling FL, Rashid ST, Boulton AJ. Preventing and treating foot complications associated with diabetes mellitus. *Nat Rev Endocrinol.* 2015;11(10):606-16. doi: 10.1038/nrendo.2015.130.
6. Tesfaye S, Chaturvedi N, Eaton SE, Ward JD, Manes C, Ionescu-Tirgoviste C, et al. Vascular risk factors and diabetic neuropathy. *N Engl J Med.* 2005;352(4):341-50. doi: 10.1056/NEJMoa032782.
7. Tesfaye S, Vileikyte L, Rayman G, Sindrup SH, Perkins BA, Baconja M, et al. Painful diabetic peripheral neuropathy: Consensus recommendations on diagnosis, assessment and management. *Diabetes Metab Res Rev.* 2011;27(7):629-38. doi: 10.1002/dmrr.1225.
8. Xinnong C, editor. Chinese acupuncture and moxibustion: Textbook for Traditional Chinese Medicine and acupuncture [Internet]. Shanghai: Shanghai College of Traditional Chinese Medicine Press; 2002. 373 p.
9. Deng L, Cheng X, editors. Chinese acupuncture and moxibustion. Beijing: Foreign Language Press; 1987. 544 p.
10. Nikolayev NA. Traditional aspects of the combination of acupuncture and herbal medicine. Riga: Global Industrial Capital Corporation; 1997. 445 p.
11. Svyrydova N, Chupryna G, Sereda V, Sinko I. The use of reflexotherapy in diseases of the endocrine system with psycho-emotional disorders. In: Innovations in the treatment of neurological pain: Collection of materials of the scientific-practical conference with international participation. Kyiv; 2023, p. 44-8.
12. Macheret EL, Korkyshko AO. Basics of traditional Chinese medicine in reflexotherapy. Kyiv: DIA; 2005. 397 p.
13. Wen J, Chen X, Yang Y, Liu J, Li E, Liu J, et al. Acupuncture medical therapy and its underlying mechanisms: A systematic review. *Am J Chin Med.* 2021;49(1):1-23. doi: 10.1142/S0192415X21500014.
14. Yang H, Xiao ZY, Yin ZH, Yu Z, Liu JJ, Xiao YQ, et al. Efficacy and safety of acupuncture for polycystic ovary syndrome: An overview of systematic reviews. *J Integr Med.* 2023;21(2):136-48. doi: 10.1016/j.joim.2022.12.002.
15. Nair PMK, Jyothis N. Role of acupuncture and fire cupping in reducing the thyroxine dose and improving the thyroid function in hypothyroidism patients: a case series. *J Acupunct Meridian Stud.* 2021;14(5):200-05. doi: 10.51507/j.jams.2021.14.5.200.

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