

Study on the Effects of Umbilical Acupuncture's "Wind-Thunder Interaction Method" on Neuro-Vascular Regulatory Peptide Groups in SCH Patients with Liver Stagnation and Spleen Deficiency

Yongfeng Li, Jialin Cheng, Hairong Wang, Bihai Zhou, Jianguo Mao

Shiyan Hospital of Integrated Traditional and Western Medicine, Shiyan 442000, Hubei, China

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Abstract: *Objective:* To evaluate the therapeutic efficacy of the umbilical acupuncture's "Wind-Thunder Interaction Method" in treating schizophrenia (SCH) patients with liver stagnation and spleen deficiency. *Methods:* A total of 120 SCH patients with liver stagnation and spleen deficiency were selected and evenly divided by ball drawing. The umbilical acupuncture group received the "Wind-Thunder Interaction Method", while the Western medicine group received pure Western medicine treatment. The outcomes were compared in terms of efficacy and other indicators. *Results:* The umbilical acupuncture group showed a higher total effective rate, a decrease in disease symptom scores, lower scores on the side effect rating scale, improved cognitive function scores, and excellent laboratory indicators, with $p < 0.05$ between the groups. *Conclusion:* The "Wind-Thunder Interaction Method" of umbilical acupuncture demonstrated a relatively high effectiveness in treating SCH patients with liver stagnation and spleen deficiency, alleviating symptoms, reducing side effects, improving cognitive function, and facilitating the recovery of neuro-vascular regulatory peptide groups.

Keywords: Umbilical acupuncture's "Wind-Thunder interaction method"; SCH; Liver stagnation and spleen deficiency; Neuro-vascular regulatory peptide groups

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1. Introduction

SCH is characterized by abnormal behavior and cognitive dysfunction, with patients often exhibiting symptoms such as weak willpower and emotional indifference. The disease has a high disability and recurrence rate, which can have a long-term impact on patients' daily lives and increase their family's burden. Western medicine treatment is the preferred therapy for this condition, as it can stabilize disease symptoms and prevent further progression. However, Western medicine has numerous side effects, and its long-term effectiveness is generally

limited, making traditional Chinese medicine treatment a viable alternative ^[1]. Umbilical acupuncture is a safe and effective traditional Chinese medicine therapy. By utilizing the “Wind-Thunder Interaction Method”, it can provide dialectical treatment for the liver stagnation and spleen deficiency pathology in SCH patients, with rapid symptom relief and strong operability, resulting in favorable therapeutic outcomes. Therefore, this study selected 120 SCH patients with liver stagnation and spleen deficiency to assess the effects of implementing the “Wind-Thunder Interaction Method” of umbilical acupuncture.

2. Materials and methods

2.1. General information

A total of 120 patients with SCH (schizophrenia) and liver stagnation and spleen deficiency syndrome, admitted between September 2024 and June 2026, were selected and randomly divided into two groups using a ball-drawing method. The detailed information between the groups is as follows (see **Table 1**).

Table 1. Detailed information for comparison between groups [n/%, mean \pm standard deviation ($\bar{x} \pm s$)]

Group	n	Gender [n(%)]		Age (years)	Disease duration (years)
		Male	Female		
Umbilical acupuncture	60	35 (58.33)	25 (41.67)	30.53 \pm 3.15	4.06 \pm 1.33
Western medication	60	36 (60.00)	24 (40.00)	30.15 \pm 3.20	4.09 \pm 1.35
Statistical test (χ^2/t)		0.035	0.656	0.123	
<i>p</i> -value		0.853	0.513	0.903	

2.2. Methods

The Western medicine group received pure Western medicine treatment: oral administration of risperidone, with an initial daily dose of 1 mg. The dose was increased based on the degree of symptom improvement in the patients, and it could be combined with benzodiazepines and benzotropine, among other drugs. After two weeks of administration, the daily dose of risperidone was increased to 3 to 6 mg, and the medication was continued for 4 weeks.

The umbilical acupuncture group received umbilical acupuncture using the “Wind-Thunder Interaction Method” in addition to Western medicine treatment: the Zhen (Thunder), Xun (Wind), and Kun (Earth) points were selected. After disinfecting the treatment area, disposable sterile acupuncture needles (0.25 \times 25 mm) were used. Taking the umbilical center as the focal point and based on the order of acupoint selection, the needles were inserted approximately one-third of the way up the umbilical wall, using a twisting method at a 30° angle to the abdominal wall skin. The needles were inserted to one-third of their depth, ensuring there was no sense of emptiness. After acupuncture, the needle bodies intersected, and they were retained for 30 minutes. The treatment frequency was three times per week, with one course of treatment lasting one week, and a total of four courses were administered.

2.3. Observation indicators

(1) Overall response rate

Based on the reduction in scores on the Positive and Negative Syndrome Scale (PANSS), a significant

response was defined as a reduction rate exceeding 75%, a preliminary response as a reduction rate between 25% and 75%, and no response as a reduction rate less than 25%.

(2) Disease symptom score

The PANSS scale was used, which includes three items, with scores calculated in a positive direction.

(3) Side effect score

The Treatment Emergent Symptom Scale (TESS) was used, which includes six items such as nervous system reactions, totaling 34 items. Each item is scored from 1 to 4, with the degree of reaction calculated in a positive direction.

(4) Cognitive function score

The Mini-Mental State Examination (MMSE) was selected, consisting of five items, with scores calculated in a positive direction.

(5) Laboratory indicators

Serum level of human neuropeptide Y (NPY), human calcitonin gene-related peptide (CGRP), and vasoactive intestinal peptide (VIP) were evaluated.

2.4. Statistical analysis

Data were processed using SPSS 28.0 software. Measurement values were compared and tested using *t*-values, while count values were compared and tested using chi-square (χ^2) values. Statistical significance was considered as $p < 0.05$.

3. Results

3.1. Comparison of overall effectiveness rates between groups

The overall effectiveness rate in the umbilical acupuncture group was higher, with a comparison between groups showing $p < 0.05$ (see **Table 2**).

Table 2. Comparison of overall effectiveness rates between groups [n/%]

Group	n	Markedly effective	Effective	Ineffective	Total effective rate
Umbilical acupuncture	60	41	17	2	96.67% (58/60)
Western medication	60	36	15	9	85.00% (51/60)
χ^2					4.904
<i>p</i> -value					0.027

3.2. Comparison of disease symptom scores between groups

After treatment, the disease symptom scores in the umbilical acupuncture group decreased, with a comparison between groups showing $p < 0.05$ (see **Table 3**).

Table 3. Comparison of disease symptom scores between groups [$\bar{x} \pm s$, points]

Group	n	Positive symptoms		Negative symptoms		General psychopathology	
		Pre-treatment	Post-treatment	Pre-treatment	Post-treatment	Pre-treatment	Post-treatment
Umbilical acupuncture	60	35.18 \pm 4.15	27.53 \pm 2.65	35.27 \pm 3.74	27.15 \pm 2.62	89.41 \pm 5.79	67.53 \pm 3.94
Western medication	60	35.14 \pm 4.10	30.02 \pm 2.69	35.26 \pm 3.79	29.97 \pm 2.66	89.49 \pm 5.81	71.05 \pm 3.97
<i>t</i> -value		0.053	5.108	0.015	5.851	0.076	4.875
<i>p</i> -value		0.958	0.000	0.988	0.000	0.940	0.000

3.3. Comparison of side effect scores between groups

The side effect score in the umbilical acupuncture group was (5.19 \pm 1.75) points, while that in the Western medicine group was (8.14 \pm 1.98) points, with $t = 8.647$ and $p = 0.000$.

3.4. Comparison of cognitive function scores between groups

After treatment, the cognitive function score in the umbilical acupuncture group was higher, with a comparison between groups showing $p < 0.05$ (see Table 4).

Table 4. Comparison of cognitive function scores between groups [$\bar{x} \pm s$, points]

Group	n	Orientation		Recall		Memory		Attention & calculation		Language ability	
		Post-Tx	Pre-Tx	Post-Tx	Pre-Tx	Post-Tx	Post-Tx	Pre-Tx	Post-Tx	Pre-Tx	Post-Tx
Umbilical acupuncture	60	4.63 \pm 0.98	8.15 \pm 1.20	1.85 \pm 0.43	2.39 \pm 0.35	1.68 \pm 0.34	2.41 \pm 0.33	2.35 \pm 0.71	4.11 \pm 0.52	4.25 \pm 1.32	7.29 \pm 1.41
Western medication	60	4.66 \pm 0.94	6.87 \pm 1.14	1.87 \pm 0.46	2.05 \pm 0.31	1.70 \pm 0.32	2.19 \pm 0.30	2.37 \pm 0.70	3.83 \pm 0.46	4.28 \pm 1.30	6.73 \pm 1.37
<i>t</i> -value		0.171	5.990	0.246	5.633	0.332	3.821	0.155	3.124	0.125	2.206
<i>p</i> -value		0.864	0.000	0.806	0.000	0.741	0.000	0.877	0.002	0.900	0.029

3.5. Comparison of laboratory indicators between groups

After treatment, the laboratory indicators in the umbilical acupuncture group were superior, with a comparison between groups showing $p < 0.05$ (see Table 5).

Table 5. Comparison of laboratory indicators between groups [$\bar{x} \pm s$]

Group	n	NPY (ng/L)		CGRP (ng/L)		VIP (pg/L)	
		Pre-Tx	Post-Tx	Pre-Tx	Pre-Tx	Post-Tx	Pre-Tx
Umbilical acupuncture	60	427.95 \pm 28.65	178.53 \pm 10.22	49.36 \pm 4.53	79.90 \pm 8.37	155.03 \pm 19.74	171.86 \pm 15.39
Western medication	60	426.88 \pm 29.13	250.36 \pm 10.94	49.41 \pm 4.57	65.12 \pm 8.20	154.93 \pm 19.66	165.02 \pm 15.23
<i>t</i> -value		0.203	37.165	0.060	9.771	0.028	2.447
<i>p</i> -value		0.840	0.000	0.952	0.000	0.978	0.016

4. Discussion

The incidence rate of SCH is approximately 1%. The disease has a long course, complex disease progression, and a high risk of deterioration. It can also reduce patients' social functioning and have a long-term impact on their quality of life ^[2]. In traditional Chinese medicine (TCM), this disease falls under the category of “mania-depression syndrome”, characterized by symptoms such as indifferent expression, psychological depression, murmuring to oneself, and a preference for inactivity and quietness. It is primarily a syndrome of liver stagnation and spleen deficiency. Additionally, patients exhibit reduced willpower, excessive worry, and irritability. TCM symptoms include chest and hypochondriac distension, epigastric fullness and belching, and being easily startled and having difficulty sleeping, accompanied by thin white tongue coating and pale red tongue.

Modern medical theories for treating this disease are relatively mature, such as the “Holographic Biology Theory” and the “Abdomen-Brain Theory”. The former posits that life is a holographic embryo, and acupuncture points can be stimulated based on acupoint theories such as the “Holographic Law”. The latter suggests that the abdomen is the body's second brain, and acupuncture in the abdominal region can act on the etiology and pathogenesis of the disease. Based on these theories, this study employed umbilical acupuncture (navel needle therapy) for patients with this condition. The umbilicus, also known as the “Shenque acupoint”, connects the umbilicus and the heart. The term “Shen” refers to the primordial spirit, dominated by the heart, reflecting the patient's mental state. “Que” means the central gate, serving as the portal through which the mind interacts with the external world ^[3]. In traditional Chinese medicine, SCH is classified as a “mental disorder”, and it is proposed that the umbilical region is interconnected with the Governor Vessel, Conception Vessel, and the internal organs of patients, capable of regulating the flow of Qi and blood as well as the state of meridian operation, acting on the limbs, bones, and internal organs, while also improving the function of meridians, muscles, and bones. Umbilical needle therapy is an umbilical acupuncture technique developed based on the aforementioned theories, which can regulate Qi, blood, Yin, and Yang, and improve the state of internal organs. The “Wind-Thunder Mutual Reinforcement Method” is the primary therapeutic concept of umbilical needle therapy, where thunder refers to the vibration and is associated with wood, representing the liver. Wind refers to the gentle breeze and is also associated with wood, representing the gallbladder. It can thus be seen that this concept enables wind and thunder to complement each other, thereby enhancing the wood element and effectively exerting effects such as regulating emotions and soothing the liver to relieve depression, ultimately improving treatment outcomes.

The results showed that the total effective rate of the umbilical needle group increased, and the disease symptom score decreased, with a significant difference between the two groups ($p < 0.05$). The analysis of the reasons is as follows: During the embryonic period, the blood vessels and nerves in the umbilical region are densely distributed, which can influence the function of the autonomic nervous center and have a certain reflexive connection with the hypothalamus-pituitary axis. Umbilical needling can act on the vagus nerve-gut-brain axis, thereby improving the release of central neurotransmitters and exerting antipsychotic effects. The Bagua orientations of Zhen, Xun, and Kun can produce a synergistic mechanism. The Zhen position is in the east, belongs to wood, and governs liver wind. Needling this area can soothe the liver and relieve depression, having a good regulatory effect on the prefrontal-limbic system and alleviating positive symptoms. The Xun position is in the southeast, belongs to wind, and governs the gallbladder meridian. It can improve the degree of neural excitement and reduce psychological symptoms such as agitation and anxiety in patients ^[4]. The Kun position is in the southwest, belongs to earth, and needling this area has effects such as invigorating the spleen and resolving phlegm. It can act on the gut microbiota-brain axis, increase the content of short-chain fatty acids, thereby down-

regulating the levels of inflammatory factors and reducing the degree of neuroinflammation. Umbilical needling has a good regulatory effect on the default mode network, preventing its overactivity and acting on abnormal neural oscillations, thus alleviating positive symptoms such as delusions or hallucinations. Umbilical needling can enhance the plasticity of the synaptic regions in the prefrontal lobe, stimulate patients' desire for emotional expression, and thereby improve negative symptoms such as emotional indifference or social withdrawal. Moreover, needling at the Xun position can increase the specific release of acetylcholine, significantly improve patients' attention and thereby enhance their social interactions ^[5]. The Kun position corresponds to the patients' spleen and stomach functions. Needling this area can down-regulate cortisol levels, thereby improving general psychotic symptoms and reducing manifestations such as hostility.

The side effect score of the umbilical needle group was low, with a significant difference between the two groups ($p < 0.05$). The analysis of the reasons is as follows: Umbilical needling can regulate the overall release of endogenous opioid peptides, enhancing the antipsychotic effect, thereby reducing the dosage of Western medications, preventing extrapyramidal reactions, and alleviating metabolic side effects. Compared with administration methods such as oral medications, umbilical needling does not involve liver metabolism and can prevent drug interactions, thereby improving treatment safety.

The cognitive function scores of the umbilical needle group increased after treatment, with a p -value less than 0.05 when compared between the two groups. The analysis suggests that umbilical needling has a strong activating effect on the ventral tegmental area, which can regulate the dopamine pathway in the prefrontal cortex, thereby enhancing patients' executive function and memory ^[6]. Umbilical needling can prevent the massive release of inflammatory factors, thereby reduce neurotoxicity and protect hippocampal neurons, thus improving patients' attention. Moreover, this therapy has a certain repairing effect on synaptic function, protecting nerves and facilitating the recovery of cognitive function.

The laboratory indicators of the umbilical acupuncture group were excellent after treatment, with a statistically significant difference between the two groups ($p < 0.05$). Following umbilical acupuncture treatment, the levels of the aforementioned laboratory indicators improved. The analysis suggests that umbilical acupuncture exerts a strong stimulating effect on the umbilical region, acting on the branches of the vagus nerve and activating NPY-ergic neurons in the nucleus of the solitary tract-hypothalamus area, thereby regulating NPY levels. The selection of the "Zhen" (vibration) position in umbilical acupuncture treatment can prevent excessive expression of stress-induced cortisol, thereby regulating NPY synthesis and establishing a negative feedback relationship between cortisol and NPY levels ^[7,8]. The "Kun" (earth) position in umbilical acupuncture treatment has a spleen-strengthening effect, acting on the vagus nerve- $\alpha 7$ nicotinic acetylcholine receptor anti-inflammatory pathway to prevent excessive activation of microglia, thereby reducing the expression levels of inflammatory factors such as interleukin-6 and regulating CGRP levels. The "Xun" (wind) position treatment can improve the function of the gallbladder meridian, increase cerebral blood flow, prevent excessive mediation of CGRP, and sustain vasodilation, thereby regulating neuronal excitability. VIP regulates cognitive function in patients and participates in biological rhythm processes. Umbilical acupuncture can act on the VIP-ergic pathway, regulating the suprachiasmatic nucleus and improving the function of the biological clock center, thereby regulating circadian rhythms and improving the physiological state of patients ^[9]. Combined treatment with the "Zhen" and "Xun" positions can regulate the activity of GABA-ergic interneurons in the prefrontal cortex, thereby enhancing synaptic plasticity.

5. Conclusion

In conclusion, the overall therapeutic effect of the umbilical needle “Wind and Thunder Interaction Method” for patients with SCH (schizophrenia) and liver stagnation and spleen deficiency syndrome is relatively good. It can improve positive and negative symptoms, alleviate general psychotic symptoms, reduce side effects during treatment, improve patients’ cognitive function, facilitate the recovery of neuro-vascular regulatory peptide groups, and demonstrate high therapeutic efficacy.

Disclosure statement

The authors declare no conflict of interest.

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