

Original Article

Effects of Huoxue Qufeng Decoction combined with Tongguan Liquefying Acupoint Penetration therapy on swallowing function and quality of life in patients with ischemic stroke

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Abstract: Objective: To analyze the effects of Huoxue Qufeng Decoction combined with Tongguan Liquefying Acupoint Penetration therapy on swallowing function and quality of life in patients with ischemic stroke. Methods: A total of 145 patients with post-stroke dysphagia admitted to Dingxi People's Hospital from January 2019 to May 2022 were selected with 65 patients in the control group and 80 patients in the observation group. The control group received Huoxue Qufeng Decoction alone, while the observation group received additional Tongguan Liquefying Acupoint Penetration therapy. Clinical efficacy, NIH Stroke Scale (NIHSS) score, Water Swallow Test, Swallowing Function Assessment (SSA) score, MD Anderson Dysphagia Inventory (MDADI) score, overall incidence of adverse events, and Swallowing Quality of Life (SWAL-QOL) score were compared between the two groups. Results: The total response rate in the observation group was higher than that in the control group, with a statistically significant difference ($P < 0.01$). After treatment, the SSA score and NIHSS score were statistically lower in the observation group than in the control group ($P < 0.01$). The MDADI and SWAL-QOL scores were higher in the observation group than in the control group, with a statistically significant difference (both $P < 0.01$). The total effective rate reflected by the Water Swallow Test was significantly higher in the observation group than in the control group ($P < 0.05$). There was no significant difference in the incidence of adverse events between the two groups ($P > 0.05$). Univariate analysis revealed that age and treatment plan were factors influencing the recovery of swallowing function. Logistic multivariate regression analysis further identified age and treatment plan as independent risk factors affecting patient prognosis ($P < 0.05$). Conclusion: Huoxue Qufeng Decoction combined with Tongguan Liquefying Acupoint Penetration has a significant effect on post-stroke dysphagia, effectively improving swallowing function and enhancing quality of life.

Keywords: Huoxue Qufeng Decoction, Tongguan Liquefying Acupoint Penetration, ischemic stroke, swallowing function, quality of life

Introduction

Stroke is a prevalent acute cerebrovascular disease [1]. Elderly individuals who suffer from a stroke often face a prolonged recovery period and may experience varying degrees of limb dysfunction, leading to high rates of disability that profoundly impact their quality of life [2]. Dysphagia, a common complication following a

stroke, serves as an independent risk factor for mortality [3]. Characterized by difficulty in moving food or liquids from the mouth to the stomach, post-stroke dysphagia can result in complications such as malnutrition, dehydration, and aspiration pneumonia. In severe cases, it may even lead to choking or fatality [4, 5]. Therefore, timely and effective restoration of swallowing function and improvement of quality of life in

stroke patients present urgent clinical challenges and warrant attention.

At present, there lacks a standard treatment protocol for post-stroke dysphagia in clinical practice, with rehabilitation techniques such as swallowing function training, cold throat stimulation, and dry swallowing being the primary modalities [6]. In recent years, traditional Chinese medicine (TCM) has garnered attention in stroke research. TCM views stroke as “zhong feng”, attributing its development to factors like blood stasis and inadequate Qi and blood circulation. Treatment strategies typically aim to disperse wind, resolve phlegm, and improve blood circulation [7]. Previous studies have demonstrated the effectiveness of Huoxue Qufeng Decoction (HQT) in stroke treatment. However, the efficacy of monotherapy is limited, underscoring the necessity of exploring combination therapies to optimize treatment outcomes. Tongguan Liquefying Acupoint Penetration Therapy, a significant intervention for post-stroke dysphagia, has shown promising results in stimulating spiritual energy by needling the Neiguan and Renzhong acupoints, as indicated by previous research in stroke patients [8]. Nevertheless, there is currently a lack of research analyzing the efficacy of combining Huoxue Qufeng Decoction with Tongguan Liquefying Acupuncture in treating patients with ischemic stroke.

In this study, we analyzed the effects of combined Huoxue Qufeng Decoction with Tongguan Liquefying Acupoint Penetration Therapy in treating patients with ischemic stroke, aiming to provide additional treatment options for stroke patients.

Materials and methods

Clinical data

A total of 145 patients with post-stroke dysphagia treated at Dingxi People’s Hospital from January 2019 to May 2022 were enrolled as study subjects. Based on the treatment plan, patients were divided into an observation group (Huoxue Qufeng Decoction combined with Tongguan Acupoint Penetration Therapy, n=80) and a control group (Huoxue Qufeng Decoction alone, n=65). All enrolled patients met the diagnostic criteria of stroke. Exclusion criteria were as follows: (1) patients with consciousness dis-

orders [9]; (2) patients with swallowing disorders due to organic injury; (3) patients with severe trauma; (4) patients with concurrent malignant tumors; (5) patients with substantial organic damage to vital organs apart from the brain, such as liver or kidney; (6) patients allergic to acupuncture. This study was approved by Dingxi People’s Hospital’s ethics committee and conducted in accordance with the principles outlined in the Helsinki Declaration.

Treatment methods

Both groups underwent standard treatment protocols aimed at controlling cerebral edema, reducing intracranial pressure, nourishing brain nerve cells, and enhancing cerebral tissue circulation. Furthermore, they were instructed to engage in dysphagia rehabilitation training, which encompassed exercises to improve tongue movement, throat function, cold stimulation therapy, soft palate elevation training, and swallowing exercises. Patients in the control group received Huoxue Qufeng Decoction in addition to the conventional treatment. The herbal formula consisted of Astragalus 80 g, Salvia miltiorrhiza 15 g, Ligusticum chuanxiong 10 g, Acorus tatarinowii 10 g, Earthworm 10 g, Paeonia lactiflora 10 g, Gastrodia elata 10 g, Buthus martensii 10 g, Uncaria rhynchophylla 10 g, Hirudo 3 g, and Scolopendra 2 pieces. For patients with qi and blood deficiency, Astragalus 30 g, Codonopsis pilosula 15 g, and Donkey-hide gelatin 6 g were added. For patients with extensive infarction and pain, Peach kernel 15 g and Agastache rugosa 10 g were added. The decoction was administered orally, with 250 mL taken in the morning and evening for 14 consecutive days.

Additionally, the observation group underwent Tongguan Liquefying acupuncture. The main acupoints selected included Fengchi (GB20), Neiguan (PC6), Yifeng (TE17), Sanyinjiao (SP6), Renzhong (GV26), Wangu (SI4), and Lianquan (CV23). Furthermore, acupuncture was performed at points along the pharyngeal wall, such as Jinjin (EX-HN12) and Yuye (EX-HN13), with bleeding from the collaterals. For patients with tongue movement disorders, additional needling was performed at Neidaoying (ST5) and dispersed points on the tongue surface. For patients with chewing movement disorders or incomplete lip closure, additional needling

was performed at Jiache (ST6), Taiyang (EX-HN5), Dicang (ST4), and Xiaguan (ST7). Neiguan was needled directly with a depth of 0.5-1.0 inches, using lifting, thrusting, twisting, and draining techniques for 1 minute. Renzhong was needled obliquely with a depth of 0.3-0.5 inches, with the needle body being twisted for 360° after insertion, followed by lifting and thrusting techniques for 1 minute. Fengchi, Yifeng, and Wangu were needled obliquely towards the throat with a depth of 2.0-2.5 inches, using twisting and supplementing techniques for 1 minute, with the sensation of throat distension and fullness. Sanyinjiao was needled obliquely with a depth of 1.0-1.5 inches, with lifting and thrusting techniques for three times until the lower limbs twitched. Lianquan was needled towards the root of the tongue with a depth of 40 mm, using twisting and draining techniques for 1 minute, and the needle was retained for 30 minutes. Jinjin and Yuye were punctured, and 1-2 mL of blood was extracted. Simultaneously, acupuncture was performed on the pharyngeal wall, pressing down the tongue with a spatula to perform acupuncture on both sides of the pharyngeal wall. Treatment was administered once daily for 14 consecutive days.

Main outcome measures

(1) The clinical treatment efficacy was observed in both groups. “Significant improvement” was defined as complete restoration of language ability, swallowing function, and limb function, with a reduction in NIH Stroke Scale (NIHSS) score by $\geq 90\%$. “Improvement” was defined as basic restoration of these functions, with a reduction in the NIHSS score by 50% to 89%. “No improvement” was noted when there was no restoration of these functions, with a reduction in the NIHSS score by $\leq 49\%$. The treatment response rate was calculated by adding the percentages of “significant improvement” and “improvement” cases, divided by the total number of cases.

(2) The neurological deficit was assessed using the NIHSS [10] before and after treatment. A higher score indicated severer neurological impairment.

(3) The swallowing function of both groups was evaluated before and after treatment using the Water Swallow Test [11]. “Complete recovery”

was defined as the disappearance of swallowing difficulties, rated as grade 1 on the test. “Significant improvement” was defined as a noticeable improvement in swallowing difficulties, indicated by an increase of 2 or more grades. “Effective” was noted as an improvement in swallowing difficulties, with an increase of 1 grade. “Ineffective” was defined as no significant improvement in swallowing difficulties, with no change in the grade on the test. The total swallowing function improvement rate was calculated as the sum of “complete recovery” and “significant improvement” cases, divided by the total number of cases.

Secondary outcome measures

(1) The Standardized Swallowing Assessment (SSA) [12] and the M.D. Anderson Dysphagia Inventory (MDADI) [13] were used to evaluate the swallowing function of both groups before and after treatment. The SSA scale has a total score ranging from 18 to 46, with higher scores indicating poorer swallowing function. The MDADI score ranges from 0 to 100, with higher scores indicating better swallowing function.

(2) The Swallowing Quality of Life Questionnaire (SWAL-QOL) [14] was used to assess the quality of life of both groups before and after treatment. The SWAL-QOL has a total score of 220, including 44 items across 11 dimensions. Higher scores indicate better quality of life, while lower scores indicate poorer quality of life.

(3) Safety analysis was conducted to record and analyze adverse reactions in both groups. Adverse reactions included muscle pain, nausea and vomiting, arrhythmia, and aspiration pneumonia.

(4) Logistic regression analysis was performed to identify independent risk factors affecting the recovery of swallowing function in patients.

Statistical analysis

Statistical analysis of the collected data was performed using SPSS 19.0 software package. Graphs were generated using GraphPad 7 software package. Count data were presented as percentages and processed using chi-square test. Continuous data were analyzed using the independent t-test for comparisons between

Table 1. Comparison of general data

Variable	Observation Group n=80	Control Group n=65	t/X ²	P
Gender			0.084	0.772
Male	45 (56.25)	35 (53.85)		
Female	35 (43.75)	30 (46.15)		
Age (years)			0.014	0.906
≤65	30 (37.50)	25 (38.46)		
>65	50 (62.50)	40 (61.54)		
BMI (kg/m ²)			1.371	0.242
≤23	37 (57.00)	31 (47.69)		
>23	43 (43.00)	34 (52.31)		
Smoking history			0.105	0.746
Yes	44 (55.00)	34 (52.31)		
No	36 (45.00)	31 (47.69)		
Hypertension			0.004	0.950
Yes	55 (68.75)	45 (69.23)		
No	25 (31.25)	20 (30.77)		
Family history of stroke			0.065	0.798
Yes	34 (42.50)	29 (44.62)		
No	46 (57.50)	36 (55.38)		

BMI: body mass index.

Table 2. Comparison of response rate between the two groups

Treatment response	Observation Group n=80	Control Group n=65	χ ²	P
Significant improvement	55 (68.75)	30 (46.15)	-	-
Improvement	20 (25.00)	21 (32.31)	-	-
No improvement	5 (6.25)	14 (21.54)	-	-
Response rate	75 (93.75)	51 (78.46)	7.362	0.007

groups and paired t-tests for comparisons before and after treatment. The significance level was set at $P < 0.05$.

Results

Comparison of general data

There were no evident differences identified in gender, age, and BMI between the two groups, indicating that the two groups were comparable (all $P > 0.05$, **Table 1**).

Comparison of response rate

Following the completion of the treatment course, we compared the response rate between the two groups. In the observation group, the response rate reached 93.75%, which is significantly higher 78.46% in the control group ($P < 0.05$). See **Table 2**.

Comparison of NIHSS scores

There was no significant difference in NIHSS scores between the two groups before treatment ($P > 0.05$). Following intervention, NIHSS scores significantly improved in both groups compared to baseline ($P < 0.05$). Moreover, the improvement in NIHSS score after intervention was more pronounced in the observation group compared to that in the control group, with statistical significance ($P < 0.05$). See **Figure 1**.

Comparison of the results of the water swallowing test

Following the completion of the treatment course, the results of the water swallowing test were compared between the two groups. In the observation group, the numbers of patients classified as recovered, improved, effectively

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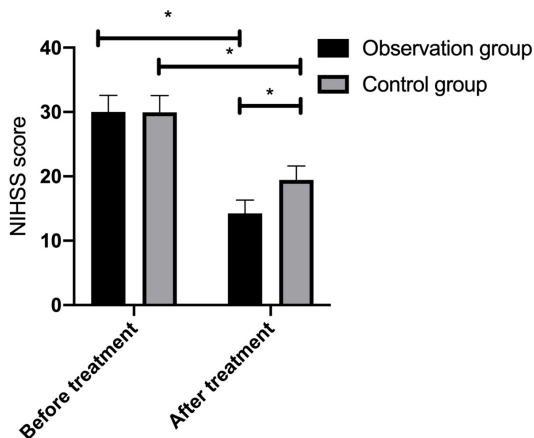


Figure 1. Comparison of NIHSS scores between the two groups before and after treatment. * Indicates $P < 0.05$.

treated, and ineffectively treated were 50, 17, 10, and 3, respectively, yielding an improvement rate of 83.75%. In the control group, the numbers were 28, 13, 17, and 7, respectively, resulting in an improvement rate of 63.08%. The improvement rate in the observation group was significantly higher than that in the control group ($P < 0.05$). See **Table 3**.

Comparison of SSA and MDADI scores

There were no significant differences in SSA and MDADI scores between the two groups before treatment ($P > 0.05$). However, after treatment, both groups showed significant improvement in SSA and MDADI scores. Furthermore, the improvements in SSA and MDADI scores were more pronounced in the observation group compared to those in the control group ($P < 0.05$). See **Figure 2**.

Comparison of SWAL-QOL scores

No significant difference in SWAL-QOL scores was identified between the two groups before treatment ($P > 0.05$). However, after treatment, both groups showed a significant increase in SWAL-QOL scores, with the improvement being more pronounced in the observation group compared to the control group ($P < 0.05$). See **Figure 3**.

Comparison of incidence of adverse reactions

We recorded and compared the occurrence of adverse reactions during the treatment period

in both groups. The results showed that in the observation group, the number of patients experiencing muscle pain, nausea and vomiting, arrhythmia, and aspiration pneumonia was 2, 2, 1, and 0, respectively, with an incidence of 6.25%. In the control group, the corresponding number of patients was 1, 1, 0, and 0, respectively, with an incidence of 3.08%. There was no significant difference in the incidence of adverse reactions between the two groups ($P > 0.05$). See **Table 4**.

Analysis of factors affecting patients' swallowing function recovery

Based on the post-treatment recovery of swallowing function (results of Water Swallow Test), patients were divided into a good recovery group (108 cases, recovered + improved) and a poor recovery group (37 cases, effective + ineffective). Univariate analysis revealed that age and treatment regimen were factors influencing the recovery of swallowing function (**Table 5**). Subsequently, logistic regression analysis identified age and treatment regimen as independent risk factors affecting the prognosis of patients (**Table 6**, $P < 0.05$).

Discussion

In recent years, as the population ages, there has been a steady rise in the incidence of stroke. This trend poses a significant threat to the health and longevity of the elderly population, particularly due to the high disability and mortality [15]. According to TCM theory, stroke falls under the category of "Zhong Feng", wherein its pathogenesis involves disturbances in wind and phlegm, blood stasis blocking collaterals, and meridian insufficiency, resulting in symptoms such as limb dysfunction, hemiplegia, numbness, and speech disorders. Hence, treatment strategies should prioritize dispelling wind, resolving phlegm, enhancing blood circulation, and unblocking collaterals.

In this study, we Huoxue Qufeng Decoction was given to all stroke patients. The herbal composition of this Decoction includes Astragalus, Salvia miltiorrhiza, Ligusticum chuanxiong, Acorus tatarinowii, Lumbricus, Paeonia lactiflora, Gastrodia elata, Scorpio, Uncaria rhynchophylla, Hirudo, and Scolopendra, among others. Specifically, Salvia miltiorrhiza exhibits analgesic properties, enhances blood circulation, and

Table 3. Comparison of swallowing function between two groups

Treatment effectiveness	Observation Group n=80	Control Group n=65	χ^2	P
Recovered	50 (62.50)	28 (43.08)	-	-
Improved	17 (21.25)	13 (20.00)	-	-
Effective	10 (12.50)	17 (26.15)	-	-
Ineffective	3 (3.75)	7 (10.77)	-	-
Improvement rate	67 (83.75)	41 (63.08)	8.064	0.005

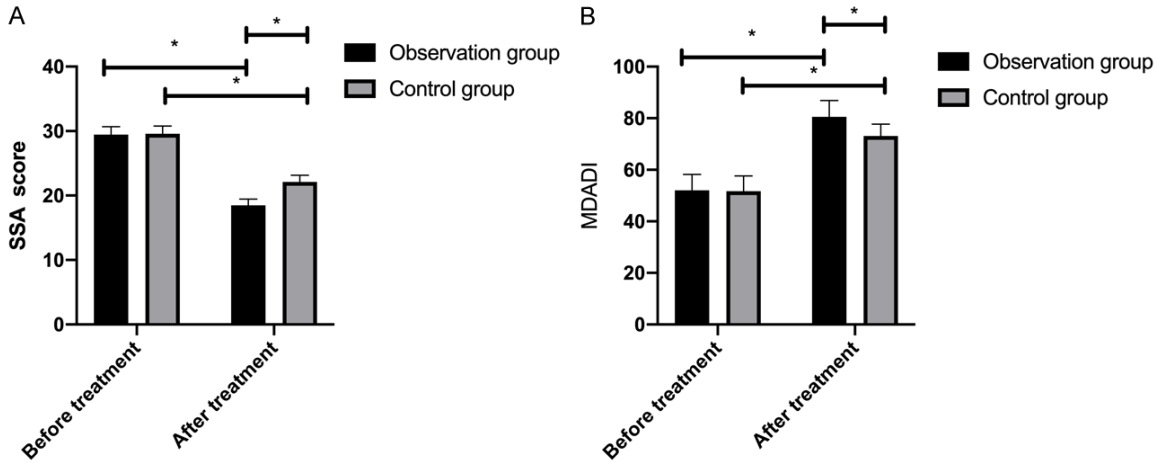


Figure 2. Comparison of SSA and MDADI scores between the two groups before and after treatment. A: Comparison of the SSA scores; B: Comparison of the MDADI scores. * Indicates $P < 0.05$.

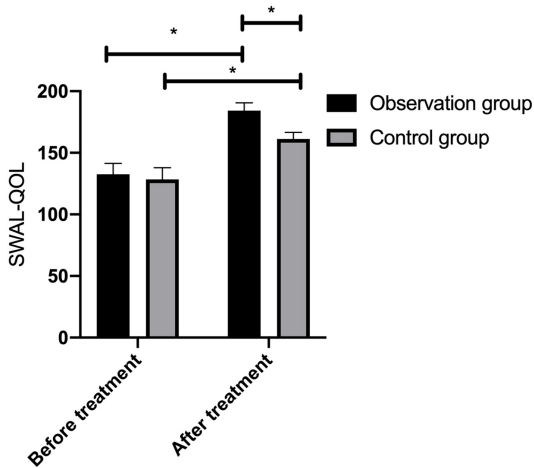


Figure 3. Comparison of SWAL-QOL scores between the two groups before and after treatment. * Indicates $P < 0.05$.

resolves blood stasis; Ligusticum chuanxiong dispels wind, alleviates pain, and improves blood circulation; Acorus tatarinowii regulates qi, enhances blood circulation, and resolves phlegm; Lumbricus soothes the liver and pro-

motes blood circulation; Paeonia lactiflora disperses stasis, alleviates pain, and clears heat; Gastrodia elata calms wind, relieves spasms, and soothes the liver; Scorpio promotes blood circulation and alleviates pain; Uncaria rhynchophylla calms wind, relieves spasms, and clears heat; Hirudo exhibits anti-thrombotic, anti-coagulative, and absorption-promoting effects; and Scolopendra detoxifies, disperses nodules, and relieves spasms [16]. This formula has clinical pharmacological effects such as anti-coagulation, anti-thrombosis, improvement of microcirculation, promotion of nerve function recovery, and enhancement of brain cell tolerance to hypoxia, therefore, significantly alleviating vascular spasm, reducing blood viscosity, and promoting hematoma absorption, which contribute to the recovery of nerve function in stroke patients. The results of this study observed that Huoxue Qufeng Decoction can effectively improve the neurological deficits and swallowing dysfunction in stroke patients.

It should be emphasized that the occurrence of swallowing dysfunction can lead to aspiration

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Table 4. Comparison of adverse reaction incidence between the two groups

Factor	Observation Group n=80	Control Group n=65	χ^2	P
Muscle pain	2 (2.50)	1 (1.54)	-	-
Nausea and vomiting	2 (2.50)	1 (1.54)	-	-
Arrhythmia	1 (1.25)	0	-	-
Aspiration pneumonia	0	0	-	-
Incidence	3 (6.25)	2 (3.08)	0.786	0.375

Table 5. Univariate analysis

Factor	Good recovery group, n=108	Poor recovery group, n=37	χ^2	P
Age (years)			12.58	0.001
≤65 (n=55)	50 (46.30)	5 (13.51)		
>65 (n=90)	58 (53.70)	32 (86.49)		
BMI			0.161	0.805
≥23 kg/m ² (n=68)	50 (46.30)	18 (48.65)		
<23 kg/m ² (n=77)	58 (53.70)	19 (51.35)		
Smoking			0.001	0.971
Yes (n=78)	58 (53.70)	20 (54.05)		
No (n=67)	50 (46.30)	17 (45.95)		
Hypertension			0.045	0.831
Yes (n=100)	75 (69.44)	25 (67.57)		
No (n=45)	33 (30.56)	12 (32.43)		
Family history of stroke			0.547	0.460
Yes (n=63)	45 (41.67)	18 (48.65)		
No (n=82)	63 (58.33)	19 (51.35)		
Treatment programs			4.300	0.038
Single decoction (n=65)	43 (39.81)	22 (59.46)		
Decoction + acupuncture (n=80)	65 (60.19)	15 (40.54)		

Table 6. Multivariate analysis

Variable	B	S.E.	Wald	P	Exp (B)	95% CI	
						Lower limit	Upper limit
Age	2.588	0.734	12.528	0.003	13.173	3.155	53.794
Treatment program	3.362	0.858	16.110	0.001	26.184	5.464	88.985

pneumonia, airway obstruction, malnutrition, dehydration, and other complications, severely affecting the recovery of patients' motor function and daily activities [17, 18]. To enhance the management of patients' swallowing dysfunction, we conducted a further investigation into the combined effects of Huoxue Qufeng Decoction and Tongguan Liquefying acupuncture therapy in stroke treatment. Our findings revealed that this combination exhibited superior efficacy in ameliorating patients' neurologi-

cal deficits and swallowing dysfunction compared to Huoxue Qufeng Decoction alone. This enhanced effectiveness can be attributed to the acupuncture component of the treatment regimen. Specifically, needling the Neiguan acupoint facilitates heart nourishment, spirit calming, brain invigoration, and qi and blood circulation regulation. Meanwhile, needling the Renzhong acupoint regulates the governor vessel, stimulates brain activity, clears the orifices, and soothes the spirit. Moreover, the

Sanyinjiao acupoint, serving as the convergence point of the three yin meridians associated with the liver, spleen, and kidneys, can be stimulated to nourish these organs, invigorate the spleen, and promote moisture elimination, thereby addressing the underlying pathology of stroke. Fengchi, Wangu, and Yifeng belong to the Shaoyang meridian and have the function of promoting the smooth flow of vital energy. The combination of these three points can nourish the brain marrow, open the orifices, and promote organ function. Additionally, needling Jinjin, Yuye, and the posterior pharyngeal wall can promote blood circulation, dissolve stasis, facilitate qi circulation, and benefit the recovery of swallowing function [19, 20]. Previous study [21] found that acupuncture could reorganize movement-related networks in stroke patients, including primary motor cortex (M1), premotor cortex, supplementary motor area (SMA), frontoparietal network (LFPN and RFPN) and sensory movement network (SMN). This may explain from the perspective of Western medicine why acupuncture treatment can further improve patients' swallowing dysfunction. The combination of these points can regulate the spirit, guide qi, nourish the three yin meridians, and promote orifice circulation, achieving a comprehensive therapeutic effect. Furthermore, to assess the efficacy more objectively and comprehensively, we introduced the SWAL-QOL scale [22] to evaluate patients' physiological, psychological, and quality of life aspects. Our observations revealed that the combination therapy of Huoxue Qufeng Decoction with Tongguan Liquefying acupuncture substantially enhanced patients' quality of life without significantly elevating adverse reactions, thereby addressing the limitations associated with singular Chinese herbal medicine treatment. Additionally, our analysis of risk factors associated with suboptimal recovery of swallowing function identified age and absence of acupuncture treatment as independent risk factors.

However, this study still has certain limitations. On the one hand, due to the small sample size, the results of this study need further confirmation by subsequent research. On the other hand, the mechanism of action of Huoxue Qufeng Decoction combined with Tongguan Liquefying acupuncture in patients with ischemic stroke is still unclear, so further basic

experiments are needed to provide scientific explanations.

In summary, the combination of Huoxue Qufeng Decoction with Tongguan Liquefying acupuncture has demonstrated favorable efficacy in the treatment of ischemic stroke by effectively improving patients' swallowing function and enhancing their quality of life. This makes the combined regimen a promising candidate for clinical promotion.

Disclosure of conflict of interest

None.

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