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Clinical Application of Denghuo Moxibustion in Treating Post-Stroke Constipation

Zhuqing Li

Honghuagang District People's Hospital, Zunyi 563000, Guizhou, China

Abstract: *Objective*: To study the clinical application of Denghuo moxibustion in treating post-stroke constipation. *Methods*: This study included 50 patients with post-stroke constipation admitted from October 2020 to December 2021. They were randomly divided into two groups using the envelope method: 25 patients in the observation group and 25 patients in the control group. The control group received only lactulose, while the observation group received Denghuo moxibustion in addition to lactulose. The efficacy, quality of life (PAC-QOL scale), and laboratory indicators [serum substance P (SP) and vasoactive intestinal peptide (VIP)] were compared between the two groups. *Results*: The efficacy of the observation group was significantly better than that of the control group ($P < 0.05$). After treatment, the PAC-QOL scores of both groups decreased significantly, and the improvement in the observation group was more significant ($P < 0.05$). Changes in laboratory indicators showed that VIP decreased significantly and SP increased significantly in both groups, and the improvement of these two indicators in the observation group was significantly better than that in the control group ($P < 0.05$). *Conclusion*: Denghuo moxibustion can enhance the efficacy of lactulose by regulating intestinal neuropeptides and is an effective treatment for post-stroke constipation.

Keywords: Stroke; Constipation; Denghuo moxibustion; Clinical application

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1. Introduction

Stroke is a common cerebrovascular disease that seriously harms human health, with high morbidity, disability, and mortality rates. Among survivors, constipation is an extremely common complication [1]. Post-stroke constipation brings significant pain to patients, such as difficulty defecating, abdominal distension, and abdominal pain. It also has a broad and profound negative impact on their psychological state, physiological functions, and even the rehabilitation process: it may not only exacerbate depression and anxiety in patients but in severe cases, it may even trigger cardiovascular and cerebrovascular events such as recurrent strokes, greatly impairing patients' quality of life [2]. Therefore, actively seeking safe and effective treatment methods to improve post-stroke constipation is crucial for enhancing patients' overall prognosis and quality of life. Currently, there are various clinical treatments for post-stroke constipation, mainly including drug therapy, rehabilitation training, and external therapies in traditional Chinese medicine [3]. Among them, the osmotic laxative lactulose is a commonly used drug. Although it has certain efficacy, long-term use has limitations, such

as possible adverse reactions including drug dependence and electrolyte imbalance [4]. External therapies in traditional Chinese medicine, especially fire moxibustion, show potential in regulating gastrointestinal function due to their unique effects of warming and unblocking meridians and harmonizing qi and blood [5]. Given the above background, this study aims to explore whether combining fire moxibustion therapy with conventional lactulose treatment can bring more significant clinical benefits to patients with post-stroke constipation.

2. Methods and materials

2.1. General information

Fifty patients with post-stroke constipation admitted to our hospital from October 2020 to December 2021 were selected. They were randomly divided into two groups using the envelope method: 25 patients in the observation group and 25 patients in the control group. There was no statistically significant difference in basic information between the two groups ($P > 0.05$), as shown in **Table 1**. This study was approved by the hospital ethics committee. This study complies with the relevant ethical principles of the Helsinki Declaration.

Table 1. Comparison of general information between the two groups ($\bar{x} \pm s$ /n)

Characteristics	Observation group (n=25)	Control group (n=25)	t/χ^2	p-value
Gender (Male/Female)	13/12	14/11	0.081	0.777
Age (years)	61–78	60–79	0.086	0.932
	69.15 ± 3.45	69.21 ± 3.36		

2.2. Inclusion and exclusion criteria

2.2.1. Inclusion criteria

(1) Meet the diagnostic criteria for cerebral infarction/cerebral hemorrhage and confirmed by CT/MRI.
(2) Meet the Rome IV diagnostic criteria for functional constipation.
(3) Aged between 18 and 80 years old.
(4) Signed informed consent.

2.2.2. Exclusion criteria

(1) Non-stroke-related constipation (such as intestinal obstruction, tumors, etc.).
(2) Combined with severe liver and kidney dysfunction.
(3) Abdominal skin damage or infection.
(4) Participation in other clinical trials within 30 days.

2.3. Methods

Both groups received daily specialized nursing and rehabilitation training for 2 weeks, including dietary guidance, regular bowel training, bedside standing, and exercise therapy. The control group patients received lactulose treatment: The initial dose of lactulose oral solution was 15 milliliters per day, taken orally in a single dose after breakfast. Based on the patient's bowel reaction and tolerance, the dose could be adjusted after 3 days of treatment, maintaining a dose range of 10 to 30 milliliters per day, taken in 1 to 2 divided doses after meals.

Intervention in the observation group: Moxibustion with lamp fire was added on the basis of the above

treatment. The patient was placed in a supine position, with the Tianshu acupoint (1.5 inches away from the navel) exposed, and the local skin was evaluated. After marking the acupoint, a 3–4 cm long wick was taken, with one end immersed in vegetable oil for about 1 cm, and the excess oil was wiped off to prevent burns. The operator held the upper end of the wick and ignited the oil-soaked end. When the flame grew larger, the marked point was quickly and vertically ignited with moderate force and appropriate distance. A successful ignition was accompanied by a "pop" sound and self-extinguishing, which was called a "Jiao". If there was no sound, another nearby point was chosen for moxibustion. Each acupoint was usually ignited once. The treatment sequence was from top to bottom, from back and waist to chest and abdomen, and from torso to limbs. Around 5–7 treatments constituted one course of treatment. Skin redness or blisters might appear after moxibustion, so it was necessary to keep the area clean to prevent infection.

2.4. Observation indicators

All subjects were required to collect 5ml of elbow venous blood on an empty stomach in the early morning. After the samples were left to stand and coagulate, they were centrifuged at 3000 rpm for 10 minutes at 4°C to separate the serum. The serum was then aliquoted and stored in a -80°C freezer for future testing.

2.4.1. Therapeutic effect

Observe and compare the therapeutic effects of the two groups of patients.

(1) Cure: Patients can defecate independently, with a defecation frequency returning to once every 1–2 days. Defecation is smooth and unobstructed, and the stool is normal and soft. Symptoms such as abdominal distension and abdominal pain related to post-stroke constipation have completely disappeared.

(2) Markedly effective: Patients can defecate independently, with a defecation frequency maintained at approximately once every 2 days. The defecation process is relatively smooth, stool consistency has softened, and major symptoms such as abdominal distension and abdominal pain related to post-stroke constipation have been significantly alleviated.

(3) Effective: Patients can defecate independently, with improved defecation frequency compared to before treatment, reaching once every 3 days. The defecation process is relatively smooth, stool has gradually softened from being dry and hard, and symptoms such as abdominal distension and abdominal pain related to post-stroke constipation have been reduced to varying degrees.

(4) Ineffective: Patients are still unable to achieve independent defecation, or there is no significant improvement in defecation frequency, smoothness, stool consistency, and related symptoms compared to before treatment, or even worsening. Total effective rate = (number of cured cases + number of markedly effective cases + number of effective cases) / total number of cases × 100%.

2.4.2. Quality of life

Observe and compare the quality of life of patients in both groups before and after treatment, using the Patient Assessment of Constipation Quality of Life (PAC-QOL) questionnaire. This questionnaire covers four dimensions: physical discomfort, psychosocial discomfort, satisfaction with treatment, and concerns/worries. It contains a total of 28 items, with each item rated on a Likert scale of 5 points (from 0 to 4). The total score ranges from 0 to 112, with higher scores indicating a more severe negative impact of constipation on the patient's quality of life, i.e., poorer quality of life.

2.4.3. Laboratory indicators

Observe and compare the laboratory indicators of patients in both groups before and after treatment. Use Enzyme-Linked Immunosorbent Assay (ELISA) to strictly follow the kit instructions and measure the concentration levels of serum Substance P (SP) and Vasoactive Intestinal Peptide (VIP). Implement a double-blind principle during the detection process and set up standard controls to ensure the accuracy of the results.

2.5. Statistical methods

Statistical analysis was performed using SPSS 21.0 software package. Measurement data were expressed as mean ± standard deviation (SD) if they followed a normal distribution. Comparisons between groups were made using the t-test for continuous variables and the chi-square test (x^2) for categorical variables. A *P*-value less than 0.05 was considered statistically significant.

3. Results

3.1. Comparison of therapeutic effects between the two groups

The observation group's therapeutic effect was superior to the control group ($P < 0.05$), as shown in **Table 2**.

Table 2. Comparison of therapeutic effects between the two groups [n(%)]

Group	Sample Size (n)	Cured n (%)	Markedly Effective n (%)	Effective n (%)	Ineffective n (%)	Total Effective n (%)
Observation group	25	13 (52.00)	6 (24.00)	5 (20.00)	1 (4.00)	24 (96.00)
Control group	25	3 (12.00)	8 (32.00)	7 (28.00)	7 (28.00)	18 (72.00)
χ^2	-	-	-	-	-	5.357
p-value	-	-	-	-	-	0.021

3.2. Comparison of quality of life between the two groups

There was no difference in the quality of life between the two groups before intervention ($P > 0.05$). After treatment, their PAC-QOL scores decreased significantly, and the decrease in the observation group was greater than that in the control group ($P < 0.05$), as shown in **Table 3**.

Table 3. Comparison of quality of life before and after treatment between the two groups ($\bar{x} \pm s$)

Group	Sample size (n)	Before treatment	After treatment
Observation group	25	84.15 ± 10.25	36.15 ± 7.15*
Control group	25	83.91 ± 9.18	45.15 ± 8.44*
t-value	-	0.087	4.068
p-value	-	0.931	< 0.001

Note: Compared with the same group before treatment, *$P < 0.05$

3.3. Comparison of laboratory indices levels between the two groups

There was no significant difference in baseline laboratory indices ($P > 0.05$). After intervention, VIP values decreased significantly in both groups, while SP values increased significantly. The changes in these two indices were more pronounced in the observation group ($P < 0.05$), as shown in **Table 4**.

Table 4. Comparison of laboratory indices levels before and after treatment between the two groups ($\bar{x} \pm s$, pg/mL)

Group	Number of cases (n)	SP		VIP	
		Before treatment	After treatment	Before treatment	After treatment
Observation group	25	29.94 ± 3.16	52.15 ± 8.41*	171.54 ± 5.08	137.15 ± 9.48*
Control group	25	30.22 ± 2.94	40.11 ± 9.08*	170.91 ± 5.15	159.48 ± 11.25*
t	-	0.324	4.864	0.435	7.589
P	-	0.747	< 0.001	0.665	< 0.001

Note: Compared with the same group before treatment, *$P < 0.05$

4. Discussion

Stroke, as a cerebrovascular disease with high disability, significantly increases the incidence of constipation among survivors. This complication not only causes physical pain such as abdominal distension and difficulty in defecation, but also may induce secondary stroke events through forced defecation, seriously affecting the recovery process and quality of life [6]. From a pathological mechanism perspective, central nervous system damage after a stroke can interfere with gut-brain axis signaling, leading to weakened intestinal motility and delayed transmission; meanwhile, factors such as limited patient mobility and changes in diet further exacerbate the retention of intestinal contents, creating a vicious cycle. Therefore, there is a clear clinical need to find safe and effective intervention methods [7].

Currently, osmotic laxative lactulose is often chosen as a basic treatment in clinical practice. It promotes water retention and softens feces by increasing intestinal osmotic pressure, providing short-term symptom relief. However, in this study, the limited effectiveness of lactulose alone in the control group reflects the limitations of drug treatment: on one hand, lactulose cannot repair damaged enteric nervous system function and only symptomatically treats feces properties; on the other hand, long-term use may lead to electrolyte imbalance and drug dependence, which is consistent with the adverse reactions described in the literature [8].

Addressing the limitations of pharmacological therapy, this study introduced lamp-fire moxibustion as a combined intervention. Tianshu acupoint was selected as the core target for moxibustion due to its traditional association with the regulation of intestinal functions as the front-mu point of the large intestine. During the procedure, the burning of rush dipped in vegetable oil produced a double effect: firstly, instantaneous thermal stimulation activated local nerve endings, enhancing the contraction of intestinal smooth muscles through axonal reflex; secondly, bioactive components released during the burning of rush (such as phenanthrene compounds) could be absorbed through the skin, which modern pharmacology has confirmed to have anti-inflammatory and neurotransmitter regulatory effects [9].

The study data showed that lamp-fire moxibustion combined with lactulose significantly optimized clinical outcomes. The total effective rate was improved in the observation group; among laboratory indicators, vasoactive intestinal peptide (VIP) was significantly lower in the observation group than in the control group ($P < 0.001$). As an inhibitory neurotransmitter, the decrease in VIP levels could relieve the inhibition of intestinal smooth muscle relaxation; meanwhile, serum substance P (SP) was higher in the observation group than in the control group ($P < 0.001$). As an excitatory neuropeptide, the increase in SP directly promoted intestinal motility and secretion. This bidirectional regulatory effect overcame the limitation of single drugs that only improve the physical properties of feces, restoring the autonomic regulatory function of the intestine at the neuro-humoral level [10].

The assessment of quality of life further supports the advantages of combination therapy. The reduction in PAC-QOL scores in the observation group was significantly greater than that in the control group. This result covers improvements in multiple dimensions such as physical discomfort, psychological distress, and treatment satisfaction, reflecting that fire moxibustion indirectly reduces patients' anxiety and concerns about complications by alleviating core symptoms (such as abdominal distension and difficulty in defecation), forming a physiologically and psychologically beneficial cycle.

5. Conclusion

In summary, fire moxibustion can synergistically enhance the efficacy of lactulose by regulating intestinal neuropeptide levels, and it is an effective treatment for post-stroke constipation.

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Disclosure statement

The author declares no conflict of interest.

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