

Research Progress on Moxibustion Therapy for the Treatment of Dysphagia after Stroke

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Abstract: *Dysphagia are common complications of stroke and have a significant impact on the health of patients. With the development of traditional Chinese medicine, moxibustion therapy has shown notable efficacy in the treatment of swallowing disorders in clinical practice. This article provides a concise overview of the research progress on the application of moxibustion therapy for swallowing disorders, aiming to offer new insights and ideas for the clinical treatment of patients with swallowing disorders.*

Keywords: Moxibustion Therapy, Dysphagia, Stroke, Application, Progress.

1. Introduction

Dysphagia refers to swallowing difficulties caused by stroke or other neurological disorders. Patients experience difficulties or pain during eating or drinking[1]. Symptoms include difficulty swallowing, coughing, choking, food residue in the oral cavity or pharynx, among others. This can lead to the aspiration of food or liquids into the airway, causing pneumonia or other respiratory tract infections, significantly impacting the patient's quality of life and increasing the risk of mortality[2]. Therefore, in the overall management of stroke patients, addressing the symptoms of dysphagia and promoting rehabilitation holds significant importance. Dysphagia is a highly prevalent complication, and research exploring effective treatment methods for this condition holds important clinical value and societal benefits[3]. Moxibustion, as a green, economical, and effective method, has been increasingly recognized. In this paper, we will first analyze the mechanism of moxibustion therapy, followed by a specific focus on the clinical advancements of moxibustion in the treatment of dysphagia. The aim is to provide new insights and ideas for the clinical treatment of patients with swallowing disorders.

2. The Mechanism of Moxibustion Therapy

The main material used in moxibustion therapy is moxa wool, which is ignited and placed on acupoints or affected areas to induce burning and fumigation. Through its thermal stimulation and pharmacological effects, moxibustion therapy aims to prevent and treat diseases. As an external therapeutic method with a long history, moxibustion can be employed to treat various ailments, regardless of whether they are caused by cold or heat, and is often referred to as the "treatment of a hundred diseases through moxibustion." [4] In the "Shen Jiu Jing Lun" (Classic of Moxibustion), Volume One, it states that "moxibustion can warm the meridians, promote the circulation of Qi and blood, and restore smooth flow to obstructed pathways." As the medicinal substance used in moxibustion, mugwort leaves possess a pure yang nature. Moxa wool exhibits strong, enduring firepower, and its pungent and aromatic properties have the ability to disperse and penetrate. The heat generated by moxibustion dispels cold,

while the pungent nature promotes meridian circulation. Additionally, mugwort leaves have the advantages of extensive growth and easy collection[5]. Moxibustion therapy utilizes the heat of the moxa fire to promote the unobstructed flow of meridians, harmonize the circulation of Qi and blood, and subsequently balance the Yin and Yang aspects of the body. Through this process, the restoration of righteous Qi and the elimination of pathogenic factors are achieved[6].

According to modern medicine, the therapeutic mechanisms involved in moxibustion therapy are complex and multifaceted, encompassing several aspects. The thermogenic effect is just one of the factors. Additionally, the spectral radiation generated during moxibustion also possesses therapeutic effects. Spectral radiation can promote cellular metabolism, improve tissue blood circulation, and induce biochemical reactions in the body, thereby exerting positive effects. Besides spectral radiation, moxibustion also elicits a biological thermal effect, which stimulates human tissues through the thermal action, promoting blood circulation, enhancing tissue oxygen supply, and metabolic activity, thereby facilitating tissue repair and regeneration. Furthermore, moxibustion exhibits a nonthermal effect, wherein the active components in moxa wool exert biological effects on the human body. These active components may enter the body through skin absorption, meridian conduction, or other pathways, influencing cellular function, immune system, metabolic regulation, and other aspects, thereby producing positive therapeutic effects. Moxibustion not only increases temperature, accelerates metabolism, enhances enzyme activity, dilates microvessels, and alleviates local and systemic inflammatory responses at the treated area but also the methanol extract derived from moxa combustion possesses the ability to scavenge free radicals and peroxidized lipids. Over 40 volatile components of mugwort leaves are present in moxa smoke, and these substances are extracted into the moxa smoke through the process of thermal distillation during combustion. These volatile components exhibit broad-spectrum antimicrobial and antiviral activities. In moxibustion therapy, these extracts may enter the body through inhalation or skin absorption, exerting their antimicrobial and antiviral effects. These effects can provide additional therapeutic benefits, help alleviate disease symptoms, and promote recovery[7]. By stimulating

acupoints, a series of physiological, biochemical, and immunological changes are induced to regulate the body, thereby achieving the goal of disease prevention and treatment[8].

3. Clinical Research on Moxibustion Therapy for Swallowing Disorders

3.1 Thermal-Sensitive Moxibustion Therapy

Thermal-sensitive moxibustion is a research achievement developed by Professor Chen Rixin and his research team at Jiangxi University of Traditional Chinese Medicine. In the human body, acupoints exist in two functional states: sensitized and resting states. Thermal-sensitive acupoints are optimal choices for moxibustion therapy, and their therapeutic effects are significantly superior to conventional acupuncture therapy targeting acupoints in the resting state[9]. The thermal-sensitive moxibustion technique utilizes the heat generated by burning moxa to stimulate thermal conduction through specific methods, such as penetrating heat, expanding heat, and transmitting heat, to apply moxibustion on the thermal-sensitive acupoints[10]. Thus, the goal is to direct the Qi to the affected area and apply in individualized and saturating doses of moxibustion. The thermally sensitized acupoints are highly responsive to moxibustion stimulation, leading to a significant improvement in clinical efficacy[11].

3.1.1 Combining Thermal-sensitive Moxibustion with Conventional Rehabilitation Therapy

Feng Liya et al.[12] randomly divided 60 patients into two groups: the conventional group received comprehensive rehabilitation care and swallowing therapy, while the intervention group received comprehensive rehabilitation care, swallowing therapy, and adjunctive thermal-sensitive moxibustion. Acupoints selected for moxibustion included Fengfu (GV16), Fengchi (GB20), Futu (LI18), d Tiantu (CV22), Dazhui (GV14), Quepen (CV12), Renying (ST9), and Jiaji points at the 4th to 6th cervical vertebrae. The results demonstrated that the swallowing function score significantly decreased in the intervention group and was lower than that of the conventional group. The total effective rate of clinical intervention in the intervention group was higher than that of the conventional group. The incidence of complications in the intervention group was lower than that of the conventional group. Furthermore, the intervention group reported higher nursing satisfaction compared to the conventional group.

Wang Chunhong et al. [13] randomly divided 97 patients with pseudobulbar dysphagia into two groups. Group A received conventional dietary training, functional exercises, and ice stimulation therapy, while Group B, in addition to the interventions in Group A, received moxibustion therapy at the Lianquan (CV23) and Tiantu (CV22) acupoints. After treatment, the proportion of patients in Group B with a Cervical Swallowing Impairment Scale (CSIS) score of 5-7 significantly increased compared to before treatment, whereas Group A showed no significant change. Additionally, both groups exhibited a significant increase in the number of swallows and the elevation of the larynx after treatment, with Group B showing a significantly greater increase compared to Group A. Furthermore, after treatment, both groups showed a

significant reduction in swallowing duration, with Group B demonstrating a significantly greater reduction than Group A. Moreover, after treatment, both groups exhibited a significant increase in maximum amplitude, with Group B showing a significantly greater increase than Group A.

In a study conducted by Yuan Jianqing et al. [14] on the treatment of swallowing disorders in elderly patients with stroke, both the treatment group and the control group received swallowing function training. In addition to swallowing function training, the treatment group also received adjunctive thermal-sensitive moxibustion therapy. Acupoints such as bilateral Fengchi (GB20), Yanglingquan (GB34), Tiantu (CV22), Dicang (ST4), Tongli (HT5), Dazhui (GV14), and Shousanli (LI10) were selected for treatment. After the completion of the treatment, the VFSS (Video fluoroscopic Swallowing Study) scores in the treatment group were significantly higher than those in the control group.

In the study conducted by Xu Haiyan et al.[15], thermal-sensitive acupoints including Renying (ST9), Quchi (LI11), Fengchi (GB20), Lianquan (CV23), and Tianding (GV23) were identified. These acupoints were treated with moxibustion in combination with conventional rehabilitation training. The improvement in swallowing function was evaluated before and after treatment using the water swallowing test. The results demonstrated a significant improvement in swallowing function.

In the study conducted by Guo Xiang et al.[16], two treatment methods, thermal-sensitive moxibustion and ice stimulation combined with swallowing training, were employed. The thermal-sensitive moxibustion group underwent quantitative manipulation at acupoints including Fengchi (GB20), Fengfu (GV16), Tiantu (CV22), Futu (LI18), Renying (ST9), Quepen (CV12), Jiaji points at the 4th to 6th cervical vertebrae, and Dazhui (GV14), achieving favorable therapeutic effects. The control group, on the other hand, received treatment with ice stimulation and swallowing training. The study results revealed that the thermal-sensitive moxibustion group exhibited superior efficacy in terms of swallowing difficulty assessment and water swallowing test compared to the control group.

3.1.2 Combining Thermal-sensitive Moxibustion with Herbal Medicine Treatment

Zhou Chenglin et al.[17] utilized thermal-sensitive moxibustion in combination with modified Wen Dan Tang and nebulized inhalation therapy to treat patients with post-stroke phlegm-stasis obstructive dysphagia. In addition to the basic treatment, the treatment group received thermal-sensitive moxibustion therapy combined with modified Wen Dan Tang and nebulized inhalation. The post-treatment Tendo-Igarashi dysphagia assessment scores improved in both groups, but the treatment group demonstrated better outcomes compared to the control group. Furthermore, no significant adverse reactions were observed in either group of patients.

3.1.3 Combining Thermal-sensitive Moxibustion with a Swallowing Therapy Device for Treatment

Liu Meijuan et al.[18] utilized a swallowing disorder treatment device in combination with thermal-sensitive moxibustion therapy to treat patients with post-stroke dysphagia. In addition to the treatment device, the observation group received thermal-sensitive moxibustion therapy at acupoints including Lianquan (CV23), Fengchi (GB20), Quchi (LI11), Yanglingquan (GB34), Tiantu (CV22), Dazhui (GV14), and Dicang (ST4). The study found that the combination of the swallowing disorder treatment device and thermal-sensitive moxibustion therapy exhibited lower neurological and swallowing function scores, higher rehabilitation effectiveness rates, and lower incidence of complications in patients with post-stroke dysphagia.

The aforementioned studies suggest that thermal-sensitive moxibustion, as a non-invasive treatment modality, has advantages such as non-contact with the human body, needle-free application, lack of side effects, and absence of harm. When combined with comprehensive rehabilitation care, swallowing therapy, or traditional herbal medicine treatment, thermal-sensitive moxibustion not only improves swallowing function but also enhances patients' quality of life, reduces the occurrence of complications, and enhances rehabilitation outcomes. In summary, thermal-sensitive moxibustion, as an adjunctive treatment method, can improve swallowing function, promote recovery, and demonstrate favorable efficacy and clinical value in the treatment of dysphagia.

3.2 Ginger-separated Moxibustion

Huang Xiaoli et al.[19] uniformly applied standardized conventional stroke treatment to 150 patients. In addition to the conventional treatment, the control group received swallowing function training, while the treatment group underwent ginger-separated moxibustion therapy at the Yamen (GV15), Hegu (L14), and Fengfu (GV16) acupoints. After two weeks of treatment, both groups showed significant improvements in Water Swallowing Symptom Score and Modified Mann Assessment of Swallowing Ability (MMASA) scores, with the treatment group demonstrating superior improvement compared to the control group. Following the completion of treatment, the incidence of aspiration pneumonia in the treatment group was significantly lower than that in the control group. The total effective rate in the treatment group was significantly higher than that in the control group, indicating better outcomes in the treatment group. Within two months after treatment, there were no significant changes in MMASA scores for both groups; however, the scores in the treatment group remained higher than those in the control group. In conclusion, ginger-separated moxibustion therapy has demonstrated definite efficacy in the treatment of acute-phase dysphagia after stroke. It can significantly improve swallowing function in patients and exhibits good long-term effects. Therefore, this treatment modality is worth promoting and applying in clinical practice.

3.3 Baixiao Moxibustion Device

Zhan Yuqing et al. [20] randomized 72 patients with post-stroke dysphagia into two groups. Both groups received conventional medication treatment, swallowing rehabilitation

training, and neuromuscular electrical stimulation. The experimental group additionally received the application of a hundred-smile moxibustion device on acupoints such as Tiantu (CV22), Tanzhong (CV17), Guanyuan (CV4), Fengfu (GV16), Dazhui (GV14), and Mingmen (GV4). The results showed that the recovery rate in the experimental group was significantly higher than that in the control group. After intervention, both groups exhibited significant improvements in VFSS scores, SWAL-QOL scores, serum albumin levels, and serum prealbumin levels compared to before the intervention. Therefore, the combination of moxibustion and neuromuscular electrical stimulation can effectively promote the functional recovery of post-stroke dysphagia, improve patients nutritional status and quality of life, and enhance clinical treatment outcomes. This combined treatment approach is simple, feasible, and demonstrates significant therapeutic effects, thereby warranting its promotion and widespread application in clinical practice.

3.4 Electronic Moxibustion

Ruan Chuanliang et al. [21] treated 60 cases of hypopharyngeal muscle relaxation using electronic moxibustion. The control group received routine basic treatment, acupuncture therapy, and swallowing rehabilitation training. The observation group received electronic moxibustion in addition to the treatment received by the control group, with acupoints including Lianquan (CV23), Tiantu (CV22), Tianding, and Futu. After treatment, both groups exhibited increased activity of the pharyngeal sidewall and higher scores on the Toida-Irao Dysphagia Scale. The observation group demonstrated greater increases in pharyngeal sidewall activity and higher scores on the Toida-Irao Dysphagia Scale compared to the control group.

Dai Wenwen et al. [22] randomly assigned 70 patients into an electronic moxibustion group and a control group. Both groups received internal medicine-based conventional treatment, routine acupuncture, and rehabilitation training. The electronic moxibustion group received additional electronic moxibustion treatment at the acupoints of Lianquan (CV23), Tiantu (CV22), Tianding (bilateral), and Futu (bilateral). The control group received swallowing therapy with the Vital Stim device. The results showed that both groups exhibited increased pharyngeal sidewall activity after treatment compared to before treatment, with a higher degree of increase observed in the electronic moxibustion group compared to the control group. In terms of the Standardized Swallowing Assessment (SSA) scores, both groups showed a decrease in scores after treatment compared to before treatment, with a greater degree of decrease observed in the electronic moxibustion group compared to the control group[23].

Therefore, electronic moxibustion can improve impaired swallowing function in patients with hypopharyngeal muscle relaxation following stroke and restore normal swallowing processes. It can effectively increase pharyngeal sidewall activity in patients with post-stroke oropharyngeal dysphagia, reduce SSA scores, and improve swallowing function. Additionally, electronic moxibustion offers advantages such as not requiring manual supervision, maintaining a constant temperature, being able to simultaneously apply moxibustion

to multiple acupoints, and avoiding burns to patients. These advantages make it worthy of promotion and application.

3.5 Zhuang Medicine Line Acupoint Moxibustion Therapy

Tao Wenjiao et al. [24] randomized 78 patients with post-stroke dysphagia into two groups. The control group received conventional Western medical treatment combined with routine acupuncture therapy, while the observation group received Zhuang Medicine Line Acupoint Moxibustion Therapy in addition to the treatment received by the control group (acupoints: Qihuan, Fengfu, Lianquan, three acupuncture points on the tongue, Tiantu, bilateral Fengchi, affected-side Hegu, affected-side Neiguan, bilateral Piyu, bilateral Stomach Yu, bilateral Zusanli, bilateral Fenglong, bilateral Taichong). The results showed that the treatment group had significantly better outcomes compared to the control group. This indicates that the combination of Zhuang Medicine Line Acupoint Moxibustion Therapy with conventional Western medical treatment is significantly effective in improving dysphagia in patients after stroke and warrants further promotion and application.

4. Conclusion

Based on the observed results of the aforementioned studies, we can confidently conclude that the current use of moxibustion therapy, as well as the combination of moxibustion therapy with rehabilitation, has demonstrated substantial therapeutic efficacy in managing post-stroke dysphagia. Furthermore, moxibustion therapy possesses the advantages of being more simple, convenient, and cost-effective, thereby presenting great potential for widespread application.

However, despite the long-standing history of moxibustion in traditional medicine, there is a lack of large-scale, rigorous experimental and mechanistic studies to substantiate its efficacy for many diseases and conditions, particularly in the context of clinical research. The application of moxibustion therapy in the treatment of post-stroke dysphagia, in particular, is scarce. Considering the unique properties of moxibustion therapy, such as its ability to warm and invigorate, which cannot be easily replicated by other therapies, there is reason to believe that it can achieve favorable therapeutic effects in the treatment of stroke and its complications[25].

Moreover, there are variations in the selection of acupoints and treatment duration for the same moxibustion therapy targeting the same disease. The evaluation of treatment outcomes primarily relies on subjective rating scales, with limited objective assessment measures. Additionally, there are issues such as inadequate sample sizes, limited treatment duration, and inconsistent operational methods[26]. Therefore, this study aimed to summarize clinical research on the combination of moxibustion therapy with other treatments for the management of swallowing disorders. The objective is to seek a more effective and efficient treatment approach and provide reliable reference data for the application of moxibustion therapy.

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