

The Effect of Ginger Slice Acupoint Application Combined with Moxibustion on Chemotherapy-Induced Vomiting in Postoperative Breast Cancer Patients

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Abstract: *Objective:* To investigate the effect of ginger slice acupoint application combined with moxibustion on chemotherapy-induced vomiting in postoperative breast cancer patients. *Methods:* Sixty postoperative breast cancer patients undergoing chemotherapy were randomly divided into an observation group and a control group, with 30 patients in each group. The control group received antiemetic treatment with dolasetron, while the observation group received ginger slice acupoint application combined with moxibustion in addition to antiemetic treatment to address chemotherapy-induced vomiting. The vomiting response on days 1–3 was compared between the two groups, along with R-INVR retching scores and patient satisfaction with the intervention methods. *Results:* On days 2 and 3 of chemotherapy, the observation group showed significantly less vomiting than the control group, with differences reaching a highly significant level ($P < 0.001$). On day 3, the R-INVR score in the observation group was significantly lower than that of the control group, with a highly significant difference ($P < 0.001$). The satisfaction score in the observation group was 8.38 ± 0.81 , higher than the control group's 7.65 ± 0.71 , with a statistically significant difference ($P < 0.05$). *Conclusion:* Ginger slice acupoint application combined with moxibustion effectively alleviates chemotherapy-induced vomiting in postoperative breast cancer patients, improves quality of life, and is worth promoting clinically.

Keywords: Ginger slice acupoint application; Moxibustion; Breast cancer; Postoperative chemotherapy; Vomiting; Intervention effect

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1. Introduction

Breast cancer has become a major global threat to women's health, with its incidence rising yearly ^[1]. While

surgery and chemotherapy remain the cornerstones of breast cancer treatment, the side effects of chemotherapy, particularly nausea and vomiting, significantly impact patients' quality of life and may even lead to treatment interruptions [2,3]. These side effects not only cause physical discomfort but also increase psychological burden, affecting treatment adherence and prognosis. Currently, commonly used antiemetic drugs, such as dolasetron, show limited efficacy for some patients [4,5]. In recent years, traditional Chinese medicine (TCM) has seen growing application in the supportive treatment of cancer due to its holistic approach and advantages in syndrome differentiation, providing new strategies for alleviating chemotherapy side effects [6,7]. This study aims to investigate the effect of ginger slice acupoint application combined with moxibustion on chemotherapy-induced vomiting in postoperative breast cancer patients.

2. Materials and methods

2.1. General information

From March 2023 to June 2024, the Cancer Hospital of China Medical University treated 60 postoperative breast cancer patients meeting the diagnostic criteria and undergoing a standardized chemotherapy regimen. The patients were randomly divided into an observation group and a control group, with 30 cases in each group. Inclusion criteria: (1) patients confirmed by histopathology, who had completed surgery and were in a suitable chemotherapy stage, with a clear postoperative pathological stage [8]; (2) female patients aged 18 to 75, able to cooperate with the study; (3) an expected survival of ≥ 6 months; (4) first postoperative chemotherapy according to the hospital's routine regimen; and (5) signed informed consent before inclusion. Exclusion criteria: (1) concurrent serious primary malignancies that could affect assessment or threaten life; (2) liver or kidney dysfunction that could not tolerate chemotherapy and intervention; (3) severe cardiovascular disease increasing adverse event risk; (4) history of mental illness or cognitive impairment making evaluation cooperation difficult; (5) allergies to relevant materials or drugs; (6) previous special treatment affecting gastrointestinal function before inclusion; (7) pregnancy or breastfeeding.

2.2. Methods

2.2.1. Control group interventions

The control group received routine treatment and care. Antiemetic treatment was administered using the standard antiemetic drug dolasetron, with dosage adjusted according to the patient's specific condition to ensure antiemetic efficacy while minimizing the likelihood of adverse reactions. Standard care interventions were also provided, including daily monitoring of the patient's condition, guidance on basic living care, and psychological support. Healthcare personnel closely observed any changes in the patient's physical condition and provided necessary assistance, such as aiding movement and maintaining a clean, comfortable ward environment. Attention was given to alleviating patients' psychological distress related to their illness and chemotherapy to help them approach treatment with a calm mindset.

2.2.2. Observation group interventions

In addition to the same antiemetic treatment with dolasetron used in the control group, the observation group received a unique intervention of ginger slice acupoint application combined with moxibustion. Acupoints chosen included Neiguan and Zusanli. Ginger slices, approximately 0.2 cm thick and 2 cm in diameter, were

precisely placed on these acupoints and fixed with medical tape. Moxibustion was administered using mild heat for 15 minutes once daily. Both ginger slice application and moxibustion were conducted 30 minutes before chemotherapy to integrate traditional Chinese medicine therapies with standard antiemetic treatment, aiming to alleviate post-chemotherapy discomfort and improve treatment outcomes.

2.3. Observation indicators

2.3.1. Vomiting frequency

The frequency of vomiting episodes within 1 to 3 days post-chemotherapy was meticulously recorded for each patient to provide a direct measure of vomiting under different intervention methods, supporting the evaluation of treatment effectiveness.

2.3.2. Nausea and retching severity

The internationally recognized R-INVR scale for nausea, vomiting, and retching was used to assess nausea and retching severity in patients from day 1 to day 3 post-chemotherapy^[9]. This scale divides symptoms into nausea, vomiting, and retching, each scored from 0 to 4, with a total possible score of 0 to 12, where higher scores indicate more severe symptoms.

2.3.3. Satisfaction

A custom-designed questionnaire was used to gauge patient satisfaction with the intervention methods for vomiting symptoms. This questionnaire covered five items, each scored from 0 to 2, for a total score ranging from 0 to 10. Higher scores indicated greater patient satisfaction with the intervention, allowing for an assessment of intervention effectiveness from the patients' perspective.

2.4. Statistical analysis

Data analysis was performed using SPSS 27.0 software. Measurement data were expressed as mean \pm standard deviation (SD) and analyzed using *t*-tests, with $P < 0.05$ indicating statistical significance.

3. Results

3.1. Comparison of vomiting symptoms on days 1–3 post-chemotherapy

On day 1 of chemotherapy, there was no statistically significant difference in vomiting symptoms between the two groups ($P > 0.05$). However, on days 2 and 3, the observation group showed significantly fewer vomiting symptoms than the control group, with a highly significant difference ($P < 0.001$). See **Table 1**.

Table 1. Comparison of vomiting symptoms between the two groups on days 1–3 post-chemotherapy (mean \pm SD, times)

Group	Day 1 of chemotherapy	Day 2 of chemotherapy	Day 3 of chemotherapy
Control group ($n = 30$)	2.51 \pm 0.52	2.81 \pm 0.83	3.00 \pm 1.01
Observation group ($n = 30$)	2.41 \pm 0.81	1.51 \pm 0.62	1.21 \pm 0.48
<i>t</i> -value	0.569	6.873	8.767
<i>P</i> -value	0.571	< 0.001	< 0.001

3.2. Comparison of R-INVR scores on days 1 and 3 of chemotherapy

On day 1, there was no statistically significant difference in R-INVR scores for nausea, vomiting, and retching between the groups ($P > 0.05$). However, on day 3, the R-INVR scores in the observation group were significantly lower than in the control group, with a highly significant difference ($P < 0.001$). See **Table 2**.

Table 2. Comparison of R-INVR scores between the two groups on days 1 and 3 of chemotherapy (mean \pm SD, points)

Group	Day 1 R-INVR score			Day 3 R-INVR score		
	Nausea	Vomiting	Retching	Nausea	Vomiting	Retching
Control group ($n = 30$)	6.21 \pm 1.13	6.32 \pm 1.21	2.85 \pm 0.34	8.74 \pm 1.15	9.43 \pm 1.42	3.71 \pm 0.91
Observation group ($n = 30$)	6.34 \pm 1.18	6.30 \pm 1.15	3.01 \pm 0.43	2.54 \pm 0.46	1.84 \pm 0.36	0.97 \pm 0.28
<i>t</i> -value	0.436	0.066	1.599	27.417	28.378	15.763
<i>P</i> -value	0.665	0.948	0.115	< 0.001	< 0.001	< 0.001

3.3. Comparison of patient satisfaction with intervention methods

The satisfaction score in the observation group (8.38 \pm 0.81) was higher than that in the control group (7.65 \pm 0.71), with a statistically significant difference ($P < 0.05$). See **Table 3**.

Table 3. Comparison of patient satisfaction with intervention methods between the two groups (mean \pm SD, points)

Group	Satisfaction score
Control group ($n = 30$)	7.65 \pm 0.71
Observation group ($n = 30$)	8.38 \pm 0.81
<i>t</i> -value	3.712
<i>P</i> -value	0.001

4. Discussion

Traditional Chinese medicine posits that the toxicity of chemotherapy drugs weakens the body's "vital qi," leading to spleen and stomach dysfunction and disrupting the normal flow of qi, thus causing nausea and vomiting^[10]. Therefore, the core of TCM in treating chemotherapy-induced vomiting lies in strengthening the body's defenses, regulating the spleen and stomach, and harmonizing the stomach to counteract rebellious qi. Among various TCM therapies, acupoint application and moxibustion have gained clinical attention due to their simplicity, safety, effectiveness, and minimal side effects. Acupoint application therapy involves applying medicinal substances to specific acupoints, utilizing meridian pathways to achieve therapeutic effects. Ginger slices, commonly used in acupoint applications, warm the middle burner (stomach area), dispel cold, and relieve nausea. Modern pharmacological studies have shown that ginger is rich in active compounds like gingerol, which can inhibit gastrointestinal motility and alleviate nausea and vomiting symptoms. Moxibustion, which uses the heat generated by burning moxa to stimulate acupoints, promotes blood circulation, moves qi, and removes pathogenic factors. Modern research indicates that moxibustion can regulate neurotransmitter release,

enhance immune function, and improve gastrointestinal function, thereby mitigating chemotherapy-induced nausea and vomiting. Combining ginger acupoint application with moxibustion may have synergistic effects: the warmth from the ginger application enhances local blood flow and promotes absorption, while moxibustion further activates meridian pathways, harmonizes qi and blood, and strengthens the body's resistance to illness. Together, these therapies can effectively relieve chemotherapy-induced nausea and vomiting, improve quality of life and aid recovery.

The results of this study show that the observation group (receiving ginger slice acupoint application combined with moxibustion) had better outcomes on the second and third days post-chemotherapy in terms of vomiting symptoms, R-INVR scores on the third day, and overall satisfaction than the control group. This suggests that ginger slice acupoint application combined with moxibustion can effectively alleviate chemotherapy-induced vomiting and related gastrointestinal reactions in postoperative breast cancer patients. Several factors may contribute to this positive effect.

- (1) Moxibustion itself has significant antiemetic effects^[11]. The acupoint Neiguan is commonly used and is closely related to gastrointestinal function. Moxibustion at Neiguan may help regulate gastrointestinal motility and restore gastrointestinal function, thereby reducing discomforts such as nausea and vomiting caused by chemotherapy. Moxibustion's effect may be particularly evident in delayed vomiting, which aligns with the study results, where the observation group experienced notable reductions in vomiting symptoms on the second and third days post-chemotherapy.
- (2) The pharmacological effects of ginger also play an important role in alleviating vomiting^[12]. Ginger is rich in active compounds such as gingerone and shogaol, which may exert antiemetic effects by acting on the sympathetic nervous system to regulate fluid balance. Ginger slice acupoint application enables better penetration of ginger's active compounds into the acupoint area, enhancing local stimulation and further improving the antiemetic effect.
- (3) The combined use of ginger slice acupoint application and moxibustion may produce a synergistic effect^[13]. Both therapies provide warmth, and their combined application enhances acupoint stimulation, promotes local blood circulation, and accelerates the removal of metabolic byproducts, effectively alleviating vomiting symptoms. Additionally, the combined therapy benefits from moxibustion's meridian-regulating effects and ginger's pharmacological actions, addressing multiple mechanisms involved in vomiting and thus providing superior efficacy^[13]. This may also explain the higher satisfaction reported by patients in the observation group.

It is worth noting that this study's sample size was relatively small, and larger-scale multicenter studies are needed to further validate these findings. Additionally, this study primarily focused on short-term efficacy and further follow-up is needed to assess long-term effectiveness. Future studies could explore the impact of different acupoint combinations, moxibustion durations, and ginger dosages to develop more individualized intervention plans. Further research should also investigate the specific mechanisms of action for ginger acupoint application combined with moxibustion, such as its effects on neurotransmitters and inflammatory factors, to provide a stronger theoretical basis for clinical applications.

5. Conclusion

In conclusion, ginger slice acupoint application combined with moxibustion effectively alleviates vomiting

symptoms in breast cancer patients undergoing postoperative chemotherapy, reducing vomiting frequency, nausea severity, and retching scores while improving patient satisfaction with the intervention. This approach is safe and effective as well as holds potential for clinical application and broader adoption.

Disclosure statement

The authors declare no conflict of interest.

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